NSW Resources
Resources Regulator

Targeted assessment program

Decommissioning of infrastructure to achieve sustainable rehabilitation outcomes

March 2025 – August 2025

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Executive summary

This report summarises the findings of the Resources Regulator's targeted assessment program (TAP) focussing on how mine operators prepare for, and implement, decommissioning of infrastructure to achieve sustainable rehabilitation outcomes.

Assessments of 8 mines were conducted between March and August 2025.

The key findings and recommendations to improve the implementation of the critical controls required to mitigate risks to achieving the final land use through the decommissioning of infrastructure, include:

Rehabilitation risk assessments

The TAP found that all the mines had conducted rehabilitation risk assessments that were generally prepared by suitably qualified people with insights into the mine operations. It was noted that most risk assessments required updates to reflect the current mining/rehabilitation phase.

While technical studies had been undertaken to better understand site specific risks and identify appropriate mitigations (e.g. focusing on land and water contamination, groundwater/mine water, or shaft sealing), the TAP identified gaps in the integration, into the risk assessment, of critical controls required to address risks and uncertainty, and the assignment of responsibility for implementing actions within clear timeframes.

Some mines had not included risks to timely rehabilitation associated with the time required to obtain approvals for heritage management (e.g. demolition and or retention of infrastructure) or to obtain consent for alternative post mining land uses that utilise mining infrastructure.

Management systems are not being used consistently for tracking progress on the implementation of actions required to mitigate risks. This in turn results in limitations to the mine operator's ability to evaluate and review actions taken to mitigate risk to ensure they remain effective and subject to ongoing monitoring.

Sealing of mine openings and boreholes

The TAP found that underground mines generally require additional details on sealing strategies to be documented in their rehabilitation management plans.

The nature of groundwater accumulation in underground workings needs to be well understood to inform mine sealing activities that prevent or reduce groundwater 'fill-and-spill'. Mines that have undertaken groundwater modelling to confirm or inform sealing activities in advance of the cessation of mining have addressed the risk that rehabilitation may be delayed, particularly where access to underground workings needs to be maintained to complete the modelling and design and implement a sealing strategy to control groundwater.

Implement decommissioning and demolition strategy

The TAP found that the majority of mines plan to remove surface infrastructure unless it is required for a lawful post-mining use.

Although decommissioning and demolition strategies are documented, they often lack detailed action plans and delivery timeframes in the rehabilitation management plan. In most cases there are records to suggest contamination assessments have been completed or are underway, and monitoring programs were in place to monitor contamination (with some sites still requiring additional phases or investigation to determine a clear path to achieving the final land use).

The integration of recommendations and actions from technical reports, into the rehabilitation management plans was often incomplete, including incomplete or outdated remediation action plans. There were also instances where related closure studies did not consider the outputs from technical reports .

Structural assessment and strategy for retained structures

The TAP found that infrastructure retention strategies varied across mines depending on the approved final land use, for example strategies for retention of dams for agricultural use or hardstands and buildings for industrial use. However, the rehabilitation management plans often lacked clarity on the ongoing management strategies for these retained structures. The relevant approvals (e.g. development consents) for the retention of structures were not consistently documented in the rehabilitation management plan.

Exclusion zones and barriers to isolate hazardous areas

Hazardous areas requiring isolation to protect the community post closure were not encountered at the various mines on the inspection program. One mine included the potential to retain a building that would require potential isolation, however, the mine's preference was to remove the building.

Heritage assessment and management

Aboriginal cultural heritage is managed under approved heritage management plans across most mines, with the majority referring to these plans in the rehabilitation management plan.

Generally, the mines expressed a preference for removing European heritage structures, however, in many cases a clear approval pathway for archival recording and demolition was yet to be determined. Additional consultation and approvals are required to confirm the fate of heritage items prior to closure to avoid any delays to rehabilitation.

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Introduction

The Resources Regulator's targeted assessment program (TAP) assesses critical rehabilitation risks and critical controls required to mitigate these risks at mines in New South Wales.

A 'bowtie' risk management framework and standardised assessment checklists have been developed for a range of TAPs that focus on implementing identified critical controls (categorised in accordance with the ICMM Guide[1]) to determine whether measures have been identified and implemented to ensure sustainable rehabilitation outcomes. Further details regarding our TAP programs, including the bowtie risk assessments, are available on our website.

A summary of the TAP set-up, including objectives and assessment criteria for each critical control is included at Appendix A.

The TAP follows the following principles:

- Consideration of risks to achieving effective rehabilitation.
- Focus on the implementation of identified critical controls.
- Evaluation of the effectiveness of implemented control measures.

The decommissioning TAP was undertaken between March and August 2025. The TAP assessed the critical controls associated with preparing and implementing decommissioning of infrastructure activities to achieve sustainable rehabilitation outcomes that will support the final land use.

The program included site inspections at 8 mines.

Scope

The TAP was limited to an examination of the 'decommissioning phase of rehabilitation' being the activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials.

In the context of the rehabilitation management plan (for large mines only) this phase of rehabilitation may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or fit for purpose-built infrastructure to be retained for future use(s) following lease relinquishment.

The process

The process for undertaking a TAP generally involves the following stages:

- written notification to the mine providing details of the proposed TAP including:
  - the focus areas of the assessment
  - assessment timing and assessment team composition
  - a list of the likely documents and records that should be made available for assessment

[1] Critical Control Management Implementation Guide, International Council on Mining and Metals (ICMM), 2015.

  - the resources that should be made available by the mine, including site personnel that may be required to participate;

- a desktop assessment of documents and records to identify the control measures the mine uses to prevent and mitigate the risks to achieving sustainable rehabilitation outcomes;
- a site inspection of the mine to assess the implementation of those controls;
- discussion with, and feedback to, the mine management team on the findings and likely actions that need to be taken by the mine operators in response to the findings; and
- written feedback to the mine, including an assessment finding letter and/or a direction to address certain matters pursuant to section 240 of the *Mining Act 1992*, where appropriate.

The threats and critical controls assessed are shown in Appendix A of this report and explanatory notes on the assessment system are in Appendix B.

Figures 1-3 present the findings for each de-identified mine and critical control.

No statutory notices pursuant to section 240 of the *Mining Act 1992* were issued to any of the mines.

Assessment findings

Controls assessed

MRP1.1 – Rehabilitation risk assessment

The risk

A standard condition of mining leases[2] requires lease holders to prepare a rehabilitation risk assessment that:

- identifies, assesses and evaluates risks that need to be addressed to achieve the final land use,
- identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks.

The measures identified in the rehabilitation risk assessment must be implemented, and mine operators must identify and record any reasonably foreseeable hazard that presents a risk to rehabilitation being able to achieve the final land use.

Rehabilitation risk assessments must identify the risks to be addressed for the decommissioning of infrastructure relevant to the specific site and circumstances. The rehabilitation risk assessment must identify the appropriate risk control measures that must be implemented and how their effectiveness will be assessed.

A deficient risk assessment will result in inadequate control measures to manage decommissioning planning and implementation risks which is likely to reduce the likelihood of successful rehabilitation that achieves the final land use.

What was assessed

If a rehabilitation risk assessment had been prepared and documented to identify, assess and evaluate the risks that need to be addressed when planning and implementing decommissioning activities to achieve sustainable rehabilitation outcomes that will support the final land use.

If a site-specific rehabilitation risk assessment had been conducted that:

- identified, assessed and evaluated the risks that need to be addressed to achieve the rehabilitation outcome documents (being the rehabilitation objectives statement, rehabilitation completion criteria statement and final landform and rehabilitation plan),
- identified site-specific risks associated with decommissioning,
- identified suitable controls and strategies to treat the identified risks,
- was relevant to active mining operations,
- was produced by a team of appropriately skilled and experienced people from the workforce with responsibilities for mine rehabilitation,
- results in the identified controls being assigned to a responsible and suitably qualified person.

Where multiple risks assessments are conducted, there should be a centralised document (e.g. risk register) that links all assessments to the requirements set out in Schedule 8A of Mining Regulation 2016.

[2] Refer to clauses 6(3) and 7 in Schedule 8A Mining Regulation 2016

What was found

All the mines had rehabilitation risk assessments in place, however, most required updates to reflect the current mining/rehabilitation phase. In most cases, the risk assessments were prepared by a range of suitably qualified people.

Common gaps included integration of the required actions from recent technical studies (e.g., contamination, groundwater modelling, shaft sealing) to address risks or uncertainty and the assignment of clear control actions with responsibilities and timeframes.

It was noted that some mines have not included risks related to delays from obtaining heritage approvals for the management (e.g. demolition or retention) of potential heritage infrastructure or obtaining development consent to enable ongoing use of mining infrastructure as part of alternative post mining land uses.

It was also observed that compliance management systems are being used inconsistently for the tracking of actions.

RP10.1 – Sealing of mine openings and boreholes – presence of underground workings and infrastructure

The risk

Mine openings and boreholes that are not adequately sealed present a risk of community and/or fauna access / exposure to underground workings and incompatibility with the final land use.

What was assessed

If a sealing strategy was in place that:

- identifies all seal locations (mine entries and boreholes),
- assesses the risk of unknown adits/shafts (e.g. historical workings),
- identifies access requirements for seal construction (especially access via underground workings),
- assesses the design of the seals (which can be conceptual in early stages, with more detailed engineering design required during later stages/closure) and takes into account:
    - the need to eliminate community and fauna access
    - the need to contain mine gas
    - the need to contain a hydrostatic head of water and/or artesian head of groundwater in bores
    - the integrity of the surrounding strata.
- nominates the likely maintenance and monitoring requirements for seals post construction,
- considers other environmental issues that have arisen during mine operation that were not initially assessed (e.g. micro-bat habitat).

If the sealing strategy was outlined in the rehabilitation management plan [section 6.2.2.(f)][3].

Note: The above components of the sealing strategy must be described in section 6.2.2 of the rehabilitation management plan. The matters set out in the plan must be implemented (refer to the standard conditions of mining leases set out in clauses 9 and 10 in Schedule 8A of Mining Regulation 2016).

What was found

Underground mines generally require additional detail on the sealing strategies to be documented in their rehabilitation management plans.

It was also observed that further groundwater modelling is required to confirm sealing requirements to prevent or reduce fill-and-spill risks as groundwater accumulates in the underground workings post closure (i.e. groundwater needed to be better understood for some mines to undertake decommissioning activities).

RP11.3 – Implement decommissioning and demolition strategy – removed or retained structures are isolated to remove/mitigate/minimise risks of contamination

The risk

Mining structures that are not removed, retained or isolated in an approved way[4] (which removes / mitigates / minimises risks of contamination and safety for post-mining land users) present a risk to community safety and incompatibility with the final land use.

What was assessed

If a decommissioning and demolition strategy was in place that:

- identifies all structures and infrastructure and whether they will be retained or removed,
- justifies the removal/retention of structures and infrastructure,
- details stakeholder consultation, including with land owners to gain consent for any structures / infrastructure to be retained,
- details timeframes for decommissioning/demolition,
- considers hazardous building materials,
- considers approvals required under other legislation,
- details the eventual fate of structures / infrastructure to be removed (e.g. off-site disposal, on-site burial, etc).

If a contamination assessment strategy was in place that:

- includes a contamination assessment conducted in accordance with relevant guidelines (e.g. National Environment Protection Measures (NEPM) guidelines),

[3] Refer to *Form and Way: Rehabilitation management plan for large mines* available on the website for the mandatory requirements to be included in a rehabilitation management plan.

[4] Retention of infrastructure needs to be consistent with the approved final land use and associated planning approvals

- includes a survey of all hazardous buildings (e.g. identification of asbestos, polychlorinated biphenyls (PCBs), etc,
- details investigation and intrusive sampling regimes for high risk areas (e.g. fuel/oil storage),
- details remediation action plans for contaminated site management (when identified),
- includes validation assessment criteria for contaminated areas to verify they are appropriately treated.

If the demolition strategy and the contamination assessment/hazardous building surveys are outlined in the rehabilitation management plan[5].

Note: The demolition strategy must be described in section 6.2.2(b) of the rehabilitation management plan. The contamination assessment/hazardous building surveys must be described in sections 6.2.1.(e) and 6.2.2.(d) and (e). The matters set out in the plan must be implemented (refer to the standard conditions of mining leases set out in clauses 9 and 10 in Schedule 8A of Mining Regulation 2016).

What was found

The majority of mines plan to remove surface infrastructure unless required for a lawful post-mining use.

Decommissioning and demolition strategies are documented but often lack detailed timeframes in the rehabilitation management plans. Infrastructure removal activities were underway at several sites and the practices observed were generally positive with good controls in place for removal of structures and tracking of the waste streams. This included undertaking additional testing of materials below removed structures to confirm any contamination.

In most cases there are records to suggest contamination assessments had been completed (at least phase 1 assessments) or were underway. Monitoring programs were generally in place to monitor contamination with some sites still requiring additional phases or investigation to determine a clear path to achieving the final land use. Underground storage tanks were typically causing issues of uncertainty at some sites.

The integration of findings from technical reports into the rehabilitation management plans are often incomplete, such as missing remediation action plan updates or other related closure studies.

Hazardous materials surveys and registers exist at most mine sites with some of the older operations having a prevalence of hazardous materials such as asbestos, lead, polychlorinated biphenyls, etc.

[5] Refer to *Form and Way: Rehabilitation management plan for large mines* available on the website for the mandatory requirements to be included in a rehabilitation management plan.

RP11.4 – Structural assessment and strategy for retained structures – retained buildings, infrastructure, landforms unsafe

The risk

Mining structures that are not retained or isolated in an approved way[6] and in a manner which removes / mitigates / minimises risks of contamination and safety for post-mining land users, present a risk to community safety and incompatibility with the final land use.

What was assessed

If a strategy for retained structures and infrastructure was in place that:

- identifies all structures and infrastructure to be retained, including justification and stakeholder consultation,
- assesses planning approvals that apply to retained structures / infrastructure (i.e. retention permissible under existing approvals),
- includes structural assessments (engineering reports) to verify suitability for retention,
- identifies ongoing maintenance requirements.

If the structures and infrastructure to be retained are included in the final landform and rehabilitation plan[7].

If the strategy for retained structures / infrastructures are outlined in the rehabilitation management plan[8].

Note: The strategy for retained structures / infrastructure must be described in section 6.2.2(c) of the rehabilitation management plan. The matters set out in the plan must be implemented (refer to the standard conditions of mining leases set out in clauses 9 and 10 in Schedule 8A of Mining Regulation 2016).

What was found

Infrastructure retention strategies varied depending on the approved final land uses. This included retention of dams for agricultural use and hardstands and/or buildings for industrial uses. However, the rehabilitation management plans often lacked clarity regarding the ongoing management obligations for these retained structures.

Relevant approvals (e.g. development consents) for the retention of structures are not consistently documented in the rehabilitation management plan.

[6] Retention of infrastructure needs to be consistent with the approved final land use and associated planning approvals.

[7] Refer to *Guideline: Form and way for rehabilitation objectives statement, rehabilitation completion criteria statement and final landform and rehabilitation plan for large mines* for the mandatory requirements for the final landform and rehabilitation plan.

[8] Refer to *Form and Way: Rehabilitation management plan for large mines* available on the website for the mandatory requirements to be included in a rehabilitation management plan.

RP11.5 – Exclusion zones and barriers to isolate hazardous areas – retained buildings, infrastructure, landforms unsafe

The risk

Hazardous areas that are not isolated in an approved way[9] and in manner which removes / mitigates / minimises risks for post-mining land users, present a risk to community safety and incompatibility with the final land use.

What was assessed

If a strategy for hazardous areas was in place that:

- identifies the hazard type and associated key risks,
- identifies the extent of hazard isolation (including potential for the area to increase with time),
- identifies the methods to isolate hazardous area from post mining land users (human and fauna),
- identifies any ongoing maintenance/ management requirements and the mechanism to transfer to subsequent land owners/ managers identified,
- assesses planning approvals that apply to the hazard.

If the hazardous areas are included in the final landform and rehabilitation plan[10].

If the strategy for hazardous areas was outlined in the rehabilitation management plan[11].

Note: The strategy for hazardous areas must be described in sections 6.2.2(c) / (d) / (e) of the rehabilitation management plan. The matters set out in the plan must be implemented (refer to the standard conditions of mining leases set out in clauses 9 and 10 in Schedule 8A of Mining Regulation 2016).

What was found

Hazardous areas requiring isolation were not encountered at the various mines. Although there was one mine where retention of a building that would require potential isolation was possible, the mine's preference was to progress with the removal of this building.

[9] Retention of infrastructure needs to be consistent with the approved final land use and associated planning approvals

[10] Refer to *Guideline: Form and way for rehabilitation objectives statement, rehabilitation completion criteria statement and final landform and rehabilitation plan for large mines* for the mandatory requirements for the final landform and rehabilitation plan.

[11] Refer to *Form and Way: Rehabilitation management plan for large mines* available on the website for the mandatory requirements to be included in a rehabilitation management plan.

RP12.1 – Heritage assessment – heritage value associated with the mine

RP12.2 – Implement appropriate heritage management measures – heritage value associated with the mine

The risk

Heritage items and areas[12] that are not identified, assessed and managed in an approved way[13] present the risk of irreversible loss of heritage and achieving the approved final land use.

What was assessed

If a heritage assessment was in place that:

- assesses heritage risks included in the rehabilitation risk assessment,
- identifies all potential heritage sites / areas and an assessment of their heritage values,
- identifies appropriate stakeholders relating to heritage and an engagement approach,
- identifies a heritage management strategy (e.g. archival recordings, salvage, preservation, etc),

If heritage management measures identified in any heritage management plans were being implemented.

If heritage items and areas are included in the final landform and rehabilitation plan[14].

If heritage management is outlined in the rehabilitation management plan[15].

Note: The management of cultural and heritage issues must be described in section 6.2.1(m) of the rehabilitation management plan. The matters set out in the plan must be implemented (refer to the standard conditions of mining leases set out in clauses 9 and 10 in Schedule 8A of Mining Regulation 2016).

What was found

Aboriginal cultural heritage is managed under approved heritage management plans across most mines with the majority referring to these plans in the rehabilitation management plan.

Mine operator's preference is to remove any European heritage structures, however, in many cases a clear approval pathway for archiving and demolition was yet to be determined. Additional consultation and approvals would be required to confirm the fate of heritage items prior to closure in order to avoid any delays to rehabilitation.

[12] Includes both Aboriginal and European heritage.

[13] Retention of infrastructure needs to be consistent with the approved final land use and associated planning approvals

[14] Refer to *Guideline: Form and way for rehabilitation objectives statement, rehabilitation completion criteria statement and final landform and rehabilitation plan for large mines* for the mandatory requirements for the final landform and rehabilitation plan.

[15] Refer to *Form and Way: Rehabilitation management plan for large mines* available on the website for the mandatory requirements to be included in a rehabilitation management plan.

Assessment findings by mine

The following figures summarise the assessment findings. More details explaining the assessment system are at Appendix B.

Figure 1: Overall assessment findings ratings by assessment criteria

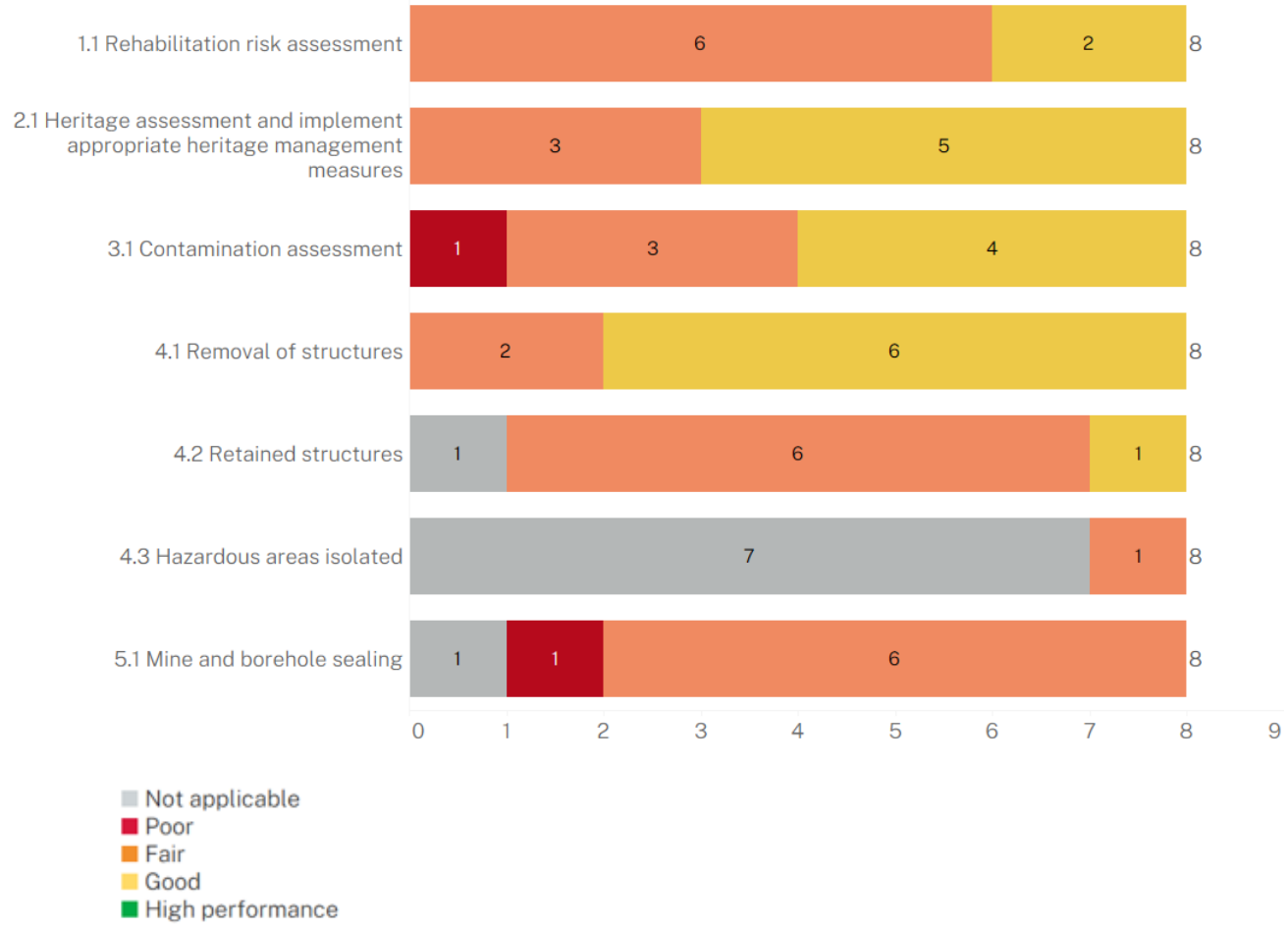

Figure 2: Overall findings results by assessment criteria

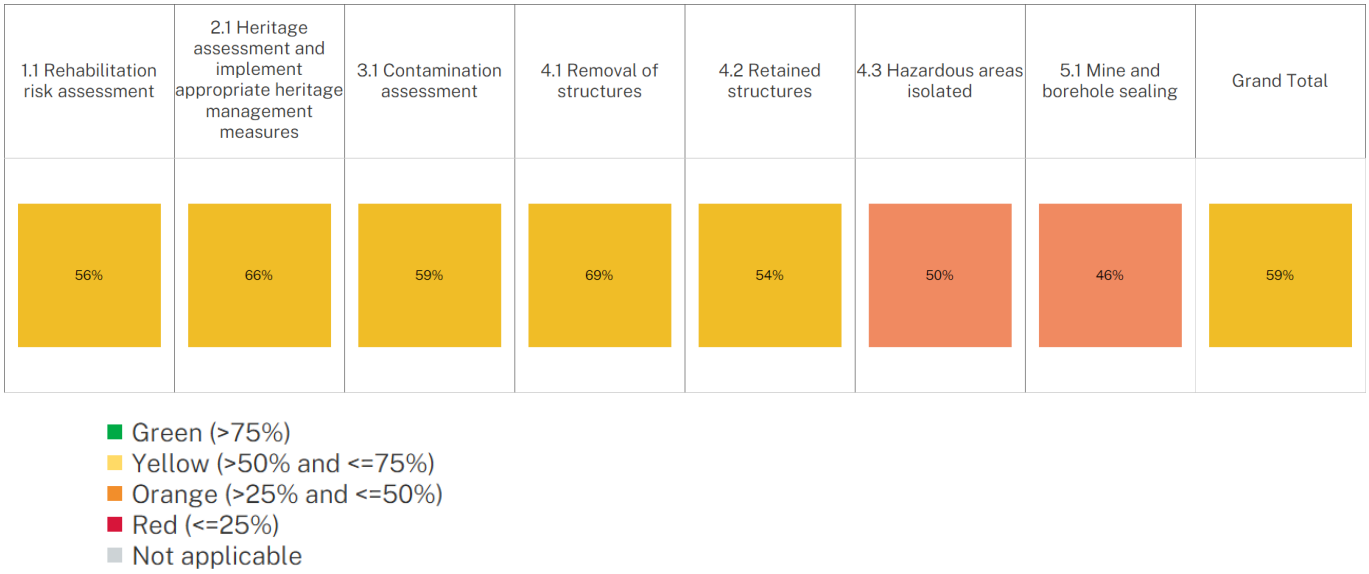

Figure 3: Overall assessment findings for each of the assessment categories for each mine

Mine Location	1.1 Rehabilitation risk assessment	2.1 Heritage assessment and implement appropriate heritage management measures	3.1 Contamination assessment	4.1 Removal of structures	4.2 Retained structures	4.3 Hazardous areas isolated	5.1 Mine and borehole sealing	Grand Total
Mine G	50%	50%	25%	50%	50%	50%	50%	46%
Mine B	50%	75%	50%	75%	50%		50%	58%
Mine H	50%	50%	75%	75%	50%		50%	58%
Mine I	50%	75%	75%	75%	50%		25%	58%
Mine D	75%	50%	50%	75%	50%			60%
Mine F	50%	75%	50%	75%	75%		50%	63%
Mine J	75%	75%	75%	50%	50%		50%	63%
Mine A	50%	75%	75%	75%			50%	65%
Grand Total	56%	66%	59%	69%	54%	50%	46%	59%

- Green (>75%)
- Yellow (>50% and <=75%)
- Orange (>25% and <=50%)
- Red (<=25%)
- Not applicable

Response to mines

Assessment finding letters were issued to each mine included in the TAP, which included a summary of key observations made during the assessment as well as recommendations for improvement in the medium to longer term. Each mine was required to develop an action plan to address each of the recommendations. Progress against implementing these action plans will be monitored by the Resources Regulator.

The common themes and key recommendations included the following:

Rehabilitation risk assessment

Rehabilitation risk assessments must be kept up to date to reflect the current phase of operations. They must also include the integration of the required actions from recent technical studies (e.g. contamination, groundwater modelling, shaft sealing) to address risks/uncertainty, with the assignment of clear responsibilities with timeframes.

Mine operators must review their rehabilitation risk assessments to ensure they take into account the recommendations in any assessment finding letters and the guidance provided by the Resources Regulator set out in *Guideline: Rehabilitation risk assessment* and *Guideline: Rehabilitation controls* available on the website.

Sealing of mine openings and boreholes

The strategy for the sealing of mine openings and boreholes must be documented in section 6.2.2 of the rehabilitation management plan with the objective that it is confirmed well in advance of closure to avoid potential delays with mine rehabilitation.

Decommissioning and demolition strategy

Section 6.1 (Life of mine rehabilitation schedule) of the rehabilitation management plan must include a summary of the proposed timeframes to obtain necessary approvals (e.g. modification to a development consent) to inform the estimated timing of decommissioning or retention of infrastructure to avoid delays to rehabilitation post mine closure. This must account for any additional consultation or the development or refinement of plans at a later date. The demolition strategy must be described in section 6.2.2(b) of the rehabilitation management plan.

Findings from contamination assessments must be included in more detail in the rehabilitation management plans. The contamination assessment/hazardous building surveys must be described in sections 6.2.1.(e) and 6.2.2.(d) and (e) of the rehabilitation management plan.

Structural assessment and strategy for retained infrastructure

Section 6.1 (Life of mine rehabilitation schedule) of the rehabilitation management plan must include a summary of the proposed timeframes to obtain necessary approvals (e.g. modification to a development consent) to inform the estimated timing of retention of infrastructure and avoid delays to rehabilitation post mine closure.

The strategy for retained structures / infrastructure must be described in section 6.2.2(c) of the rehabilitation management plan.

The structures and infrastructure to be retained must be included in the final landform and rehabilitation plan as final landform features.

Heritage assessment

European heritage management and associated approval pathways need clearer documentation relating to demolition and/or retention post closure.

Heritage items and areas must be included in the final landform and rehabilitation plan.

The management of cultural and heritage issues must be described in section 6.2.1(m) of the rehabilitation management plan.

Notices issued

No notices pursuant to section 240 of the *Mining Act 1992* were issued.

Recommendations

It is recommended mine operators, on reading this report, review and amend (where relevant), their site's rehabilitation risk assessment, rehabilitation management plan, final landform and rehabilitation plan and management practices to manage the risks associated with preparing and implementing decommissioning activities that are unique to their site.

During the review process, mine operators are encouraged to consider the matters outlined above in the 'Response to mines' and implement these recommendations as relevant to their site.

Further information

For more information on targeted assessment programs, the findings outlined in this report, or other mine rehabilitation information, please contact the Regulator:

Contact type	Contact details
Email	info@sys.resources.nsw.gov.au
Phone	1300 814 609 (option 2, then 5)
Website	www.resources.nsw.gov.au
Address	516 High Street Maitland NSW 2320

Appendix A - TAP assessment set-up

The critical control consolidation process resulted in seven critical control groups for assessment in the TAP. All the relevant critical controls, the threats that they address, the objective and the assessment criteria used in the TAP are listed in Table 1 below.

Table 1: Critical controls and associated objectives assessed in TAP

Critical control	Threat	Control objective	Assessment criteria (control support)
MRP1.1 Rehabilitation risk assessment	n/a	To ensure the range of risks associated with decommissioning of infrastructure are identified and appropriate controls are in place to facilitate sustainable rehabilitation outcomes.	• Risk assessment
RP10.1 Sealing of mine openings and boreholes	Presence of underground workings and infrastructure	To restrict/prevent community and / or fauna access / exposure to underground workings and address impacts (incompatibility with) final land use.	• Sealing strategy developed and implemented to restrict / prevent community and fauna access / exposure to underground workings and address impacts (incompatibility with) final land use.
RP11.3 Implement decommissioning and demolition strategy	Retained buildings, infrastructure, landforms unsafe	To ensure mining structures are removed, retained or isolated in a way which removes / mitigates / minimises risks of contamination and safety for post mining land users. Retention of infrastructure is consistent with the final land use and associated planning approvals.	• Decommissioning, demolition and contamination strategies developed and implemented to remove / mitigate / minimise risks of contamination and safety for post mining land users .
RP11.4 Structural assessment and strategy for retained structures	Retained buildings, infrastructure, landforms unsafe	To ensure mining structures are retained or isolated in a way which removes / mitigates / minimises risks of contamination and safety for post mining land users. Retention of	• Retained structures and infrastructure strategy developed and implemented to remove / mitigate / minimise risks for post mining land users.

Critical control	Threat	Control objective	Assessment criteria (control support)
		infrastructure is consistent with the final land use and associated planning approvals.	
RP11.5 Exclusion zones and barriers to isolate hazardous areas	Retained buildings, infrastructure, landforms unsafe	To ensure mining structures are removed, retained or isolated in a way which removes / mitigates / minimises risks of contamination and safety for post mining land users. Retention of infrastructure is consistent with the final land use and associated planning approvals.	• Hazardous areas strategy developed and implemented to remove / mitigate / minimise risks for post mining land users.
RP12.1 Heritage assessment	Heritage value associated with mine	To ensure heritage sites are appropriately identified, assessed and managed in accordance with approvals or heritage plan.	• Heritage assessment is developed to appropriately identify, assess and manage heritage items and areas.
RP12.2 Implement appropriate heritage management measures	Heritage value associated with mine	To ensure heritage sites are appropriately identified, assessed and managed in accordance with approvals or heritage plan.	• Heritage assessment is implemented to appropriately identify, assess and manage heritage items and areas.

Appendix B - Assessment system explained

We used a bowtie framework to proactively assess how mine sites managed the risks to rehabilitation. Bowties are a widely used risk management tool that integrate preventative and mitigating controls onto threat lines that relate to a material unwanted event.

As part of program planning, controls were categorised in accordance with the ICMM Guide[16] to identify the critical controls.

Standardised assessment checklists for a range of TAPs were developed. Each TAP focused on the implementation of an identified critical control(s) to determine whether measures were identified and implemented to ensure sustainable rehabilitation outcomes.

Assessment findings

During each mine's site assessment, inspectors rated each control support and recorded the findings. Points were awarded on whether there was evidence the control support was documented and/or implemented, as summarised in the table below.

Table 2: Assessment system scoring

Scoring	Finding outcome	Points
High performance	As per good criteria, however, continued improvement could be demonstrated. For example, the scope of control support methodology was updated to reflect feedback from research and monitoring.	4
Good	Methodology was described/documented in the rehabilitation management plan (or other relevant document) and was reflective of constraints and opportunities that were identified. Methodology was implemented.	3
Fair	Methodology was described/documented in the rehabilitation management plan (or other relevant document) but was limited (in terms of scope and implementation).	2
Poor	Not documented and not implemented.	1
N/A	Circumstances where the critical control/control support did not apply	n/a

For each critical control, an overall result was calculated on the total points scored as a proportion of the maximum possible points for that critical control. For example, if a critical control comprises 10 control supports and 5 were assessed as high performance and 5 were found to be poor then the overall assessment result for that critical control would be 62.5%.

Critical control calculations took into account instances where control supports were not applicable to the mine being assessed or when control supports were not able to be assessed during a site visit.

The overall assessment result for each critical control has been assigned a colour based on the assessment bands presented in the table below. The colour band results are then used to identify industry focus areas requiring improvement.

[16] Critical Control Management Implementation Guide, International Council on Mining and Metals (ICMM), 2015.

Table 3: Scoring criteria and assessment colour bands

Criteria	Colour
An assessment result of >75% of possible points	Green
An assessment result of >50% but ≤75% of possible points	Yellow
An assessment result of >25% but ≤50% of possible points	Orange
An assessment result of ≤25% of possible points	Red
n/a	