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PILBARA IRON ORE PROJECT

REHABILITATION AND REVEGETATION MANAGEMENT PLAN

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1. INTRODUCTION

1.1 BACKGROUND

Fortescue Metals Group Limited (FMG) is proposing to develop the Pilbara Iron Ore and Infrastructure Project (the Project), which involves a series of iron ore mines in the Pilbara region of Western Australia, and rail and port infrastructure for export of iron ore through Port Hedland. The development of the Pilbara Iron Ore and Infrastructure Project Stage A and B, and specifically the rail and port components provide the infrastructure required to facilitate the development of other projects in the region. FMG's exploration programme has identified the Cloud Break area as an economically viable resource in close proximity to the Stages A and B infrastructure.

For the purposes of the environmental approvals process, FMG has assessed its Projects in the following way:

- Stage A Project: Proposed port and a 345km long north-south railway from Mindy Mindy to Port Hedland;
- Stage B Project: (Christmas Creek and Mindy Mindy) mines and a 120km long east-west rail spur; and
- Cloud Break Project: The Cloud Break mining operations.

1.2 PURPOSE

The purpose of this management plan is to outline the actions that will be undertaken during the rehabilitation and revegetation for the Project. This management plan will highlight the general rehabilitation and revegetation management actions that will be adopted. The plan will be continually updated to incorporate successful procedures identified in site specific trials throughout the life of the project.

1.3 REHABILITATION AND REVEGETATION

It is recognised that mining is a temporary landuse which should be integrated with, or followed by, other forms of landuse. Rehabilitation of mines will be aimed towards a clearly defined future landuse for the area. This use will be determined in consultation with relevant interest groups including government departments, local government councils, traditional owners and private landowners. Different components of a mine, such as reject rock dumps, plants and office sites, access roads, may have different post-mining landuses.

2. RELEVANT LEGISLATION

There are a number of legislative mechanisms that are applicable to the rehabilitation and revegetation of mine sites in Western Australia. Legislative obligations and potential liabilities are created under the *Mining Act* 1978 (Mining Act) and the *Mines Safety and Inspection Regulations* 1995 which are administered by the Department of Industry and Resources (DoIR). In addition all mining operations in Western Australia are also subject to the State *Environmental Protection Act* 1986 (EP Act). The EP Act overrides all other Acts, including the Mining Act and is administered by the Environmental Protection Authority (EPA) and the Department of Environment (DoE). An approval to mine issued under the Mining Act does not override the requirement to obtain an environmental approval under the EP Act. Consequently the requirements of both Acts and their regulators must be satisfied.

3. EXISTING ENVIRONMENT

The Project is located within the Pilbara Bioregion as described in the Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway and Cresswell, 1995; Environment Australia, 2000).

The proposed mining areas and railway line occur within three major physiographic units within the Fortescue District. These are:

- Chichester Plateau - a plateau of mainly basalts, with included siltstone, mudstone, shale, dolomite and jaspilite; forming a watershed between numerous rivers flowing north through the Abydos Plain to the coast, and the Fortescue drainage on the southern side of the range (Beard, 1975). The plateau supports shrub steppe characterised by *Acacia pyrifolia* over *Triodia pungens* hummock grass. Snappy Gum (*Eucalyptus leucophloia*) tree steppes occur on ranges.' (IBRA Revision 5.1; Environment Australia, 2000). The Christmas Creek and Cloud Break mine sites are located on the southern edge of this unit.

- Fortescue Valley - occupying a trough between the Chichester and Hamersley Plateaux; the eastern portion drains into the Fortescue Marshes, while the western portion drains through a valley through the Chichester Plateau (Beard, 1975). These alluvial plains and river frontages support salt marsh, *mulga/bunch grass, and short grass communities. River Gum (Eucalyptus* camaldulensis) / Coolibah (*Eucalyptus victrix*) woodlands fringe the drainage lines. This is the northern limit of mulga (*Acacia aneura*). (IBRA Revision 5.1; Environment Australia, 2000). The rail spur follows the northern edge of the Fortescue Valley where it meets the Chichester Plateau.
- Hamersley Plateau - rounded hills and ranges, mainly of jaspilite and dolomite with some shale, siltstone and volcanics (Beard, 1975). This plateau supports mulga

low woodland over bunch grasses on fine textured soils and Snappy Gum over hummock grass (*Triodia brizoides)* on skeletal sandy soils of the ranges. (IBRA Revision 5.1; Environment Australia, 2000). This subregion contains the Mindy Mindy mining area.

3.1 VEGETATION

Beard (1975) mapped the vegetation of the Pilbara at a scale of 1:1,000,000. The entire Project Area lies within the Fortescue Botanical District of the Eremaean Botanical Province as defined by Beard. The vegetation of this province is typically open, and frequently dominated by spinifex, wattles and occasional eucalypts. According to Beard's (1975) mapping, vegetation along the proposed east-west rail line is predominantly sparse low mulga woodland discontinuous in scattered groups.

Vegetation at Christmas Creek and Cloud Break is a mosaic of low woodland with mulga in valleys and hummock grasslands, low open tree steppe with snappy gum (*Eucalyptus leucophloia*) over *Triodia wiseana,* and kanji over soft spinifex and *Triodia wiseana* hummock grasslands.

Mindy Mindy is characterised by low tree steppe with snappy gum over *Triodia wiseana* hummock grasslands.

3.2 CLIMATE

The inland Pilbara region is classified as arid, with most rain falling during the hot summers. The closest Bureau of Meteorology weather station is Newman. Climatic data from this station indicates that peak rainfall occurs in the summer months between January and March with a smaller peak in May and June.

Climatic conditions in the Pilbara are influenced by tropical cyclone systems predominately between January and March. Rainfall during May and June is generally a result of cold fronts moving across the south of the State, which occasionally extend into the Pilbara.

Annual average rainfall for the Pilbara ranges from 180 mm to over 400 mm (Beard 1975) with the Bureau of Meteorology data indicating an average of 312 mm at Newman. Average maximum temperatures are generally between 35^{o}C and 40^{o}C and winter maximum temperatures generally between 22^{o}C and 30^{o}C. In this climate annual evaporation rates generally exceed the mean annual rainfall.

Winds are predominately east-south-easterly at Newman between May and August with stronger west-north-westerly winds between September and March and an annual average wind speed of 9.4 km/hr.

3.3 STUDIES

Extensive studies were carried out as part of the environmental impact assessment of the Project. These studies include:

- Hydrogeology: Aquaterra
- Surface Hydrology: Aquaterra
- Flora and Vegetation: Biota Environmental Sciences and Mattiske Consulting
- Terrestrial Fauna: Biota Environmental Sciences and Bamford Consulting Ecologists
- Stygofauna: University of WA and CALM
- Dust: ENVIRON
- Noise: Lloyd Acoustics
- Greenhouse Gas Emissions: ENVIRON
- Aboriginal Heritage: Anthropos Australis
- Socio-economic study: Environmental Resources Management

Reference should be made to these documents for detailed information. Throughout the project additional studies will be undertaken on various areas and if relevant this information will be incorporated into this management plan.

4. MINING

The ore body that FMG is proposing to mine is relatively shallow. Therefore, FMG mines will look different to traditional open cut mines. The FMG mines will be relatively shallow and progress along a face, rather then mining to depths in a stationary pit. Parallels can be drawn between FMG's mining technique and mineral sands mining seen elsewhere in Western Australia.

Due to the mining technique adopted by FMG there is an opportunity to progressively rehabilitate the mine sites. FMG will therefore aim to minimise the amount of area that is open during operations and rehabilitation is likely to commence shortly after mining has begun (potentially within two years). Refer to Figure 1.

There will be three broad categories of land uses during FMG's operations:

- Cleared land – land that has had the vegetation removed and topsoil stripped in preparation for mining.
- Operational land – land that is being utilised for operations, such as mine pits, in-pit stockpiles, access tracks, workshops etc.
- Rehabilitated land – land that has been re-profiled, had topsoil spread and has been seeded with local native species if necessary.

Mining will occur within the pit footprint with overburden removed utilising stripping shovels and backhoes working with crushers and conveyors or via haul-pak dump trucks to its final location. Ore will be transported within the pit via haul-pak dump trucks or a conveying system to the crusher(s) which will be located in the pit or at the pit rim. As soon as practicable after the ore is removed from a strip it will be back-filled with overburden and/or reject material from the process plant(s). The back-filled strip will be contoured and superficial material being stripped from advancing strips be placed over the area as part of the rehabilitation programme, where practicable (Figure 2).

Primary crushing is planned using semi-mobile crushing units. The modular design of these units will allow reuse and relocation of the equipment as necessary. Overland conveyors, haul roads and/or rail spurs will convey the crushed ore to the central processing plant(s) and return rejects to the mined out areas.

The average waste to ore stripping ratio is expected to be approximately 1.0 – 1.5 waste to 1.0 ore at Christmas Creek, 0.7 – 1.2 waste to 1.0 ore at Mindy Mindy and 3.5 - 4.5 waste to 1.0 ore at Cloud Break. Initially, for at least two years, overburden will be disposed of to permanent placement areas, which will be rehabilitated, and then as the mining faces progress the concurrent overburden product will be placed within the pit voids, where practicable. For every tonne of screened ore processed the beneficiation process generates approximately 0.35 tonne of rejects.

The process plant(s) will beneficiate low grade ore, which involves upgrading the crushed ore to increase its iron content and reduce impurities. The secondary crushed and screened ore is beneficiated using various unit processes such as screening, wet gravimetric processes and magnetic separators to reduce contamination and increase the ore grade to a marketable product. This process is inert and does not involve the use of chemical additives and therefore will not result in the production of chemical pollutants.

4.1 MINE SITE DISTURBANCE

The following are the approximate areas of mine site disturbance for the life of each mine site:

- Christmas Creek East – 4,245 ha
- Christmas Creek Central – 4,100 ha
- Christmas Creek West – 1,778 ha
- Mindy Mindy – 852 ha
- Cloud Break – 5,500 ha
- Railway construction – 1,200 ha
- Railway Operation – 600 ha

The above disturbance figures detail the total disturbance that will occur over the life of the mine. Due to FMG's progressive rehabilitation, the amount of area that will be considered 'open' will be much less. It is also noteworthy that the above areas will not necessarily all be operating at the same time.

Open area is land that has either been cleared or is used in active operations. Land would no longer be considered open when it has been re-profiled and has had topsoil spread. The amount of land that is required to be open will depend on operational issues and the depth and thickness of the ore body. If the ore body is thick, less land would be required to achieve the output of the mine. However, a minimum amount of open area would be required regardless of the depth of the ore body to ensure safety requirements are met.

5. REHABILITATION AND REVEGETATION PROCEDURES

5.1 OBJECTIVE

FMG has developed a conceptual closure plan for the mining operations and east west rail. The closure plan addresses all the areas associated with closing the operations, of which rehabilitation and revegetation forms a component. As such the post-mining land use and objectives for closure are relevant to rehabilitation and revegetation.

The first step in developing the overall mine closure strategy is to identify potential post-mining land use options and establish key objectives for closure to be incorporated in the project design. The most likely post-mining land use is pastoral, with management of the land being returned to the pastoral leaseholders on completion of closure, decommissioning and rehabilitation. This may be reviewed at a later date, depending on the outcome of the Pastoral Lands Board's review of pastoral lease holdings, scheduled for 2015. This review may result in some areas of pastoral lease holdings being excluded for 'public purposes' (e.g. conservation areas).

In this context, the primary objectives for the closure of the mining operations and east-west railway are:

- Establish a safe and stable post-mining land surface which supports vegetation growth and is erosion resistant over the long-term.
- Re-establish a self-generating ecosystem comprising local native flora and vegetation which resembles the surrounding environment, as close as practical.
- Leave site in a safe, stable, non-polluting and tidy condition with no remaining plant or infrastructure that is not required for post-operational use.
- Minimise downstream impacts on vegetation due to interruption of drainage.
- Identify any potential long-term soil, surface water or groundwater pollution associated with the operations and formulate an action plan to address this.

- Develop a stakeholder consultation group prior to the onset of closure, to facilitate discussion of closure planning.
- Continue to monitor environmental performance during decommissioning, rehabilitation and post-closure stages of the project and take appropriate action until the approved completion criteria have been met.

5.2 CLEARING

The area to be cleared will be kept to a minimum based on safety and operational constraints. Maps will be produced that detail the areas to be cleared, including the timing of the clearing operations for the life of the mine. These maps will be updated on a regular basis, to match the actual progress of the mining operations. Cleared vegetation will not be burnt. Where practicable the cleared vegetation will be used as mulch, a seed source or as habitat for fauna during the rehabilitation and revegetation programme.

A clearing procedure has been developed to manage clearing operations. The draft Clearing Procedure is presented in Appendix One.

5.3 SOIL HANDLING

A topsoil management procedure has been developed to address the handling of soil from the site. The draft Topsoil Management Procedure is presented in Appendix Two. The general concepts are described below.

5.3.1 Salvage

Topsoil is often the most important factor in the success of a rehabilitation and revegetation programme. Topsoil typically refers to the upper 250 mm of soil however, site specific surveys may identify depths of topsoil that differ from this figure.

The topsoil will be stripped with scrapers or similar. Where possible the scrapers will directly return the topsoil to the rehabilitation areas behind the mine face. However, scrapers are not operationally viable over extended distances (nominally 1 km). Therefore, it may be necessary to stockpile the topsoil for a short period (limited to a few weeks) prior to placing it into trucks for transportation. Minimising the amount of time that the topsoil is stockpiled will maximise the return of the floral species from the seed resource within the topsoil.

5.3.2 Stockpiling

Where practicable topsoil will not be stockpiled for an extended period. However, during the start-up phase of an area it may be necessary to stockpile topsoil until rehabilitation begins. If topsoil requires stockpiling it will not be stored for a period greater then 2 years and will not be stockpiled at a height greater then 2 metres. Stockpiles will be located as close as practicable to the area to be rehabilitated and revegetated to limit transportation requirements. Site traffic will not be permitted on any topsoil stockpiles. All topsoil stockpiles will be clearly marked.

5.3.3 Timing of Topsoil Stripping

Where practicable, topsoil will not be stripped when it is too wet or too dry, as this can lead to compaction, loss of structure and the loss of the viability of the seeds. FMG will investigate the viability of stripping topsoil following the period when the native plants set their seeds, to maximise the seed store in the soil.

5.3.4 Replacement

As far as possible topsoil will be placed along the contour to help reduce erosion. Placing the topsoil in such a manner will reduce the down slope flow of water and increase water storage.

5.4 REHABILITATION WORKS

5.4.1 Landform Design and Reconstruction

The re-shaping and grading of a site is an essential component of the rehabilitation process. During the initial stages of mining, material will be placed in an overburden storage area. When the mine has progressed a sufficient distance, material will be placed in the mining void to progressively rehabilitate the mine. Within FMG's Conceptual Closure Plan some objectives have been included for the landform design.

The Closure Objectives for the mining areas to be backfilled, the mining voids and the overburden storage areas include:

- Establish a safe and stable post-mining land surface which supports vegetation growth and is erosion resistant over the long-term.
- Rehabilitated land surface functioning as uninterrupted water catchment for sheetflow-reliant mulga communities.
- Re-establish self-generating ecosystem comprising local native vegetation which resembles the surrounding environment, as close as practical.

- Continue to monitor environmental performance during decommissioning, rehabilitation and post-closure stages of the project and take appropriate action until the completion criteria have been met.

The final landform will resemble the pre-mining landform where practicable. The overburden storage area will take into consideration the surrounding landform and as far as practicable match the surrounding features. Typically the slopes will be less then 20^0 and the length of slope will also be minimised (Figure 3). However, in some circumstances the rehabilitated areas may be designed to resemble outcrops. If this is the case detailed geotechnical investigations will be undertaken to determine stability.

5.4.2 Erosion Control

The main mechanism to control water erosion is through the design of the final landform. The angles of the slopes in the rehabilitated areas will be minimised to reduce the velocity of the down slope water flow. The final angles will be based on site specific information and consider the surrounding topography. Typically the slopes will be less then 20^0 and the length of slope will also be minimised. Up slope surface water flow will also be managed to minimise erosion potential.

Wind erosion to the freshly placed topsoil will be monitored. If wind erosion is excessive measures will be investigated to reduce the erosion potential. This may include but not be limited to:

- Using a mulch over the affected area;
- Applying a surface treatment to reduce the erosion potential (may include spraying a clogging agent over the area);
- Reducing the wind velocity over the area by constructing wind breaks; and/or
- Seeding with a single generation (sterile) cover crop.

The final method chosen will depend on the area to be treated and site specific experience.

Refer to section 5.4.6 for information on erosion control when rehabilitating roads and tracks.

5.4.3 Mine Areas

Mining areas will be progressively rehabilitated. During the initial start-up phase of an area, overburden will be placed off path at a permanent storage area and topsoil will be stockpiled.

Following the initial start-up phase, overburden will be returned to the mining void and the final landform will take into consideration pre-mining landform. It is likely that overburden will be placed off path for the first two years of operation at Christmas Creek, and Cloud Break. Based on the ore body at Mindy Mindy, only a small off path area is required to contain material from the initial pit margins.

The establishment of vegetation on the rehabilitated areas will rely on the seed source within the topsoil; however where required seeding with local native species will also be undertaken. Refer to section 5.5 for additional details on revegetation.

5.4.4 Overburden Storage Area

Mining operations will be scheduled to maximise the backfilling of mined out pits and therefore minimising the required area for the off path placement of overburden. However, there will be a requirement to construct permanent off path storage areas. It is necessary to use an overburden area to establish a safe and stable operational area. The topsoil from these areas will be stripped and stockpiled adjacent to the area. Refer to section 5.3.2 for details on topsoil stockpiling.

The feasibility of progressively rehabilitating overburden areas will be investigated and implemented if practicable. The final design of the overburden areas will take into consideration surrounding topography and as far as practicable match the local features.

5.4.5 Rail Corridor

During the construction phase, the rail corridor will be up to 40 metres wide with additional areas for access roads, lay down areas and borrow pits. However, following construction the corridor will be reduced. Topsoil disturbance will be kept to a minimum within the rail corridor during construction operations. The only area that will have topsoil stripped is the area that will be directly covered by the permanent rail infrastructure. Where practicable topsoil that is stripped from these areas will be used to rehabilitate nearby areas such as borrow pits or cuttings.

The estimated life of the east west railway is 20+ years. When the operation of the railway is no longer viable the track will be removed and the area rehabilitated using FMG's standard procedure.

5.4.6 Roads and Tracks

Prior to the rehabilitation of road and tracks, consultation will be undertaken with the relevant stakeholders to determine whether the tracks will be required for future access. Any roads and tracks that are not required will be rehabilitated.

Typically roads and tracks will be ripped to encourage revegetation. However, in some circumstances it is not appropriate to rip these areas. Roads and tracks that are on steep slopes will not be ripped as this can encourage gully formation and enhance erosion. If vegetation regrowth has occurred on a road or track then ripping may not occur.

When ripping is undertaken a number of measures will be utilised to ensure maximum efficiency with minimal disturbance. Any ripping that occurs along slopes will have regular contour banks built across the tracks to prevent erosion from water runoff. Ripping of road and tracks will be done so as to create an undulating broken surface in which seeds can become trapped and germinate in uncompacted soil. Vegetation that was pushed to the side of the track by the initial clearing of the tracks will be pulled over the ripped tracks to promote seed germination if practicable.

When a track or road has been rehabilitated it will be appropriately signed to prevent traffic using the area. Roads and tracks will be monitored to determine the success of the rehabilitation and revegetation programme.

A procedure for the rehabilitation of roads and tracks has been developed. The draft procedure can be found in Appendix Three.

5.4.7 Borrow Pits

Borrow pit locations will be selected based on the characteristics of the fill required and minimising disturbance to vegetation. Prior to the establishment of a borrow pit, topsoil will be stripped and stockpiled as per FMG's standard procedures. The borrow pits will be designed to encourage natural drainage and prevent the establishment of ponded water. The slope of the re-contoured land will be minimised to reduce the potential for water erosion. The pit floor will be deep ripped to relieve compaction. Where practicable the cleared topsoil will be spread over the borrow pit. Refer to Appendix Four for a draft Borrow Pit Rehabilitation Procedure.

5.5 REVEGETATION

The revegetation technique that is adopted for an area must be based on site specific trials and experience. The following details the broad concepts that will be adopted. However, these concepts will be modified based on experience and trials throughout the life of the project.

5.5.1 Species Selection

The species selection will be based on the flora surveys that were carried out during the Impact Assessment for the Project. These surveys were conducted by consultants who are experts in the area of botanic surveys. It is likely that additional surveys will be

undertaken throughout the project life to supplement these initial surveys. The latter will maximize the coverage of the areas and knowledge of the species present after varying seasonal rainfall conditions including post cyclonic surveys.

A range of terrestrial vegetation types were defined for the proposed operational areas, representing a wide range of structural and floristic variants. These types can be grouped as the following:

- Mulga *Acacia aneura* woodlands and tall shrublands over spinifex or various grasses on the plains of the Fortescue Valley, including extensive areas of groved mulga within the Stage B rail corridor;
- Hummock grasslands of spinifex *Triodia* species with a variable shrub overstorey on stony plains, hillslopes and crests of the mine areas;
- Tall shrublands of *Acacia* species, usually with an overstorey of *Corymbia*, in creeklines;
- Open woodlands of Coolibah *Eucalyptus victrix* over tall shrublands of *Acacia* spp. on river banks and beds; and
- Variable vegetation on cracking clays of the Fortescue Valley (ranging from tussock grasslands to herblands).

5.5.2 Establishment

The initial establishment of the native vegetation will be from the seed bank contained within the topsoil. Due to FMG's proactive approach to topsoil management by returning the topsoil as soon as practicable to the rehabilitated areas (typically within a few weeks), it is likely that the seed bank from the topsoil will be maximised.

The propagation of native species from the seed bank in the topsoil has been a technique that has been successful in the Pilbara in the past. Investigations have been undertaken into rehabilitation methods used in Mulga communities in the Pilbara. This review has highlighted that with appropriate topsoil/overburden, handling and seeding (as required) it is feasible to undertake Mulga rehabilitation on similar environments in the Pilbara region (pers. comms Mattiske, 2004)

If establishment is shown to be ineffective, trials of directly seeding the areas with a seed mix of native vegetation will be undertaken. The final seed mix for a particular area will depend on the species that have already established.

One of the first areas that will be revegetated is the railway construction corridor. As the topsoil will remain insitu in this area, it will provide valuable information on the establishment of floral species from the seed bank in the topsoil. This information will be incorporated into this management plan.

5.5.3 Seed Collection, Processing and Storage

Seed collection will be undertaken if the establishment of native vegetation from the topsoil does not achieve the revegetation criteria. Seed used to revegetate an area will be sourced from the general location of the rehabilitation works. The collection, processing and storage methods implemented will be species specific. Generally the following will be applied to collection, processing and storage methods:

- The capsules or pods that are collected may be dried in the sun or in an oven or cones may be burnt to release the seeds;
- Clean seed will be stored in dry, insect and vermin proof containers;
- Containers will be clearly labelled with details of the species, date collected and collection location;
- The seed may be treated with an insecticide and fungicide prior to storage;
- The seed storage area will be regularly fumigated if necessary;
- The seeds will be stored in a low humidity low temperature environment;
- The seeds of some species may require pre-sowing treatment. This may include heat and/or smoke treatment. The species that are targeted for collection will be investigated to determine the most appropriate pre-sowing treatment.

5.5.4 Weed Control

A weed management plan will be developed for the project. Based on the vegetation surveys areas that contain a high density of weeds will be identified and appropriately managed. One such management technique will be the development of a vehicle hygiene procedure. Surveys of the rehabilitated areas will also be undertaken to determine species diversity, including weed levels.

5.6 FAUNA

FMG will aim to encourage native fauna to return to the rehabilitation areas. Some of the invertebrate species will be introduced in the topsoil. This introduction will be maximised through the direct return of topsoil to the rehabilitated areas. Typically faunal groups will quickly colonise any areas which contain the resources they require such as food, shelter and breeding sites. As one of FMG's closure objectives is to *Re-establish a self-generating ecosystem comprising local native vegetation which resembles the surrounding environment, as close as practical,* this will encourage the return of native fauna.

FMG will also investigate the feasibility of using the cleared vegetation to encourage the return of fauna, for example by establishing log piles for shelter.

5.7 MAINTENANCE

Rehabilitated areas need to be monitored and managed after the initial rehabilitation. FMG's primary tool for maintenance of the rehabilitated area will be monitoring of the sites. If areas are identified that are considered unsatisfactory then maintenance may include, but not be limited to:

- Replanting failed or unsatisfactory areas;
- Repairing any erosion problems;
- Fire management; and
- Pest and weed control.

5.8 SUCCESS CRITERIA AND MONITORING

In order to assess when the rehabilitation and revegetation process is complete, FMG will develop a set of completion criteria. These criteria will be reviewed by FMG senior management before being submitted to the regulatory authorities for approval and sign off. The approved set of completion criteria will be used as a basis for assessing the closure of the mining and rail operations, with FMG required to be in compliance with the specified criteria before the land management can be relinquished. The completion criteria will be reviewed every two years with the closure plan and updated to include findings of FMG's mine rehabilitation research and development program as well as additional requirements of the regulatory authorities.

When selecting completion criteria consideration must be given to the climatic conditions in the Pilbara. Using simple %species and %cover may not be appropriate as this is dependant on when the samples are taken. If the baseline was established during a wet year and the assessment undertaken during drought the criteria will not be met. FMG is currently investigating the options for completion criteria.

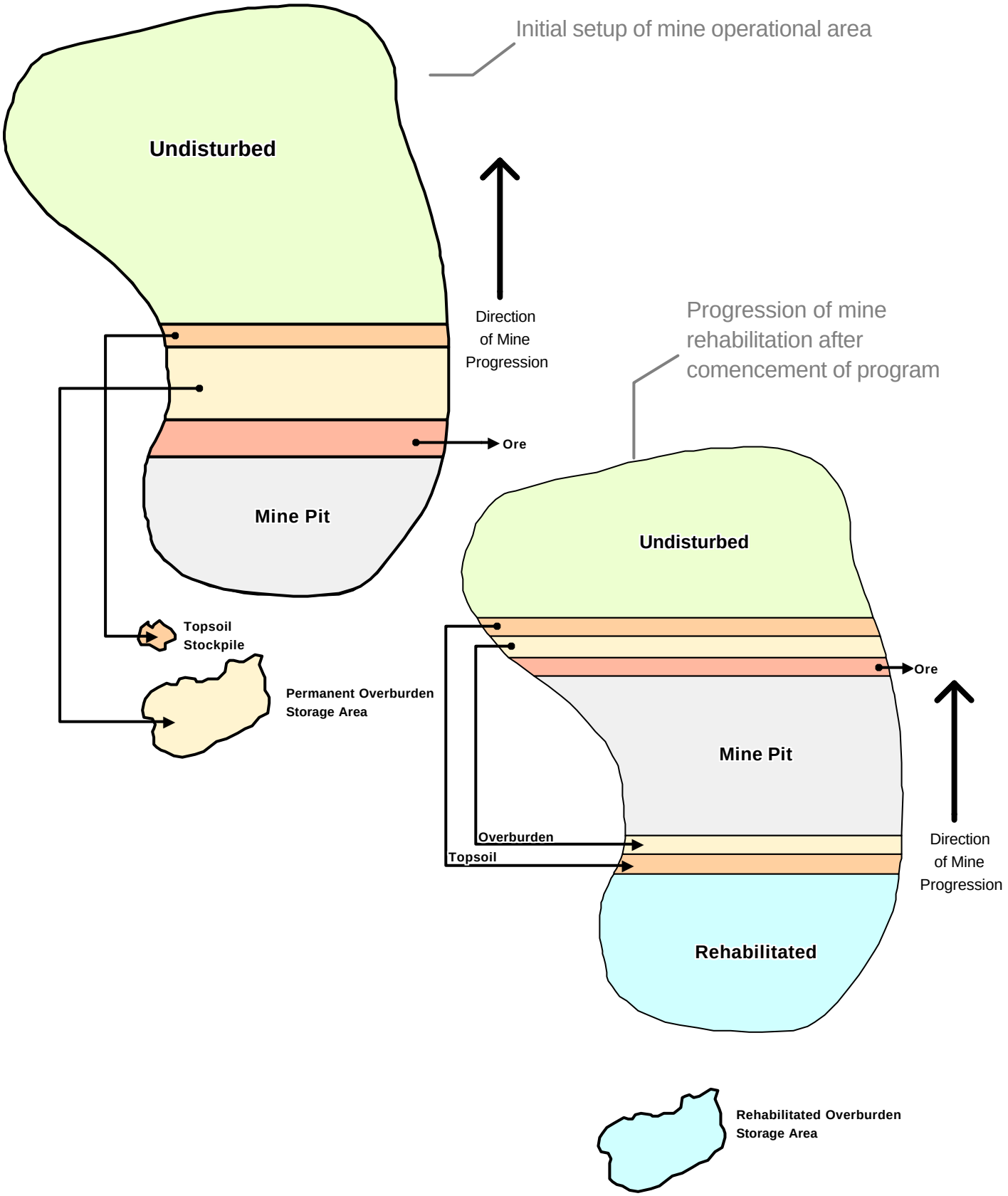
The rehabilitated and revegetated areas will be monitored to determine the progress of the programme. Monitoring is likely to be a combination of methods and may include photographic monitoring, transects and standard plot areas.

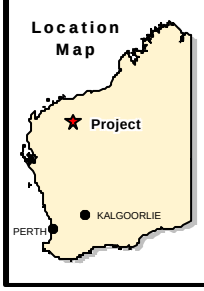
6. RESEARCH AND DEVELOPMENT

Throughout the project a number of research and development programmes will be undertaken. The information from these programmes will be incorporated into this management plan. The research and development programmes will aim to offset the disturbance that is caused by FMG's operations. These programmes have not been finalised however, may include the ecology and taxonomy of the mulga, revegetation trials, the success of water distribution techniques through culverts and seed collection and propagation of *Acacia aneura.*

FIGURES

Plan View



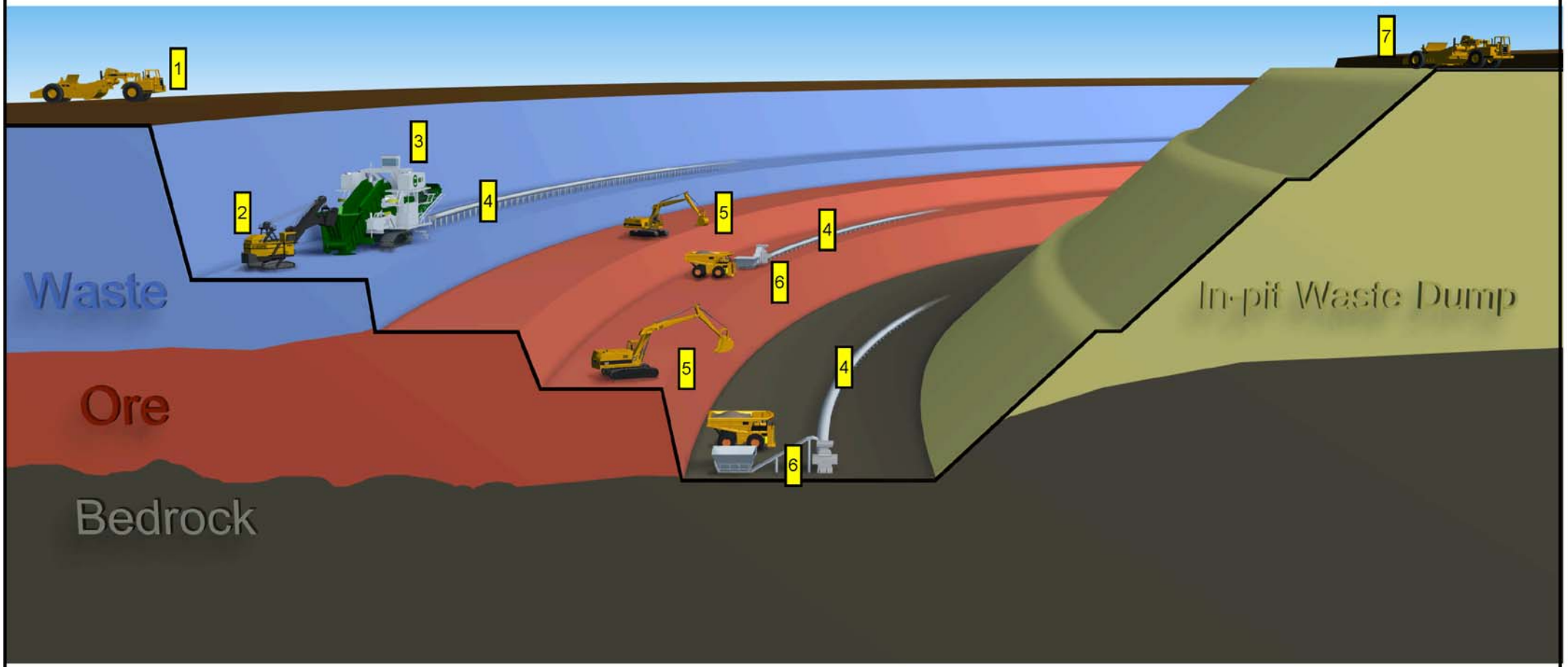


* Information shown is for conceptual purposes only and is not to scale or indicative of the actual pit/storage areas shape or size

Fortescue Metals Group Limited

Figure 1 Progression of Mine Rehabilitation Over Time

Author:	FMG	Date:	29/11/04
Drawn By:	A. Gregory	Revised:	06/01/05
Fig No.:	1	Report No.:	FMG 04095
Projection:	Unprojected	Scale:	Not To Scale



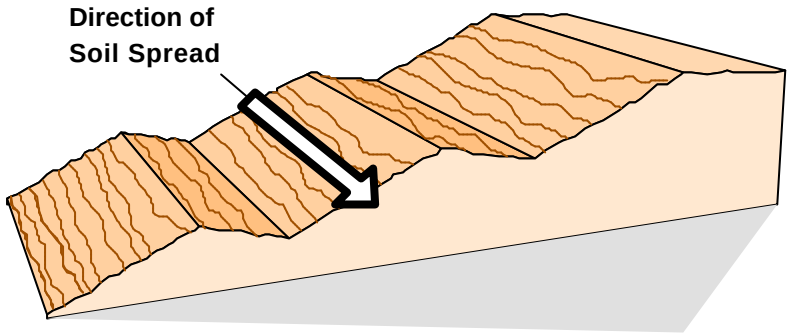
LEGEND

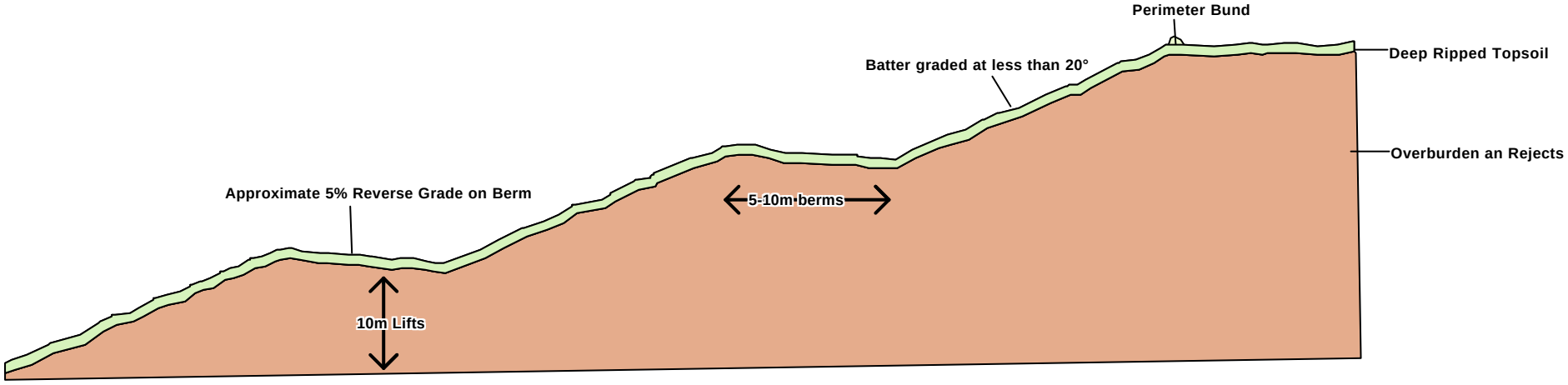
1. Scraper stripping topsoil for placement on rehabilitation areas.
2. Stripping shovel used to remove overburden.
3. In-pit crusher to crush overburden prior to permanent placement.
4. Conveyors to transport material.
5. Excavators placing ore in haul trucks for transport to crusher.
6. Ore crushed and transported to Benefication Plant or to stockpile for direct shipment.
7. Scraper placing topsoil on rehabilitation areas.

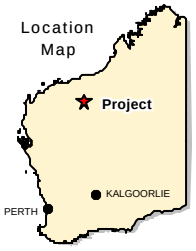
Fortescue Metals Group Limited

Figure 27 Conceptual Mining Method

Author:	FMG	Date:	10/11/04
Drawn By:	Mapability	Revised:	
Fig No.:	27	Report No.:	FMG 04106
Projection:	Unprojected	Scale:	Not To Scale







* Information shown is diagramatic only
and is not to scale or indicative of
the actual pit/storage areas shape or size

Fortescue Metals Group Limited

Figure 3 Design Concept for Overburden Storage Area

Author:	FMG	Date:	29/11/04
Drawn By:	A. Gregory	Revised:	06/01/05
Fig No.:	3	Report No.:	FMG 04097
Projection:	Unprojected	Scale:	Not To Scale

APPENDIX ONE

DRAFT CLEARING PROCEDURE

PILBARA IRON ORE and INFRASTRUCTURE PROJECT

DRAFT CLEARING PROCEDURE

Document Title:	Clearing Procedure
Document No:	
Document Type:	Procedure
First Issue Date:	July 2005

Rev Code	Issue Date	Description & Location of Revisions Made	Signatures		
			Originator	Checked	Approved
0			Ben Garnett		

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1. PURPOSE

The purpose of this procedure is to manage and coordinate areas that require clearing. FMG aims to minimise the amount of area that is cleared at any one time.

2. SCOPE

Clearing permits are required for all clearing of vegetation on site (even previously disturbed areas), that have not been approved under the mine path plan. Clearing Permits are our way of protecting native fauna and flora, not to mention the aesthetics of environment. It regulates how much clearing is done on site and it gives us a record of the clearing operations that have been undertaken.

3. PROCEDURE

- Contact the Environmental Department who will provide you with a clearing permit.
- Fill out the form, detailing the reason for the work, a description of what clearing will be involved, the amount of clearing, a general description of the site and environmental management practices to be used whilst the clearing is being undertaken.
- The Permit needs to be signed by person proposing to clear and the signature of the supervisor of the contractor or person carrying out the work.
- Pass the plans on to the survey department who will survey the proposed area and attach plans to the permit.
- Return the clearing permit to the Environmental Department who will carry out a site assessment.
- Once the site assessment is carried out then the Environmental Department will approve / not approve the clearing proposal. Reasons for non approval may include rare flora and fauna located, aboriginal artefacts located, difficulties with the site in terms of position, erosion risk or the clearing can not be justified.
- Once the clearing permit has an Environmental signature, it will be returned and the clearing can commence. Clearing will be checked to confirm all procedures have been adhered to.
- A final survey is to be carried out of the area disturbed and the amount of topsoil stockpiled.

4. RESPONSIBILITIES

Table 1 provides provisional roles and responsibilities of the personnel responsible for this procedure (this is subject to change). Contractor responsibilities will be outlined within contract documents.

Table 1: Roles and Responsibilities

Position	Responsibility
Environmental Dept:	Ensures that disturbance is carried out in an environmentally sound manner.
Area Managers	Ensuring that all employees under their control are aware of this procedure.
All Employees:	Ensure that clearing permits are in place prior to any surface disturbance.

5. DOCUMENT CONTROL

Document Control will be as per FMG's Environmental Management System, which will be developed to the ISO14001 framework.

APPENDIX TWO

DRAFT TOPSOIL MANAGEMENT PROCEDURE

PILBARA IRON ORE and INFRASTRUCTURE PROJECT

DRAFT Topsoil Management Procedure

Document Title:	Topsoil Management Procedure
Document No:	
Document Type:	Procedure
First Issue Date:	July 2005

Rev Code	Issue Date	Description & Location of Revisions Made	Signatures		
			Originator	Checked	Approved
0			Ben Garnett		

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1. PURPOSE

Soil is of critical importance in relation to mined land rehabilitation because of the nutrients, mycorrhiza and native seed store it contains. Topsoil provides an essential resource for the establishment of vegetation on mine rehabilitation areas.

This Procedure has been developed to ensure that available soil resources are adequately managed, that the quantity and quality of the soil resource is maximised and that statutory obligations regarding soil removal and rehabilitation requirements are met.

2. SCOPE

This procedure applies to management of topsoil from areas that have been cleared as part of FMG's operations and includes the placement of topsoil at rehabilitated areas.

3. TOPSOIL STRIPPING

The key points of the Topsoil Stripping are:

- A vegetation survey of the area to be cleared is to be carried out prior to disturbance.
- Stripping of soil must proceed prior to the commencement of mining activities on undisturbed ground.
- Stripping involves the removal and stockpiling of all large shrubs and trees together with the pushing back of all unconsolidated soil materials including sand, loam and gravel.
- Topsoil will be stripped and where practicable returned directly to a rehabilitation area. If the topsoil must be stockpiled it will be done so for as short a time as possible. The topsoil is considered to be the top 250 mm of the soil profile. However, site specific surveys may identify areas that have differing levels of topsoil.
- If practicable subsoil will be stripped and managed separately.
- Subsoil is considered to be all sand, loam or gravel occurring deeper than 250mm from the surface within the soil profile. As with topsoil, surveys may indicate areas that have subsoil of greater or lesser depths.
- If topsoil requires stockpiling, they are to be layed out in strips no more than 2 metres in height and as close as possible to where they are to be used in future rehabilitation work. Cleared vegetation should be spread on the stockpiles.
- Subsoil stockpiles are to be placed adjacent to associated topsoil stockpiles. Subsoil stockpiles need not be restricted to 2 metres in height, depending upon the availability of storage space.

- A buffer zone of *at least* two bulldozer widths (10 metres) must be maintained between unstripped and mined areas to allow access to soil and vegetation stockpiles.
- Ideally, soil stripping should not proceed in wet conditions when handling and separation into constituent components may prove difficult and there may be some compaction of the soil profile in wetter conditions.

4. CLEARING AND NOTIFICATION

FMG has a clearing procedure. This procedure requires specific input including details relating to the reason for a particular area is to be cleared, its specific location and an estimate of the area to be cleared. Approval must be obtained prior to any clearing operations.

5. TOPSOIL STOCKPILING

The stockpiling of topsoil will be kept to a minimum. Where practicable topsoil will be directly returned to rehabilitation areas. If topsoil requires stockpiling the time it is stored will be kept to a minimum (a few weeks were practicable). However, topsoil will require stockpiling during the initial start-up phase of a project area.

Scrapers will be used to strip topsoil and transport the topsoil to the rehabilitation areas. However, scrapers are only operational viable over short distances. It may therefore be necessary to store the topsoil in stockpiles for a short period, prior to it being loaded into trucks for transportation.

If it is practicable to strip the subsoil separately, it will be stockpiled *separately* in order to gain maximum benefit from each resource. Where gravels are present, these will be stockpiled together with stripped subsoil. Gravel has proven to be an exceptional growth medium and provides a valuable addition to the soil stockpile inventory.

6. STOCKPILE INVENTORIES

If topsoil is to be stockpiled for an extended period, a topsoil inventory will be maintained with information collected including, but not limited to:

- Location by stockpile number, tenement, position in landscape and location description.
- Date reviewed.
- Stockpile dimensions - stockpile volume, surface area occupied by the stockpile, average maximum stockpile height and stockpile layout (piles or windrows).

- Stockpile characteristics - material type/colour, % sand, % gravel, % rock, presence of any boulders/rocks, presence of any rubbish/waste material and type of rubbish present.
- Resource availability - % of stockpile suitable for use as a growth medium and the stockpile volume suitable for rehabilitation use.
- Vegetation (growing on stockpile).
- Date stockpiled.
- Comments (if any).

As soon as an area has been cleared then a survey should pick up the area and volumes and passed on the Environmental Department who can update the topsoil inventory.

7. RESPONSIBILITIES

Table 1 provides provisional roles and responsibilities of the personnel responsible for this procedure (this is subject to change). Contractor responsibilities will be outlined within contract documents.

Table 1: Roles and Responsibilities

Position	Responsibility
Environmental Dept:	Ensures that topsoil inventories are maintained
Area Managers	Ensuring that cost of topsoil stockpiling is added to clearing costs.
All Employees:	Ensure that clearing permits are in place before topsoil removal and this procedure is adhered to.

8. DOCUMENT CONTROL

Document Control will be as per FMG's Environmental Management System, which will be developed to the ISO14001 framework.

APPENDIX THREE

DRAFT ROADS AND TRACKS REHABILITATION PROCEDURE

PILBARA IRON ORE and INFRASTRUCTURE PROJECT

DRAFT Roads and Track Rehabilitation Procedure

Document Title:	Roads and Tracks Rehabilitation Procedure
Document No:	
Document Type:	Procedure
First Issue Date:	July 2005

Rev Code	Issue Date	Description & Location of Revisions Made	Signatures		
			Originator	Checked	Approved
0			Ben Garnett		

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1. PURPOSE

A number of roads and access tracks are constructed throughout the life of a project. The rehabilitation of these roads and tracks are necessary to achieve FMG's closure objectives. The purpose of this procedure is to provide guidance on the necessary steps for the rehabilitation of a road and track.

2. SCOPE

This procedure applies to all roads and tracks constructed within FMG's areas.

3. PRIOR TO THE REHABILITATION OF ROADS AND TRACKS

Some of the roads and tracks that have been established on FMG areas may be required following the completion of FMG's operations. Therefore, consultation must be undertaken with relevant stakeholders prior to the rehabilitation of any roads or tracks. When approval has been given the rehabilitation may commence.

4. REHABILITATION OF ROADS AND TRACKS

When rehabilitating roads and tracks, the following will be adhered to:

- An assessment will be made to determine whether ripping of the road or track is appropriate. Roads and tracks that are on steep slopes or have vegetation re-established on them may not be ripped.
- Any ripping that occurs along slopes will have regular contour banks built across the track to minimise water erosion potential.
- Ripping of road and tracks will be done so to create an undulating broken surface in which seeds can become trapped and germinate in uncompacted soil, as well as assist in the infiltration of water into the soil profile.
- Vegetation that was pushed to the side of the track by the initial clearing of the tracks will be pulled over the ripped tracks to promote seed germination if practicable.
- When a track or road has been rehabilitated it will be appropriately signed to prevent traffic using the area.
- Roads and tracks will be monitored to determine the success of the rehabilitation and revegetation programme.
- If the establishment of vegetation does not achieve the stated criteria, the roads and tracks will be seeded with a native seed mix.

5. RESPONSIBILITIES

Table 1 provides provisional roles and responsibilities of the personnel responsible for this procedure (this is subject to change). Contractor responsibilities will be outlined within contract documents.

Table 1: Roles and Responsibilities

Position	Responsibility
Environmental Dept:	Ensures that roads and tracks are not required prior to rehabilitation and determine the appropriate method to be adopted. Monitor the success of the rehabilitation.
All Employees:	Ensure this procedure is followed when rehabilitating roads and tracks

6. DOCUMENT CONTROL

Document Control will be as per FMG's Environmental Management System, which will be developed to the ISO14001 framework.

APPENDIX FOUR

DRAFT BORROW PIT REHABILITATION PROCEDURE

PILBARA IRON ORE and INFRASTRUCTURE PROJECT

DRAFT Borrow Pit Rehabilitation Procedure

Document Title:	Borrow Pit Rehabilitation Procedure
Document No:	
Document Type:	Procedure
First Issue Date:	July 2005

Rev Code	Issue Date	Description & Location of Revisions Made	Signatures		
			Originator	Checked	Approved
0			Ben Garnett		

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1. PURPOSE

A number borrow pits will be constructed throughout the life of a project. The rehabilitation of these areas is necessary to achieve FMG's closure objectives. The purpose of this procedure is to provide guidance on the necessary steps for the rehabilitation of borrow pits.

2. SCOPE

This procedure applies to all borrow pits constructed within FMG's areas.

3. PRIOR TO THE CONSTRUCTION OF BORROW PITS

Prior to establishing a borrow pit, the following should be considered:

- Select borrow pit sites in accordance with minimal vegetation disturbance.
- Survey the area to be disturbed and plot on map.
- Clear vegetation with the dozer blade raised above the soil surface in order to preserve vegetation rootstock.
- Strip the top 250mm of topsoil and conserve in piles not more than 2 metres in height.
- Spread cleared vegetation over the topsoil stockpiles. This helps to keep the topsoil seed bank viable.
- The pit should be designed to be self draining where practicable. In addition the slope of the edges should be less then 20^{O}.

4. REHABILITATION OF BORROW PITS

When rehabilitating borrow pits, the following will be adhered to:

- Use a bulldozer for rehabilitation work. Spacing between tines should be minimal to provide comprehensive ripping.
- Deep ripping is required, not simple scarification, to enable rip lines to hold up after heavy rainfall.
- Ripping to be done along contour, not up and down slope which leads to enhanced erosion.
- Topsoil to be re-spread across borrow pit evenly.
- Minimise bowl effect within pit, i.e. attempt to reduce the depth of the pit as far as is practicable to minimise ponding - surface ponding reduces the efficiency of revegetation, leading to bare patches or poor regrowth and potential erosion.

- Around the perimeter of the borrow pit, drag in undisturbed vegetation from up to 5m to break up edge-effect and promote seed distribution and mulching.
- All rubbish, equipment, etc, to be removed from the borrow pit.
- Clearly identify the borrow pits which have to be left open for future work.

5. RESPONSIBILITIES

Table 1 provides provisional roles and responsibilities of the personnel responsible for this procedure (this is subject to change). Contractor responsibilities will be outlined within contract documents.

Table 1: Roles and Responsibilities

Position	Responsibility
Environmental Dept:	Ensures that rehabilitation of borrow pits are undertaken in an appropriate manner. Monitor the success of the rehabilitation
All Employees:	Ensure this procedure is followed when rehabilitating borrow pits

6. DOCUMENT CONTROL

Document Control will be as per FMG's Environmental Management System, which will be developed to the ISO14001 framework.