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From plan to practice: evidence-based verification of mine rehabilitation

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Abstract

Mine rehabilitation success extends beyond the completion of earthworks and revegetation, it requires systematic documentation and verification to demonstrate conformance with approved designs, regulatory commitments and closure criteria. This paper examines the increasing evidentiary and administrative burden placed on rehabilitation practitioners to demonstrate compliance with rehabilitation commitments.

In Queensland, Australia, the progressive rehabilitation and closure plan (PRCP) framework establishes legally binding milestones and sequencing requirements for rehabilitation activities. PRCP schedules are site specific and typically contain numerous criteria across multiple technical domains, resulting in hundreds of individual compliance requirements and thousands of discrete records needed to verify achievement. Managing this volume of data presents significant operational and governance challenges.

Drawing on practical experience at Glencore's Clermont Coal Mine, this paper outlines tools and systems developed to embed PRCP requirements into day-to-day site processes. Key initiatives include integration of PRCP criteria into the site's inspection and test plan (ITP) framework, providing a structured mechanism for quality control, activity verification and contemporaneous record keeping. Additional evidence sources include time-series aerial imagery to track land disturbance and infrastructure changes, and lidar surveys to assess landform development and erosion performance.

A customised rehabilitation tracking system has also been developed to align annual operational plans and budgets with PRCP milestones, enabling transparent reporting and forward planning.

This paper presents practical, transferable approaches to managing rehabilitation verification requirements and demonstrates how regulatory commitments can be effectively translated from planning documents into operational practice.

Keywords: *mine rehabilitation, verification, ITP, PRCP, Clermont Coal Mine*

1 Introduction

Historically, rehabilitation success has often been judged by visible outcomes, such as reshaped landforms, established vegetation, or the absence of obvious erosion. While these outcomes remain necessary, they are no longer sufficient in isolation.

Regulatory frameworks increasingly require mine operators to demonstrate compliance through explicit, auditable evidence. This shift reflects broader trends in environmental regulation, where performance claims must be supported by traceable records, structured verification and defensible data. For rehabilitation practitioners, this has fundamentally altered the nature of closure delivery, elevating the importance of documentation, data management and governance alongside physical works.

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In Queensland, the introduction of PRCPs represents a significant change in how rehabilitation is planned, implemented and regulated. PRCPs translate closure intent into legally binding schedules that define what rehabilitation must achieve, when it must be delivered and how progress will be assessed. While the framework provides clarity of expectations, it also introduces considerable complexity in terms of compliance management and verification.

This paper focuses on the practical challenge of moving from rehabilitation plans to verifiable outcomes. Using Clermont Coal Mine (CCM) as a case study, it explores how verification requirements were operationalised through embedded site processes, integrated quality systems and supporting spatial datasets.

2 Rehabilitation verification: an emerging challenge

Mine closure and rehabilitation have traditionally focused on the execution of physical works such as landform shaping, topsoil placement and seeding, followed by monitoring to demonstrate whether rehabilitation has been successful. This approach is no longer sufficient. Contemporary regulatory frameworks increasingly prescribe not only what constitutes successful rehabilitation, but how it must be achieved and when it must be demonstrated.

The PRCP framework in Queensland, Australia, is often regarded as leading practice in clearly articulating rehabilitation expectations, timeframes and outcomes. Under Queensland legislation, persons carrying out mining activities are legally obligated to rehabilitate land disturbed by mining operations.

In 2018, the Queensland Government introduced a comprehensive suite of reforms aimed at strengthening rehabilitation delivery and improving financial assurance outcomes across the resources sector. These reforms included the formal introduction of PRCPs under the *Mineral and Energy Resources (Financial Provisioning) Act 2018 (Qld)* (State of Queensland 2018), together with consequential amendments to the *Environmental Protection Act 1994 (Qld)* (State of Queensland 1994). Collectively, these changes established a more structured, enforceable and transparent framework for planning, delivering and verifying mine rehabilitation and closure outcomes.

The PRCP framework requires mine operators to articulate final land condition, define post-mining land uses (PMLUs), and demonstrate how progressive and final rehabilitation will be designed, implemented, monitored and measured over time. PRCPs comprise a planning part and a schedule, with the PRCP schedule being the statutory and enforceable component.

While PRCPs provide clarity of expectations, they transfer significant responsibility to operators to demonstrate compliance. Each criterion within a PRCP schedule requires evidence, and where milestones are staged across multiple years, evidence must be systematically tracked and retained over extended periods.

For rehabilitation practitioners, this necessitates clear interpretation of PRCP criteria into measurable site-level requirements, alignment of operational activities with scheduled milestones, and robust systems to capture, store and retrieve evidence in an auditable format.

As a result, rehabilitation performance can no longer be summarised simply by reporting the number of hectares rehabilitated at the end of a calendar year. Instead, mining companies are now required to demonstrate compliance against hundreds of detailed and discrete requirements, spread across multiple milestones, rehabilitation areas and domains.

Rehabilitation areas are also typically aggregations of multiple, discrete work areas across a site. Consequently, dozens of spatially distinct areas may need to be assessed against each requirement. The scale and complexity of the verification task is therefore substantial, particularly when the goal is not to have any non-compliances. This necessitates continuous and proactive monitoring of rehabilitation performance so that any deviations can be identified and rectified prior to the end of the reporting period.

The expansion of rehabilitation verification requirements has correspondingly driven a significant increase in both the volume and diversity of evidence expected by regulators. This evidence commonly includes, but is not limited to:

- construction and as-built records
- quality assurance and quality control documentation
- inspection checklists and certification sign-off forms
- photographic records
- spatial datasets demonstrating disturbance reduction and landform development
- environmental monitoring data collected over multiple years.

Inadequate rehabilitation verification presents both regulatory and operational risks. As a result, verification is no longer a back-end administrative task, but a core element of rehabilitation delivery that must be considered early and managed proactively. For large operations with extensive rehabilitation programs, there are thousands of records, spanning multiple disciplines and operational teams, and managing and verifying this evidence is now a central challenge of modern mine closure practice.

3 Implementation of the progressive rehabilitation and closure plan schedule at Clermont Coal Mine

CCM is a large open cut coal operation in central Queensland (Figure 1), with a substantial historical and ongoing rehabilitation program. The mine, owned and operated by Glencore, commenced production in 2010 and is scheduled to close in 2028. The mine incorporates a 12 km overland conveyor to the train load-out (TLO) facility. The TLO facility is located in the historical mining area of Blair Athol dating back to the 1970s, with a considerable amount of completed historical rehabilitation at that location.

The general sequence of rehabilitation activities at CCM involves:

- bulk earthworks to achieve the required slope arrangement
- installation of drainage structures to ensure the landforms will effectively shed surface water
- surface trimming with smaller machinery to ensure improved tolerance to design and to complete works which cannot be established with larger equipment
- placement of growth media with deep ripping to promote incorporation of the growth media into the underlying landform materials
- revegetation activities.

The landform design at CCM incorporates trilinear batters (Figure 2), which have been integrated into the overall design concept along with surface drainage features. This involves optimising landform height, slope gradient and vegetation covers to achieve acceptable erosion rates over the long term. The landform design details across the three areas of the mining lease are provided in Table 1. Photographs of key rehabilitation steps are shown in Figure 3.

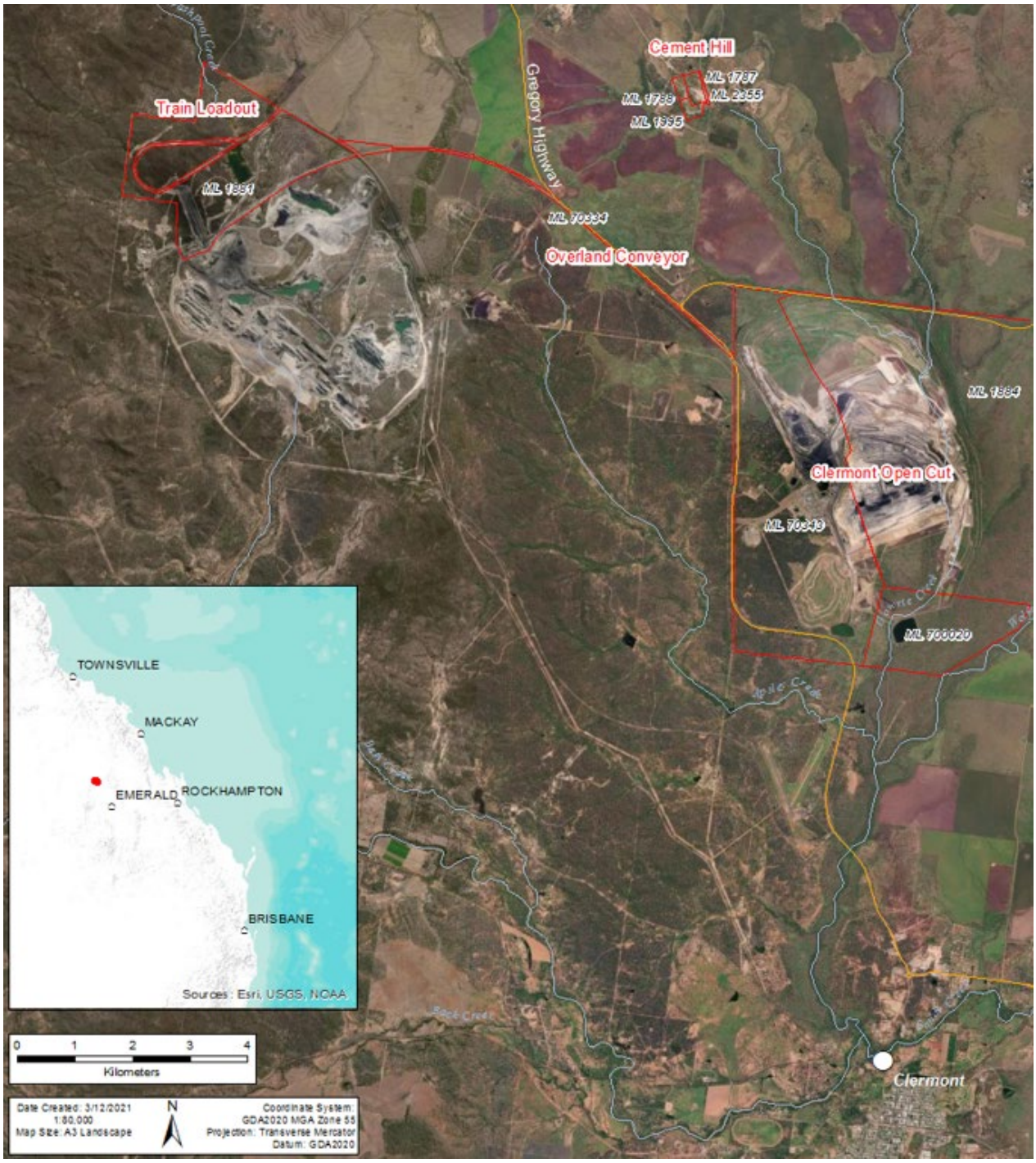


Figure 1 Clermont Coal Mine locality

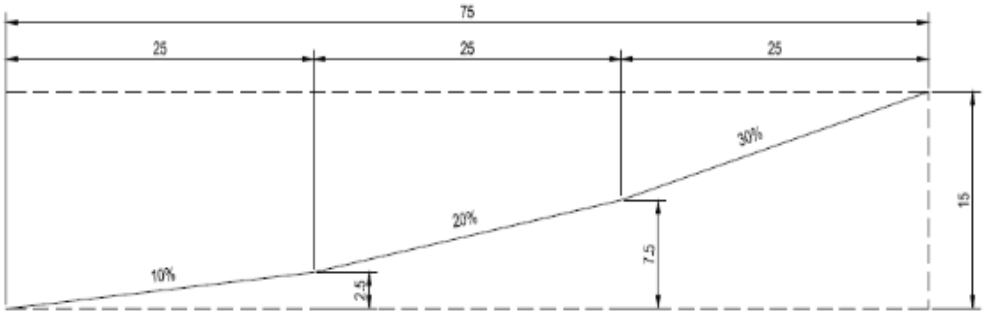
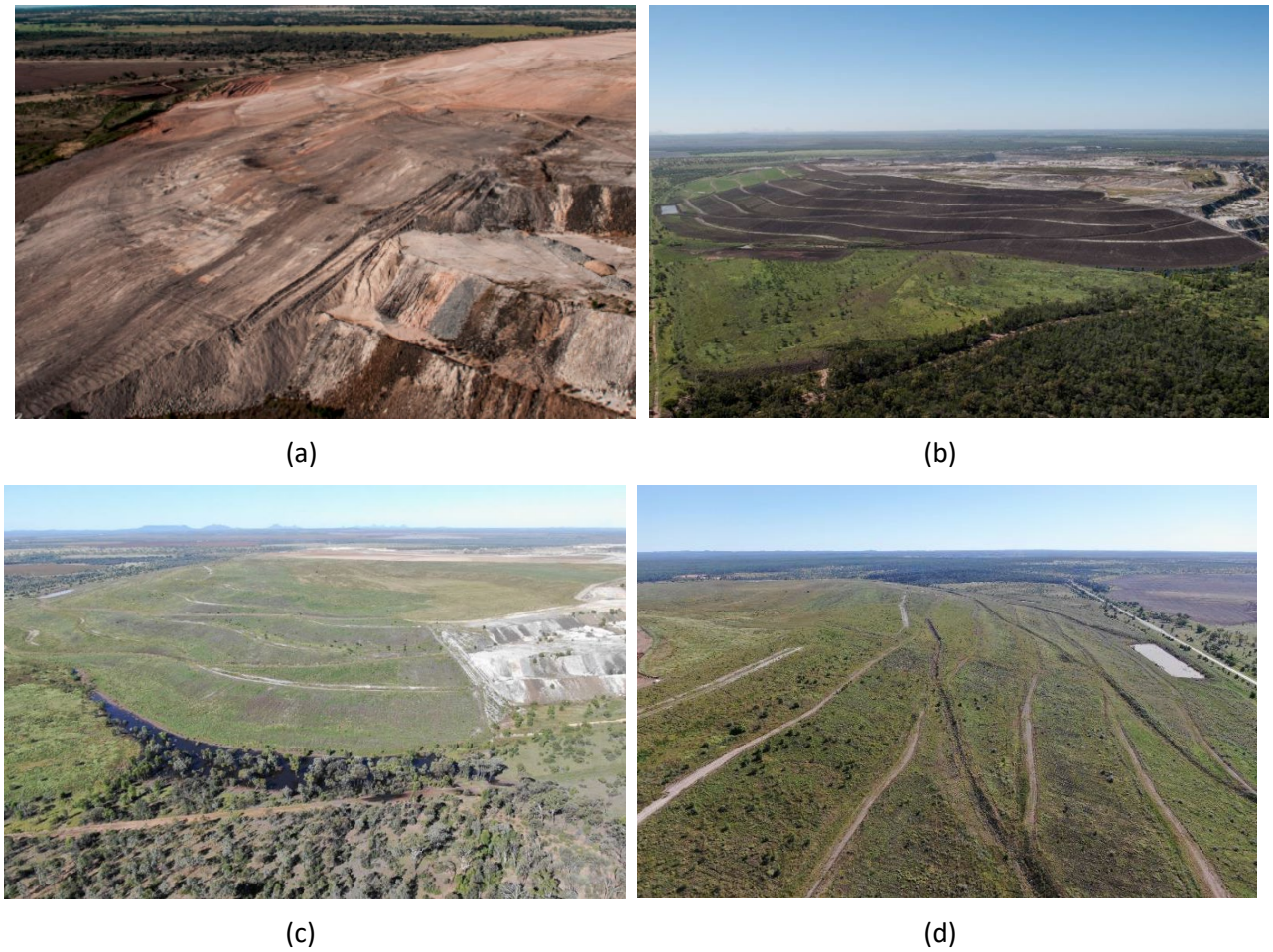


Figure 2 Trilinear slope design

Table 1 Landform design

Area	Landform design aspect	Dimensions
Clermont open pit	Individual landform footprints:	60–654 ha
	Individual landform elevation:	295–360 m AHD
	Slope gradient:	Trilinear gradient: 30%/20%/10% with external dumps having an average slope ≤20% between benches and horizontal slope length between benches <125 m
	Lift height:	15 m out-of-pit/ 20 m in-pit
	Surface water philosophy:	Water-shedding
	Surface treatment:	Revegetated
	PMLU:	Woodland (with grazing as a management tool)
	Key design constraints and considerations:	Restricted footprint, visual impact, significant interaction with mine planning, environmental factors – geotechnical (void), flooding, geochemical
Cement Hill	Individual landform footprints:	3–10 ha
	Individual landform elevation:	310–320 m AHD
	Slope gradient:	Linear
	Lift height:	N/A, optimised for cut/fill balance
	Surface water philosophy:	Water-shedding
	Surface treatment:	Revegetated
	PMLU:	Woodland (with grazing as a management tool)
	Key design constraints and considerations:	Restricted footprint, historical disturbance, stakeholder expectations, environmental factors – geotechnical, flooding, water resource
TLO facility	Individual landform footprints:	4–10 ha
	Individual landform elevation:	320–340 m AHD
	Slope gradient:	Linear (15% for West Dam), optimise cut/fill for rehabilitation maintenance
	Lift height:	N/A
	Surface water philosophy:	Water-shedding
	Surface treatment:	Revegetated
	PMLU:	Woodland (with grazing as a management tool)
	Key design constraints and considerations:	Preservation of existing rehabilitation, historical disturbance, interaction with multiple stakeholders, environmental factors – revegetation, water management, infrastructure



(a) (b)

(c) (d)

Figure 3 Clermont Coal Mine rehabilitation process. (a) Bulk push; (b) Topsoil and seeding; (c) Completed rehabilitation; (d) Trilinear slopes, bench drains and chutes

The PRCP schedule for the site, finalised in 2024, comprises 11 milestones, incorporating 49 criteria and 173 individual requirements. These requirements apply across 10 rehabilitation areas, each subject to annual compliance reporting. In practical terms, this equates to approximately 1,730 individual requirements that must be assessed each year. In addition, the mine includes non-use management areas (NUMAs), which introduce further milestones, criteria and requirements, compounding the overall compliance burden.

CCM was the first Glencore Coal Assets Australia (GCAA) site in Queensland to have an approved PRCP schedule. The scale and diversity of rehabilitation activities, plus being the first approved PRCP schedule, made it an appropriate site for piloting structured verification approaches aligned with PRCP requirements across the GCAA portfolio.

Rather than treating verification as a standalone compliance function, CCM has sought to integrate PRCP requirements into existing operational systems wherever possible. The overarching principles were to:

- embed verification into normal work processes
- avoid duplication of documentation
- ensure evidence is generated contemporaneously with works
- enable transparency and accessibility of records across operational and corporate teams.

4 Approach to progressive rehabilitation and closure plan integration

4.1 Integrating progressive rehabilitation and closure plan requirements into the inspection and test plan framework

ITPs are widely used in mining and construction to manage quality control during earthworks, civil construction and infrastructure development. ITPs define inspection points, acceptance criteria, responsibilities and required records for each activity.

At CCM, the ITP framework provided an effective mechanism for translating high-level PRCP criteria into site-level verification requirements.

The first step involved systematically reviewing the PRCP schedule to identify criteria that could be directly verified during rehabilitation activities. These criteria were then mapped to relevant ITPs, for example, landform shaping criteria were linked to earthworks ITPs, topsoil placement requirements were linked to soil handling ITP, and drainage construction standards were linked to civil works ITPs. Where PRCP criteria were outcome-based rather than activity-based, interim verification steps were defined to demonstrate progress toward the final outcome.

Integrating PRCP requirements into ITPs delivered several benefits. Verification became part of routine quality checks rather than an additional task and evidence was collected at the time works were undertaken, reducing reliance on retrospective documentation. Responsibilities for verification were clearly assigned and records were generated in a consistent, auditable format.

4.2 Contemporaneous record keeping and evidence quality

Regulators increasingly expect rehabilitation evidence to be contemporaneous, rather than reconstructed after the fact. Contemporaneous records are more reliable, provide clearer context and reduce the risk of disputes regarding what was undertaken and when.

To manage the volume of data generated, CCM adopted standardised evidence types for common rehabilitation activities. These included:

- ITP sign-off sheets
- georeferenced photographs
- survey data for landform geometry
- daily or weekly inspection logs
- completion summaries linked to PRCP milestones.

Standardisation improved consistency and simplified auditing and reporting.

Spatial data were also captured and kept as an important source of evidence. Time-series aerial imagery was used to provide an objective, site-wide record of changes in disturbance footprint over time, removal of infrastructure, progression of rehabilitation works and vegetation establishment patterns. These datasets supported high-level verification of PRCP disturbance reduction requirements and complemented ground-based records.

Lidar surveys were used selectively to assess landform development and provide verification of landform slopes and drainage alignment, identification of erosion features and comparison of as-built landforms with approved designs.

4.3 Rehabilitation tracking and governance systems

A customised rehabilitation tracking system was developed to align annual operational plans, rehabilitation budgets and PRCP milestones. This enabled forward planning of rehabilitation activities in a way that was

explicitly aligned with regulatory commitments. The tracking system provided transparent reporting of completed rehabilitation against milestones, upcoming verification requirements and risks to milestone delivery. This supported internal governance and facilitated clear communication with regulators.

5 Progressive rehabilitation and closure plan rehabilitation tracking system at Clermont Coal Mine

A purpose-built PRCP tracker spreadsheet was developed as a centralised rehabilitation management and evidence system. The tracker provides a consolidated and auditable record of all defined rehabilitation areas (RAs) and their associated rehabilitation milestones (RMs) across time, enabling transparent tracking of rehabilitation progress against the binding, time-based commitments specified in the approved PRCP schedule.

The initial task in the development of the tracker was to reflect all rehabilitation milestone requirements by year, as shown in Figure 4.

Contents | Area (Ha) by Rehabilitation Area & Rehabilitation Milestone

Rehabilitation Area	Rehabilitation Milestone	10-Dec-25		10-Dec-26		10-Dec-27		10-Dec-28		10-Dec-29		10-Dec-30		10-Dec-31		10-Dec-32		10-Dec-33		10-Dec-34	
		Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati	Tot	Cumul. ati
RA3 - Infrastructure Areas	RM4 - Bulk earthworks and general reshaping							52	52	0	52	0	52	0	52	0	52	70	122	136	258
	RM5 - Placement of topsoil or growth medium							52	52	0	52	0	52	0	52	0	52	70	122	136	258
	RM6 - Seeding							52	52	0	52	0	52	0	52	0	52	70	122	136	258
	RM7 - Water management in the final landform							52	52	0	52	0	52	0	52	0	52	70	122	136	258
	RM8 - Achievement of surface requirements										0		0		0		0		0		0
	RM9 - Achievement of PMLU to a safe, stable, non-polluting, and self-sustaining condition										0		0		0		0		0		0
	RM10 - Surface water and groundwater demonstrate non-polluting landform										0		0		0		0		0		0
	RM11 - Erosion demonstrates stable landform										0		0		0		0		0		0
RA4 - Water Management Areas	RM1 - Infrastructure decommissioning and removal; or retention for handover									93	93	0	93	0	93	48	141	7	148	0	148
	RM4 - Bulk earthworks and general reshaping											93	93	0	93	0	93	48	141	7	148
	RM5 - Placement of topsoil or growth medium											93	93	0	93	0	93	48	141	7	148
	RM6 - Seeding											93	93	0	93	0	93	48	141	7	148
	RM7 - Water management in the final landform													93	93	0	93	0	93	48	141
	RM8 - Achievement of surface requirements														0		0		0		0
	RM9 - Achievement of PMLU to a safe, stable, non-polluting, and self-sustaining condition														0		0		0		0
	RM10 - Surface water and groundwater demonstrate non-polluting landform														0		0		0		0
	RM11 - Erosion demonstrates stable landform														0		0		0		0
RA5 - TLO Waste Rock Dumps	RM1 - Infrastructure decommissioning and removal; or retention for handover														0		0	29	29	0	29
	RM4 - Bulk earthworks and general reshaping														0		0		0	29	29
	RM5 - Placement of topsoil or growth medium														0		0		0	29	29
	RM6 - Seeding														0		0		0	29	29
	RM8 - Achievement of surface requirements														0		0		0		0
	RM9 - Achievement of PMLU to a safe, stable, non-polluting, and self-sustaining condition														0		0		0		0
	RM10 - Surface water and groundwater demonstrate non-polluting landform														0		0		0		0
	RM11 - Erosion demonstrates stable landform														0		0		0		0

Figure 4 Example breakdown of rehabilitation milestone requirements by year

The tracker is structured around a matrix framework in which each rehabilitation area forms a distinct column and each milestone stage (e.g. decommissioning, earthworks, seeding) forms a row (Figure 5). Milestone progress and completion status are recorded at the intersection of each area and milestone, supported by cell colour coding to enable rapid visual interpretation of rehabilitation status. Milestones are time-phased by scheduled target year, allowing clear identification of milestones that are completed, in progress, or delayed relative to the PRCP schedule.

CCM PRCP Schedule - Works Schedule Dashboard by Year

Report Date: 10-Dec-26

Rehabilitation Areas:

RA1 - Waste Rock Dump								RA2 - CM Tailings								RA6 - Existing Rehabilitation							
Rehabilitation Milestones:																							
	Area (Ha)	% Work Comp	% QA Comp	ITP Template	# of ITPs Required	QA Folder	ArcMap View		Area (Ha)	% Work Comp	% QA Comp	ITP Template	# of ITPs Required	QA Folder	ArcMap View		Area (Ha)	% Work Comp	% QA Comp	ITP Template	# of ITPs Required	QA Folder	ArcMap View
RM1 - Infrastructure decommissioning and removal; or retention for handover	40.00	10%	5%	RM1	1	2025	Map	RM1 - Infrastructure decommissioning and removal; or retention for handover	18.00	0%	0%	RM1	1	2025	Map	RM8 - Achievement of surface requirements	50.00	0%	0%	RM8	2	2025	Map
RM4 - Bulk earthworks and general reshaping	40.00	5%	2%	RM4	2	2025	Map	RM2 - Identification and remediation of contaminated land	18.00	0%	0%	RM2	1	2025	Map								
RM5 - Placement of topsoil or growth medium	40.00	0%	0%	RM5	2	2025	Map	RM3 - Installation of cap on tailings	18.00	0%	0%	RM3	1	2025	Map								
RM6 - Seeding	40.00	0%	0%	RM6	2	2025	Map																
RM7 - Water management in the final landform	40.00	0%	0%	RM7	1	2025	Map																

Figure 5 Example works schedule dashboard

Planned (scheduled) rehabilitation activities are explicitly distinguished from actual on-ground completion, with variance tracking used to highlight departures from schedule (Figure 6). These data are summarised through an integrated dashboard that aggregates rehabilitation progress by year, area and milestone, and presents key performance indicators and graphical outputs suitable for management reporting, internal reviews and audit preparation.

CCM E&C PRCP Schedule 2025

Contents — Highlight Date: 2 — Plan Duration — Actual Start — % Complete — Actual (beyond plan) — % Complete (beyond plan)

#	Rehab Area #	Task	Area (Ha)	PLAN START	PLAN DURATION	ACTUAL START	ACTUAL DURATION	% COMPLETE	% QA
		Rehab Auditors report #1 - submit to Regulator.		36	4			0%	
		Rehab Auditors report #2 - submit to Regulator.		78	4			0%	
		2025 All Milestones Scheduled Finish		12	1			0%	
		2025 Milestones		1	12			53%	15%
1,1,1	1	RM1-Infrastructure	40	1	2	1	2	100%	10%
1,4,1	1	RM4-Bulk earthworks and general	40	1	4	1	3	50%	30%
6,8,1	6	RM8-Achievement of surface	50	1	12	1	3	10%	5%
		2026 All Milestones Scheduled Finish		24	1			0%	
		2026 Milestones		13	12			2%	1%
1,1,2	1	RM1-Infrastructure	40	13	1			10%	5%
1,4,2	1	RM4-Bulk earthworks and general	40	13	3			5%	2%
1,5,2	1	RM5-Placement of topsoil or	40	15	1			0%	0%
1,6,2	1	RM6-Seeding	40	16	1			0%	0%
1,7,2	1	RM7-Water management in the	40	17	3			0%	0%
2,1,2	2	RM1-Infrastructure	18	14	2			0%	0%
2,2,2	2	RM2-Identification and	18	15	1			0%	0%
2,3,2	2	RM3-Installation of cap on tailings	18	14	3			0%	0%
6,8,2	6	RM8-Achievement of surface requirements	50	13	12			0%	0%
		2027 All Milestones Scheduled Finish							

2025 | 2026 | 2027

Figure 6 Example works schedule progress tracker

A core function of the tracker is its integration with the broader rehabilitation evidence system. Each completed milestone is linked to a supporting quality assurance (QA) evidence package, including ITPs (refer Figure 7), georeferenced photographs, closure certificates (refer Figure 8), and suitably qualified person (SQP) reports. Spatial datasets (GIS shapefiles and maps prepared in accordance with regulatory spatial submission guidelines) are aligned with tracker attributes to ensure consistency between reported rehabilitation status and spatial extents. Document control, naming conventions and QA requirements are aligned with the site closure quality system and supporting procedures.

INSPECTION AND TEST PLAN:

Rehabilitation Milestone:	RM1-Infrastructure decommissioning and removal; or retention for handover decommissioning	ITP no:	ITP-RM1	Lot Size (ha):	40	Document Scope
		Lot #:	RA1-RM1-SS9-1			This document serves as formal certification by an appropriately qualified person that the rehabilitation works detailed herein, which form part of the mine closure PRCP schedule for the Clermont Coal Mine, have been completed in accordance with the requirements set out in the approved PRCP schedule (P-PRCP-10076141-29/11/2024).
		Chainage:	NA			
		Work Area:	Slot 59			

LEGEND: | **H** - Hold Point | **I** - Inspection | **M** - Milestone | **R** -Review Documentation | **T** - Test | **W** - Witness Point |

PERSONNEL LEGEND: | **CM** - Construction Manager | **PE** - Project Engineer | **SUP** - Project Supervisor | **QR** - Quality Representative | **SURV** - Surveyor | **CR** - Company Representative

REF	ACTIVITY	STANDARD/ SPECIFICATION	ACCEPTANCE CRITERIA	TEST METHOD	Max Lot Size	# TESTS PER LOT	RECORDS	VERIFICATION		COMMENTS
								QR	CR	
1.1 (a)	All services (water, electricity, gas, etc.) disconnected;	NA	Visual verification of physical disconnection (e.g., capped pipes, removed cables).	Visual Inspection	NA	NA	Photos (on ground & aerial images) - Before & After.			With the exception of any infrastructure to remain as part of the post-mining land use (PMLU) or where infrastructure is agreed to be retained by the landholder as evidenced by a signed landholder agreement.
1.1 (b)	All asbestos and other hazardous materials removed;	NA	Hazardous material clearance report from a licensed contractor confirming safe removal and disposal in	Visual Inspection	NA	NA				
1.1(c)	All buildings demolished and removed;	NA	No remaining structural elements, foundation areas levelled, and waste materials removed.	Visual Inspection	NA	NA				
1.1 (d)	All pipelines decommissioned;	NA	Pipelines cut, removed, and capped at designated locations; no flow detected.	Visual Inspection	NA	NA				
1.1 (e)	All fencing removed;	NA	All posts, wires, and footings removed, and area reinstated to match surrounding landform.	Visual Inspection	NA	NA				
1.1 (f)	All roads decommissioned;	NA	Surface ripped, reshaped, and revegetated; erosion controls in place where necessary.	Visual Inspection	NA	NA				
1.1 (g)	All boreholes decommissioned;	NA	Boreholes sealed and capped to prevent environmental contamination; completion report submitted.	Visual Inspection	NA	NA				
1.2	All general waste and demolition waste has been removed or disposed of where authorized by environmental authority EPML00634113.	NA	Site cleared of debris; disposal records provided, and waste tracking forms submitted where required.	Visual Inspection	NA	NA	Photos - Before & After.			
1.3	Transfer of ownership agreements in place for all water management infrastructure to be retained.	NA	Signed agreements in place, listing assets transferred and new responsible entity.	Visual Inspection	NA	NA	Photos - Before & After.			

REFERENCE DOCUMENTS	ITP CONFORMANCE APPROVAL				
PRCP schedule: P-PRCP-10076141-29/11/2024	DESIGNATION	NAME	POSITION	SIGNATURE	DATE
Environmental authority EPML00634113					

Figure 7 Example inspection and test plan

GLENCORE

Contents Dashboard

CLOSURE CERTIFICATE : 2025-RA1-RM4-WWR-01

Rehabilitation Milestone:	RM4-Bulk earthworks and general reshaping	ITP no:	2025-RA1-RM4-WWR-01	Lot Size (ha):	9.03	This document serves as formal certification by an appropriately qualified person that the rehabilitation works detailed herein, which form part of the mine closure PRCP schedule for the Clermont Coal Mine, have been completed in accordance with the requirements set out in the approved PRCP schedule (P-PRCP-10076141-29/11/2024-29/11/2024).
		Lot #:	WWR			
		Year:	2025			
		Work Area:	Wet Weather Ramp			

PERSONNEL LEGEND: | **CM** - Closure Manager | **PE** - Project Engineer | **SUP** - Project Supervisor | **QR** - Quality Representative | **SURV** - Surveyor | **CR** - Company Representative

REF	ACTIVITY	STANDARD/ SPECIFICATION	ACCEPTANCE CRITERIA	TEST METHOD	RECORDS	VERIFICATION		COMMENTS
						CM	CR	
4.1	External dump slopes constructed to the following specifications: (a) Average slope angle is ≤20% between bench drains; (b) Horizontal slope length between bench drains is <125m.	NA	Design includes conformance to criteria. Survey records demonstrate conformance to design.	Survey & Inspection	Survey and design conformance presentation/ report	G.M.	H.S	Refer design report
4.2	Bench drains are constructed to the following specifications: (a) Between areas of tri-linear batters; (b) To direct flow to stormwater chutes; (c) With a ≥300mm freeboard from design water level to top level of drain, where drains are ≥1m deep.	NA	Design includes conformance to criteria. Survey records demonstrate conformance to design.	Survey & Inspection	Survey and design conformance presentation / report / photos	G.M.	H.S	Refer conformance report.
4.3	Stormwater chutes are constructed to the following specifications: (a) To capture flow for a ≤10% AEP critical duration event; (b) To direct flow of water from bench drains to receiving environment or final void. (c) With geofabric and rock armouring, where flow velocity is >1.5 metres per second (m/s).	NA	Hydraulic design criteria includes design flow capacity and stability requirements.	Survey & Inspection	RPEQ Certification of As Constructed drawings.	G.M.	H.S	No stormwater chutes to area
4.4	Reactive material is not exposed on landform surface and is covered with ≥10m of non-acid forming (NAF) material.	NA	Design includes conformance to criteria. Survey records demonstrate conformance to design.	Survey & Inspection	Mining spoil conformance presentation / report / sign-off	G.M.	H.S	Refer PAF material review. Potential presence of minor quantity of PAF to be further investigated.

REFERENCE DOCUMENTS	CLOSURE CERTIFICATE CONFORMANCE APPROVAL			
PRCP schedule: P-PRCP-100761412-29/11/2024	SIGNED	NAME	POSITION	DATE
Environmental authority EPML00634113		Clare Foley	E&C Manager	08/12/25
		Graham Moxham	Closure Manager	3/12/2025

Figure 8 Example closure certificate

Together, this integrated tracking framework provides a robust, auditable and regulator-ready system for managing PRCP obligations, demonstrating rehabilitation progress, and supporting compliance reporting and independent audit processes over the life of the mine.

The PRCP compliance statement (Figure 9) is an annual statutory report that demonstrates whether the site has complied with its approved PRCP schedule. It is prepared each year ahead of the milestone completion date (10 December) and supports both regulatory compliance and the Department's annual return and independent PRCP audit processes. The statement is supported by the data management system and verification records collected through the tracker.

5.3 RA6 RM8 Compliance

Area	Hectares
SD421	10.3
360P17	39.7
Total	**50**

Table 5-6 RA6 RM8 hectares achieved

	Milestone Criteria	Compliant (Yes / No)	Comment/ Evidence
8.1	Vegetation groundcover is ≥50%.	Yes	As per PRCP RM8 Conformance Report
8.2	Proportion of Category 3 restricted invasive plant species8 and Weeds of National Significance is <10% of total vegetative groundcover.	Yes	As per PRCP RM8 Conformance Report
8.3	The landform is free draining, with exception of water management infrastructure retained under RA4, and there is no evidence of any of the following: a) Vegetation die-back localised in low points on the landform surface; or b) Salt rise as evidenced by salt deposition at the landform surface.	Yes	As per PRCP RM8 Conformance Report
8.4	An AQP certifies that there is no erosion classified as 'moderate' or 'severe' as defined by Attachment 7 – Erosion Classification Framework.	Yes	As per PRCP RM8 Conformance Report
8.5	Despite RM8.4 erosion is acceptable in the achievement of surface requirements provided an AQP certifies that all active erosion has been identified, and remediation activities have been completed.		Not applicable
8.6	There is no evidence of saline, metalliferous or acid mine drainage from landforms to the receiving environment.	Yes	As per PRCP RM8 Conformance Report
8.7	There is no evidence of spontaneous combustion or self-heating material on the landform surface.	Yes	As per PRCP RM8 Conformance Report

Figure 9 Excerpt from compliance statement

6 Challenges and lessons learned

The sheer volume of records required to verify rehabilitation remains a challenge. Early investment in structured systems and standardised processes was critical to managing this burden.

Embedding verification into operational practice required a cultural shift, with site teams recognising documentation as integral to rehabilitation success rather than an administrative add-on. Early alignment between PRCP authors, operational teams and verification systems reduced the volume of rework and ambiguity during delivery.

The experience at CCM demonstrates that verification does not need to be overly burdensome if it is integrated into existing systems and workflows. While regulatory requirements have undoubtedly increased complexity, they have also driven improvements in discipline, transparency and long-term accountability for rehabilitation outcomes.

The approaches outlined are adaptable to other jurisdictions and regulatory frameworks, particularly where outcome-based closure requirements are emerging.

7 Conclusion

Evidence-based verification is no longer optional in mine rehabilitation. It is a fundamental component of demonstrating compliance, achieving certification and ultimately relinquishing mining tenure.

By embedding PRCP requirements into operational systems such as ITPs, and by leveraging spatial data and structured tracking tools, mine operators can translate planning commitments into verifiable practice. The CCM experience demonstrates that with appropriate systems and governance, rehabilitation verification can be both rigorous and practical.

References

State of Queensland 1994, *Environmental Protection Act 1994 (Qld)*, Australia
State of Queensland 2018, *Mineral and Energy Resources (Financial Provisioning) Act 2018*, Australia.