



Timor
Resources

**Operating Management System
Environmental Management Plan - Drilling Activity
PSC TL-OT-17-09
Appendix B - Rehabilitation Plan
Doc No: TR-HSE-PLN-008**

**Revision: Rev1
Issue date: 04/06/21
Page: 1 of 14**



**ENVIRONMENTAL MANAGEMENT PLAN (EMP)
DRILLING ACTIVITY
PSC TL-OT-17-09**

APPENDIX B - REHABILITATION PLAN

TR-HSE-PLN-00-000-008



Timor
Resources



Operating Management System
Environmental Management Plan - Drilling Activity
PSC TL-OT-17-09
Appendix B - Rehabilitation Plan
Doc No: TR-HSE-PLN-008

Revision: Rev1
Issue date: 04/06/21
Page: 2 of 14

REVISION HISTORY

REVISION	DATE	DESCRIPTION
Rev1	04/06/21	Issued for review

MANAGEMENT APPROVAL

POSITION TITLE	NAME	SIGNATURE	DATE
Chief Executive Officer	Suellen Osborne		04/06/21
GM Exploration	Jan Hulse		04/06/21

DISTRUBUTION LIST

AUTHORITY/COMPANY'S NAME	DATE	REVISION
Autoridade Nacional do Petróleo e Minerais	04/06/21	Rev1



TABLE OF CONTENTS

TABLE OF CONTENTS	3
FIGURES	3
ACRONYMS	4
1 INTRODUCTION	5
1.1 CONTEXT	5
1.2 PURPOSE	5
1.3 SCOPE	5
2 REHABILITATION STRATEGY	7
2.1 REHABILITATION OBJECTIVE	7
2.2 OUTCOMES	7
3 REHABILITATION METHODS	8
3.1 VEGETATION CLEARING	8
3.2 NATURAL REGENERATION.....	8
3.3 MANAGEMENT OF SOIL	8
3.3.1 <i>Topsoil</i>	8
3.3.2 <i>Re-contouring</i>	8
3.3.3 <i>Ripping and scarification</i>	10
3.3.4 <i>Topsoil re-spreading</i>	10
3.4 EROSION AND SEDIMENT CONTROL	10
3.5 REVEGETATION	11
3.6 WEED AND PEST MANAGEMENT	11
3.7 MAINTENANCE AND MONITORING	11
3.8 ACCESS TRACK	12
3.9 TEMPORARY LAY DOWN AREAS	12
4 SUCCESSFUL REHABILITATION CRITERIA	12
5 MONITORING	13
5.1 FREQUENCY OF MONITORING.....	13
6 REPORTING & RESPONSIBILITIES	14

FIGURES

FIGURE 1-1: LOCATION OF PROPOSED RUSA-1 WELL.....	6
FIGURE 3-1: RUSA-1 WELL LAYOUT SHOWING TOPSOIL STORAGE AREAS	9



ACRONYMS

DBH	Diameter at Breast Height
ED	Eastern Drilling
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
HSE	Health Safety Environment
IECA	International Erosion Control Association
IFC	International Finance Corporation
PPE	Personal Protective Equipment
TG	Timor Gap
TL	Timor Leste
TR	Timor Resources



1 INTRODUCTION

1.1 CONTEXT

The project is the construction of a wellsite and access road for the Timor Resources Rusa #1 exploration well in PSC TL-OT-17-09 on the South Coast of Timor Leste located at Suco Foho Ai-LiCo, Ainaro, Ainaro District.

1.2 PURPOSE

This project was determined to require a Category A Licence under Decree Law No. 5/2011.

The TR Rehabilitation Plan is a requirement under the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP). The EIA identified potential impacts from the project and various plans have been developed to supplement the EIS and EMP. Rehabilitation is considered a critical component of this project, and failure of rehabilitation is considered a major risk. This Plan details rehabilitation methods, monitoring procedures and defines rehabilitation success criteria.

This report is an appendix to the EMP – Appendix B

1.3 SCOPE

This report will address rehabilitation strategies for the Rusa-1 well site in PSC: TL-OT-17-09 (see Figure 1-1).

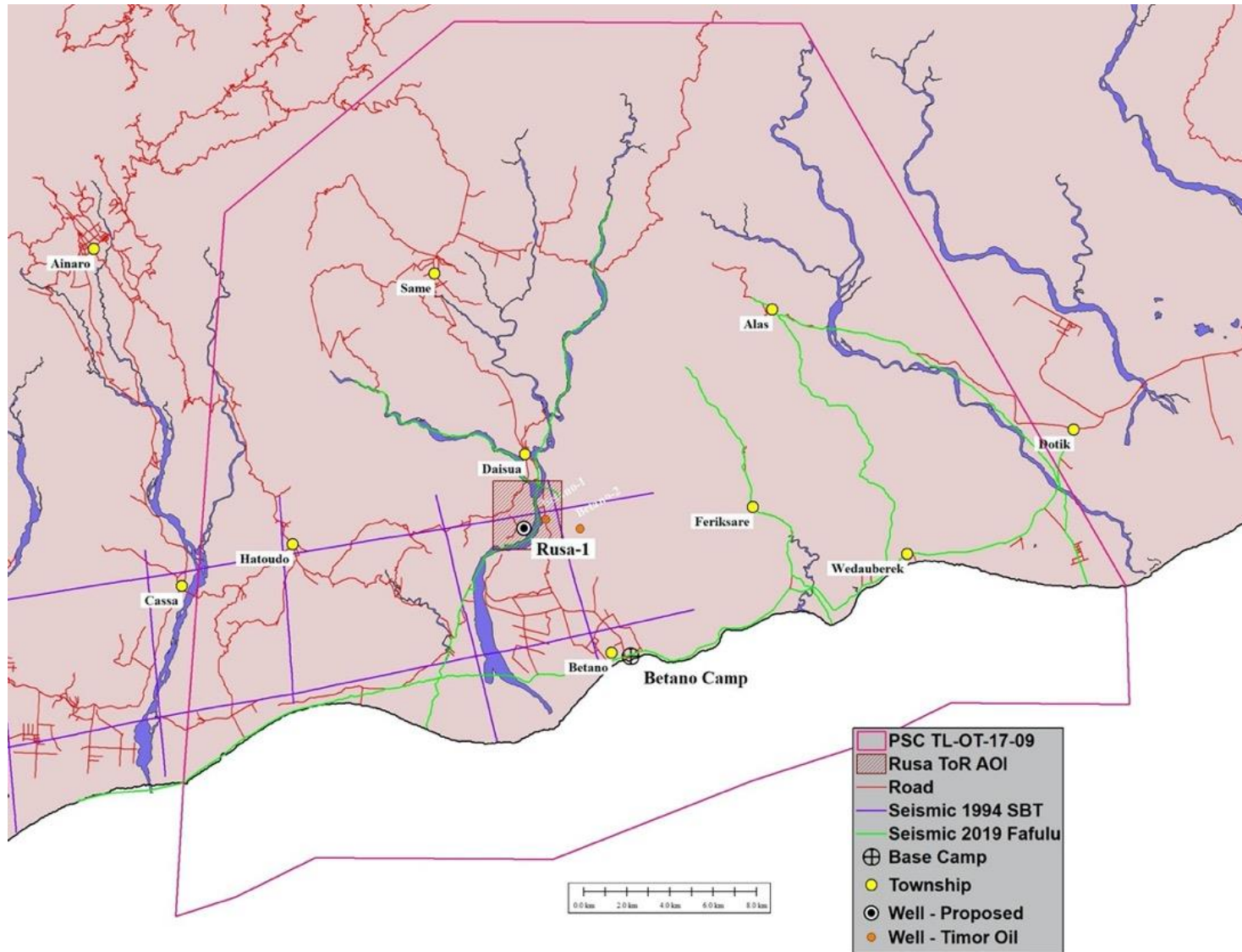


Figure 1-1: Location of Proposed Rusa-1 Well



2 REHABILITATION STRATEGY

TR will ensure that rehabilitation is:

- Stable and self-sustaining.
- Safe for the community and wildlife.
- Able to return land to an agreed after use or close-to-pre-disturbance level that requires little or no ongoing management.
- Complementary to the adjoining landscape.
- Able to reflect the natural ecosystem/s, or establish an alternative outcome that is commensurate with the surrounding land use e.g. vegetation growing, cropping, etc.

2.1 REHABILITATION OBJECTIVE

Rehabilitation of the well site will be carried out in a progressive manner, following the completion of drilling works in each well site. Where access tracks or construction areas can be reduced, rehabilitation will be undertaken where and as possible, this will ensure that land is stabilised as soon as possible after disturbance to reduce the occurrence of erosion, sedimentation, loss of topsoil and weed invasion.

Final rehabilitation will be completed at the well site once the drilling project is finalised e.g. rig site will be decommissioned and removed and the site rehabilitated at the completion of the drilling works, unless the area is required and approved for use in future operational activities.

Methods of rehabilitation are discussed in Section 3.

2.2 OUTCOMES

Extensive consultation has been undertaken with community and landholders. It is expected that this will be an ongoing process and will assist in determination of an agreed rehabilitation outcome. In some cases, it may be the wish of the landholder for the land to be rehabilitated for a future land use, however, in most cases the land will be rehabilitated to a mutually agreed level consistent with surrounding land uses and ecological values.

Rehabilitation requirements and objectives will be determined on a case-by-case basis, but will be compatible with the safety, landform, vegetation cover and soil stability of the surrounding area and methods developed in this plan.



3 REHABILITATION METHODS

3.1 VEGETATION CLEARING

Cleared vegetation is to be pushed to one side of any road rights of way, to assist in future rehabilitation works. In other areas, such as rig sites, cleared vegetation may be mulched or stockpiled. Cleared vegetation may also be used in erosion and sediment control structures. Retention of green waste can assist in creation of micro-habitats for seed germination, promote retention of soil moisture, and provide habitat for fauna.

In areas of high weed occurrence, cleared vegetation should be flagged so that it is not used in rehabilitation works. Vegetation clearing is to avoid removal of large trees (>50 cm DBH) where possible.

3.2 NATURAL REGENERATION

In most areas, rehabilitation will rely on natural regeneration. This will be achieved through the re-spreading of topsoil with supplementary planting where it is deemed necessary e.g. within areas of high ecological value pre-disturbance. Where possible, tree root stock should be left undisturbed to facilitate regrowth and soil stabilisation.

3.3 MANAGEMENT OF SOIL

3.3.1 Topsoil

Topsoil is a vitally important part of rehabilitation, as it contains the nutrients, microbes and seed bank. Topsoil is to be removed and stored in such a way that it is protected until such time that it can be re-spread (see designated storage areas in Figure 3-1). It is essential to minimise chemical or physical deterioration of the topsoil, and careful consideration is to be given to the location of topsoil storage areas and how it is handled. It will be necessary to store topsoil in many locations, to prevent mixing and/or contamination. This will also ensure timely re-instatement of topsoil in the correct location and order along the corridor.

Topsoil stockpiling will assist in preservation of its biological and chemical properties. It is to be stockpiled separately from other cleared vegetation and protected and stabilised to minimise erosion and soil loss. Ideally, topsoil will be stored on high ground away from drainage flow paths. Erosion and sediment control measures are to be implemented where stockpiles are located within 50 m of any watercourse or drainage flow path.

3.3.2 Re-contouring

Re-contouring will be applied to areas where surface drainage may create instability. Re-contouring is to ensure that water flowing over the surface behaves similar to the surrounding area to minimise the risk of erosion. Where possible, planning is to minimise the need for cut and fill to reduce the need for re-contouring. Re-contouring is to be completed before re-spreading of topsoil.

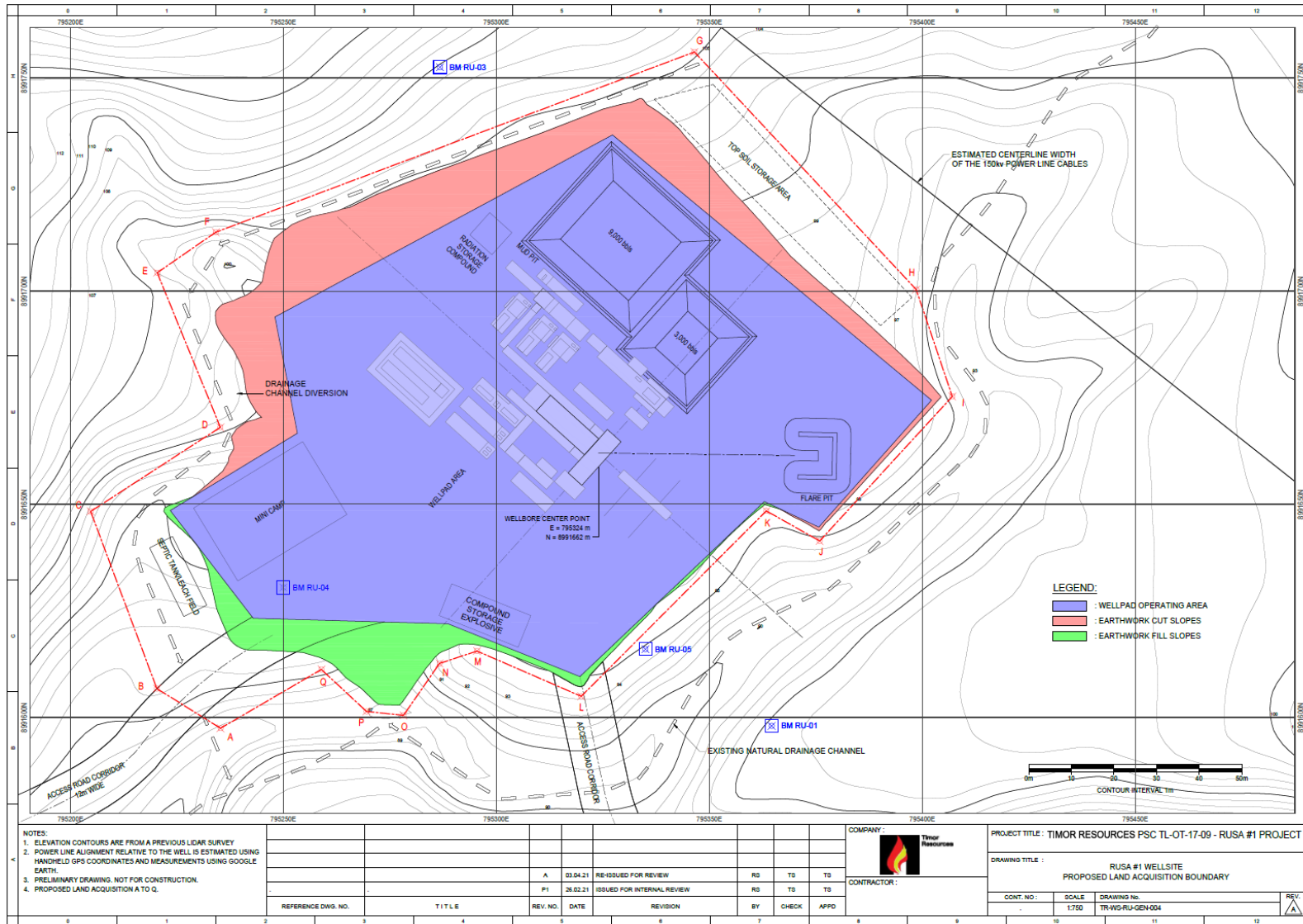


Figure 3-1: Rusa-1 well layout showing Topsoil storage areas

3.3.3 Ripping and scarification

Prior to re-spreading of topsoil, it may be necessary to rip the ground surface. Ripping aids in water infiltration and retention, facilitating seed germination and reducing the velocity and volume of surface water runoff.

Ripping is to be done following the natural contours. Depth of ripping will depend on degree of soil compaction but should not exceed 300 mm to avoid disturbance of underground infrastructure.

After-re spreading of topsoil, the surface can be lightly scarified to promote water infiltration and plant growth, zig-zagging may assist in preventing rill erosion in flat and low gradient areas.

3.3.4 Topsoil re-spreading

Re-spreading of topsoil should be carried out according to the following guidelines:

- Topsoil is to be spread evenly but with a rough surface to avoid compaction and assist with water infiltration and plant growth.
- Topsoil is to cover all sub-surface material. If insufficient topsoil is available, it may be sourced from another similar location, provided the location has similar plant species and is weed free. This should be done in consultation with environmental specialist.
- Erosion and sediment control measures to limit runoff velocities e.g. control banks.
- Weed infested topsoil is not to be used.

3.4 EROSION AND SEDIMENT CONTROL

Key activities in erosion and sediment control include constructing, improving or repairing drainage control measures to reduce water movement, and ensuring topsoil is located away from drainage lines to reduce chance of erosion. The following measures can be used to protect rehabilitated areas.

- Rehabilitation will be undertaken in a progressive manner to limit erosion risk.
- Contour banks should be placed at intervals along a flow path, with frequent discharge points to reduce flow velocities.
- During the rehabilitation period, areas prone to concentration of surface water flows, will be identified. These areas will be monitored and, if necessary, additional mitigation measures may be required (e.g. channelling, drainage)
- Erosion and sediment control devices are to be constructed with consideration of the IECA Best Practice Erosion and Sediment Control Guideline 2008.



3.5 REVEGETATION

When selecting species for use in rehabilitation, consideration will be given to:

- Structure and composition of surrounding areas.
- Advice from community members via consultation.
- The needs of fauna – e.g. food and shelter.
- Soil conditions, microclimate and aspect of the area to be rehabilitated.
- Direct seeding may be carried out in some areas, particularly where erosion potential is high. If direct seeding is done, it is to be completed prior to the wet season to assist in germination without need for ongoing management. Seed is to be sourced locally, where possible.
- Where necessary, the site may need to be protected from destruction by cattle until vegetation is well established e.g. temporary fencing.

3.6 WEED AND PEST MANAGEMENT

Weed and pest management should consider the following controls:

- Vehicles moving to and from the rehabilitation area/s are to be free from weed seed. Weed hygiene is to be carried out prior to access into areas undergoing rehabilitation e.g. wash vehicle down.
- Weed control is required for at least 12-months post rehabilitation, to remove any emerging weeds within the rehabilitated area/s.
- All materials and equipment used during rehabilitation are to be clean and free from dirt that may contain weed seed.
- Species specific management will be developed if identified as required.
- Management of pests is important to limit impacts from grazing, trampling and uprooting of vegetation. Management may be in the form of temporary fencing or other measures as deemed appropriate.

3.7 MAINTENANCE AND MONITORING

Following rehabilitation works, vehicular access should be limited except where required for maintenance or monitoring work. Monitoring will be carried out to ensure:

- Vegetation re-established is on track and consistent with success criteria and surrounding land.
- Erosion and sediment control measures are effective.
- Weed species are controlled.
- Landforms remain stable.

3.8 ACCESS TRACK

The access track if not required for ongoing operational works and if not required by the community as an agreed after use, will be rehabilitated as soon as possible. The surface of track will be lightly scarified before re-spreading of topsoil. Any erosion control measures no longer required will be removed, leaving only those control measures that will reduce surface water flow velocities. Reseeding should be carried out over areas prone to erosion or which may require additional management in order to reach success criteria. Other areas will be left to naturally regenerate.

3.9 TEMPORARY LAY DOWN AREAS

Temporary laydown areas will result in minimal impact, so it is expected that most areas will revegetate naturally. More heavily impacted areas will be treated the same as access tracks, with light surface scarification and ripping. Rip lines are to be spaced such that movement of soil is limited. Direct seeding will be used where required.

4 SUCCESSFUL REHABILITATION CRITERIA

The following, quantifiable criteria has been established so that it is possible to assess the success of rehabilitation. The success criteria are performance objectives and/or standards against which rehabilitation success can be measured. Using these criteria, it should also be possible to assess rehabilitation trends, to ensure it is moving towards a safe, stable and sustainable ecosystem.

Rehabilitation will be deemed successful when the following conditions have been met:

- Rehabilitation is stable and self-sustaining.
- Safe for the community and wildlife.
- Returned to an agreed and close-to pre-disturbance level that requires little or no ongoing management.
- Complementary to the adjoining landscape.
- Re-instated to reflect the natural ecosystem/s, or establish an alternative outcome that is commiserate with the surrounding land use e.g. vegetation growing, cropping, etc.
- No signs of erosion, sedimentation, loss of topsoil or weed invasion.

Significantly disturbed areas must be rehabilitated to the following condition (at minimum), in comparison to surrounding land use:

- Greater than, or equal to, 70% native groundcover species richness.
- Greater than, or equal to, total percent of original groundcover.



- The original condition of the location or analogue sites (selected pre-works) are to be used to determine levels of species composition and richness, and to assist in reaching the specified rehabilitation success criteria.

5 MONITORING

Monitoring will assess the following parameters:

- Percent plant cover-canopy, sub-canopy and shrub layers.
- Percent groundcover.
- Percent weed species.
- Species richness – tree, shrub, grass.
- Presence of debris – woody, leaf litter etc.
- Total vegetation ground cover.
- Signs of erosion.

Large areas (e.g. the well site) will have four randomly selected monitoring sites, of nominal size 10 m x 10 m. Linear sites (e.g. access tracks) will have smaller plots measured within each vegetation type, nominally 1 m x 1 m. The number of sites will depend on the size of the vegetation assemblage but should be a minimum of two per assemblage.

5.1 FREQUENCY OF MONITORING

Those areas that are to be progressively rehabilitated will be monitored from the start of rehabilitation works as per the following:

- Monthly for the first three months; then
- After 3 months; then
- After 6 months (12 months since rehabilitation started)

After 12 months an assessment will be made to determine if successful rehabilitation criteria have been met (either actual or on a trajectory). Those sites that are not on the correct trajectory will have remedial works carried out and continue with monthly monitoring, every six months, until successfully rehabilitated. Once deemed successful sites are to be signed off by the Operations Manager.



6 REPORTING & RESPONSIBILITIES

Operations personnel and/or contractors will undertake rehabilitation works and monitoring under the direction of the HSE Officer.

The HSE Officer will compile monitoring data and information on rehabilitation works undertaken and provide these to the Operations Manager. The HSE Officer will compile the final rehabilitation report under the direction of the Operations Manager, for submission to relevant authority.