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Exploration Code of Practice: Rehabilitation

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Title: Exploration Code of Practice: Rehabilitation

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More information

This **Code of Practice** forms part of a suite of Codes that comprise:

- Exploration Code of Practice: Community Consultation
- Exploration Code of Practice: Environmental Management
- Exploration Code of Practice: Petroleum Land Access
- Exploration Code of Practice: Produced Water Management, Storage and Transfer
- **Exploration Code of Practice: Rehabilitation**

The following **Guidelines** may also provide assistance to explorers:

- ESG2: Guideline for Preparing a Review of Environmental Factors
- ESG4: Guideline for Preparing an Environmental and Rehabilitation Compliance Report for Exploration
- ESG5: Assessment Requirements for Exploration Activities
- Exploration and Production Guideline: Drilling and Integrity of Boreholes and Wells
- Exploration Guideline: Work Programs for Prospecting Titles
- Exploration and Production Guideline: Petroleum Drilling and Well Servicing – Competencies
- Exploration Guideline: Annual Activity Reporting for Prospecting Titles
- Guideline for Agricultural Impact Statements at the Exploration Stage

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Date	*Version #*	*Amendment*
July 2015	1.0	First published
April 2017	2.0	First scheduled review
September 2017	3.0	Clarified when the Code applies to the transfer of petroleum prospecting titles – refer to "*When this Code applies*"

Contents

Part A: Introduction

Regulatory purpose

Exploration licences and assessment leases for all resources (prospecting titles) are granted with the objective of encouraging ecologically sustainable development, social responsibility and building economic wealth for the people of NSW.

This Code of Practice (this Code) sets out **mandatory requirements** (**Part B**) and provides title holders with related guidance (**Appendix 1**) regarding the expected performance to ensure that exploration is undertaken in a manner that manages and minimises risk and achieves sustainable rehabilitation outcomes.

This Code serves three purposes. It:

1. provides upfront information to the Industry and the Community
2. facilitates the assessment of exploration activities consistent with Part 5 of the *Environmental Planning and Assessment Act 1979*
3. sets out enforceable mandatory requirements related to rehabilitation.

This Code enables industry to:

- adopt a risk-based approach to ensure compliance with mandatory requirements related to rehabilitation
- commit to measurable performance outcomes
- monitor performance and take corrective action if these outcomes are not being achieved
- keep and maintain relevant records of activities and/or actions.

This approach allows title holders to adopt innovative solutions and best practice techniques to meet performance requirements.

When this Code applies

This Code only applies if imposed as a condition on prospecting titles. Title holders should refer to the conditions of their prospecting title to determine whether this Code applies.

This Code will be applied as a condition of:

- prospecting titles granted, renewed or transferred in respect of applications received after 1 July 2015
- petroleum prospecting titles renewed after 1 July 2015.

Compliance requirements

This Code applies to the extent provided for under the conditions of a prospecting title.

The guidance in **Appendix 1** provides context to the mandatory requirements and some options for the type of controls that could be used by title holders, where relevant, to meet these requirements. The type of controls the title holder applies to achieve the mandatory requirements should be developed, implemented and monitored as part of a risk assessment (e.g. *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*) that is continuously evaluated over the term of a prospecting title.

Based on the likely risk, type and scale, phase and duration of exploration activities, this guidance, and any updates or new standards related to rehabilitation, may be used to measure and assess environmental performance during the term of a prospecting title.

If compliance with this Code is required by the conditions of a prospecting title or the terms of an activity approval, then a breach of this Code will be an offence under section 378D of the *Mining Act 1992* or section 125E of the *Petroleum (Onshore) Act 1991* (as relevant).

From 1 July 2015, under the *NSW Gas Plan*, the Environment Protection Authority is the lead authority to regulate compliance with and enforcement of all conditions (excluding work health and safety) contained within petroleum titles. This includes any terms imposed in relation to specific activity approvals.

The Division of Resources and Geoscience within the Department of Planning and Environment (the Department) is responsible for regulating compliance for all other matters relating to prospecting titles under the *Petroleum (Onshore) Act 1991* and the *Mining Act 1992*. The Department's approach to compliance and enforcement is set out in its Compliance and Enforcement Policy.

Compliance with this Code is not a defence to actions taken under any legislation or statutory instrument.

Compliance with the mandatory requirements within this Code will not be required to the extent that they duplicate or are consistent with the conditions of an Environment Protection Licence or the provisions of the *Protection of the Environment Operations Act 1997*[1].

Interaction of this Code with other regulation

Approvals

Certain approvals issued by other regulators are not required for activities carried out under prospecting titles. However, depending on the nature of the exploration activity or its location, the following subsequent approvals may be required:

- an environment protection licence under the *Protection of the Environment Operations Act 1997* is required for petroleum exploration, which regulates noise, air, water and waste pollution
- approvals may be required under the *Water Management Act 2000* or the *Water Act 1912* for activities that involve the take or use of water
- development consent may be required for development to which *the State Environmental Planning Policy No 14—Coastal Wetlands* or *State Environmental Planning Policy No 26—Littoral Rainforests* applies
- approvals may be required under the *Environment Protection and Biodiversity Conservation Act 1999*.

Land access arrangements

Under section 140 of the *Mining Act 1992* and section 69C of the *Petroleum (Onshore) Act 1991*, the holder of a prospecting title may only carry out prospecting operations in accordance with an access arrangement with the landholder(s) of the land. Section 141 of the *Mining Act 1992* and section 69C(D) of the *Petroleum (Onshore) Act 1991* set out the matters that the access arrangement may make provision for, including conditions to be observed during prospecting.

As specified by the mandatory requirements of this Code, the title holder must submit rehabilitation objectives and completion criteria to the Department following consultation with relevant landholders. The development of rehabilitation objectives and completion criteria set out in this Code should be addressed as part of land access arrangements. The *Exploration Code of Practice: Petroleum Land Access* sets out information which may assist landholders and title holders negotiate and agree on access arrangements to facilitate compliance with this Code.

Public disclosure

Prospecting title decisions will be publicly disclosed consistent with the *Government Information (Public Access) Act 2009*. However, geological information will be kept confidential in accordance with the provisions of, and regulations made under, the *Mining Act 1992* and *Petroleum (Onshore) Act 1991*.

Contact details

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Review

This Code will be reviewed after the first year of publication, and then every five years. The effectiveness of this Code will also be monitored on an ongoing basis.

[1] The intention of this provision is to not require compliance with a mandatory requirement of this Code if the matter regulated by that mandatory requirement is already regulated by an Environment Protection Licence.

Part B: Mandatory requirements

Objective

It is essential that rehabilitation is undertaken so that areas disturbed by exploration activities are returned to a condition that is safe and stable. The final condition should be as good or better than as it existed prior to exploration activities, or one that allows the proposed final land use(s) to be sustained.

To achieve this outcome, rehabilitation planning and practices must be integrated throughout all phases of an exploration program. However, as a first principle, title holders should aim to prevent or minimise (where prevention is not practicable) the extent of disturbance associated with exploration activities as a means to reduce the extent of rehabilitation required.

What are the risks?

Exploration activities may cause disturbance to land and, while rehabilitation risks can be prevented or mitigated, without adequate rehabilitation planning and controls in place, there is a risk of degradation to both land capability and land use.

These risks must be assessed, controls must be planned for, implemented, and evaluated for their effectiveness, and the potential for risks must be monitored to actively and continuously manage rehabilitation performance during the term of a prospecting title.

These risks will depend on the likely type, scale and duration of exploration activities.

To prevent and mitigate these potential risks, the following mandatory requirements apply to NSW exploration activities.

Mandatory requirements

1. Prior to the commencement of an activity, the title holder **must** conduct a risk assessment to evaluate the range of potential threats and opportunities associated with rehabilitating disturbed areas to a condition that can support the intended final land use(s).

2. No later than 14 days prior to the commencement of any surface disturbance activity associated with an assessable prospecting operation, the title holder **must** provide to the Secretary[2]:
   a. a copy of specific, measurable, achievable, realistic and time-bound rehabilitation objectives and completion criteria for activities associated with that activity, developed in consultation with relevant landholders, and
   b. if associated with higher-risk prospecting operations, a copy of a Rehabilitation Management Plan which provides for the effective rehabilitation of areas disturbed by that activity.

3. The title holder **must** develop, implement and complete a rehabilitation program (which includes a monitoring program) to rehabilitate disturbed areas to a condition that can support the intended final land use(s).

4. For prospecting titles issued under the *Mining Act 1992*, the title holder **must** commence rehabilitation of a site as soon as reasonably practicable following the completion of activities on that site, or as otherwise directed by the Minister.

5. For prospecting titles issued under the *Petroleum (Onshore) Act 1991*, the title holder **must** commence rehabilitation of a site as soon as practicable following the completion of activities on that site.

6. The title holder **must** keep and maintain the records set out in the following table (as applicable).[3]

[2] Submission to the Secretary must be as per the Contact Details in **Part A: Introduction**.

[3] The records required to be kept and maintained according to this Code should be kept from the time this Code applies as a condition of a prospecting title. Records are to be kept in a legible form for production to any inspector for a period of four years following the expiry or termination of a prospecting title (sections 163D and 163E of the *Mining Act 1992* and sections 97D and 97E of the *Petroleum (Onshore) Act 1991)*.
Other records associated with surface disturbing activities may be required under other Codes of Practice, including the *Exploration Code of Practice: Environmental Management*.

Mandatory requirement	Record type
1	Rehabilitation risk assessments, and any updates made from time to time to improve the effectiveness of risk controls during the term of a prospecting title
2(a) & (b)	Rehabilitation requirements agreed to by landholders
3, 4 & 5	Photographs of the baseline conditions of disturbed areas, disturbance caused by exploration activities and showing completed rehabilitation works Records of actual methodologies used to rehabilitate the site (e.g. species utilised, fertiliser rate, details of ripping and scarifying, timing of sowing, sowing rates, seedling planting density, origin of seed, rainfall etc.) Environmental incident reports, corrective and preventative actions Records of care and maintenance activities undertaken on rehabilitation areas Outcomes of rehabilitation inspections and monitoring programs Assessments of rehabilitation performance against the nominated rehabilitation objectives and completion criteria Records of surveying, sealing and decommissioning of boreholes and petroleum wells

Notes:

- Guidance for each mandatory requirement is provided in **Appendix 1**.
- An example of Rehabilitation Objectives and Completion Criteria for an exploration program is provided in **Appendix 2**.
- An example of a Rehabilitation Program Checklist which may be used as guidance by title holders (not obligatory) is provided in **Appendix 3**.
- The interpretation and definitions used for this Code are provided in **Appendix 4**.

Appendix 1: Guidance

This Appendix provides assistance to title holders on how they may achieve compliance with mandatory requirements. The information in this Appendix should be used as a guide only and should not be interpreted as imposing any additional mandatory requirements. The applicability of certain parts of this guidance will vary depending on the likely risk, type and scale, phase and duration of exploration activities.

Title holders should note that the standards and guidelines outlined below (as amended or replaced from time to time), in addition to any new standards taken to set out best practice relating to rehabilitation, may be used to measure and assess environmental performance for compliance and enforcement purposes during the term of a prospecting title.

Risk assessment

The rehabilitation risk assessment may be undertaken as a component of a broader risk assessment conducted for the proposed exploration activities (such as relating to environmental management, drilling and community consultation). The level of detail in the rehabilitation risk assessment **should** be proportionate to the type and scale of exploration activities likely to cause disturbance, as well as the sensitivity of the surrounding environment.

The risk assessment **should** consider the range of threats and causes that, without effective management controls, could lead to the condition of a site being inadequate to support the intended final land use on a sustainable basis. A list of the threats and causes to be considered as part of a rehabilitation risk assessment may include, but are not necessarily limited to, the following:

- adoption of inappropriate or inadequate rehabilitation techniques
- adoption of inappropriate rehabilitation and monitoring timeframes
- adoption of inadequate topsoil management practices
- soil compaction from exploration activities
- contamination resulting from exploration activities (e.g. storage and use of hydrocarbons/chemicals, drilling fluids, spillage of produced saline water, etc.)
- failure of borehole or petroleum well seals
- weather and climatic influences (e.g. drought, intense rainfall events, bushfire, etc.)
- weed infestation associated with both introduction and control (or lack thereof)
- introduction of plant disease
- damage from fauna (e.g. kangaroos, pest animals, livestock, etc.)
- lack of rehabilitation care and maintenance
- insufficient skills and experience of rehabilitation personnel
- lack of clearly defined responsibilities
- use of inappropriate rehabilitation machinery and equipment
- pre-exploration site conditions and environmental values (e.g. over-grazing, clearing, etc.).

The applicability of the controls to achieve effective rehabilitation is to be determined based on the site-specific risk assessments conducted by a title holder. This risk assessment **should** be used not only to establish a basis for managing risk when planning an activity, but it **should** also be used and updated (as required) to continuously evaluate risk and the effectiveness of controls used to prevent or minimise impacts. A title holder may also be directed to implement further measures where it is considered that a risk assessment and associated controls are unlikely to result in effective rehabilitation outcomes.

Title holders **should** use *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines* to support risk assessments.

Rehabilitation objectives and completion criteria

Rehabilitation objectives and completion criteria define the outcomes that will be used to measure and determine whether rehabilitation is successful and capable of supporting the intended post-exploration land use on a sustainable basis.

The level of detail to be included in the rehabilitation objectives and completion criteria **should** be proportionate to the type and scale of activities likely to cause disturbance, as well as the sensitivity of the surrounding environment.

A template on how to develop and present rehabilitation objectives and completion criteria is included as **Appendix 2**.

Rehabilitation Management Plan

Activities which have the potential to cause a significant rehabilitation liability (defined in this Code as higher-risk prospecting operations) require specific management to achieve sustainable rehabilitation outcomes. Higher-risk prospecting operations will require documentation of the rehabilitation risk management process within a Rehabilitation Management Plan (RMP). A RMP provides both a systematic and transparent means to manage these risks. A RMP is a "living" document that should be reviewed, updated and resubmitted to the Secretary as relevant.

The level of detail within a RMP **should** be proportional to:

- the type and scale of exploration activities likely to cause disturbance
- the sensitivity of the surrounding environment.

At a minimum, a RMP **should** include the following:

- a description of the type and scope of exploration activities covered by the RMP
- a risk assessment conducted in accordance with *AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines*, which evaluates the range of potential threats and opportunities associated with rehabilitating disturbed areas to a condition that can support the intended post-exploration land use (refer to Risk Assessment guidance above)
- baseline information on pre-existing land use, conservation values, land capability, extent of existing degradation, assessment of biological resources to be salvaged, etc.
- a requirement to take and keep photographs of work sites where it is proposed to disturb the surface
- final land use goals for the areas to be disturbed by exploration activities
- rehabilitation objectives and completion criteria developed in consultation with relevant landholders, which will need to be achieved to return land to a condition that is capable of supporting the post-exploration land use goal (refer to **Appendix 2**)
- a description of the measures that may be required to maintain or salvage biological resources for later use in rehabilitation (e.g. topsoil management, seed collection or purchase, salvage of habitat structures in consideration of baseline conditions)
- a description of the type of rehabilitation methods that may be used
- an outline of the proposed rehabilitation schedule, including opportunities for rehabilitation to be carried out in stages
- a description of the rehabilitation monitoring program, including initial establishment and performance against the rehabilitation objectives and completion criteria
- an outline of the triggers for, as well as types of, rehabilitation care and maintenance activities, (including intervention and adaptive management measures), to ensure that rehabilitation work is progressively meeting the nominated completion criteria in a timely and efficient manner
- any other control measures required to manage the risks identified in the risk assessment.

Rehabilitation program

It is well recognised that an effective and efficient means to achieve sustainable rehabilitation outcomes is to factor in rehabilitation throughout the life cycle of an exploration program. As a means to promote a systematic and integrated approach to rehabilitation, an example checklist to be considered by a title holder appears in **Appendix 3**. This checklist sets out the range of industry-recognised best practice rehabilitation controls and techniques that may be considered and used as guidance (not obligatory) by title holders on how to achieve the mandatory requirements on a case by case basis as part of a rehabilitation program.

A rehabilitation program will be specific to the nature and scale of disturbance and **should** be developed and implemented in consideration of site specific risk assessments. Title holders are encouraged to develop innovative practices in order to achieve the stated objectives and completion criteria.

The rehabilitation program must include a monitoring program to evaluate the progress of rehabilitation towards fulfilling long-term land use objectives and completion criteria (and **should** include non-disturbed areas for reference (analogue) sites).

The scope of the monitoring program will depend on the nature and scale of exploration activities (i.e. fit for purpose). It **should** be flexible enough to incorporate a range of industry accepted techniques that will enable rehabilitation to be assessed as meeting the completion criteria, whilst still enabling

comparison between monitoring periods. Guidance on the type of monitoring techniques that **should** be considered and implemented (where relevant) is outlined in **Appendix 3**. In order for rehabilitation to be determined to be complete, the title holder must provide sufficient records to the Department (refer to mandatory requirement 6) to demonstrate that the associated rehabilitation objectives and completion criteria have been met (refer to mandatory requirement 2a). The Minister may also consider whether the relevant landholder is of the opinion that rehabilitation has been completed.

Commencing rehabilitation

Progressive rehabilitation provides an effective means to reduce the overall liability for rehabilitation works, provide stability for disturbed areas, test and improve rehabilitation practices and improve visual amenity. Importantly, it has the potential to reduce the timeframe required to return land disturbed by exploration activities to a condition that is capable of supporting the intended final land use(s) on a sustainable basis. Therefore, the principle of progressive rehabilitation **should** be integrated within the exploration Work Program.

However, there are a number of factors that may affect the appropriate timing of rehabilitation activities, such as the nature and scale of exploration activities, the need to prevent sowing in unseasonal conditions, the availability of suitable rehabilitation equipment and machinery, and access to land. Nevertheless, a title holder would be expected to show reasonable cause **should** the rehabilitation program be delayed.

Maintenance of records

The objective of the requirement to maintain records is to enable a title holder to demonstrate compliance with the mandatory requirements of this Code.

Further, without an effective and relevant records management system, there is a risk that knowledge is not retained, and the effectiveness of controls cannot be evaluated to continually improve rehabilitation practices.

Appendix 2: Example rehabilitation objectives and completion criteria template

Land use goal	Objectives	Completion criteria
Native Ecosystem or Agricultural Land Use or Other *Note:* Where there are multiple land use goals, a set of objectives and completion criteria will need to be developed for each land use goal.	**Infrastructure** All infrastructure that is not to be used as part of the future intended land use is removed to ensure the site is safe and free of hazardous materials.	• All services (power, water, communications) that have been connected on the site as part of the exploration program have been removed. • All exploration plant, equipment and associated infrastructure (including portable offices, camp facilities, storage racks, and samples) have been removed. • All equipment and logging tools have been removed from the borehole or petroleum well prior to sealing or plugging and abandonment. • All water management infrastructure (including pumps, pipes and power) have been removed. • All drill cores and collected cuttings have been removed. • All boreholes and petroleum wells have been surveyed, sealed and rehabilitated in accordance with departmental guidelines. • Statutory notification/reporting (as required) of any unsealed parts of any boreholes or petroleum wells, or any tools lost down boreholes/wells has been completed.
	Infrastructure to remain All infrastructure that is to remain as part of the future land use is safe and does not pose any hazard to the community.	• Potential hazards (e.g. electrical, mechanical) have been effectively isolated. • No bushfire risk has been created (point of ignition). • Damage to access tracks has been repaired and stabilised. • If any underground pipelines are to remain in situ, the location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig.
	Land contamination There is no residual soil contamination on site that is incompatible with intended land use or that poses a threat of environmental harm.	• There are no visible signs of contamination following the removal of plant, equipment and materials. • All rubbish and waste materials have been removed from the site. • Contamination has been appropriately remediated so that appropriate guidelines for intended land use are met.

Land use goal	Objectives	Completion criteria
Native Ecosystem or Agricultural Land Use or Other *Note:* Where there are multiple land use goals, a set of objectives and completion criteria will need to be developed for each land use goal.	**Landform stability** The final landform is stable and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna.	There is: • minimal erosion that would require moderate to significant ongoing care and maintenance works • no areas of active gully erosion • no evidence of excessive sediment build-up (from sheet erosion) at the base of slopes • no evidence of tunnel erosion • no active rilling and rill erosion limited to isolated areas of up to 200 mm deep • no active scouring where the runoff from rehabilitation areas discharges into natural channels.
	Landform stability (large-scale excavations) Final landform is suitable for final land use and compatible with surrounding landscape as a sustainable native ecosystem (potentially relevant for exploration activities such as bulk sampling).	• Where the maximum slope of final landform exceeds 10 degrees, a geotechnical assessment undertaken by a suitably qualified person concludes that the landform is stable and suitable for the final land use objective. • Contour banks are stable and there is no evidence of overtopping or significant scouring as a result of runoff. • Surface layer is free of any hazardous materials.
	Bushfire The risk of bushfire and impacts to the community, environment and infrastructure have been addressed as part of rehabilitation.	• Appropriate bushfire hazard controls (where required) have been implemented on advice from the NSW Rural Fire Service.
Native Ecosystem or Agricultural Land Use or Other *Note:* Where there are multiple land use goals, a set of objectives and completion criteria will need to be developed for each land use goal.	**Water quality** Runoff water quality is similar to, or better than, the pre-disturbance runoff water quality.	• Runoff water quality from rehabilitation areas represent an acceptable level of change from a defined reference condition (refer to Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000).
	Native revegetation Revegetation is sustainable for the long term, and only requires maintenance that is consistent with the intended final land use.	• Topsoil or a suitable alternative has been applied in a manner to maximise viability of revegetation substrate. • Revegetation areas contain flora species assemblages characteristic of species found within the region and will provide fauna habitat value in the future. • More than 75% of trees are healthy and growing as indicated by monitoring. • Vegetation cover is adequate to reduce the risk of soil erosion. • There is no significant weed infestation, such that weeds do not comprise a significant proportion of species in any stratum.

Land use goal	Objectives	Completion criteria
	Agricultural revegetation Revegetation is sustainable for the long term and only requires maintenance that is consistent with the intended final land use.	• The re-established topsoil/subsoil substrate is capable of supporting the targeted pasture/cropping regime on a sustained basis. • Cropping/Pasture establishment is consistent with the range of species utilised within the region. • Cropping/Pasture establishment is in good health and provides adequate cover. • Cropping yields from rehabilitated drill sites are similar to adjacent cropping land.

Appendix 3: Example rehabilitation program checklist

Note: The example rehabilitation program checklist below may be used (as appropriate) as guidance by title holders (not obligatory). The applicability of each item outlined in the checklist will vary depending on the nature, scale and risks associated with the proposed exploration activities.

Controls	Check
Prior to ground disturbance works	
Where vegetation is to be disturbed, implement a seed collection and handling program aimed at maximising the viability and diversity of local seed in the revegetation mix as part of the rehabilitation program. Factors to consider include forward timeframes required to collect seed, appropriate treatment and storage to maintain viability, and suitably qualified and experienced selectors.	
Undertake assessment of soils (e.g. to assess the suitability, thickness and quality of the topsoil resource and all subsoil horizons, including with regard to (as appropriate) soil texture, fertility, presence of organic matter, presence and abundance of weed species, and chemical analyses) in any areas to be stripped, to determine potential constraints to achieve rehabilitation to the intended post-exploration land use. *(Note: Visual characterisation of the profile should be more than adequate in most circumstances).*	
During ground disturbance works	
Implement erosion and sediment controls in accordance with the practices and principles of *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2E, Mines and Quarries* (DECC 2008b). Refer to http://www.environment.nsw.gov.au/stormwater/publications.htm).	
Undertake topsoil and subsoil stripping when soils are moist (i.e. not saturated nor dry).	
Strip topsoil and subsoil using appropriate equipment to the appropriate depths as identified through the soil characterisation assessment. Where a weed infestation exists, a risk assessment should be conducted to determine whether the reuse of this material will compromise sustainable rehabilitation outcomes.	
Set equipment blades above ground level to minimise disturbance to topsoil, rootstock and the topsoil seed bank in areas where total clearing and/or stripping is not required (e.g. where the proposed activities are limited to the storage of materials, placement of demountable buildings and surface tanks).	
Strip and stockpile topsoil and subsoil layers separately so that they can be returned in sequential order as part of rehabilitation.	
Salvage and retain cleared vegetative materials (e.g. logs and branches) for later use in native rehabilitation and habitat provision (e.g. hollow logs).	
Locate soil stockpiles away from traffic areas and at an appropriate distance from watercourses.	
Locate soil stockpiles on level or gently sloping areas to minimise the potential for erosion and soil loss.	
Limit soil stockpiles to less than two metres high and set out in windrows to maximise surface exposure and biological activity.	

Controls	Check
Implement measures to reduce compaction of soil stockpiles (e.g. matting and geofabric material) as appropriate *(Note: This risk is scale dependent and more applicable to large-scale stockpiles)*.	
Install appropriate sediment controls around soil stockpiles to reduce the potential for soil loss.	
Establish a cover on soil stockpiles within 10 days of stockpiling (e.g. by establishing a cover crop, spraying with a bind agent or using geotextile material).	
Appropriately sign-post soil stockpiles to identify the area and minimise the potential for unauthorised use or disturbance.	
Monitor and control weed growth on soil stockpiles. Scalp weeds if appropriate.	
At the completion of exploration activity	
Remove and lawfully dispose of all grid pegs, tags, sample bags, flagging tape, drill chips and other waste.	
Remove all drill cores.	
Remove and lawfully dispose of all plant and equipment (including surface pipelines) and imported fill material.	
Where buried pipelines are to remain *in situ* due to the environmental risks associated with removal, mark the pipeline route on site services plans and register with the local relevant authority (e.g. local Council) and Dial Before You Dig.	
Remove equipment and logging tools from the borehole or petroleum well prior to sealing or plugging and abandonment of the borehole or petroleum well, unless otherwise directed by the Minister.	
Prior to commencing rehabilitation (identification and remediation of contamination)	
Undertake a visual contamination assessment where potential pollution generation activities have occurred (e.g. hazardous substance storage, saline water storage) to identify potential signs of contamination.	
Where contamination is present, develop and implement a contamination remediation program to ensure that the rehabilitation objectives and completion criteria for the intended post-exploration land use are met.[3]	
Prior to commencing rehabilitation (developing rehabilitation methodologies)	
Consult with relevant landholder(s) regarding the timing and methodology for rehabilitation.	
Consult with the relevant landholder regarding: • areas of potential impacts to be factored into the rehabilitation program • where a return to an agricultural land use is nominated, development of the revegetation strategy (including the proposed seed mix).	
Develop rehabilitation methodologies in consideration of site specific constraints (e.g. topsoil and subsoil availability and quality, presence of contamination) in order to achieve the nominated rehabilitation objectives and completion criteria.	
Where revegetation is required, analyse representative samples to characterise the nature of the substrate (e.g. sodicity, acid-generating potential) and determine any potential limitations to rehabilitation and sustainable plant growth.	

Controls	Check
Use the results to determine specific amelioration techniques (e.g. addition of gypsum, lime, organic matter) that will be used to overcome potential limitations to landform stability, vegetation establishment and growth.	
Apply ameliorants (e.g. gypsum or lime) and organic material (e.g. mulch) based on the outcomes of the substrate characterisation (as appropriate).	
Prior to commencing rehabilitation (substrate preparation)	
Scalp any weed growth from the top of soil stockpiles to minimise the transport of weeds into rehabilitated areas.	
Implement suitable erosion control measures (e.g. catch drains, sediments dams, silt fences, ripping/scarifying parallel to contour) to minimise soil loss from areas undergoing rehabilitation.	
During rehabilitation (general timing of rehabilitation activities)	
Undertake revegetation activities in or just prior to suitable seasonal conditions.	
If revegetation is delayed due to unsuitable seasonal conditions, undertake temporary stabilisation measures (e.g. sterile cover crops, erosion and sediment controls) to prevent, or where prevention is not practicable, minimise, erosion and further land degradation.	
Return all subsoil horizons and topsoil layers in sequential order.	
During rehabilitation (general methodologies)	
Use appropriate earthmoving equipment to prevent, or where prevention is not practicable, minimise, compaction of the rehabilitation substrate.	
Restore soil structure by scarifying or ripping (if soil compaction or erosion has occurred) in parallel with the contour.	
Implement erosion and sediment controls in accordance with the practices and principles of *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2E, Mines and Quarries* (DECC 2008b). Refer to http://www.environment.nsw.gov.au/stormwater/publications.htm).	
Where direct tree seeding is planned, rip final surfaces parallel with the contour prior to the application of seed to provide for an adequate seed bed.	
Where access tracks are to be removed (e.g. not to be left as part of final land use as defined by rehabilitation objectives and completion criteria), remove imported fill material (if any) and re-profile the disturbance area to the pre-existing landform.	
Apply soil ameliorants (if required), such as fertiliser, etc., to the substrate prior to the commencement of revegetation activities.	
During rehabilitation (revegetation—native ecosystem)	
Consider techniques such as brush-matting where disturbed areas are situated directly adjacent to mature native ecosystems that provide a good source of local seed, to stabilise the site while natural recruitment occurs.	
Use local provenance seed for direct seeding or for the propagation of tubestock.	

Controls	Check
Use structures such as tree hollows, logs and other woody debris, to augment the habitat value of native rehabilitation (if appropriate, including with regard to bushfire risks).	
Where adverse seasonal conditions (i.e. drought) or other factors may affect the availability of local provenance seed, supplement with non-local provenance seed as required.	
During rehabilitation (revegetation – agricultural land use)	
Implement revegetation techniques to establish grazing and cropping areas consistent with local agricultural practices (e.g. sowing with grasses and legumes appropriate to the district/same paddock and recognised as suitable for grazing).	
After rehabilitation and prior to relinquishment (rehabilitation monitoring program)	
A range of monitoring techniques may be used for native rehabilitation, depending upon the sensitivity of the ecosystem to be established. The scope of the monitoring program should usually include photographic monitoring from fixed points. It may also include, but not necessarily be limited to, general walkover inspections to assess condition, vegetation monitoring procedures, such as measurement of cover, abundance (density), and numbers of species.	
For areas rehabilitated to an agricultural land use, include surveys to assess the quality and health of soils and pasture/crop species along with stock carrying capacity (where required) and crop yields (where required) in rehabilitation monitoring programs.	
After rehabilitation and prior to relinquishment (rehabilitation care and maintenance program)	
Develop and implement a rehabilitation care and maintenance program based on the needs identified in the rehabilitation monitoring program. This program may include, for example: • weed and pest animal control • erosion and drainage control works • re-seeding/planting of failed rehabilitation areas (e.g. through lack of germination, high plant mortality rate) • watering and fertilising (as appropriate) of rehabilitation plantings • repair of fence lines, access tracks and other general related land management activities • regular site inspections to assess rehabilitation performance. The program should facilitate progress of rehabilitation towards meeting the nominated rehabilitation objectives and completion criteria in a timely and cost-effective manner.	
Conduct a site inspection not later than three months following the completion of each rehabilitation campaign to determine whether any performance issues have occurred or are emerging which have the potential to delay revegetation establishment.	
Conduct additional regular site inspections (such as quarterly) to assess the effectiveness of rehabilitation measures (e.g. soil conditions and erosion, drainage and sediment control structures, runoff water quality, revegetation germination rates, plant health and weed infestation) until vegetation has become well established and the site can be considered stable.	
Record outcomes of inspections and implement any required intervention/adaptive management actions as soon as practicable after a monitoring program indicates that rehabilitation performance is unsatisfactory as part of the rehabilitation care and maintenance program.	
Continue rehabilitation care and maintenance program until rehabilitation can be demonstrated to have satisfied the rehabilitation objectives and completion criteria.	

Appendix 4: Interpretation and definitions

In this Code of Practice:

1. reference to a document is a reference to that document as amended or replaced from time to time
2 words have the meaning given to those terms in a prospecting title, unless otherwise defined in the table below
3 terms in column 1 of the following table have the meaning set out in column 2.

Column 1 (Term)	Column 2 (Meaning)
Act	The *Mining Act 1992* and/or the *Petroleum (Onshore) Act 1991*, as relevant
Activity	Any activity carried out in connection with exploration including: • the use of land • means of accessing land • the carrying out of a work
Activity approval	An approval to carry out assessable prospecting operations granted under the *Mining Act 1992* or the *Petroleum (Onshore) Act 1991*
Assessable prospecting operation	Any prospecting operation that is not exempt development within the meaning of clause 10 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
Biological resources	In biology and ecology, a substance that is required by a living organism for normal growth, maintenance and reproduction In the context of rehabilitation, a biological resource may include, but is not necessarily limited to, topsoil and subsoils, woody or vegetative materials, rocks, and nesting structures that when salvaged can be used to enhance the biological and ecological functioning of a rehabilitated site.
Borehole	A hole made by drilling or boring, but excludes sampling and coring using hand held equipment; and petroleum wells
Clearing	Any one or more of the following: • cutting down, felling, thinning, lopping, logging or removing vegetation • killing, destroying, poisoning, ringbarking, uprooting or burning vegetation
Department	The Division of Resources and Geoscience within the Department of Planning and Environment
Drilling	The perforation of the earth's surface crust by mechanical means to form a hole, whether the hole caused by the perforation is vertical, inclined or horizontal, and includes all operations for preventing collapse of the sides of any such hole or for preventing it from being filled with extraneous materials including water
Drilling fluid	Any liquid or gaseous fluid, or mixture of fluids and solids (as solid suspensions, mixtures and emulsions of liquids, gases and solids) used in operations to drill boreholes into the earth
Exempt development	Has the same meaning as it has in *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
Exploration	Has the same meaning as it has in the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*

Column 1 (Term)	Column 2 (Meaning)
Fauna	Has the same meaning as it has in the *National Parks and Wildlife Act 1974*
Habitat	Has the same meaning as it has in the *Threatened Species Conservation Act 1995* and *Fisheries Management Act 1994*
Harm	In relation to matters of national environmental significance, has the same meaning as 'significant impact' as provided by the 'Significant Impact Guidelines' used to determine whether assessment and approval is required under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* In relation to the environment, has the same meaning as it has in the *Protection of the Environment Operations Act 1997* In relation to threatened species, populations or ecological communities, has the same meaning as: • 'harm an animal' in the *National Parks and Wildlife Act 1974* • 'pick a native plant' in the *National Parks and Wildlife Act 1974* • 'harm' in the *Fisheries Management Act 1994* In relation to an aquifer or waterfront land, has the same meaning as it has in the *Water Management Act 2000* In relation to Aboriginal places or Aboriginal objects has the same meaning as it has in the *National Parks and Wildlife Act 1974* In relation to items of heritage significance, has the same meaning as it has in the *Heritage Act 1977* In relation to protected marine vegetation, has the same meaning as it has in the *Fisheries Management Act 1994*
Higher-risk prospecting operations	Includes any of the following activities (excluding geological mapping and airborne surveys): • excavations or bulk sampling in excess of 60 cubic metres • any prospecting operation resulting in a cumulative surface disturbance exceeding a total of five (5) hectares within the prospecting title area • construction and use of petroleum wells, including associated water management, gas gathering and pipeline infrastructure
Land	Includes: • the sea or an arm of the sea; • a bay, inlet, lagoon, lake or body of water, whether inland or not and whether tidal or non-tidal; • a river, stream or watercourse, whether tidal or non-tidal; and • a building erected on the land
Minister	The Minister administering the Act

Column 1 (Term)	Column 2 (Meaning)
Petroleum well	A hole made by drilling or boring in connection with prospecting for petroleum or operations for the recovery of petroleum, but excludes: • sampling and coring using hand held equipment • a hole constructed and operated for the following purposes where the operation of that hole does not involve fracture stimulation or the recovery of petroleum: – stratigraphic definition – seismic (for example shot holes, geophone, tilt meters bores – water monitoring – environmental assessment
Prospect	Has the same meaning as it has in the *Mining Act 1992* and the *Petroleum (Onshore) Act 1991* (as relevant)
Prospecting title	An exploration licence, special prospecting authority or assessment lease granted under the *Mining Act 1992* or the *Petroleum (Onshore) Act 1991*
Rehabilitation	Has the same meaning as it has in the *Mining Act 1992*
Relinquishment	Sites disturbed by exploration activities which have been accepted by the Secretary as being rehabilitated
River	Has the same meaning as it has in the *Water Management Act 2000*.
Secretary	The Secretary of the Department of Planning and Environment.
Seismic survey	The use of shock waves (generated in the ground using either small explosive charges detonated below the surface, hand-held mechanical hammers or vehicle-mounted hammers) and an array of geophones, which are connected to measuring instruments, to differentiate the geophysical properties of the subsurface of the earth
Site	The land on which an activity is carried out
Surface disturbance	Means: • disturbance, exposure, or covering of the surface of land in any manner • degradation or deterioration in any manner of the physical surface of land
Terms	In relation to activity approvals, the terms imposed by the decision-maker on the grant of an activity approval
Threatened species, populations, or ecological communities	Has the same meaning as it has in the *Threatened Species Conservation Act 1995* and *Fisheries Management Act 1994*
Title holder	A person or company to whom a prospecting title has been issued
Track	All unsealed routes that will be traversed multiple times, but does not include single pass (ingress and egress) routes or seismic shot and receiver lines
Waste	Has the same meaning as it has in the *Protection of the Environment Operations Act 1997*
Watercourse	A river, estuary or lake as defined in the *Water Management Act 2000*
Water land	Has the same meaning as it has in the *Fisheries Management Act 1994*
Well	Has the same meaning as it has in the *Petroleum (Onshore) Act 1991*

Column 1 (Term)	Column 2 (Meaning)
Western Division	Has the same meaning as it has in the *Crown Lands Act 1989*
Wetlands	Has the same meaning as it has in the *Fisheries Management Act 1994*