



e) Describe briefly the Layout of Mine Workings, Pit road layout, the layout of faces and sites for disposal of overburden/waste along with ground preparation prior to disposal of waste, reject etc. A reference to the plans and sections may be given. UPL or ultimate size of the pit is to be shown for identification of the suitable dumping site.

LAY OUT OF MINE WORKING

Development of existing benches will be done laterally as well as depth ward. At the end of the plan period the approximate dimension of the quarry will be as follows:

Sl. No.	Parameters	Pit-1	Pit-2
1.	Quarry Size (L x W x D)	590m x 350m x 90m	500m x 400m x 130m
2.	Total No. of Benches	9 nos	13 nos
3.	Top Bench RL	630 m. RL	720m
4.	Bottom Bench RL	540 m. RL	590
5.	Maximum Bench Height	10 m	10 m
6.	Bench Width	20 m(max) 10m(min)	20 m(max) 10m(min)
7.	Average Bank Slope	85 ⁰	85 ⁰

PIT ROAD LAYOUT

As far as economically feasible, all geometric elements of haulage roads will be designed to provide safe, efficient travel at normal operating speeds. Considering the capacity of the dumper, the haul road will be designed by safe and scientific way up to the final dispatch point.

Haul Road Geometry

There will be both temporary and permanent nature of haul road within the block. The temporary haul road in each pit will change from time to time. The length of the permanent haul road with in the Pit -1 & Pit-2 will be approx. 1 Km.

The proposed benches of the pit-1 and 2 will be utilized for haul road. The bench width has been kept at 20m. However, the after keeping safety berms of 1.0m width and 1.5m height on either side of the haul road along with drainage channel the effective width of haul road will be kept at 17m with gradient of 1:16.

The haul roads are designed to be 2 to 3 times the width of the largest dumper using the road. This thumb rule is intended to provide adequate passing clearance between dumpers. Haul road geometry is comprised of many factors including maximum grade, cross slopes of road, running width etc. The maximum haul road gradient will be limited to 6% and maximum 10% in short ramps between benches. Maximum curve super-elevation will be limited to 3% and speed limits

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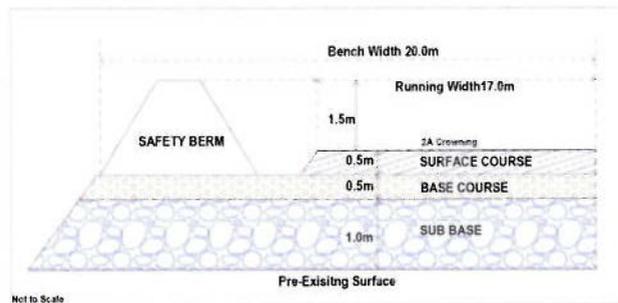
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will be imposed at tighter curves to reduce the required super-elevation. The height of safety berms will be generally calculated as 1/2 to 3/4 of the largest tire diameter in use and thus varied from 1.0m to 1.5m.

Haulage Road Cross Section

A stable road base is one of the most important fundamentals of road design. Moreover, lack of a sufficiently rigid bearing material beneath the road surface will permit excessive rutting, sinking, and overall deterioration of the travelled way. As far as lithology is concerned the proposed haulage road will be over the laterite, and hard hematite. Hence, there will be mainly sub base of 1.0m, over which the base course will be another 0.5m. Above the base course it has been envisaged to put surface course of 0.5m. All together the sub-base, base course, surface course will be 2.0m. Over the surface course it has been proposed to make 2% of crowning. The schematic diagram of proposed haul road is furnished below:

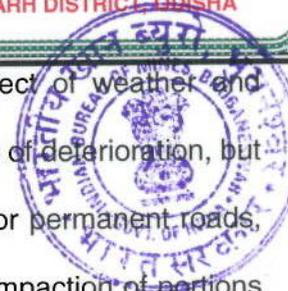


Symptoms and Causes of Haul Road Deterioration

Potholes, rutting, and settlement are major symptoms of haul road deterioration. The running surface of the road suffered mostly due to precipitation/runoff, heavy traffic volume, spring breakup, and vehicle spillage. Main causes of deterioration to the base layer are spring breakup, precipitation/runoff, heavy traffic volume and poor compaction. Poor compaction, high ground water level and precipitation are major causes of deterioration to other layers.

Haul Road Maintenance

Lack of road maintenance can increase the operating cost for haulage. Proper maintenance of the road surface minimizes the effect of bumps, holes, spillage, and rolling resistance on the haulage fleet. Haul roads will not propose to be allowed to remain rutted or grooved. Graders will be used to keep the road surface smooth to maintain cross slope, and to remove loose rocks



from the surface. All roads deteriorate gradually with time due to the effect of weather and repetitive loading from passing vehicles. Road maintenance can slow the rate of deterioration, but eventually a point is reached where repairs or rehabilitation is necessary. For permanent roads, the repair may involve removal of the surface layer and replacement and compaction of portions of the damaged base and sub-base. Often the existing surface layer can be scarified and compacted followed by placement of an additional thickness of compacted material on top. Rehabilitation of the road may be a strategy used to extend the life of a road.

Layout of faces

Layouts of faces have been tentatively furnished as follows:

Name of the quarry	Description	1 st	2 nd	3 rd	4 th	5 th
Pit-1	Face RL(m)	600-620	570-630	560-630	540-640	540-630
	Length of face(m)	900(avg.)	680(avg.)	600 (avg.)	1000m	550m (avg.)
	Direction of advancement	Down ward and laterally	Down ward and laterally (due south)	Down ward and laterally (due south)	Down ward and laterally (due north)	Laterally (due north)
	Length of Advancement	110m	40m	145m	120m	178m
Pit-2	Face RL	620-680	620-700	600-710	600-720	590-720
	Length of face	595m(avg)	535(avg.)	550(avg.)	550m(avg.)	480m (avg.)
	Direction of advancement	Lateral and down ward	Lateral movement due south	Lateral movement due south	Lateral movement due south	Laterally due south
	Length of Advancement	100m	60m	150m	20m	75m

Sites for disposal of waste along with ground preparation

There will be 2 waste dumps one for pit-1 at northern part of the lease area and the other one will be at southern part of the lease area for pit-2. Approach road to the proposed dumping site already exists. Prior to commencement of dumping all statutory clearances will be made. After tree felling, retaining wall & garland drains along with settling pits will be constructed to protect the surrounding environment from wash-offs etc.

Site for disposal of mineral rejects along with ground preparation

There will be two mineral reject/ sub grade dumps, one is for 45-55%Fe and other is for 55-58%Fe. The proposed sub-grade/mineral reject dump area has been shown in the earmarked site. The area selected will be made ready by clearing the vegetation. Further retaining wall and garland drains will be made on the toe of the mineral reject dump as a part of mineral reject stack management.

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Note on Details of plans for transportation of Minerals raised from the mining lease

The minerals raised will be processed in the mining area to produce (+10mm, -30mm) called Lump Ore product as well as (-10mm) product called Iron Ore Fines.

The Lump Ore will be transported through a combination of road, rails and shipping to Integrated Steel Plant of Essar Steel India Limited located at Hazira, Surat, Gujarat.

Iron Ore Fines can either be converted into pellets at Paradeep or it can be directly transported to Integrated Steel Plant to be used as raw material of Sinter plant located at Hazira, Gujarat using road rail and shipping.

The Iron Ore Fines from the mine head will be transported to the existing beneficiation plant of Essar Steel India Ltd situated at Dabuna, Joda in Keonjhar District of Odisha. This will be initially done by road and subsequently through a underground slurry pipeline after commissioning of slurry pipeline from mine head to Dabuna Plant.

Slurry from the Dabuna beneficiation plant will be transported to Paradeep Pellet plant through existing 253 km of slurry pipeline from Dabuna plant to Paradeep Pellet Plant of the company, where this Iron Concentrate will be converted to Pellets.

Pellet from the pellet plant will be transported to the Paradeep port by a existing dedicated belt conveyor, which will be further shipped from to company's Integrated Steel Plant located at Hazira, Gujarat.

