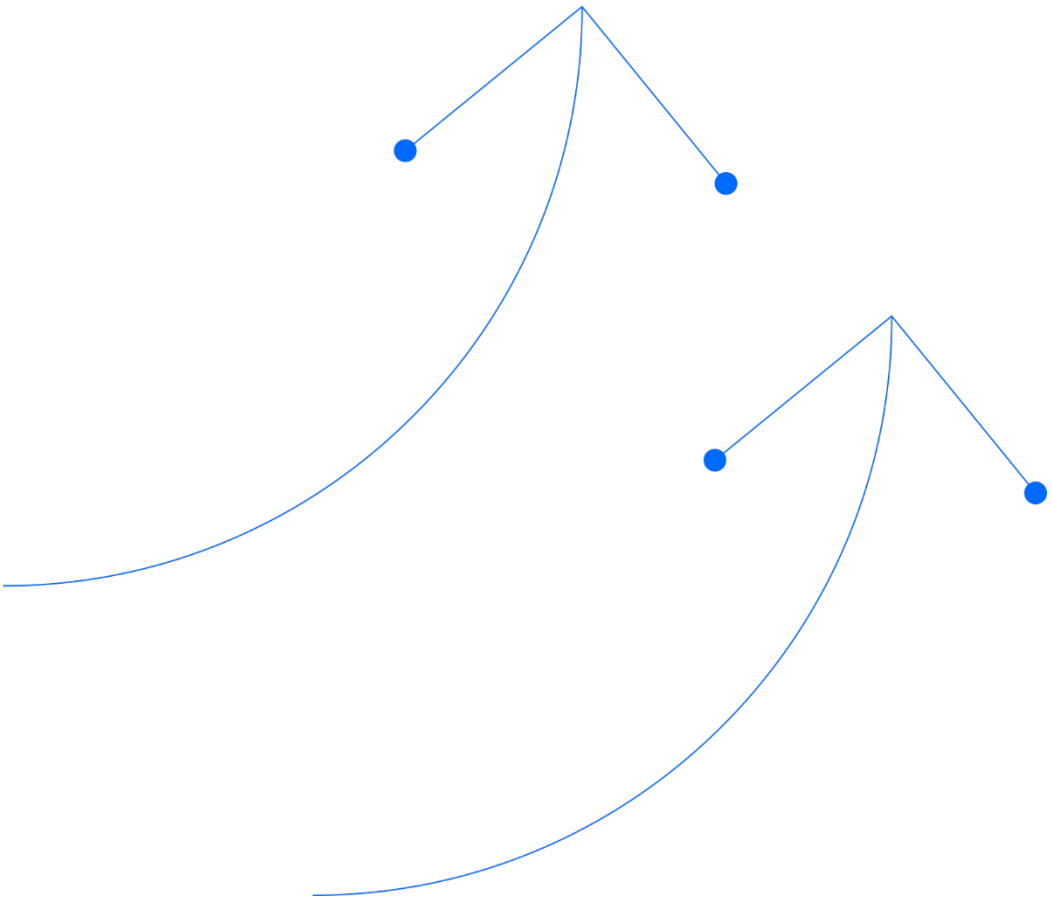
Santos

Santos Roma Phase 7-7B-SD20 Development

REHABILITATION MONITORING PLAN

February 2025



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Glossary

Term	Definition
ADP	Advanced Depletion Pilots
AHD	Australian Height Datum
ATP	Authority to Prospect
BD	Biodiversity
CCA	Conduct and Compensation Agreements
CSG	Coal Seam Gas
DESI	Department of Environment, Science and Innovation, Queensland Government (now DETSI)
DETSI	Department of the Environment, Tourism, Science and Innovation, Queensland Government
EA	Environmental Authority
EMP	Santos Roma Phase 7-7B-SD20 Development Environmental Management Plan
EP Act	Environmental Protection Act 1994
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
EPQ	Exploration Permit Greenhouse Gas
ESA	Environmentally Sensitive Area
ESC	Erosion and sediment controls
FRC	Final Rehabilitation acceptance Criteria
FRR	Final Rehabilitation Register
GDE	Groundwater Dependent Ecosystem
GFD	Gas Field Development
GIS	Geographic Information System
GLNG	Gladstone Liquefied Natural Gas
ha	hectares
HES	High Ecological Significance
HEV	High Ecological Value
JV	Join Venture
km	kilometres
m	metres
MNES	Matters of National Environmental Significance, being the relevant matters protected under Part 3 of the EPBC Act.
PESCC	Petroleum Exploration Standard Condition (Schedule C)
PESCD	Petroleum Exploration Standard Condition (Schedule D)
PL	Petroleum Lease
Project Area	The bounds of ATP 2053
RE	Regional Ecosystem
RMP	Santos Roma Phase 7-7B-SD20 Development Rehabilitation Monitoring Plan
RoW	Right of Way
SDS	Safety Data Sheet
SF	State Forests
SSMP	Santos Roma Phase 7-7B-SD20 Development Significant Species Management Plan
TRC	Transitional Rehabilitation Criteria
VMA	Vegetation Management Act 1999

1. Introduction

Santos and its joint venture partners are proposing a new gas field development located in central-eastern Queensland to supply natural gas to commercial markets. The proposed development will be known as the 'Santos Roma Phase 7-7B-SD20 Development' (the Project).

1.1. Overview

The Project will involve the progressive construction, operation, decommissioning and rehabilitation of up to 24 coal seam gas (CSG) wells, gas and water gathering flowlines and access track infrastructure in petroleum exploration tenure Authority to Prospect (ATP) 2053 (the Project Area). The Project Area is located in central-eastern Queensland, approximately 5 kilometres (km) east of the regional town of Wallumbilla. The regional location of the Project Area is shown in Figure 1.

The Project footprint located in the Project Area will cover approximately 66 hectares (ha) of land. Petroleum exploration activities undertaken by the Santos in the Project Area to date include the drilling and completion of 5 CSG appraisal wells and construction of associated infrastructure in 2022-2024. These activities are authorised under existing approved Queensland Environmental Authority (EA) 0002052. The existing 5 wells form part of the proposed 24 CSG wells.

CSG and water produced from the Project Area will be sent to existing approved centralised gas and water storage / processing and gas compression facilities located on adjacent Santos owned and operated petroleum tenures. Petroleum activities on adjacent tenures are authorised under existing EPBC Act approvals for the Gladstone Liquified Natural Gas Field Development Project (GLNG GFD) (EPBC Numbers 2008/4059 and 2012/6615) and EAs EPPG00898213 and EPPG00662213.

No gas compression or water treatment facilities are proposed to be constructed or operated within the Project Area, and no significant water storage structures will be constructed or operated within the Project Area. Where required, prefabricated water storage tanks (concrete panel tanks or similar) will be assembled for water storage.

The Project will include the following components (but not limited to):

- well leases (typically 1.25 ha for single wells and 3 ha for multi-wells)
- water / gas gathering lines, trunklines and pipelines (typically 20 - 35 metres (m) wide)
- roads and access tracks (typically 10 - 15 m wide)
- other supporting infrastructure:
  - temporary water storage tanks
  - temporary workers camps
  - power and communications lines; and
  - other incidental and ancillary petroleum activities required to support the authorised activity.

Well development will be phased to optimise gas production to meet Santos' gas supply obligations and opportunities. Once operational, gas produced from the Project will supply commercial markets.

Once completed and connected to gas and water gathering infrastructure, operational wells will operate continuously on a 24-hour basis for an anticipated operational life of 30 - 50 years. Progressive decommissioning and rehabilitation of activities and infrastructure will occur over the life of the Project, thereby reducing disturbance areas for the duration of operation, until final decommissioning and rehabilitation at end of project life.

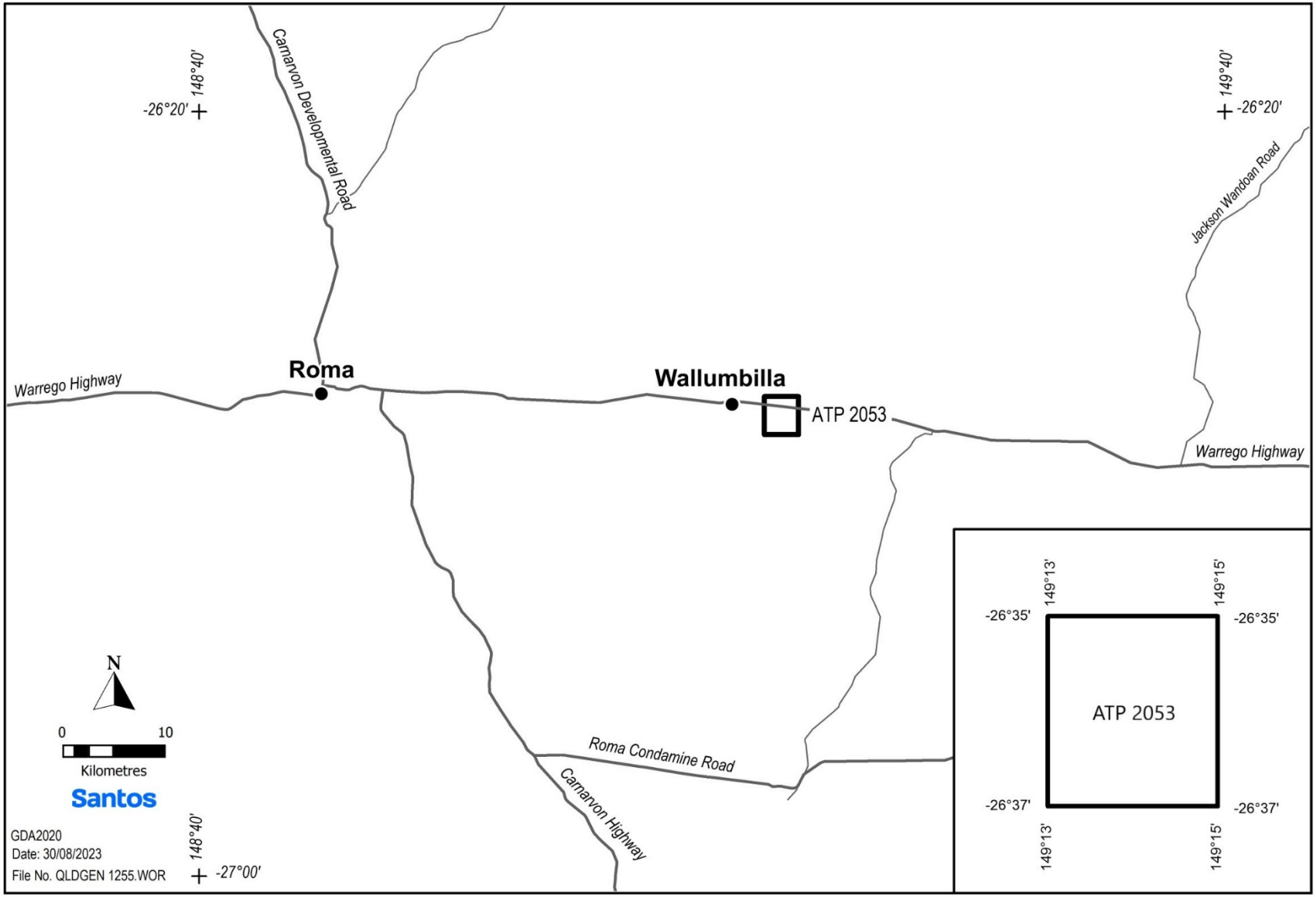

Figure 1: Santos Roma Phase 7-7B-SD20 – Project Area (ATP 2053)

1.2. Purpose and scope

This Rehabilitation Monitoring Plan (RMP) identifies a range of rehabilitation methods required to successfully undertake rehabilitation of land to pre-disturbance land use. This RMP has been developed to meet the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and *Environmental Protection Act 1994* (Qld) (EP Act).

The RMP identifies rehabilitation monitoring, indicators and acceptance criteria to be met in returning land to a pre-disturbance land use and ecological condition, and it will assist to minimise impacts to MNES through the restoration of land to pre-disturbance land use and ecological condition. This RMP has been written by a suitably qualified person to meet and / or exceed final rehabilitation requirements set out in the Streamlined model conditions for petroleum activities (ESR/2016/1989) (DESI, 2024) (refer to Section 1.3.2).

Santos plans to convert the current exploration tenure for the Project Area (ATP 2053) from an ATP to a new Petroleum Lease (PL). Santos will need to apply for new a PL, granted under Chapter 2 of the Queensland *Petroleum and Gas (Production and Safety) Act 2004* (P&G Act) to replace the existing ATP. To authorise petroleum production activities on the new PL, Santos will also need to apply for a new EA under the EP Act.

By referencing the Streamlined model conditions (DESI, 2024), this RMP has been written to consider likely final rehabilitation requirements (conditions) of the new EA, however it will be revised or updated once the new EA is granted to ensure it complies with any additional conditions.

In addition, this RMP will be revised or updated from time-to-time to align with regulatory requirements. Revised versions of the RMP will be made available upon request to DCCEEW or as otherwise required under conditions of a regulatory approval, whether under the EPBC Act or any other applicable legislation.

1.3. Project approvals

1.3.1. EPBC Act

This Plan has been prepared with consideration to the MNES values potentially impacted by the Project and operates in conjunction with other key documentation including the *Santos Roma Phase 7-7B-SD20 Development Environmental Protocol for Constraints Planning and Field Development* (Constraints Protocol) (Santos, 2024a), *Santos Roma Phase 7-7B-SD20 Development Significant Species Management Plan* (SSMP) (Santos, 2024b) for the implementation of the hierarchy of management principles to avoid, minimise and manage land disturbance impacts on MNES during the Project.

The Project will avoid disturbance to areas confirmed as MNES (as detailed in the Constraints Protocol). Refer to the *Roma Phase 7-7B SD20 Development Matters of National Environmental Significance Ecological Assessment Report* (Boobook, 2025) for a detailed description of MNES present in the Project Area.

This Plan focuses on the following management principle:

- actively rehabilitate disturbed areas to promote and maintain long-term recovery of the values unavoidably impacted by the Project.

1.3.2. EP Act - Streamlined Conditions

As discussed in Section 1.2, this RMP has been developed to achieve compliance with rehabilitation conditions contained in ESR/2016/1989 (and the expected conditions to be contained in a new EA following conversion of the Project Area from an ATP to a PL). Table 1 identifies relevant ESR/2016/1989 conditions as they relate to rehabilitation for this RMP.

For the purposes of this RMP, rehabilitation means:

> "*the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration*".

Table 1: Relevant Streamlined conditions for rehabilitation

EA Condition Number	Requirement	RMP Section Addressed
Rehabilitation 1	A rehabilitation Plan must be developed by a suitably qualified person and must include the: a) rehabilitation goals; and b) procedures to be undertaken for rehabilitation that will: i. achieve the requirements of conditions (Rehabilitation 2) and (Rehabilitation 8)[1], inclusive; and ii. provide for appropriate monitoring and maintenance	1.2 above
Rehabilitation 2	Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria: a) contaminated land resulting from petroleum activities is remediated and rehabilitated b) the areas are: i. non-polluting ii. a stable landform iii. re-profiled to contours consistent with the surrounding landform c) surface drainage lines are re-established d) top soil is reinstated; and e) either	6.1 below

EA Condition Number	Requirement	RMP Section Addressed
	i. groundcover, that is not declared pest species, is growing; or ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained	
Rehabilitation 3	All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use: a) greater than or equal to 70% of native ground cover species richness b) greater than or equal to the total per cent of ground cover c) less than or equal to the per cent species richness of declared plant pes species; and d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.	4 below 5 below
Rehabilitation 4	Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre- disturbance biodiversity values assessment (required by conditions (Biodiversity 1)[2] and (Biodiversity 2)[3]) must be met: a) greater than or equal to 70% of native ground cover species richness b) greater than or equal to the total per cent ground cover c) less than or equal to the per cent species richness of declared plant pest species d) greater than or equal to 50% of organic litter cover e) greater than or equal to 50% of total density of coarse woody material; and f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.	6 below 7 below
Notes on Final Acceptance Criteria:	Notes on Final Acceptance Criteria: Final acceptance criteria are required in order to provide certainty and finality about when criteria are met. These conditions are critical in order to declare that rehabilitation standards have been met. Final acceptance criteria must be met before the EA can be surrendered. A final rehabilitation report, required to be submitted with a surrender application will demonstrate this. There are no prescribed monitoring standards for rehabilitation as this is inherently required in order to demonstrate compliance with conditions (Rehabilitation 3) and (Rehabilitation 4). The plan of Operations also must contain a program for rehabilitation that sets out how rehabilitation will be carried out. The action program within the Plan of Operations will necessarily include monitoring as this will be the primary means to demonstrate compliance with the rehabilitation and financial assurance conditions of the environmental authority. The onus of proof in relation to the data presented to demonstrate that final acceptance criteria have been met lies with the holder of the environmental authority.	

Table note:

[1] Rehabilitation 8 pertains to remaining dams:

- Where there is a dam (including a low consequence dam) that is being or intended to be utlitised by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

[2] Biodiversity 1 pertains to protecting biodiversity values:

- Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation confirmation of on-the-ground biodiversity values of the native vegetation communities at that location must be undertaken by a suitably qualified person.

[3] Biodiversity 2 pertains to protecting biodiversity values:

- A suitably qualified person must develop and certify a methodology so that condition (Biodiversity 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.

2. Roles and Responsibilities

Santos's personnel are responsible for the environmental performance of their activities, for complying with relevant approval / permit requirements and for ensuring that all environmental objectives associated with the work are achieved.

Personnel must also be mindful of the General Environmental Duty as outlined in the EP Act. Section 319 of the EP Act states that "*a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practical measures to prevent or minimise the harm*".

3. Existing Environment

The Project Area is located approximately 5 km east of the regional town of Wallumbilla in central Queensland in the Maranoa Regional Local Government Area (LGA). This Project Area is located in the southern extent of the Brigalow Belt Bioregion (BRB).

3.1. Land use

The Project Area is predominantly rural land characterised non-remnant derived grasslands dominated by introduced pastoral grasses with occasional native trees and shrubs. The area is used largely for agricultural development, primarily cattle grazing. The findings of ecological field surveys and review of aerial imagery indicate that vegetation and fauna habitats within the local area are generally disturbed and highly fragmented as a result of land use practices (Boobook, 2025).

The agricultural land uses of the region coexist with existing petroleum, energy and mining activities. Existing permits overlapping the Project Area include:

- EPC 1763 held by Wanbei Coal Electricity International Mining (Australia) Pty Ltd
- EPG 2034 held by Within Energy Pty Ltd
- Wallumbilla to Reedy Creek Pipeline (Petroleum Pipeline Licence (PPL) 2023) held by APA Reedy Creek Wallumbilla Pty Ltd; and
- a powerline easement crossing the northern portion of the Project Area held by Ergon Energy.

Two State-controlled roads are in the vicinity of the Project Area, including the Warrego Highway running east to west through the northern half of the Project Area, and Wallumbilla South Road located approximately 3 km west of the Project Area, providing efficient access for local and heavy vehicle traffic.

In the wider local area, a number of State Forests (SF) occur within 20 km of the Project Area, including Inglebogie SF approximately 15 km east of the Project Area, Yuleba SF approx. 20 km to the east and Wallabella SF 16 km to the south.

3.2. Topography

This is a landscape of low relief comprising a broad floodplain with meandering streamlines flanked by slightly elevated areas. Ground elevations within the Project Area range from approximately 300 m to 350 m Australian Height Datum (AHD). Beyond the Project Area, to the east, an abrupt north-south trending plateau rises up to 50 m above the surrounds, forming the Grafton Range.

3.3. Climate

The climate of the Project Area is classified as subtropical with a moderately dry winter. Mean maximum temperatures range between 34.6°C in the summer months and 20.4°C in the winter months (Bureau of Meteorology station 043091, Roma Airport) (Bureau of Meteorology, 2024). Mean minimum temperatures range between 21.1°C in the summer months and 3.7°C in the winter months. The highest rainfall occurs during December to February with an average highest rainfall of 75.2 mm in December, the lowest rainfall occurs during June to September with a lowest average rainfall of 24.9 mm in August (Bureau of Meteorology, 2024).

The average annual evaporation in the vicinity of the Project Area is between 2,000 millimetres (mm) and 2,400 mm. The highest evaporation occurs during the summer months (average monthly pan evaporation 300 mm), while the lowest evaporation occurs during the winter months (average monthly pan evaporation 80 mm) (Bureau of Meteorology, 2024) (Bureau of Meteorology, 2024).

3.4. Regional catchment and surface water quality

The Project Area is located within the Bungil Creek catchment of the Maranoa-Balonne Rivers Basin (WQ4222) as described by the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (DESI, 2023). The Maranoa–Balonne Basin is a subset of the broader Condamine-Balonne catchment of the Murray-Darling Basin. Environmental values and water use associated with the Bungil Creek catchment include aquatic ecosystems, irrigation, farm supply / use, stock water, aquaculture, human consumption, primary recreation, secondary recreation, visual recreation, drinking water, industrial use and cultural, spiritual and ceremonial values. No High Ecological Value (HEV) waters are mapped within the Project Area. While the Project Area generally has a uniform elevation, ranges in the surrounding region include the Great Dividing Range to the north, Grafton Range to the west, and the Dulacca Range to the south-east. Most watercourses in the Project Area are ephemeral. There are no watercourses mapped within the Project Area, the closest major watercourses include:

- Washpool Creek: is a minor creek, which originates 5 km north of the Project and flows through the Project before joining Wallumbilla Creek 2 km south of the Project
- Wallumbilla Creek: originates 16 km northwest of the Project and flows south – southeast close to the township of Wallumbilla. The creek continues to flow south before reaching the Balonne River confluence downstream of Yuleba Creek, 54 km south of the Project; and
- Middle Creek: is a tributary of Wallumbilla Creek, which originates 15 km northwest of the Project and flows south between the township of Wallumbilla and the Project before joining Wallumbilla Creek 2 km west of the Project.
- Yuleba Ck (consists of SO 1-5 tributaries) is identified by the *Qld Water Act 2000* as a major watercourse and flows for approx. 187 km from near the Great Dividing Range before joining the Balonne River 45 km south of Yuleba. Yuleba Ck flows predominately south, close to the township of Yuleba, located 13 km east of the Project Area and joins the Balonne River, 46 km southeast of the Project Area.

Other minor, unnamed watercourses occur within the Project Area, almost all of which drain into one of the watercourses listed above.

The Sustainable Rivers Audit 2 (SRA 2) for rivers within the Murray-Darling basin (Murray–Darling Basin Authority, 2012) found that the Condamine Valley, which includes the region around the Project Area, had an overall poor ecosystem health rating. The physical form of the Condamine Valley river system was rated as being in moderate condition, characterised by enlarged channels and evidence of widening and channel bed degradation. The cause of this condition was not specified. According to desktop assessment (Queensland Government, 2024), there are no wetlands of High Ecological Significance (HES) or HEV within or immediately adjacent to the Project Area, with the nearest mapped HEV wetland located approximately 39 km south-west of the Project Area. There are no active springs mapped within 30 km of the Project Area. There are no known or mapped terrestrial groundwater dependent ecosystems (GDEs) located within the Project Area. There are no known or mapped subterranean GDEs or groundwater-dependent spring ecosystems located within the Project Area. There are two registered groundwater bores located in the Project Area, these bores are recorded as Registered bore Numbers (RNs) 123195 and 208460 in the Groundwater Database - Queensland, which are sub-artesian bores for private water supply.

3.5. Regional geology

The regional geology of the Project Area comprises sediments from the Early Cretaceous to Quaternary age Surat Basin. Stratigraphic units of relevance to the Project include:

- quaternary alluvial systems within majority of the Project area
- early cretaceous age mudrock along the mid-eastern border of the Project area; and
- fine grained sedimentary rock north-eastern corner of the Project area.

Land zones are categories that describe the major geologies, the associated landforms and geomorphic processes in Queensland, and are a critical component of the RE classification scheme. Land zones identified within the Project Area using state mapping (Department of Resources, 2023) are detailed in Table 2.

Table 2: Land zones occurring within the Project Area (Department of Resources, 2023)

Land zone	Description as per Wilson & Taylor (2012)
3	Recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes and associated wave built lunettes. Excludes colluvial deposits such as talus slopes and pediments. Includes a diverse range of soils, predominantly Vertosols and Sodosols; also with Dermosols, Kurosols, Chromosols, Kandosols, Tenosols, Rudosols and Hydrosols; and Organosols in high rainfall areas.
4	Tertiary-early Quaternary clay deposits, usually forming level to gently undulating plains not related to recent Quaternary alluvial systems. Excludes clay plains formed in-situ on bedrock. Mainly Vertosols with gilgai microrelief, but includes thin sandy or loamy surfaced Sodosols and Chromosols with the same paleo-clay subsoil deposits.
9	Fine grained sedimentary rocks, generally with little or no deformation and usually forming undulating landscapes. Siltstones, mudstones, shales, calcareous sediments, and labile sandstones are typical rock types although minor interbedded volcanics may occur. Includes a diverse range of fine textured soils of moderate to high fertility, predominantly Vertosols, Sodosols, and Chromosols.

3.6. Vegetation

The extent, condition, dominant species and conservation significance of vegetation communities in the project area are identified in Table 3. Refer to the *Roma Phase 7-7B SD20 Development Matters of National Environmental Significance Ecological Assessment Report* (Boobook, 2025) for further information on the vegetation and ecology of the Project Area.

Table 3: Vegetation communities within the Project Area and PDF

RE Code	VMA Class	BD Status	Short RE Description	Extent in Project Area – remnant (ha)	Extent in Project Area – regrowth (ha)	Extent in PDF – remnant (ha)	Extent in PDF – regrowth (ha)
11.3.2	OC	OC	*Eucalyptus populnea* woodland on alluvial plains	19.41	65.57	0.15	0.15
11.3.17	OC	E	*E. populnea* woodland with *Acacia harpophylla* and / or *Casuarina cristata* on alluvial plains	10.81	0.00	0.00	0.00
11.3.25	LC	OC	*E. tereticornis* or *E. camaldulensis* woodland fringing drainage lines	20.94	0.00	0.00	0.00
11.9.7	OC	OC	*E.populnea*, *Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks	0.61	1.30	0.00	0.00
11.9.10	OC	E	*E. populnea* open forest with a secondary tree layer of *A. harpophylla* and sometimes *C.cristata* on fine-grained sedimentary rocks	23.96	2.34	0.00	0.00

Notes: RE is 'Regional Ecosystem'. 'VMA Class is 'Vegetation Management Act Class' as per QLD *Vegetation Management Act 1999*. BD Status is 'Biodiversity Status' as per QLD *Environmental Protection Act 1994*. E: Endangered, OC: Of concern.

3.7. Environmentally Sensitive Areas

Environmentally sensitive areas (ESAs) are defined as Category A or B as per Schedule 19, Part 1 of the *Environmental Protection Regulation 2019* (*Environmental Protection Act 1994*) (EP Regulation) (which supersedes the *Environmental Protection Regulation* 2008 (Qld)) and Category C as per Section 20 AN, Division 5AA of the *Vegetation Management Act 1999* (VMA).

Maps will be developed to determine if Category A, B or C are present within the Project Area. Definitions for these categories are included in Table 4.

Table 4: Environmentally Sensitive Area category definitions

ESA category	EP Regulation Definition
Category A	A Category A ESA means any of the following: *a)* any of the areas under the *Nature Conservation Act 1992* b) the wet tropics area under the *Wet Tropics World Heritage Protection and Management Act 1993* c) the Great Barrier Reef Region under the Great Barrier Reef Marine Park Act 1975 d) a marine park under the *Marine Parks Act 2004*, other than a part of the park that is general use zone under the Act
Category B	A Category B ESA means any of the following: a) any of the areas under the *Nature Conservation Act 1992:* b) an area subject to the following conventions to which Australia is a signatory: i. A 'Convention on the Conservation of Migratory Species of Wild Animals' (Bonn, 23 June 1979) ii. The 'Convention on Wetlands of International Importance, especially as Waterfowl Habitat' (Ramsar, Iran, 2 February 1971) iii. The 'Convention Concerning the Protection of the World Cultural and Natural Heritage' (Paris, 23 November 1972) c) a zone of a marine park under the *Marine Parks Act 2004* that is within a general use zone of the marine park under the Act; d) an area to the seaward side of the highest astronomical tide; e) the following under the *Queensland Heritage Act 1992* i. a place of cultural heritage significance ii. a Queensland heritage place, unless there is an exemption certificate issued under that Act; f) an area recorded in the Aboriginal Cultural Heritage Register established under the Aboriginal Cultural Heritage Act 2003, section 46, other than the area known as the 'Stranbroke Pastoral Development Holding', leased under the *Land Act 1994* by lease number PH 13/5398; g) a feature protection area, State forest park or scientific area under the *Forestry Act 1959* h) a declared fish habitat area under the *Fisheries Act 1994* i) a place in which a marine plant under the *Fisheries Act 1994* is situated; j) an endangered regional ecosystem identified in the database known as the 'Regional ecosystem description database' published on the departments website
Category C	A Category C area is an area, other than a category A area, category B area, Category R area or Category X area, shown on regulated vegetation management maps as Category C area that: a) contains high value regrowth vegetation; or b) the chief executive decides to show on the regulated vegetation management map as a category C area *Note: the chief executive may decide under section 20AI to show an area on the regulated vegetation management map as a category C area even through the vegetation is not high value regrowth vegetation.*

4. Rehabilitation Techniques

There are a number of techniques available to Santos to carry out rehabilitation works. Regardless of the technique employed, monitoring is key to understanding the success of rehabilitation across the asset lifecycle. Further details of the rehabilitation techniques are provided below.

4.1. Topsoil management

Topsoil that is stripped and stored as part of construction activities is to be re-spread as part of stabilisation and rehabilitation activities. Correctly preserved topsoil resources can provide viable sources of seed-stock, biological life and nutrient conditions that assist with soil productivity and fertility, and thereby vegetation establishment.

4.2. Sodic soil amelioration

Sodic soils, when encountered, will be blended with an appropriate soil ameliorant (i.e. gypsum, lime) during rehabilitation processes (if required) to maintain soil structures and reduce dispersiveness (e.g. reduce dispersiveness in sodic soils). Amelioration with gypsum and / or lime or addition of organic mulch can improve soil structure, infiltration and soil aeration can promote vegetation establishment.

4.3. Soil compaction

For long-term disturbances such as well leases, it is likely that the soil will have become compacted over time. Where necessary, the soil will be treated (i.e. deep ripped) to alleviate the soil compaction. This will occur prior to reshaping the upper layers of the soil stratum.

4.4. Contaminated land

Where there is a risk of contaminated land occurring, a site-specific contaminated land assessment may be undertaken. The scale and type of contamination will determine the chosen management strategy. Small volumes may be disposed offsite via facilities licenced to accept the waste whereas larger volumes may be managed on site using landfarming techniques.

4.5. Watercourse crossings

Where clearing of riparian vegetation is unavoidable, the objective will be to reinstate the creek banks and riparian vegetation, as soon as practical post-construction. To minimise erosion and destabilisation of creek banks, erosion controls will be constructed or installed, where necessary. The surface will typically be lightly scarified before spreading the topsoil, to promote regeneration of native vegetation and prevent loss of topsoil. Where higher velocity water flows are designed for, engineered controls such as coir mesh or rock protection will be installed (see Section 5.1).

4.6. Landform management

Sites will be reprofiled to a safe and stable landform, with surface drainage lines and topsoil profile re-instated. Where practical, sites will be reprofiled to contours consistent with the surrounding landform. However, where this is not practical (i.e. cut and fill operations on slopes, or within highly dispersive soils), a stable landform will be reinstated by surface re-profiling, contouring or benching. Methods to reshape the landform will vary depending on the level of disturbance.

4.7. Revegetation

Active seeding will be completed on all areas of disturbance where revegetation is required to facilitate stability during operations or to meet transitional and / or final rehabilitation criteria. Within areas of native vegetation, a combination of tube-stock and seeding may be implemented. Tube-stock will be used for canopy and shrub species, while a combination of tube-stock and seeding is appropriate for herbs, forbs and grasses. Species will be selected based on assessments of the adjacent vegetation community composition and other appropriate benchmark guidelines.

4.8. Mulching and placement of vegetation

Vegetation cleared during construction phases, will be retained on-site for use during stabilisation and / or rehabilitation activities. Mulch and vegetation may be respread over the site as required. This will assist in site stabilisation, revegetation and suppressing weed growth.

4.9. Weed management

Weed management will be required to enable the regeneration of pre-disturbance land uses and to ensure that the disturbance does not allow for the introduction of new species to an area or increase the localised population of a species.

Weed control requiring chemicals will be undertaken by licenced contractors under the Queensland *Agricultural Chemicals Distribution Control Act 1966*. All chemical application will be carried out in strict accordance with registered labels and safety data sheet (SDS) requirements and considering any Minor Use Permit PER11463 requirements as issued by the Australian Pesticides and Veterinary Medicines Authority for ground-based herbicide application in non-agricultural areas (i.e. bushland areas).

4.10. Pest and livestock management

Where livestock occur within areas undergoing rehabilitation, temporary stock fencing may be erected to ensure cattle / feral animals (pigs) etc cannot damage rehabilitation works. Fencing will be erected primarily to well pads, laydowns etc., where there is a localised disturbance footprint.

5. Disturbance Lifecycle and Maintenance Monitoring

The disturbance lifecycle can be defined by three distinct stages: construction, operation and final rehabilitation. Regardless of the stage, all works aim to achieve a safe, stable, non-polluting landform. All disturbance works are planned, approved and recorded in a Geographic Information System (GIS) database.

Construction is undertaken using standardised designs for the majority of works. These designs include both temporary (construction) and long-term erosion and sediment controls (ESC).

During the operational stage, a risk-based inspection program is implemented to ensure installed ESC is functioning and disturbed areas are stabilising through vegetation growth. Maintenance actions will be implemented where monitoring identifies that performance criteria are not being met. Maintenance repairs are scheduled and prioritised using a risk-based approach.

Final rehabilitation is undertaken once an asset is assessed to be no longer required for the petroleum activity. Section 6 provides specific detail on the final rehabilitation process to ensure final rehabilitation criteria are met.

5.1. Pipelines

Pipeline right of ways (RoWs) are cleared, pipelines installed and land reinstated in quick succession. This methodology reduces exposure of unprotected subsoils, preserves topsoil characteristics e.g. structure, native seed bank etc, and minimises potential impacts from significant rainfall events.

Reinstatement is undertaken to ensure:

- a stable landform
- re-profiled to a level consistent with surrounding soils
- re-profiled to original contours and established drainage lines; and
- vegetated with groundcover which is not a declared pest species, and which is established and growing.

In addition, RoWs are reinstated immediately following pipeline construction (typically within 3 months, or in accordance with relevant EA conditions), with considerations made for a range of factors including ESC, soil amelioration, fertiliser and seeding. These considerations are applied to ensure timely reinstatement of the pipeline RoWs.

Santos has standardised watercourse reinstatement designs for pipeline crossings that are assigned to crossings based on the site-specific risk profile. Watercourses are assessed as part of the planning phase and designs advised for each crossing based on several inputs (e.g. soil type, catchment, modelled flows, bank profiles). There are five key options for reinstatement, three standard reinstatement designs (low, medium and high), a fourth site-specific design, and a fifth where standard pipeline reinstatement is deemed adequate.

Regular desktop assessments are undertaken using up-to-date aerial imagery to identify potential ESC and integrity issues. The potential issue locations are inspected onsite, and maintenance repairs are prioritised based on risk. In addition to the desktop assessments, issues identified during standard work schedules are recorded within a central database to capture, monitor, maintain and / or schedule repair issues as they arise.

5.2. Wells leases

Santos has developed a catalogue of standardised well lease (i.e. the prepared surface / hard stand area around a CSG well head to enable well drilling and operational activities) construction designs that focus on long-term stability

for the operational life of the well, generally greater than 20 years. Using standardised designs Santos achieves consistent and high-quality execution whilst minimising future disturbances. Where standard designs are deemed not fit for purpose, site specific designs are developed.

All well leases are monitored throughout operations using a risk-based inspection and maintenance program. Santos has a standardised well inspection program, whereby every well lease is typically inspected every 2 years. Inspections target a range of environmental aspects / criteria for assessment.

Further, the inspections utilise a scoring system that assists in prioritising corrective actions via the civil works request system. Maintenance works are then prioritised by the civil works team based on the final inspection score e.g. well pads with high inspection scores hold the most environmental risk and are prioritised for maintenance. This allows maintenance works to be prioritised using the most up-to-date data and ensures Santos' environmental risk is the lowest possible at any given time.

5.3. Facilities

These assets typically cover a large disturbance footprint whereby the risk of erosion and sediment issues is elevated. To reduce risk and ensure long-term stability, all facilities (e.g. laydown areas and camps) are constructed using site specific designs that are prepared during the early planning phase.

Post-construction, environmental inspections are scheduled annually and assessed against rehabilitation and stability criteria. Any identified issues are recorded with a central database to monitor, maintain and / or repair.

5.4. Roads and tracks

For unsealed roads and tracks the key techniques to minimise erosion and damage are good shaping (camber, elevation etc) and good drainage. These techniques are imbedded in the standardised construction designs.

Watercourse crossings are assessed as part of the early planning phase and designs advised for each crossing based on several inputs (e.g. soil type, catchment, modelled flows, bank profiles). In some instances, the standardised design is deemed unsuitable, and a site-specific design will be developed.

When planning for roads, considerations are made for existing and / or proposed adjacent infrastructure. Where construction occurs alongside adjacent infrastructure, the erosion and sediment controls marry into both pieces of infrastructure to not cause unwanted drainage, or erosion impacts from one to the other i.e. surface waters are controlled across the entire disturbance footprint.

Roads will undergo routine maintenance grades throughout the life of the infrastructure. These will typically follow high vehicle traffic and / or wet weather. In addition to the routine maintenance, any unforeseen issues are captured and stored within a central database for priority maintenance.

Once roads are no longer required for petroleum activities, they will be offered to the landholder as an asset. Any roads unwanted by the landholder will be rehabilitated. This may include removal of any gravel, ripping, levelling and re-profiling to reinstate natural contours of the land (including any watercourses) and revegetating to match the surrounding land-use or landholder requirements.

6. Rehabilitation Acceptance Requirements

Transitional rehabilitation requirements apply when assets are no longer required for ongoing petroleum activities.

Final rehabilitation requirements apply when significantly disturbed areas have either occurred in an ESAs, or when assets are being retained by the landholder (which are not located in ESAs) as detailed in Section 6.3.

Areas classified as ESA are excluded from being transferred to landholders. In all instances, transitional rehabilitation requirements must be met once the asset is no longer required for ongoing petroleum activities, as shown in Figure 2.

The transfer of infrastructure assets to landholders will be undertaken in compliance with the *Guideline for Petroleum Activities Transferring petroleum infrastructure to landholders* (ESR/2020/5403) (DESI, 2024) before the surrender of the EA or petroleum tenure.

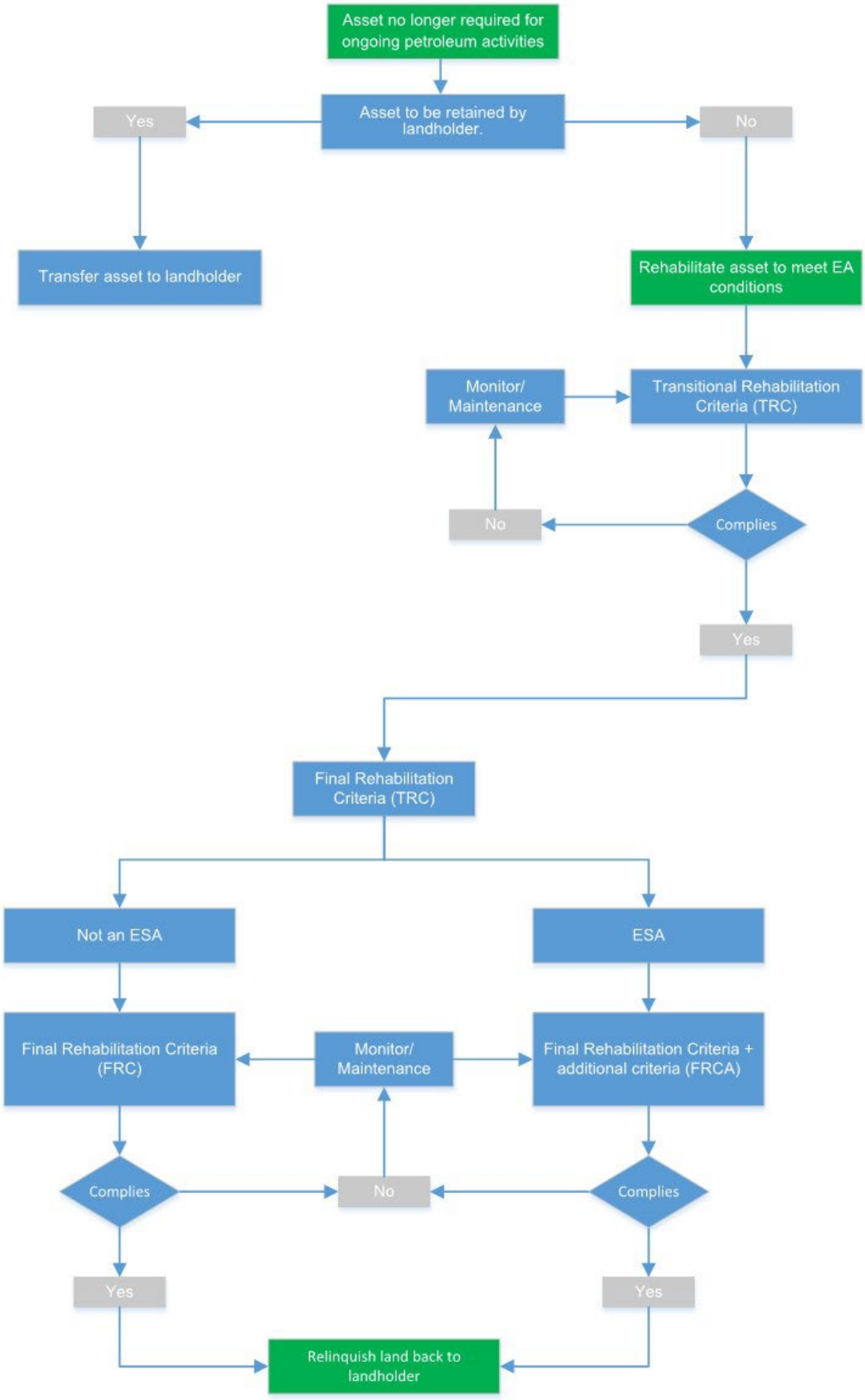

Figure 2: Rehabilitation acceptance requirements – internal approval process

6.1. Transitional rehabilitation and monitoring

Transitional rehabilitation is defined as the minimum rehabilitation criteria to which each disturbed area must comply with following decommissioning. The transitional rehabilitation criteria (TRC) are:

- contaminated land resulting from petroleum activities is remediated and rehabilitated
- the areas are:
  - non-polluting
  - stable landform
  - re-profiled to contours consistent with the surrounding landform
- surface drainage lines are re-established
- topsoil is reinstated; and
- either:
  - groundcover, that is not a declared pest species, is growing; or
  - an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

All transitional rehabilitation activities will be undertaken in accordance with the site-specific requirements and relevant EA conditions.

Immediately upon decommissioning sites will be monitored for compliance against the transitional rehabilitation criteria and may require a combination of techniques as described in Section 4.

6.1.1. Re-profiling and topsoil

Where re-profiling and topsoil has been demonstrated as stable (has constructed drainage, rock reinforcement, stable cover and / or no evidence of erosion) data and geo-located photos should be gathered during monitoring. Areas which have not been re-profiled and demonstrated as stable will need to be maintained or reworked according to the extent of instability.

If problematic soils are identified, remediation actions may be required to decrease the area of bare ground. This may include reworking, capping / reburial of poor substrates or the improvement of soils using suitable materials.

6.1.2. Groundcover

In areas of poor groundcover, assessments should be made to determine if the soil needs amelioration and possible re-seeding.

6.1.3. Erosion

Where erosion has been identified the area may require rework and maintenance. Erosion should be monitored to ensure that any rehabilitated area is stable. If erosion monitoring shows that the erosion is unstable and continuing to get worse, the area will need to be maintained or reworked depending on the extent of the instability. If erosion is unchanging and has good vegetation cover the area may not need any further maintenance or re-work, especially if it has been identified as well-established rehabilitation.

When a site is assessed as compliant with the TRC it can then progress to the final rehabilitation stage.

6.2. Final rehabilitation acceptance criteria

Once areas of disturbance are assessed to meet the TRC, they are then to be rehabilitated to meet the following final rehabilitation acceptance criteria (FRC), which are either measured against the highest ecological value adjacent land use, or the pre-disturbed land use:

- greater than or equal to 70 per cent of native ground cover species richness
- greater than or equal to the total per cent ground cover
- less than or equal to the per cent species richness of declared plant pest species
- where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then:
  - at least one RE from the same broad vegetation group, as demonstrated by the predominant species in the ecologically dominant layer, must be present; and
  - the RE present must possess an equivalent or higher conservation value (biodiversity status) than the REs in either the adjacent land or pre-disturbed land.

All rehabilitation during the FRC stage will be undertaken in accordance with the site-specific requirements and relevant EA conditions.

6.2.1. Groundcover

The area may require direct seeding and / or planting of ground layer, shrub and tree species depending on the final post-disturbance land use. Weed control methods may also be required.

6.2.2. Revegetation

The selection of species to be used in rehabilitation where native vegetation is the final land use should consider structural and floristic composition of the pre-disturbed land use or the ecological value of an adjacent land use.

6.3. Environmentally sensitive areas

Of the ESAs located in the Project Area, some may include ‘Endangered’ and ‘Of Concern’ REs.

Where petroleum activities have resulted in disturbance to land in an ESA, the following final additional rehabilitation criteria (and / or relevant EA conditions), as measured against the pre-disturbance biodiversity values assessment, must be met:

- greater than or equal to 50 per cent of organic litter cover
- greater than or equal to 50 per cent of total density of coarse woody material; and
- all predominant species in the ecologically dominant layer, that define the pre-disturbance REs are present.

7. Rehabilitation Monitoring

Monitoring will inform rectification where non-conformances with transitional criteria are reported. Where required, data will be compared to the pre-disturbed land use data or an analogue site in the highest ecological value adjacent land use.

7.1. Final rehabilitation register

A Final Rehabilitation Register (FRR) captures the results of rehabilitation monitoring against relevant rehabilitation criteria and EA conditions. All monitoring data is be captured in a GIS database. GIS data is captured at the location of the relevant disturbance, and the GIS database is regularly updated to inform a monitoring schedule for final rehabilitation. Reporting and filtering of GIS database records are utilised to inform monitoring schedule, disturbance rehabilitation status, and required actions.

7.2. Risk based methodology

Upon decommissioning, a risk-based approach will be used to proactively identify the risk level based on the intended final land use and progress towards the FRC. A site may contain a combination of the below risk profiles.

7.2.1. High risk areas – rework / rectify

High risk areas are classified as areas requiring re-work or rectification in order to meet the TRC and / or FRC.

High risk areas (rework / rectification) may require a combination of stabilisation works, re-profiling and / or reseeding / revegetation works on decommissioning. An area that is deemed high risk will require a review of the rehabilitation works based on the final land use requirements. Fencing, where practical, should remain intact until FRC are met.

7.2.2. Medium risk areas – maintain / monitor

Medium risk areas are those areas meeting the TRC but require time and potentially maintenance to meet the FRC. Fencing, where practical, should remain intact until FRC are met.

7.2.3. Low risk areas – relinquish

Low risk areas are defined as rehabilitated areas meeting the TRC and FRC and are ready for final acceptance and site relinquishment.

7.3. Decommissioning Monitoring

On decommissioning, formal monitoring should be undertaken against the TRC and FRC. The status of sites should be entered into the FRR along with any recommended rehabilitation requirements. Based on this initial assessment, formal monitoring frequency will be assessed on a case-by-case basis and may depend on weather conditions and predicted time to meet the rehabilitation criteria. As a guide the following formal monitoring schedule is proposed as a minimum to inform rehabilitation requirements (refer Table 5).

Table 5: Proposed monitoring frequency

Risk rating	Rehabilitation Status	Monitoring frequency	Method
High risk areas	Rework / rectify	Annually	Remote sensing / ground survey / sampling

Risk rating	Rehabilitation Status	Monitoring frequency	Method
Medium risk areas	Maintain / monitor	Annually (pending weather conditions)	Remote sensing / ground survey / sampling
Low risk areas	Meets FRC	Based on previously collected data	On-ground Third Party Rehabilitation Assessment and Reporting

7.3.1. Data capture

Monitoring data indicators for TRC and FRC are shown in Table 6 and Table 7, respectively.

Table 6: TRC monitoring parameters

Land use	TRC	Monitoring data indicators
All	Contaminated land resulting from petroleum activities is remediated and rehabilitated.	Where there is a risk, or records confirming contaminated land (i.e. hydrocarbon/chemicals) occurring from petroleum activities, remediate to meet legislative requirements.
	Stable landform, non-polluting and re-profiled to contours consistent with the surrounding landform.	No run-off or subsidence caused by the decommissioning of petroleum activities. Rate of erosion to be no more that surrounding landscape. Re-profiled to natural landform or where not practical re-profiled to ensure stability and ESC.
	Surface drainage lines are re- established.	No evidence of ponding, landform reinstated to be consistent with drainage in surrounding landscape
	Topsoil is reinstated.	Where disturbed during decommissioning, reinstated topsoil is consistent with surrounding soil profile of the site. No evidence of soil profile mixing or compaction.
	Groundcover, that is not a declared pest species, is growing; or An alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.	No restricted species present on site. Ground cover stable across site.

Table 7: FRC monitoring programs

Land use	FRC	Monitoring data indicators / methodology
All	Greater than or equal to 70 per cent of native ground cover species richness.	Comparison with analogue site in either adjacent ecological value land use or the pre-disturbed land use. The 50 x 10 m plot method of the BioCondition Assessment methodology V2.2 as per Eyre *et al*. (2015) or any subsequent updated version is to be used in the rehabilitated area in comparison to the analogue site.
	Greater than or equal to the total per cent ground cover.	Comparison with analogue site in either ecological value adjacent land use or the pre-disturbed land use. The 1 x 1 m quadrats method of the BioCondition Assessment methodology V2.2 as per Eyre *et al*. (2015) or any subsequent updated version is to be used in the rehabilitated area in comparison to the analogue site.

Land use	FRC	Monitoring data indicators / methodology
	Less than or equal to the per cent species richness of declared plant pest species.	Comparison with analogue site in either ecological value adjacent land use or the pre-disturbed land use. The 50 x 10 m plot method of the BioCondition Assessment methodology V2.2 as per Eyre *et al*. (2015) or any subsequent updated version is to be used in the rehabilitated area in comparison to the analogue site.
Non-ESA areas only	Where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then: – at least one REs from the same broad vegetation group, as demonstrated by the predominant species in the ecologically dominant layer, must be present; and, – the RE present must possess an equivalent or higher conservation value (biodiversity status) than the REs in either the adjacent land or pre-disturbed land.	Comparison with analogue site in either ecological value adjacent land use or the pre-disturbed land use. RE delineation following the "*Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.0*" (Neldner *et al*, 2019) or any subsequent updated version of this methodology. Once RE has been confirmed it will require confirmation of its Broad Vegetation Group, as well as the Biodiversity status.
ESA Only	Greater than or equal to 50 per cent of organic litter cover.	Comparison with analogue site in either ecological value adjacent land use or the pre-disturbed land use The 1x1 m quadrats method of the BioCondition Assessment methodology V2.2 as per Eyre *et al.* (2015) or any subsequent updated version is to be used in the rehabilitated area in comparison to the analogue site.
	Greater than or equal to 50 per cent of total density of coarse woody material.	Comparison with analogue site in either ecological value adjacent land use or the pre-disturbed land use The 50x20 m plot method of the BioCondition Assessment methodology V2.2 as per Eyre *et al.* (2015) or any subsequent updated version is to be used in the rehabilitated area in comparison to the analogue site.
	All predominant species in the ecologically dominant layer, that define the pre-disturbance REs are present.	Comparison with analogue site in either ecological value adjacent land use or the pre-disturbed land use The 100x50 m plot method of the BioCondition Assessment methodology V2.2 as per Eyre *et al.* (2015) or any subsequent updated version is to be used in the rehabilitated area in comparison to the analogue site.

Note: where plot sizes are reduced, adjustments to calculations will be required to adequately scale up data from plots to hectare rates.

7.4. Final acceptance reporting

As part of the asset relinquishment process, areas of rehabilitated land that meet the final rehabilitation acceptance criteria (deemed low risk). To support this process, a final acceptance report will be completed by a suitably qualified third party / in accordance with relevant EA conditions and EP Act requirements.

8. Key References

Boobook Ecological Consultants (Boobook) 2025, *Roma Phase 7-7B-SD20 Development, Matters of National Environmental Significance Ecology* Assessment Report.

Bureau of Meteorology. (2024). *Average annual, monthly and seasonal evaporation*. Retrieved from Bureau of Meteorology: http://www.bom.gov.au/climate/maps/averages/evaporation/?period=jun

Bureau of Meteorology. (2024, October 22). *Climate Data Online*. Retrieved from Bureau of Meterology: http://www.bom.gov.au/climate/data/

Department of Environment, Science and Innovation. (2023). *Environmental Protection (Water and Wetland Biodiversity) Policy 2019.*

Department of Resources. (2023). *Queensland Globe*. Retrieved from Queensland Globe: https://qldglobe.information.qld.gov.au/

Eyre, T. J., Kelly, A. K., Neldner, V. J., Wilson, B. A., Ferguson, D. J., Laidlaw, M. J., & Franks, A. J. (2015). *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2.* Brisbane: Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts,.

Neldner, V. J., Wilson, B. A., Dillewaard, H. A., Ryan, T. S., Butler, D. W., McDonald, W. J., . . . Appelman, C. N. (2024). *Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 7.0.* Brisbane: Queensland Herbarium, Queensland Department of Environment and Science.

Santos. (2025a). *Roma Phase 7-7B SD20 Environmental Protocol for Constraints Planning and Field Development (Constraints Protocol).*

Santos. (2025b). *Roma Phase 7-7B-SD20 Significant Species Management Plan (SSMP).*

Santos. (2025c). *Roma Phase 7-7B SD20 Environmental Management Plan (EMP).*