

ENVIRONMENT MANAGEMENT PLAN

GHODADIAN ROAD METAL QUARRY

Mouza	Khata No.	Plot No.	Area (ha)	Kissam
Ghodadian	174	842,1474,1495,1503	2.274	Patharabani
Total			2.274	

Tahasil:- Odapada
District:- Dhenkanal
State :- Odisha

“Category- B2”

PROJECT PROPOSED BY

Pramod Kumar Parida
S/o-Pravakar Parida
Vill-Ekagharia
P.S- Motanga
Dist-Dhenkanal,Odisha

Prepared By

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GEO ENVIRONMENTAL SERVICES

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1 Introduction

Environmental Management Plan (EMP) is a site specific plan developed to ensure that the Ghodadian mine project is implemented in an environmentally suitable manner. Environmental Management Plan also ensures that the project implementation is carried out in accordance with design by taking appropriate mitigation methods to minimize impacts on the environment during the construction and/ or operational phase. Environmental Management Plan will outline Environmental Aspects of concern as well as their level of risk and environmental protection measures to diminish this risk. It emphasizes how the development may impact on relevant environmental factors and how these impacts may be mitigated and managed so that they are environmentally acceptable accordingly Environmental Management Plan is prepared.

1.1. Brief Description of the Project

The Mining lease for Road Metal over an extent of 2.274 ha of Village Ghodadian Under Odapada Tahasil of Dhenkanal District of Odisha. The mining lease area is bounded by latitude 20°43'32.8"N to 20°43'39.1"N and longitude 85°22'56.4"E to 85°23'03.6"E in the Toposheet no. F45T6.

The project i.e. Ghodadian Road Metal Quarry of ***Pramod Kumar Parida*** which has been granted for five financial years have been applied for EC. So the Environmental Management Plan (EMP) is being prepared for this mine though no other mine has been located within 500m from the proposed quarry.

The objective of the Ghodadian Road Metal Quarry of ***Pramod Kumar Parida*** to produce 30022 cum, of Road Metal during the plan period to meet the raw material requirement of nearby crusher, the community needs by ensuring the economy feasibility pointing the following objectives.

- Ensure that ecological balance of the area is not adversely affected by air , noise missions and solid wastes
- To minimize operational risk and maximize safety of working persons.
- Improvement in the living standard of local inhabitants.
- Improvement of indirect means of livelihood.

Table 1-1: Salient features

Description	Details
Site Location	Plot No-842,1474,1495,1503,Khata No.-174 Ghodadian (V), Odapada (T),Dhenkanal (D),Odisha
Production	6000 of Road Metal Per Annum
Mine Lease Area	2.274 Hectares
Latitude	Latitude 20°43'32.8"N to 20°43'39.1"N
Longitude	Longitude 85°22'56.4"E to 85°23'03.6"E
Top sheet No.	F45T6
Nearest railway line	Nayabhagirathipur PH Railway Station-6 Km
Airport	Biju Patnaik International Airport ,Bhubaneswar-69 Km
Road/ Highway	NH- 42-5.5 Km
Hospital	Bedapada Primary Hospital 2 Km
Nearest Town	Dhenkanal- 24 km
Neatest Habitant & Village	Bedapada village-2 Km
Nearest Canal/Dam/Lake	Rengali Right Main Canal- 4 Km
Nearest Reserve Forest	Nimidha Reserve forest- 6 Km
Nearest Archaeological site	Hanuman Mandir,Handifuta -1 km
Method of Mining	Opencast semi mechanized method

2 Reserves Estimation and Life of Mine

Geological traverses in the quarry and the study exposures in the vicinity of quarries facilitated to access the shape and size of the deposit in the area.

The proposed area is occupied by the Eastern Ghats Mobile Belt (EGMB) constituted of rock types belonging to Eastern Ghats Supergroup comprising metasediments, Charnokite and its variants and migmatitic granitoids. All the above mentioned lithotypes have undergone and are products of intense polyphase deformation and granulite facies metamorphism during proterozoic. Magmatic bodies intrusive into EGMB include massif-type anortosites, miaskitic nepheline syenite and minor ones like peridotite and pyroxenite. The area constitutes part of Easternghat belt of Archaean age. The strongly metamorphosed sequence of litho-facies along with its structural complexity indicates a complex tectonic history of the Easternghat Supergroup.

The lithological assemblage of Khondalite Group of rocks, charnokites and the ubiquitous gneiss along with the related pegmatites and quartz veins comprise the Easternghat Group. The laterites and quarternaries represent the Pleistocene and Holocene formations.

Quartz -garnet - sillimanite - graphite gneisses and schists, quartzite and calc - granulites, represent the khondalite group. The pyroxene granulites, termed by some workers as charnokite, comprise the charnokite suite along with its intermediate and acid variants. The entire sequence of both the groups have undergone regional metamorphism along with the intrusion of granite gneisses syntectonically resulting in obliteration of structural and metamorphosed features. Extensive migmatisation has affected all the litho-units to various degrees along with emplacement of pegmatites and quartz veins.

The tentative litho-stratigraphy of the region is given below.

Holocene Pleistocene				Alluvium Laterite
A	E	S		Pegmatite/quartz vein
R	A	U		Porphyroblastic granite Gneiss / migmatite
C	S	P		
H	T	E	Charnokite Group	Pyroxene granulite and Charnokites
A	E	R		
E	R	G		
A	N	R		

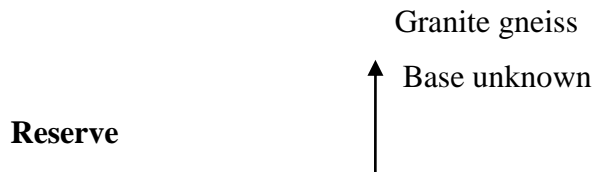
N	G H A T	O U P	Khondalite Group	Quartz - garnet - sillimanite +graphite gneisses and schists Calc-granulites Quartzites
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Local Geology

The total area represents granite gneiss throughout the hillock. The trend of the granite-gneiss is NW-SE.

Lithology:

The characteristic features of the litho units of the area are described below:



The reserve has been estimated by considering the following parameters.

- Cross sectional area method has been adopted for estimation of reserve of Granite as building stone in cum.
- The reserve has been calculated under probable category for building stone/road metal.
- It is revealed from field study and geological mapping that the lowest extent of the building stone is up to 70 mRL over the area under study. Also from the field observation it is found that there is no soil cover over the lease area with rock pebbles/boulders cover the area. Based on the above field observation probable limit has been taken till 65 mRL for reserve estimation.
- In the area three geological sections i.e. AB, CD & EF has been drawn across the trend of the rock mass.
- The rock pebbles/boulders cover, of the total rock mass can be excavated. The deposit over the area is partly weathered, fractured and soft. Therefore, as observed from the field studies the recovery factor of rock mass suitable for building stone has been taken as 80%. Rest 20% has been considered as waste material over the area.
- The length of influence for geological and mineable reserve calculation has been given in details below Table- 1 & Table- 2 respectively.
- Based on the above consideration, site specificity & chosen local parameter, the

reserve has been calculated for building stone/road metals by cross sectional area method i.e. multiplying cross sectional area with length of influence and recovery factor to obtain the total volume. The total geological reserve has been estimated as **122568 cum.**

The mineable reserve has been estimated in similar manner as geological reserve and excluding 7.5m safety zone barrier all along the area boundary. Thus, the mineable reserve (Probable) for building stone worked out to be about **55676.8 cum.**

2.1 Total Mineable Reserves: 55676.8 cum

2.3 Total Geological Reserves: 122568 5cum

2.4 Life of the Mine

Life of the Mine = total mineable reserves/ Annual production rate
 = **55676.8 /6000=9.27** or 9.
 = 9.27 or Say as 9 years

3 Production details

The aim is to produce 30022 cu.m of Road Metal from the proposed quarry during the five years plan period.

3.1 Land Usage details

Land Use Pattern of the quarry area during the next 5 years will be as follows

Table 3-1 : Land usage details

Type of land use	At the beginning of the plan period (in ha.)	At the end of the 5 year plan period (in ha.)
Mining	0.4241	0.1889
Top soil	Nil	Nil
Overburden dump	Nil	0.002
Mineral storage	Nil	Nil
Sub-Grade Storage	Nil	Nil
Infrastructure	Nil	Nil
Roads	Nil	Nil
Green belt area	Nil	0.629
Screening plant/Washing Plant	Nil	Nil
Tailing pond	Nil	Nil
Total land degradation	0.4241	0.1909
Area which will remain untouched (River)	1.8499	2.0831
Total	2.274	2.274

Table 3-2 : Man power requirement

Sl.No.	Category	No. of Persons
1	Mines Manager & Mine Supervisor	1
2	Skilled Workers	1
3	Semi Skilled Workers	3
4	Un-skilled	10
Total		15

4 Environmental Management Plan

Mining of Road Metal involves using heavy machinery and impacts the surrounding environment. In order to reduce the impact, we assessed the possible impacts on surrounding environment and suggested possible preventive measures by categorizing as Air, Noise and Water. The details of the possible causes and measures taken to reduce them are as follows. In addition to these measures a green belt will also be developed to remedy the biomass loss occurring due to the mining process.

4.1 Air pollution management

In the process of mining heavy machinery such as excavators, Tippers, etc are used. This result in air pollution at various stages, which are stated as follows:-

1. Particulate matter generation from the mining process,
2. Particulate matter generation due to hauling, loading & unloading of mined Road Metal
3. NO_x & SO₂
4. Gas generated from the consumption of fossil fuels in heavy machinery and transportation vehicles.

4.1.1 Measures taken to reduce pollution

During mining: Particulate matter generation during mining is mainly from drilling holes which can be controlled by covering the drill holes with cloth.

Transportation:

- a. To minimize the particulate mixing in air during hauling the vehicles are never overloaded and covered with a tarpaluin.
- b. The particulate generation from the vehicular movement is suppressed by sprinkling water twice a day and conducting regular road repairs.

Additionally the proposed green belt would act as sinks for particulate matter.

4.2 Noise Pollution management

The major source of noise pollution is due to

- i. Drilling,
- ii. Blasting and
- iii. Vehicular movements.

Regular maintenance of noise generating units (repairing, greasing and minimization vibrations) will be taken to minimize noise levels. During blasting operations the noise level may increase (short time exposures). Blasting will be carried out during daytime to avoid noise intensity to the surrounding people at night time.

Personal protective equipment like earplugs and other protective devices will be provided to workers those who are working near by the noise generating sources (drill machine operators). But as with distance away from the mining operations, the noise levels will reduce and the anticipated noise levels falls below the day and night residential standard limits set by CPCB (day Leq 55 and night Leq 45 dB(A)).

Dense vegetation is planned at the periphery of the lease area to minimize the impact of blasting in the surrounding environment.

4.3 Water Pollution Management

The ground water table in this belt is 30 m below from the surface and since the quarry depth will not reach upto this depth in the near future flooding by ground water is not anticipated. However, during rainy months, there is a possibility of wet conditions developing in the working pit. This will be minimized if not altogether eliminated by adopting simple techniques like digging trenches all round to drain off rainwater and preventing surface run off from entering and flooding working pit. The water from the will be pumped by deploying suitable pumps, if and when required, the mine drainage can be effectively managed and the pit kept dry to keep up the production schedule.

4.4 Green belt development

The whole area is occupied by scattered sparse vegetation of thorny trees and small bushes. In the quarry lease area no wild animals are witnessed as per the statements collected from the local population, since 50 years. There will be loss of biomass due to clearing of existing vegetation, but will be compensated by the given afforestation plan. As the site is near to human settlement other than domestic animals no important wild life is found that need to take special attention. However due to planned development of green belt, the area attracts more avifauna and also gives shelter to other domestic animals.

Table 4-1: Proposed Green belt & corresponding water requirement

Year	Trees at the end of year (No.)	Water needed @2 L/tree (KLD)
1 st Year	50	0.20
2 nd Year	50	0.20
3 rd Year	50	0.20
4 th Year	50	0.20
5 th Year	50	0.20

Table 4-2: Suggested trees for green belt

No.	Botanical Name	Comm on Name	Height (m)	Color of the flower	Flowering time
1	<i>Acacia Arabica</i>	Nallathumma	8.0-10.0	Yellow	March-May
2	<i>Azadirachta indica</i>	Neem	15.0- 20.0	White	January- May
3	<i>Terminalia catappa</i>	Badam	10.0- 35.0	White	March - April

4	<i>Nerium odorum</i>	Ganneru	2.0-4.0	Red, white	Febraury- March
5	<i>Tectona GRANDIs</i>	Teak	10-45	White	June - september
6	<i>Annonasquamos a</i>	Sethaphalam	3.0 -8.0	Creami sh yellow	May- August
7	<i>Eucalyptus citridora</i>	Eucalyptus	30.0 - 45.0	White	July- August

4.5 Environmental Monitoring program

The survey of air pollution comprises of the following monitoring aspects;

- i. Ambient air quality survey
- ii. Noise Level Monitoring

Ambient air quality and noise level Monitoring will be carried out at minimum three stations, one station within mine site and two stations nearby residential areas out- side the mine. Parameters like suspended particulate matter, sulphur dioxide, oxides of nitrogen carbon monoxide and lead will be monitored. The frequency of monitoring is preferably once in three months on 24 hour basis. The samples will be collected in accordance with the procedures given by CPCB.

4.6 Mine closure plan:

Reclamation

The top soil or the waste generated from the mine will be used to refill the pit and since it won't be sufficient to fill the mine. The mining pit will be developed as water logged areas with suitable fencing all along the boundaries. Storage of rain water in the mine it will help to improve the ground water table in the area.

As this area always experiences acute drought situation, this water body can act as a source of water. The aqua fauna like fish, prawns, etc. will be developed in the hydro-reclaimed areas by migrating them from the area having similar type of environment. The pit will be fenced appropriately keeping in view the most important aspect of safety.

4.7 Occupational health and safety

Health and safety aspects of the mine will be taken care off as per the DGMS guidelines on opencast mining. The guidelines provide the detailed information on the aspects that are required to be taken into account for maintaining proper health and safety issues. The workers continuously exposed to dust will be provided with some protective devices like dust mask to prevent respiratory disorders. The workers continuously exposed to a high noise will be provided with ear muffs/ earplugs. Green belt in and around the mining area will be developed to attenuate noise and dust impact. The blasting carried out in the mine area will be carefully planned and executed under the supervision of a responsible officer, to avoid any accidents. Drinking water supply for the employees will be provided by the project authority. The standard of the drinking water will be per WHO guidelines.

Periodical training programme to inform the employees about their task, associated risk, and safe working practices will be undertaken. Training will also include information on accident prevention, proper control and maintenance of equipment and safe material handling practices.

A regular monitoring of the Occupational Health and Safety will reduce the chances of accidents in the mine. Records of job related accidents and illness should be maintained. This information will be reviewed and evaluated to improve the effectiveness of Environmental Health and Safety programme.

4.8 Other management aspects

Records will be maintained for the analysis of ambient air quality and noise levels. These records are not only required for the perusal of the Pollution Control Board authorities. The management will maintain the records as per the hazardous waste regulations and EPA regulations and apply for the annual consents for air and water, and renewal of authorization for the storage of hazardous waste as per the Hazardous Waste (Handling & Management) Rules, 1989. The records of hazardous waste manifest will be maintained. The format of the same is enclosed in appendix.

The mine shall obtain the consent to operate (CTO) as required under section 25/26 of the Water act, 1974 and under section 21/22 of Air Act, 1981, bT will be renewed each year by the management. The mine will submit environmental statement every year before September 30. The management ensures that it will comply with all the directions and regulations issued by the Ministry of Environment and Forests, New Delhi, State and Centre Pollution Control Boards.

The Consent to Establish & Consent to Operate will be displayed in a conspicuous location for reference to the inspecting authorities of different departments.

EMP Report of Ghodadian Road Metal Quarry

4.9 Cost of Environmental Management Plan

The cost for EMP is Rs.1 Lakhs and the details of the same are given below.

Budgetary measures for EMP

Heads		Ghodadian Road Metal Quarry
Sl. No.	Activity	Total Capital Cost in Rs.
1.	Environmental Monitoring & Pollution Control Measures	75,000
2.	Maintenance of Vehicles	10,000
3.	Plantation & Maintenance	10,000
4.	Water Sprinkling	5,000
Total Capital Cost in Rs.		Rs. 1,00,000
Total Recurring Cost in Rs.		Rs.25,000/- annum