

Framework for Queensland's Residual Risk in the Resource Sector

PREPARED BY QUEENSLAND TREASURY CORPORATION



Foreword

This document is a public version of an independent report prepared by Queensland Treasury Corporation for consideration by Government.

The Government supports in principle the general direction of the recommendations and seeks to consult with industry and the community for feedback on the proposed framework.

The Government will consider all feedback provided through the consultation process in finalising any potential change to the framework.

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Executive Summary

Protecting Queensland from the Residual Risk of resource projects

By its nature, resource exploration and extraction creates disturbance and changes the environment. While the State holds Financial Assurance (FA) to ensure funds are available if a resource activity operator fails to meet its environmental and rehabilitation obligations during the life of a resource site, as a part of an Environment Authority (EA) surrender process, the State may also require the resource activity operator to provide a Residual Risk (RR) payment(s). The RR payment is designed to protect the State against costs that may be incurred in the future to address rehabilitation and environmental issues, when the resource entity no longer has statutory obligations for the site. The Queensland Government has considered a wider suite of reforms to manage the State's resource activity, one of which is the RR framework.

The purpose of this report is to provide advice and recommendation in the establishment and refinement of key elements of the RR Framework ahead of the State planned policy development and implementation. The recommended RR framework has four pillars of desired outcomes:

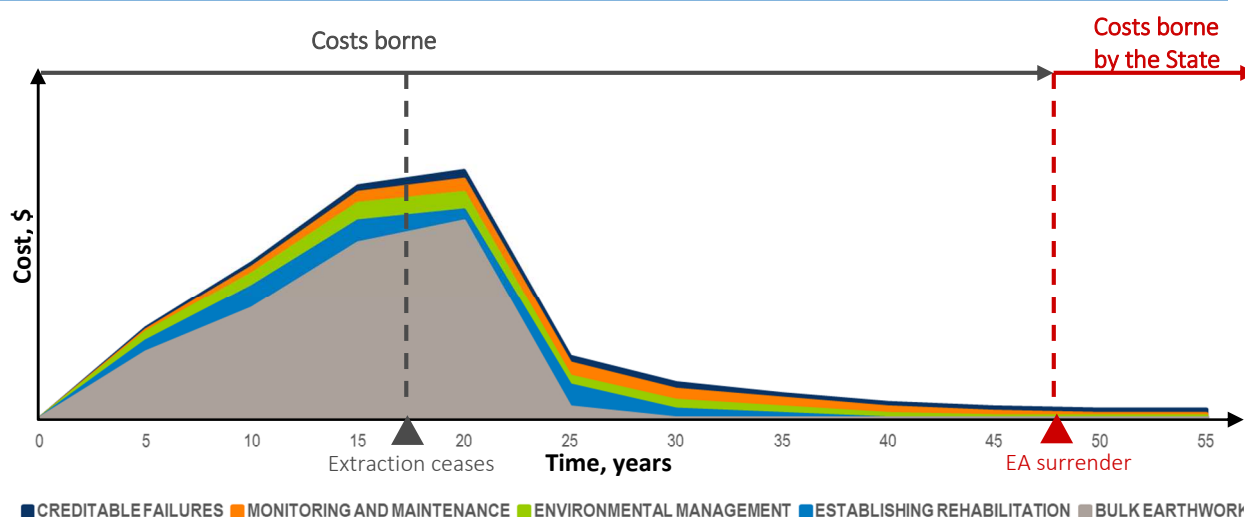
Environment	State	Industry	Community
Delivering a high level of environmental performance	Protecting the State's financial interest	Not a disincentive to Industry	Satisfying community expectations

QTC reviewed other jurisdictions to identify aspects of RR regimes operating elsewhere that could be adopted in Queensland, while considering the need for an approach to be integrated into the State's wider reform package.

QTC consulted stakeholders as part of the design and refinement of the RR framework while emphasising it is neither a policy maker nor presenting the Government position but rather an advisor to Government.

While costs are incurred continuously throughout the life of a resource site to manage and mitigate environmental damage, there is a clear delineation between the parties responsible for meeting those costs as shown in Figure A.

FIGURE A: ENVIRONMENTAL COSTS THROUGHOUT RESOURCE SITE LIFE CYCLE



Source: DES, QTC

Costs to the left of the dotted red line are borne by the EA holder, with the State's financial position protected by the FA held – either as a surety or contributions made to Financial Provisioning Fund – should the EA holder default and the site cannot be on-sold to another entity.

Costs to the right of the dotted red line – which represent the Residual Risk Costs and extend indefinitely into the future – are borne by the State and funded by the Residual Risk Payment(s) from EA holders.

Effective Residual Risk management requires specific expertise

While balancing the desired outcomes, it is important to recognise the risk, quantify it and apply appropriate measures. QTC recommends that the RR management includes the following steps:

- Estimating the **RR Cost** exposure, either through the Universal approach or the Expert Panel process. The goal is to:
 - Identify the residual risks specific to individual resource sites and document key findings
 - Analyse and evaluate the risks (more complex sites going through the Expert panel process)
- Determining the amount and form of the **RR Payment** to be collected for the future risk treatment, balancing the four desired outcomes.
- Deciding on a **potential treatment** of the RR for different segments of the portfolio and risks.

Once the RR Cost is identified and quantified and a RR Payment has been made, QTC advise that the State should aim to manage the residual risks in the most efficient and reasonable way, considering the whole-of-State outcomes. A decision on how the risk is treated can depend on a resource site's risk characteristics such as the severity of loss and regularity of occurrence as shown in Figure B.

FIGURE B: RISK MATRIX

		LIKELIHOOD	
		Occurs regularly	Infrequent
CONSEQUENCE	Very severe	1 RISK AVOIDANCE	3 RISK TRANSFER
	Not severe	2 RISK REDUCTION	4 RISK RETENTION

Source: QTC

1. **Risk avoidance** – risks that are both regular and very severe should be avoided.
2. **Risk reduction** – this quadrant includes risks that are not severe and can occur regularly.
3. **Risk transfer** – when there are infrequent but very severe credible risk events.
4. **Risk retention** – the quadrant includes infrequent and not severe risks that do not represent a material financial threat to the viability of the overall RR regime.

Once the framework is implemented and a number of resource sites have been surrendered and supported by RR Payments, QTC recommends the State streamline the ongoing monitoring and maintenance approach using its economies of scale in procurement and maintenance scheduling, eg, personnel and equipment are scheduled to be deployed to the same areas for multiple resource sites to deliver savings and synergies in monitoring and maintaining costs.

QTC consider that it is imperative, as with other components of the Financial Assurance Reform Package (see Figure 1) that clear operational responsibility in managing the RR program are agreed, documented and implemented with decisions on the risk treatment made in collaboration across Queensland central agencies and DES, considering whole-of-State outcomes.

Identifying & estimating Residual Risk Cost – two approaches can be used

In QTC's recommendation, there are two methods proposed to identify and estimate the RR Cost: Expert Panel and Universal Approach, with each outlined in relevant policies and guidelines.

Expert Panel – a collective decision making process

The Expert Panel is a collective decision making process where a range of qualified experts and select representatives participate in estimating the RR Cost. QTC recommends that the Expert Panel members include technical experts, resource entity representatives, a project manager and a risk advisor:

- Technical experts, who can include geotechnical engineers, geochemists and water specialists, focus on identifying key risks and providing expert opinion and judgement based on experience, qualifications and knowledge on associated key elements.
- Resource entity will provide relevant representatives, make information available for consideration and actively participate in the discussions, given it has an intimate knowledge of a resource site, although are not the ultimate decision maker on the RR Cost for the site.
- A Project Manager coordinates the whole process, including the recruitment of technical experts and risk advisor, and monitors the timely delivery.
- A Risk Advisor facilitates risk assessment workshops with the Expert Panel and quantifies the risk exposure.

The quality of the analysis will depend greatly on the experience and knowledge of the people involved, so, recruitment will be an important consideration. The panel will also be provided with relevant supporting material: briefing, workshop agenda and an example of the desired output.

Universal Approach – based on a standard algorithm

QTC recommends that a Universal Approach be adopted based on a standard algorithm using a Residual Management Cost Calculator Tool (RMCCT) developed by a consultant Accent Environmental. The RMCCT comprises:

- Data input sheets where the EA holder identifies the features and risk factors applicable to the EA
- An ongoing cost calculation component that automatically identifies likely maintenance and monitoring costs
- A risk cost component that automatically identifies credible post-surrender risk events at the site, assigns a likelihood and consequence to each event, and calculates an overall risk cost for the site
- Data outputs in the form of a summary sheet that shows the sum and breakdown of Ongoing Cost Components and Credible Risk Cost Components, and provides graphical displays of the risk analysis.

The RMCCT has known limitations, such as it cannot possibly consider all factors specific to a particular site. However, it provides a means for an estimation of RR Cost at individual sites throughout their site life and to assist with the quantification of the State's overall RR Cost across the Queensland resource industry.

The resource industry is maturing and the State should be ready for a number of applications for EA surrenders in the near future. As the resource company rather than the State will decide when individual EAs will be surrendered there is no definitive way of accurately estimating the likely number of EAs which may surrender with a material RR cost over the near term.

QTC recommend the RMCCT be made available as the default approach to estimate the RR Costs for individual sites and may be used as the default approach at least initially for all sites in the future, in determining the most appropriate approach to assess the RR Costs for a site approaching EA surrender the Queensland's portfolio of resource entities could be segmented into three parts:

1. Resource sites that are complex and/ or may potentially represent **significant residual risk** exposure that will eventually go through the Expert Panel process
2. Resource sites that are less complex and/ or may potentially represent **moderate residual risk** exposure, for which the cost of the Expert Panel would not be justified – the Universal Approach will apply for these resource sites
3. Some resource sites may potentially represent a **minor risk** to the State as they are restricted by the level of activity that can be undertaken and potential environmental impact on the site, where there may be minimal residual risk – the Universal Approach will apply for these resource sites.

Three phase implementation process on individual sites

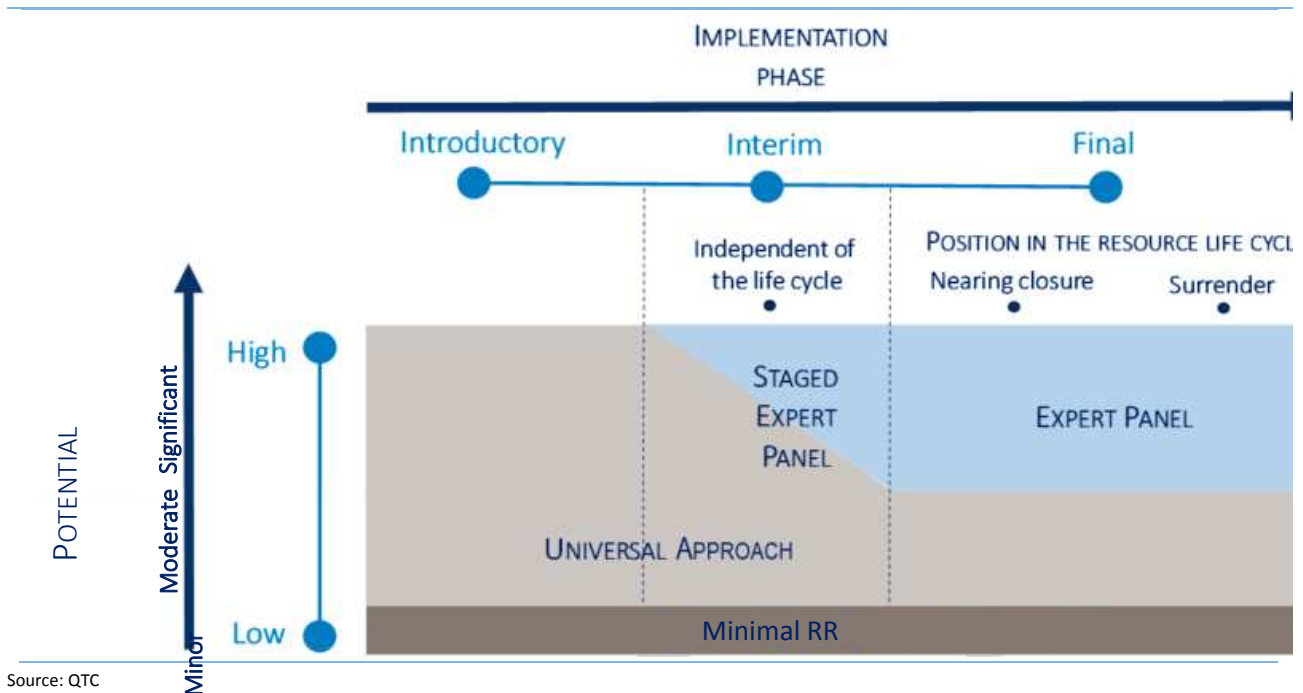
QTC segments the key phases of the proposed RR framework implementation, which reflect two approaches to determine the RR Cost – Expert Panel and Universal Approach – and potential availability of information in:

- **Introductory:** initially the RR Cost would be estimated using the Universal Approach as the default methodology. While the RR Cost for sites with moderate residual risk exposure is proposed to be estimated under the Universal Approach throughout, the RR Cost estimate for resource sites with significant residual risk exposure will gradually transition to the Expert Panel process, which will not be available from inception, given some time will be required for the overall RR approach to be established and developed.
- **Interim:** following a period to allow the refinement of the RR system, an Expert Panel process could be introduced through a number of staged assessments of identified sites with large potential RR Cost exposure independently of where they sit in the resource life cycle.

- **Final:** an Expert Panel process would complete RR assessments for sites with **significant residual risk** exposure nearing closure and at surrender.
 - **Nearing closure:** five years prior to the end of production or when, for example, a resource site's remaining probable reserves reach a certain percentage of the total probable reserves, the estimated RR Cost would indicate the key risk events and the potential size of the final RR Cost.
 - **Surrender:** at or near surrender based on the final rehabilitation outcome, an Expert Panel determines the final RR Cost.

QTC's recommendation for the implementation process is illustrated in Figure C below, noting that the length of each phase is merely indicative of the approach, with the RR regime anticipated to commence in mid-2019. The need for an Expert Panel, for an individual site that is complex or large in scale where the RMCCT may not provide an accurate estimate of the likely RR cost, may require that the State moves quickly to the Interim and Final phases.

FIGURE C: PHASING OF RR COST CALCULATION APPROACH

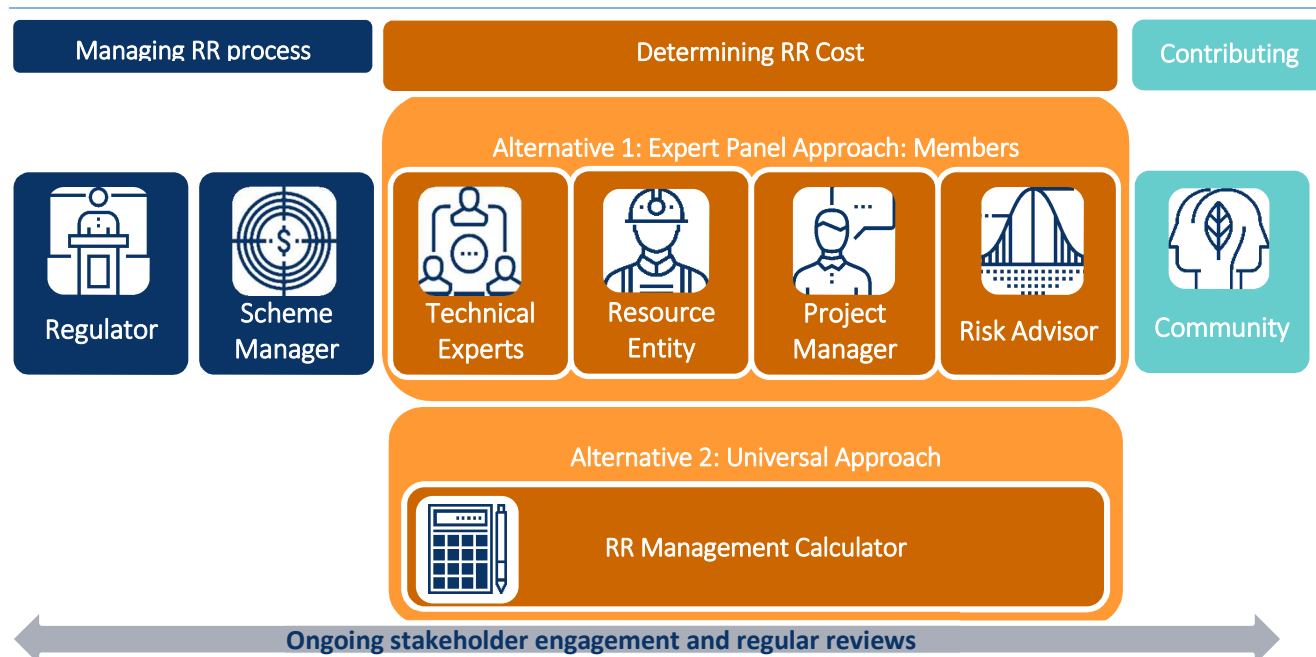


Source: QTC

Stakeholder participants in RR process

There are three key groups of stakeholders in the RR framework involved in Managing the RR process, determining the RR Cost and Contributing to the Expert Panel Process, as shown in Figure D below.

FIGURE D: ROLES AND RESPONSIBILITIES FOR THE RR FRAMEWORK



Source: QTC

Managing RR process: the Regulator manages the whole process from setting the policy and introducing the framework to ensuring the robustness and transparency of the RR Cost estimate, regardless of how this estimate is determined. The Scheme Manager's role is to oversee the financial aspects of the RR Fund.

Determining RR Cost: under the two alternative approaches (Universal Approach and Expert Panel Approach).

Contributing to the Expert Panel process. Community representatives on a self-selection basis for each representative group can be present and observe the risk assessment workshops and the work of the Expert Panel members, provide additional information, but do not act as technical experts. Community representatives do not play an active role in the RR cost calculation under the Universal Approach.

Residual Risk Payments

QTC recommends the resource entity make a RR Payment in cash on surrender of the EA. The RR Payment is designed to cover the State's post-surrender financial risk, based on the RR Cost determined at or near EA surrender. The RR Payment should be sufficient, based on credible future assumptions, to cover the costs to monitor, maintain and repair a resource site post-surrender and rectify the financial consequences of credible risk events in perpetuity.

A minimum threshold is proposed to improve the administrative and operational simplicity of the RR regime by avoiding the need to confirm and collect small amounts of RR payments from a large number of EA holders. Below the minimum threshold (say a RR cost estimate of \$1,000 or \$10,000), a notional RR Payment equal to the minimum threshold, or even half the threshold¹ could be collected. The alternative is to request no payment from EA holders who fall below the threshold, with the cost covered by general government revenue or met from the Residual Risk Fund. In the latter case, effectively the costs of smaller (or less complex sites) are funded by larger (or more complex) sites. QTC believes that all sites should make a notional RR payment at EA surrender given that in reality some level of costs will be incurred to monitor and manage any site regardless of the level of disturbance.

In reviewing the overall RR regime, QTC identified that the State is exposed to a 'Counterparty Risk' – the risk that the resource entity becomes insolvent prior to the surrender of the EA, and no party exists to make the RR Payment to cover the State's RR Cost. The Financial Provisioning Scheme covers the State's costs to rehabilitate the resource site prior to EA surrender (ie costs to the left of the red line in Figure A). While the costs on default for a rehabilitated sites still remain, given the anticipated costs are small relative to other aspects of the Reform Package program, QTC believes that an explicit counterparty payment should not be levied. The Counterparty Risk costs would be covered from other funding sources. This significantly simplifies the RR regime which is rightly focused on the costs, risks and management of a resource site following successful rehabilitation and surrender of the EA.

¹ That is, with a minimum threshold of \$1,000 any site with a Residual Management cost estimate below \$1,000 would pay \$500.

Noting that the Reform Package is delivered as a suite of solutions to protect the State's financial position, there are a number of components which together will assist in mitigating the counterparty risk:

- DES has published its Rehabilitation guidelines for mined sites, including requiring a PRCP² linked to EAs with specific rehabilitation milestones.
- The Risk Advisor approach has been developed and an external partner appointed to complete regular financial and resource project risk assessments on the EA holder, providing greater insight into these risk levels.
- The Estimated Rehabilitation Cost (ERC) Calculator (formerly the FA calculator) is being updated and a specific contingency margin proposed, which will increase the total ERC amounts held to cover rehabilitation costs for defaults prior to surrender
- Margins exist in the initial contribution rates recommended to apply to EAs in the Financial Provisioning Fund, which can provide the State with a financial safeguard against adverse default experience.
- The MERFP Bill has been tabled in parliament, which outlines the proposed regulatory approach to managing the Rehabilitation Pool, and
- The RMCCT will enable EA holders to determine a regular indication of the likely RR Payment applicable at surrender, enabling them to make suitable financial provisions, and provide the government with a high level estimate of the State's overall RR Cost at a point in time.

Further details and discussion are included in Section 4.2.

Residual Risk Fund to be established

QTC recommend that a Residual Risk Fund (RR Fund) be established to pool RR Payments, and meet the RR Costs as they fall due. Interest will accrue and be retained in this RR Fund. Pooling within the RR Fund provides a degree of flexibility in cash flow management albeit the RR Payment received for each site should be applied to cover the actual costs associated with that site.

While the environmental regulator would be responsible for ensuring that appropriate actions are taken on each individual site, whether this work is completed by the Government or an external contractor, the ongoing financial management of the RR Fund would be undertaken outside the environmental regulator (potentially by the Financial Provisioning Scheme Manager), consistent with the approach under the Financial Provisioning Scheme.

A governance and operational regime needs to be established to ensure that the funds are applied for the purposes that they were intended. Where ever possible the governance regime should use various bodies already established or being developed under the broader Reform Package, specifically the Advisory Committee which will oversee the management of the Financial Provisioning Scheme and LTAAB³ to consider the investment strategy of the RR Fund.

In practice there will be a divergence in the outcomes between what was allowed for in determining the RR Cost and the actual experience over time, even with the advantage of pooling the funds to improve cash flow management. Various mechanisms and controls are proposed to minimise the impact of experience variations on the RR Fund and the wider Reform Package regime, noting that in practice the financial impact can only be borne by the State or current and future resource entities.

² Progressive Rehabilitation and Closure Plan

³ Long Term Asset Advisory Board, which amongst other things will be the advisory body to recommend the investment strategy and objectives of the Rehabilitation Fund.

Contents

Executive Summary	2
1 Background	9
1.1 Scope of the review	9
1.2 Review approach	11
2 Jurisdictional review: case studies	12
2.1 Overview of jurisdictional review	12
2.2 Key case studies	12
3 Stakeholder feedback	16
4 Proposed framework	17
5 Residual Risk Cost	19
5.1 Overall Residual Risk Cost approach	19
5.2 Expert Panel	22
5.3 Universal Approach	28
5.4 Allowance for Private Ownership in RR Cost calculation	28
6 Residual risk payments	30
6.1 Residual Risk Payment on EA surrender	30
6.2 Counterparty risk	31
7 Residual Risk Fund	33
7.1 Objectives of a Residual Risk Fund	33
7.2 Operation of RR Fund	33
7.3 Governance of RR Fund	33
7.4 Variation in RR Cost experience	34
7.5 Costs associated with post-mining land use	35
Disclaimer	37
Appendix A: Stakeholder consultation	38
Appendix B: Description and assessment of options for funding Counterparty Risk	39
Appendix C: Residual Risk terminology and nomenclature	44

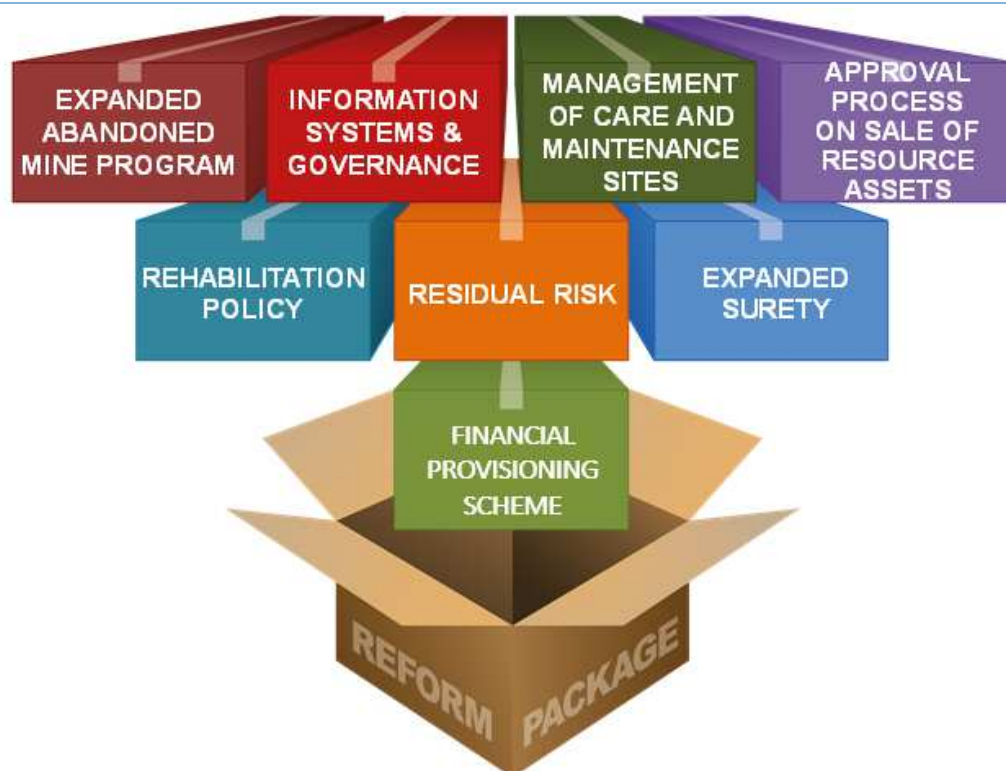
1 Background

1.1 Scope of the review

By its nature, resource exploration and extraction creates disturbance and changes the environment. While the State holds Financial Assurance (FA) to ensure funds are available if a resource activity operator fails to meet its environmental and rehabilitation obligations during the life of a resource site, as a part of an Environment Authority (EA) surrender process, the State may also require the resource activity operator to provide a Residual Risk (RR) payment(s). The payment is needed to protect the State against costs that may be incurred in the future to address rehabilitation and environmental issues when the company no longer has statutory obligations for the site.

The Queensland Government has proposed a significant reform package, including the RR framework, designed to manage the State's resource activity as shown in Figure 1.

FIGURE 1: FINANCIAL ASSURANCE REFORM PACKAGE



Source: QTC

The RR framework as proposed by QTC in this paper was designed to ensure consistency with other components and to meet the four desired outcomes of the Reform Package for Key Stakeholders:

Environment	State	Industry	Community
Delivering a high level of environmental performance	Protecting the State's financial interest	Not a disincentive to Industry	Satisfying community expectations

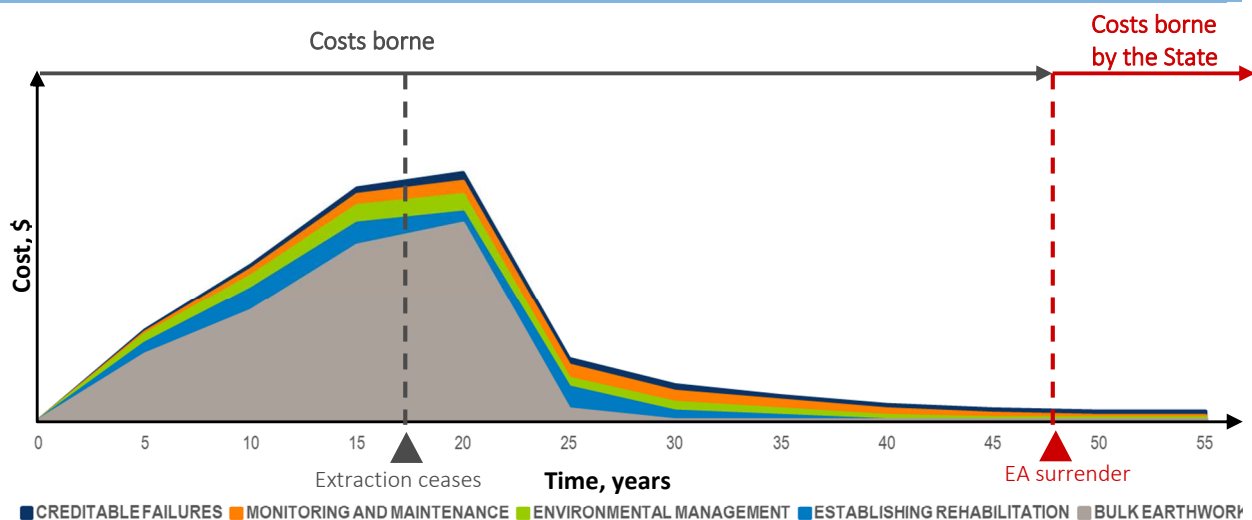
As outlined in the *Better Mine Rehabilitation for Queensland*⁴ discussion paper, land disturbed by a resource activity should be rehabilitated and returned to another sustainable post resource activity land use. The RR process should consider how any remaining risks on the site are managed post-surrender and ensure that sufficient funds are available to ensure ongoing monitoring and maintenance and to remediate any potential rehabilitation failures. An RR framework

⁴ This paper provides details of the 'Rehabilitation Policy' initiative shown in Figure 1.

is a key component to enable resource entities to relinquish the tenure and surrender the EA while providing protection against the financial consequences of residual risks for the State.

Costs are incurred to manage and mitigate environmental damage throughout the entire resource site life continuum, with the management of RR starting at the end of the life cycle and extending indefinitely into the future. Figure 2 shows illustrative cost levels.

FIGURE 2: ENVIRONMENTAL COSTS THROUGHOUT RESOURCE SITE LIFE CYCLE



Source: DES, QTC

While costs are incurred continuously throughout the life of a resource site, there is a clear delineation between the parties responsible for meeting those costs.

Costs to the left of the dotted red line are borne by the EA holder(s), with the State's financial position protected by the FA held – either as a surety or contributions made to Financial Provisioning Fund - should the EA holder default and the site cannot be on-sold to another entity. In the ordinary course of events, the EA holder meets the costs of rehabilitation of the site during its operations, including establishing and demonstrating the success of the rehabilitation measures leading into the surrender of the EA.

A level of costs continues beyond the surrender of the EA, those to the right of the dotted red line in Figure 2 – the RR Costs – are borne by the State and funded by the RR Payment(s) from EA holders.

While RR arises when the land is first disturbed, it can only be assessed and quantified with a high level of certainty when the entire site has been fully rehabilitated. It is advantageous for all stakeholders to be able to determine an estimate of the financial consequences throughout the life cycle of a resource site to allow the resource entity to take appropriate rehabilitation and risk management actions to manage the likely future residual risks, and for the State to understand potential levels of future RR Costs.

While legislation⁵ is in place permitting the State to collect RR payment(s), a detailed RR methodology and process has not been developed.

The Department of Environment and Science (DES) engaged Queensland Treasury Corporation (QTC) to review the State's Residual Risk framework, considering although not necessarily limited to, the following:

- the RR approach used in other jurisdictions
- emerging changes to the monitoring and regulatory regime of resource activities
- the State's appetite for financial and environmental risk, and
- existing legislation, regulations and guidelines relevant to RR.

This report considers key elements necessary to establish a RR Framework, estimate RR Costs and quantify RR Payments with specific details to be refined following government consideration and stakeholder consultation ahead of the planned policy development and implementation.

⁵ Under the *Environmental Protection Act 1994* and accompanying guidelines

While ensuring that the RR framework development satisfies the four desired outcomes of the overall Reform Package, the RR approach needed to be:

Transparent	Consistent	Justifiable	Pragmatic	Reportable
Components of the RR calculation need to be clear to all parties	Provide consistency with the proposed components of the FA reform package	Be based on credible assumptions of future events	Be based on the best available information at a point in time	Allow public reporting to meet community expectations

Components of the proposed RR framework as outlined in this report are related to aspects of the wider reform package, in particular the determination of the Estimated Rehabilitation Costs (ERC) for Financial Assurance and the rehabilitation policy.

1.2 Review approach

RR is defined in Schedule 4 of the *Environmental Protection Act 1994* to include the risk that:

- apparently satisfactory rehabilitation will, in the foreseeable future, fail to perform as predicted and require repair, replacement or maintenance
- the rehabilitated area will require ongoing maintenance (commencing immediately), and
- contaminants will be released and potentially cause environmental harm that will need to be appropriately addressed.

However, Queensland's current regulatory literature does not outline the framework/ methodology to quantify the RR payment(s), nor has the State to date collected a RR Payment from a resource entity on the surrender of its EA.

QTC adopted an iterative approach in formulating the proposed RR Framework including:

- undertaking a desktop review of similar jurisdictional regimes, including New Zealand, Papua New Guinea, Canada, South Africa and other Australian states, to identify and select any relevant features that could be applied in Queensland
- consulting with key stakeholders and industry experts, including resource entities, Queensland Resources Council (QRC), environmental groups, participants in other jurisdictions, rehabilitation specialists, insurers, government stakeholders, academics and external consultants
- seeking assistance from industry advisors, including experts who developed an industry-accepted approach to RR in other jurisdictions reviewed, to deliver a number of workshops to key stakeholders and contribute to the development of the proposed framework
- outlining a potential solution and framework which was refined following consideration of the views and feedback from various key stakeholders, and
- applying the learnings and approach adopted by other components of the Reform Package, and in particular work associated with the Financial Provisioning Scheme⁶ and proposed mine rehabilitation policy⁷, to ensure that the proposed RR framework could be an integrated part of the overall wider reform package.

The quantification of the RR payment reflects a key component of the RR framework - to ensure sufficient funds are available, based on credible assumptions about the future, to cover the costs to monitor and maintain the rehabilitated former resource site to the desired standards and address potential rehabilitation failure in perpetuity.

As part of QTC's jurisdictional review, an established and industry-accepted methodology was identified in New Zealand that could be used to quantify the RR Cost – the RISQUE method.

RISQUE - Risk Identification and Strategy using **QU**antitative **E**valuation - is a risk management process that involves the assessment of risk and development of risk management strategies using predominantly financial measures. The method seeks to translate complex, technical information into financial terms and to quantitatively assess the environmental and social business risks.

Elements of the RISQUE method have been adapted to the Queensland context in the proposed RR framework.

⁶ *Financial Assurance Framework Reform* discussion paper, April 2017
www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/financial-assurance-framework-reform/

⁷ *Better Mine Rehabilitation for Queensland* discussion paper, April 2017
www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/better-mine-rehabilitation-queensland/

2 Jurisdictional review: case studies

2.1 Overview of jurisdictional review

QTC reviewed other jurisdictions to identify aspects of RR regimes operating elsewhere that could be adopted in Queensland, considering the need for an approach to be integrated into the State's wider reform package.

Overall, no single jurisdiction had a complete RR solution. New Zealand has a reasonably mature approach with various aspects being readily adaptable to the Queensland overall resource regime. Relevant components from overseas regimes considered in designing the proposed solution for Queensland include:

- Expert panels used in New Zealand and Papua New Guinea to identify and then quantify the financial consequences of key risk events
- Relevant stakeholder involvement in the overall RR Cost and risk assessment process
- Monitoring, management and reporting requirements, notably in the province of Saskatchewan in Canada
- Time value of money in determining the RR Cost by discounting future cash flows to the present value
- Greater integration of the overall financial and environmental risk regime: FA, final rehabilitation, decommissioning and site closure plans, and
- Regulatory and legislative changes to specify closure and post-closure obligations of resource entities.

2.2 Key case studies

2.2.1 New Zealand: Martha Mine

The Waihi Gold Company (WGC) Martha Gold Mine⁸ was selected as a case study to demonstrate the use of quantitative risk assessment techniques to assess post-closure costs, while noting the residual risk calculation for Martha Mine was determined prior to closure of the mine.

FIGURE 3: THE MARTHA MINE IN NEW ZEALAND



Source: www.waihibeachlodge.co.nz/activities/martha-gold-mine

The WGC is required to regularly estimate and provide a post-closure assurance, to be held indefinitely, for site monitoring and management and the cost of mitigating potential environment impairment arising from its rehabilitated mine site at any time in the future.

In the absence of an established residual risk approach, available at the time, the RISQUE method was used to develop a post-closure assurance strategy and determine an adequate and realistic value to the satisfaction of all relevant stakeholders.

⁸ The Martha Mine is located adjacent to the town and community of Waihi

There were two key components of the approach:

1. Establishment and operation of the expert panel
 - WGC personnel with experience in mining, tailings dam construction, environment, milling, water treatment and engineering
 - Specialist expertise from outside the company, particularly in the areas of the law, geotechnical engineering, geochemistry, hydro-geochemistry, hydrogeology and water treatment
 - Workshop format used to identify all of the operational, site closure and post-closure risks, with a risk register prepared to be later used in developing risk management strategies.
2. Risk quantification and modelling
 - The likelihood and occurrence costs of post-closure risks were assessed (using RISQUE approach), considering sudden and gradual risk events
 - The appropriate timeframe and ongoing monitoring, maintenance and remediation costs for each risk event was identified by relevant expert panel members
 - The financial consequences of the ongoing costs and risk event costs were determined in net-present-value terms based on the appropriate timeframe.

The total Residual Risk Cost estimate was in the order of NZ\$6 million⁹, with around 80% covering administration, maintenance, monitoring and regular ongoing costs and the remaining 20% to remediate credible risk events.

2.2.2 Papua New Guinea: Ok Tedi project

The Ok Tedi Mine is an open-pit copper and gold mine located near the headwaters of the Ok Tedi River in the Western Province of Papua New Guinea. Discharges from the mine have caused widespread and diverse environmental and social harm to the 50,000 people who live in the 120 villages downstream of the mine.

The Ok Tedi Mine is now owned by a public sector conglomerate including the PNG Government as a substantial owner. Funds are managed under a trust, given the scale of the costs and operations and the long time period over which future costs are expected to be met.

With support of the local community, the mine life was extended with two thirds of the profits from the mine's operations deposited into a long-term fund to enable the mine to continue to contribute to the PNG economy for up to 50 years after it closes. The balance is allocated to current development programs in the local area (Western Province) and PNG more generally.

FIGURE 4: THE OK TEDI MINE, PAPUA NEW GUINEA



Source: www.oktedi.com/media-items/gallery

⁹ Source: Leading Practice Sustainability Development Program for the Mining Industry (May 2008): www.im4dc.org/wp-content/uploads/2014/01/Risk-assessment-and-management.pdf

The risk quantification and closure planning processes align with the Australian and New Zealand Risk Management Standard (AS/NZ 31000:2009). The mine closure risk assessment involved an open risk identification workshops, facilitated by an external specialist and attended by internal and external stakeholders, including local and national governments, landowner representatives, independent closure cost auditors appointed on behalf of the State and Ok Tedi management and staff.

Workshop risk assessments outcomes were consolidated into a risk register, with responsibilities for managing risks allocated based on pre- and post-closure status and used to define and prioritise closure planning initiatives including considering the social and economic impacts of, and stakeholder involvement in, closure of the mine.

Despite the complexity and scale of the operations, 20 key risks were identified to be used to determine the financial cost considering the likelihood, consequence and mitigation actions assessed by the expert panel, with the RISQUE method used to:

- develop a risk profile to rank closure risks
- develop an exposure profile and determine the costs associated with risk events
- assess the cost-effectiveness of risk mitigation actions and develop a preferred mitigation strategy; and
- provide a risk-based contingency for inclusion in the closure cost estimate.

The risk modelling determined that the pre-mitigation risk profile was dominated by four key post-closure risk events¹⁰ which had relatively low to moderate occurrence costs and without implementing any risk mitigation actions the pre-mitigation risk cost was estimated at US\$24.6 million¹¹.

The cost of implementing combinations of mitigation actions was assessed against the impact on the pre-mitigation risk cost, in order to develop an optimal mitigation strategy focused on the four highest risk events in the risk profile. The implementation of these four mitigation actions – estimated to be an additional cost of US\$4.1 million – reduced the total residual risk estimate cost from US\$24.6 million to US\$4.7 million. The process adopted demonstrated the financial and environmental benefits from early and ongoing engagement with key stakeholders.

2.2.3 Canada: post-closure care in Saskatchewan

The Canadian province of Saskatchewan developed a formal regulatory process for the long term monitoring and management of provincial lands once resource activities and remediation are complete, following which responsibility for the land would ordinarily revert to the Saskatchewan provincial government.

The overall framework was developed in consultation with stakeholders across federal regulators, industry, aboriginal communities, special interest groups and the general public. An independent body, Institutional Control Program (ICP), was established to oversee the process with two key components of the ongoing management regime created:

- the Institutional Control Registry, which maintains a formal record of closed sites, manages the funding and performs any required monitoring and maintenance work, and
- the Institutional Control Funds: the Monitoring and Maintenance Fund (ICMMF) and the Unforeseen Events Fund (ICUEF), which are held separately to the State's general revenue funds.

The ICMMF was established to pay for the long term monitoring and maintenance of sites. Contributions are set to generate revenue sufficient to pay those future costs at each individual site in perpetuity, based on the net present value of the obligation using forecast inflation and investment return rates.

The ICUEF is designed to pay for unforeseen future contingent events, such as damage resulting from floods, tornadoes or earthquakes, including failure of a containment dyke, pit wall collapse, shaft cover degradation and change in regulatory requirements. Contributions are 20% of the ICMMF contribution if a tailings or engineering structure exists on a closed site and 10% otherwise.

A site-holder is responsible indefinitely, and therefore cannot be granted complete absolution from responsibility for environmental contamination at a particular site.

The province is responsible for future clean-up costs arising from unforeseen circumstances with the ICUEF only called upon where the original operator is no longer in existence.

¹⁰ Generation performance standards, global warming, mercury emissions, and wastewater discharge

¹¹ Source: www.mineearth.com.au/wp-content/uploads/2013/10/2012_PDF.pdf

2.2.4 South Africa: legislative changes

In November 2015¹² South Africa updated its mining legislation, with key changes involving:

- Stricter requirements and expanded scope of financial provision to cover ongoing rehabilitation, final closure, and management of post-closure environmental impacts and latent or residual impacts that may only become known in the future
- Enhanced rehabilitation, closure and post-closure planning including describing measures and costs of annual and final rehabilitation and the remediation of latent or residual environmental impacts post-closure
- Formalising care and maintenance provisions
- Increased enforcement and Directors liability

The first two points are specifically relevant for the design of Queensland's Residual Risk framework. Notably, South Africa has adopted an integrated approach to resource management across the full life resource life cycle, similar to Queensland's proposed Reform Package (Figure 1).

¹² Source: www.nortonrosefulbright.com/knowledge/publications/139267/south-africa-adds-legislation

3 Stakeholder feedback

QTC consulted stakeholders as part of the design and refinement of the proposed RR framework (as listed in Appendix A), while emphasising it is neither a policy maker nor presenting the Government position, but rather an advisor to Government on specific aspects of the Reform Package. Major topics, discussion points and views raised as part of the consultation process are presented below, segmented by stakeholder type, noting that the views expressed were not consistently shared by all participants in each group.

Resources industry

- Integrated solution which forms part of the wider suite of Reform Program, specifically rehabilitation including considerations of safe, non-polluting, stable landform, and self-sustaining (sustains agreed land form)
- Concerns about the financial implications of costs being covered in ‘perpetuity’
- Timing of the residual risk assessment and payment, including interim payments prior to EA surrender
- Treatment of private land
- Certainty of outcome, clarity of terminology, triggers for Residual Risk calculation and transparency of approach
- Assessment methodology reflects difference in resource type, characteristics and assessment of residual risk
- Allowance for individual companies’ expertise, experience and financial standing
- Industry involvement in assessment including Expert Panel process at individual level
- The proposed triggers for a residual risk assessment

Environmental groups

- Costs of rehabilitation and ongoing management should be borne by the group responsible for the potential environmental harm – ‘polluter pays’ principle
- Need to ensure consistency of approach and an integrated solution package, noting that some aspects of the rehabilitation approach, such as the existence of non-use management areas, are better addressed as part of the wider reform
- Expert Panel process, involvement and frequency
- Contribution to costs covered while a resource site is operating, rather than requiring a payment only at the end of life of the resource

Financial industry (general insurers and brokers)¹³

- Global nature of general insurance provides sufficient financial capacity to manage the State’s likely risk levels
- Insurance pricing driven by robust suite of data for rehabilitation success, mitigating actions and availability of credible results over an extended period (eg, at least 10 to 15 years) on key sites
- Proposed group risk products to aggregate across multiple sites, locations and types
- Generally supported the pooling of RR payments to manage the State’s portfolio of rehabilitated site, which would assist in purchasing appropriate insurance cover on an aggregate portfolio basis
- Preference for the State to retain an appropriate proportion of key risks to maintain a financial incentive (ie, not 100% ceding of key risks to insurer)
- Insurance products and pricing could be used to benchmark the likely key risk costs, noting that many insurance arrangements, are priced on a yearly renewable basis based on experience and market forces

Industry consultants

- Insight into specific examples/experiences in other jurisdictions which could be applicable in Queensland
 - Apparent lack of understanding of the possibility or quantum of residual risk in consideration of the financial consequences of rehabilitation
 - Availability of a range of skills, expertise and experience including at academic institutions, in developing resource specific techniques and knowledge of best practice approaches especially in overseas’ jurisdictions. Expertise would be invaluable in Expert Panel process implementation, engagement and execution
-

¹³ Consultation occurred in early 2017, so later refinements were not tested with financial professionals

4 Proposed framework

The RR framework recommended was assessed to meet four desired outcomes of the FA Reform Package that:

- delivers a high level of environmental performance
- protects the State's financial interest
- does not present a disincentive to investment in the resources sector, and
- provides an outcome that satisfies community expectations.

While balancing the desired outcomes, it is important to recognise the existing financial risk for the State, quantify it and apply appropriate measures. Generally, a financial risk management process involves steps¹⁴, such as:



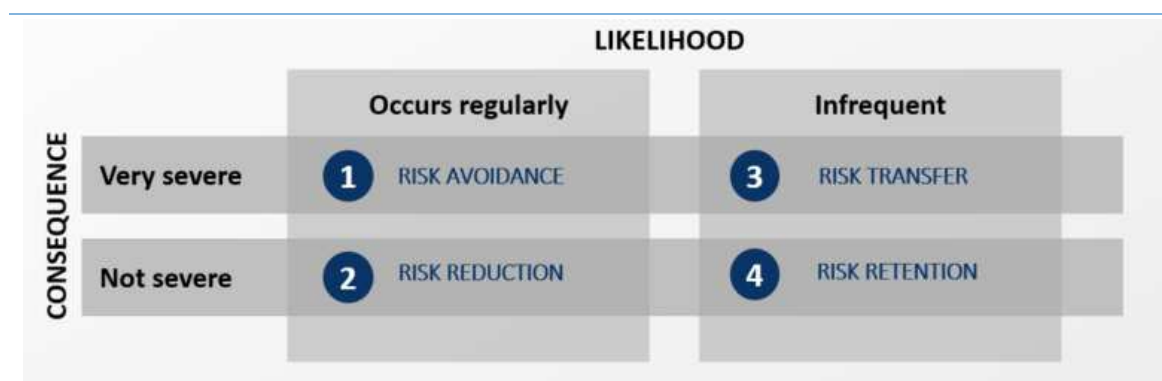
Likewise, with the RR management it is important to separate three steps:

1. Estimating the **RR Cost** exposure, either through the Universal Approach or the Expert Panel process. The objective is to:
 - Identify the residual risks specific to individual resource sites and document key findings
 - Analyse and evaluate the risks, with an Expert Panel approach adopted for more complex sites.
2. Determining the amount and form of the **RR Payment** to be collected for the future risk treatment.
3. Deciding on a **potential treatment** of the residual risk for different segments of the portfolio and risks, balancing the four desired outcomes.

While the calculation and payment of RR are inter-related, the two concepts are discussed separately in the Report with the proposed RR framework consistent, as far as possible, with the four desired outcomes applying to the broader reform package.

A decision on how the risk is treated can depend on a resource site's risk characteristics considering the severity of loss and regularity of occurrence as shown in Figure 3:

FIGURE 3: RISK TREATMENT DECISION TREE



Source: QTC

Each quadrant is described below:

1. **Risk avoidance** – risks that are both regular and very severe should be avoided. Resource entities would not be expected to be able to surrender the EA, and would continue to bear responsibility for and take appropriate steps to rectify the potential risks to move the site into another quadrant.
2. **Risk reduction** – this quadrant includes risks that are not severe and can occur regularly. These can be managed:
 - (a) through a change in the rehabilitation method prior to surrender to reduce their frequency or

¹⁴ Source: AS/NZS ISO 31000:2009 Risk management - Principles and guidelines. QTC considered the standard from the financial point of view.

- (b) by potentially accepting the risk on the EA surrender although reflecting the increased frequency of ongoing monitoring and maintenance required in the calculation of the RR Costs and resultant RR Payment.
- 3. **Risk transfer** – when there are infrequent but very severe credible risk events, while it depends on a number of factors, these post-rehabilitation risks will likely be addressed by requiring a RR Payment(s). The State may decide to mitigate its risks by:
 - (a) purchasing insurance provided by independent third-party companies, or
 - (b) pooling of funds managed by the State and diversification of risks through the pooled group, if appropriate.
- 4. **Risk retention** – the quadrant includes infrequent and not severe risks that do not represent a material threat, where the State could absorb the cost including where the State deems a payment is not required (eg, where a threshold or other criteria can be applied).

Once the framework is implemented and a number of resource sites have been surrendered and supported by RR payments, QTC recommends the State streamline the ongoing monitoring and maintenance approach using its economies of scale in procurement and maintenance scheduling, eg, personnel and equipment are scheduled to be deployed to the same areas for multiple resource sites to deliver savings and synergies in monitoring and maintaining costs.

QTC consider that it is an imperative, as with other components of the Reform Package, that clear operational responsibility in managing the RR program is agreed, documented and implemented with decisions on the risk treatment made in collaboration across Queensland central agencies and DES, considering whole-of-State outcomes.

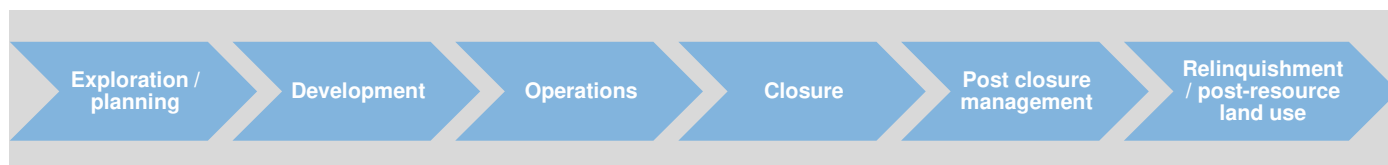
5 Residual Risk Cost

5.1 Overall Residual Risk Cost approach

Residual risk for the resource sector is defined in Schedule 4 of the Queensland *Environmental Protection Act 1994* (EP Act) as:

- the risk that, although the rehabilitation appeared to be satisfactory when the area was assessed for a progressive certification application, surrender application or site management plan
 - it will, in the foreseeable future, fail to perform as predicted in a relevant progressive rehabilitation report, a relevant final rehabilitation report or the site management plan; and
 - the failure will result in the need for repair, replacement or maintenance work for the area
- the risk that the area will need ongoing management, and
- the risk of contaminants being released from the area by animals, water or wind and potentially causing environmental harm that may require a program to monitor what management action should be taken for the release.

While the management of RR is the last part of the resource activity continuum, RR exists throughout the resource life and extends indefinitely into the future. That said, RR is neither a substitute for the ERC nor designed to cover the risk or cost if an EA has been surrendered without fulfilling the regulator's surrender requirements. It is assumed that surrender will not occur and ERC released until all EA surrender commitments have been satisfied.



It is advantageous for all stakeholders to be able to determine an estimate of the financial consequences throughout the life cycle of a resource site to allow the resource entity to take appropriate rehabilitation and risk management actions to manage the likely future RR, and for the State to understand potential levels of future RR Costs.

The calculation of RR Cost becomes more accurate the closer a site is to the end of life, with a range of factors contributing to the degree of accuracy in future cost estimates including the resource type, risk features, location, scale of operations, developing data as post surrender information improves and type of rehabilitation. A one-size fits all approach is therefore not appropriate for all individual resource entities, so two alternative approaches are proposed:

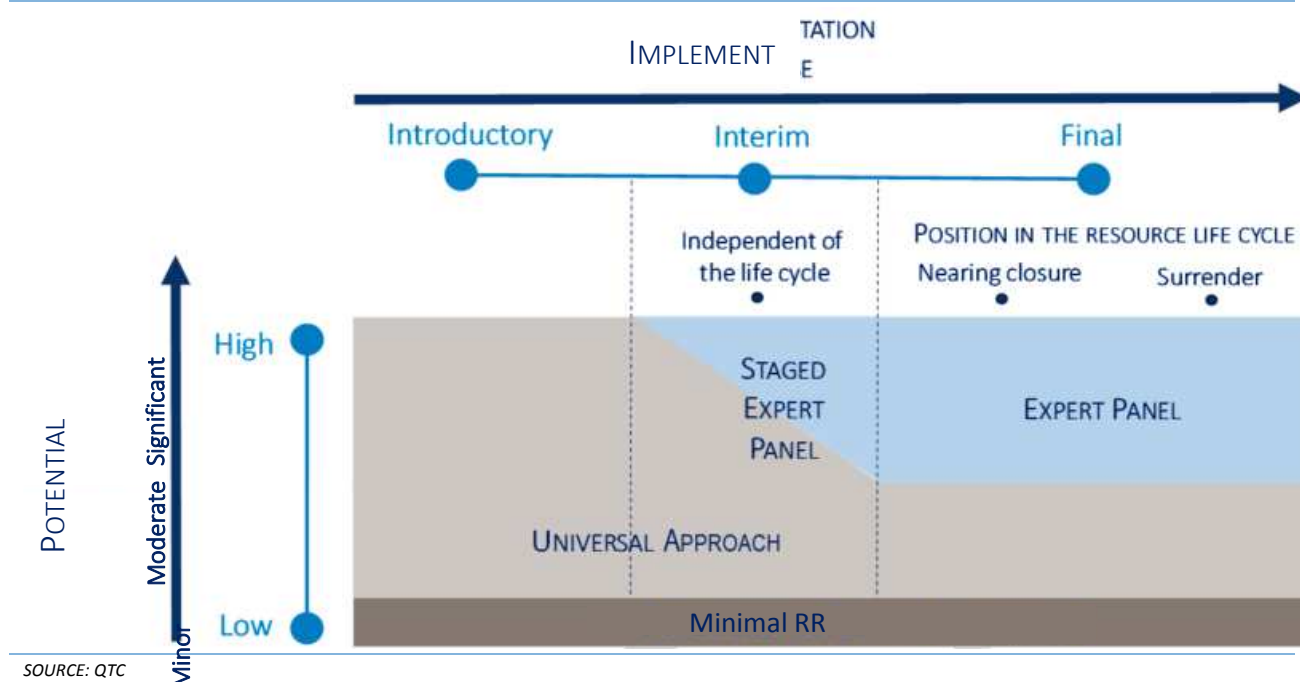
- A Universal Approach (the default across resource sites) as described in Section 5.2
- An Expert Panel Approach as described in Section 5.3

Balancing the costs of estimating the residual risk with potential benefits, Queensland's portfolio of resource entities could be segmented into three parts:

1. Resource sites that are complex and/or may potentially represent **significant residual risk** exposure where the estimation of the RR Cost will eventually be determined through the Expert Panel process
2. Resource sites that are less complex and/or may potentially represent **moderate residual risk** exposure, for which the cost of the Expert Panel would not be justified – the Universal Approach will apply for these resource sites
3. Resource sites that potentially represent a **minor risk** to the State as they are restricted by the level of activity that can be undertaken and potential environmental impact from the site.

The Universal Approach, including a Residual Management Cost Calculator Tool (RMCCT), is proposed to be available to determine Residual Risk Cost estimates on individual EAs throughout the life of the project, from the introduction of the RR Framework. As more information becomes available on the potential residual risks on the portfolio of resource sites and the RMCCT is further refined and sufficient time is available to develop the Expert Panel process, the approach used to determine RR Costs on individual sites is proposed to be transitioned to progressively include Expert Panel assessments as illustrated in Figure 3.

FIGURE 3: PHASES OF THE RR FRAMEWORK IMPLEMENTATION TO DETERMINE RR COSTS AT INDIVIDUAL SITES



QTC proposes that the key phases as:

- **Introductory:** initially the RR Cost for all sites would be estimated using the Universal Approach, described in Section 5.3. Under the Government's Rehabilitation Policy¹⁵, new site-specific mines will be required to provide a Progressive Rehabilitation and Closure Plan (PRCP), which could form a key part of the RR assessment process.
- **Interim:** following a period to embed and refine the RR system as part of the Reform Package, it is proposed an Expert Panel process would be introduced through a number of staged assessments of identified sites with potential **significant** RR exposure. QTC recommends that criteria for the engagement of Expert Panels are confirmed by the Government once the framework is operational and there is sufficient data on RR Cost estimates through the Universal Approach (ie, using the RMCCT).
- **Final:** an Expert Panel process would complete RR assessments for sites with **significant** RR exposure nearing closure and at surrender.
 - **Nearing closure:** five years prior to the end of production or when, for example, a resource site's remaining probable reserves reach a certain percentage of the total probable reserves, the Expert Panel's assessment would identify key credible risk events and a potential size of the RR Cost. This will provide the resource entity with an opportunity to make appropriate amendments to the rehabilitation methods and practices to reduce the size of the final RR Cost, and therefore the RR Payment needed for ongoing monitoring and maintenance and address potential rectification of identified credible risks. As post production rehabilitation activities will likely be a medium term program, a time period between the 5 year prior to the end of production mark and the expected surrender will be significant.
 - **Surrender:** at or near surrender based on the final rehabilitation outcome, an Expert Panel determines the final RR Cost.

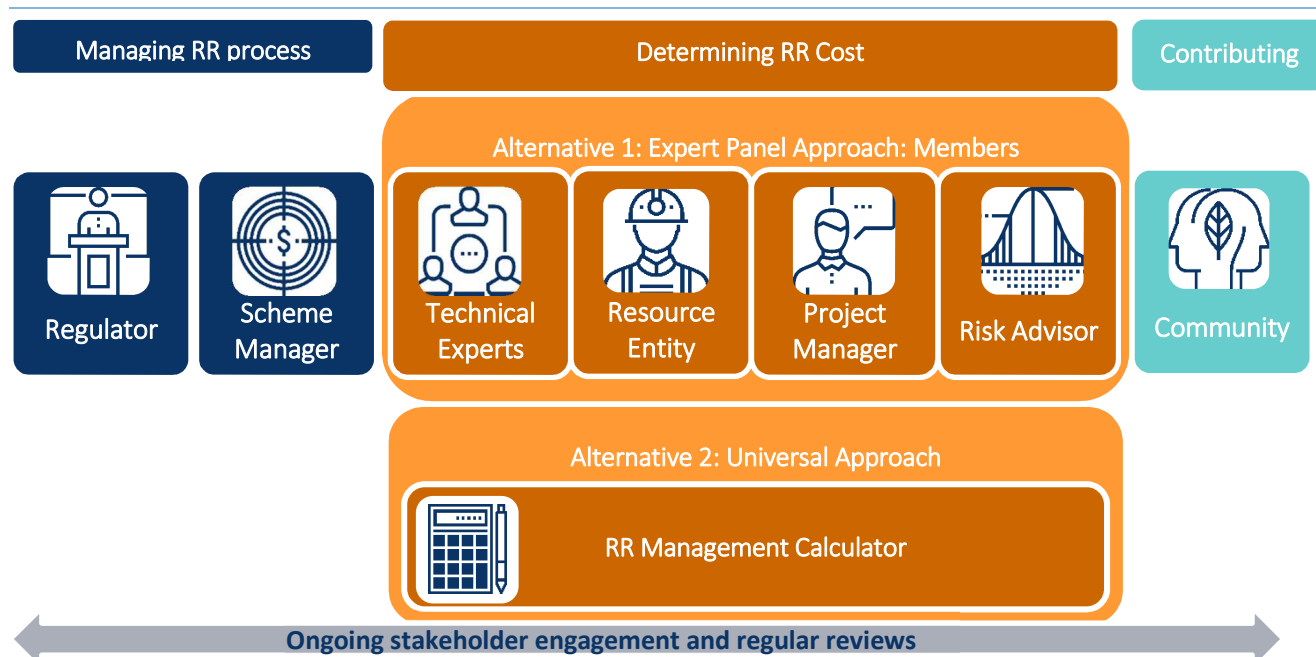
The length of each phase is merely indicative of the approach proposed by QTC, noting that the RR regime is anticipated to commence in mid-2019. The need for an Expert Panel, for a site that potentially represents a significant RR where the RMCCT may not provide an accurate estimate of the likely RR cost, may require that the State moves quickly to the interim and final phases.

Figure 4 shows the three general groups proposed to be involved in the RR framework, depending on their domain of responsibility:

- Managing RR process
- Determining RR Cost, where two alternative approaches can be used, and
- Contributing to the RR process

¹⁵ <https://www.ehp.qld.gov.au/management/pdf/mined-land-rehabilitation-policy.pdf> Note the requirement to produce a PRCP does not apply at present to P&G operations, although the rollout of the RR principles could be extended to P&G operations once the PRCP guidelines are implemented.

FIGURE 4: ROLES AND RESPONSIBILITIES FOR THE RR FRAMEWORK



SOURCE: QTC

The proposed roles and responsibilities of the key stakeholders involved independently to the approach used to determine the RR Cost are summarised below:

▪ **Managing RR process:**

– **Regulator**

The Regulator would be responsible for developing the policy settings, interacting with industry, administering the RR framework, considering consultants' recommendations for the RR Cost estimation, managing RR environmental risk, and collaboration across government.

Where the RR Cost is calculated via an Expert Panel, the Regulator would establish the range of potential expertise required, the pool of potential Expert Panel members (notably technical experts) and ensure ongoing review of the overall approach. The Regulator could observe the deliberation and discussions of the expert panel determining the RR Cost and be present at the risk workshops to understand the RR of the site and ensure integrity of the process, although would not be a member of the Expert Panel, except to the extent that an individual from the Regulator's office has the requisite skills to fill a technical expert or Project Manager role(s).

– **Scheme Manager**

The Scheme Manager's responsibility would be to manage the RR Fund as a central financial aspect of the RR framework, the central repository of industry data and the whole-of-State financial risk and its treatment, and report regularly on the RR Fund's operations, including income and payments from the RR Fund.

▪ **Contributing:**

– **Community**

It is proposed that community members only have direct involvement in the Expert Panel approach, where individuals are nominated on a self-selected basis to represent a specific range of community groups, including special interest groups, local councils, land holders and native title holders. The community can be present throughout the Expert Panel process to ensure transparency and that their viewpoints are appropriately considered in the management and quantification of residual risk. A community member would contribute to the Expert Panel process by identifying issues or concerns, but does not make decisions.

Community representatives do not play an active role in the RR cost calculation under the Universal Approach.

The next two sections describe key details of the two approaches proposed to determine the RR Cost: Expert Panel and Universal Approach.

5.2 Expert Panel

A more tailored approach to identify key potential residual risks is required for resource sites to capture their unique features, as one complex resource site may be very different from another. An Expert Panel, in this case, would play a critical role in qualitative and quantitative risk assessment. The quality of the analysis will depend greatly on the experience and knowledge of the people involved so recruitment will be important in the success of the Expert Panel process.

5.2.1 Key roles, responsibilities and selection criteria

The roles and responsibilities of the key stakeholders involved in the Expert Panel approach are summarised below:

Technical Experts

The role of the Technical Experts is pivotal in determining possible residual risks for each specific site. This group includes consultants focused on identifying key risks and providing expert judgement based on experience, qualifications and knowledge on associated key elements.

Technical Experts together with other Expert Panel members, would participate in a risk assessment workshop(s) facilitated by the Risk Advisor, during which they identify a range of risk events, potential consequences and likelihoods, based on their individual and collective experience and expertise. Technical Experts provide expert opinions on potential credible risk event and ongoing monitoring and maintenance cash outflows relevant to each site post surrender.

The range of technical expertise on each Expert Panel would depend upon the specifics of the site under consideration. Possible specialist areas will include suitably qualified and experienced professionals with relevant expertise in subjects including but not limited to the following:

- Geotechnical engineering
- Geochemistry
- Groundwater hydrology
- Surface water hydrology
- Engineering
- Geomorphology
- Vegetation, and
- Soils.

Suitable candidates may be registered Professional Engineers of Queensland under the provisions of the *Professional Engineers Act 2002*, who have an appropriate level of expertise in the structures, geo-mechanics, hydrology, hydraulics and environmental impact of watercourse diversions.

The composition of each specific Expert Panel should not be static and can be subject to change if a need in additional expertise is discovered in the discussion process. Likewise, it is also possible to remove some of the members if their subject matter knowledge is not required for a specific site once its characteristics are better understood.

Ideally a pool of relevant experts should be maintained under Standing Arrangements, where technical experts could be called upon for the Expert Panel process depending on the expertise required and timing of the risk assessment. A register of requisite skills and potential candidates may already be available to establish the Expert Panel pool, as similar skills are required for water resource plans within the Department of Natural Resources, Mines and Energy. The Expert Panel pool should include a number of technical professionals from the same subject matter areas to ensure experts' availability when risk assessments are required, to manage conflicts of interest and workload requirements.

Compensation of such experts could be based on actual work-hours when they are invited to the Expert Panels for specific resource sites and may include other arrangements. It is important that the approach to risk identification and estimation is consistent across various Expert Panels for specific sites even when it is performed by different individual experts.

Figure 5 shows potential topics to consider depending on the characteristics of each resource site to be considered in the expert panel process (again, noting that the rehabilitation must be performed to a predetermined standard prior to surrender and any RR payment).

FIGURE 5: POTENTIAL TOPICS TO CONSIDER IN THE EXPERT PANEL PROCESS

Topography <ul style="list-style-type: none"> main landforms elevation slope 	Climate <ul style="list-style-type: none"> mm of rain per year mean (potential) annual evaporation amounts monthly distribution of average daily maximum temperatures range 	Geochemistry <ul style="list-style-type: none"> acidity / PH salinity sulfidic waste rocks and tailings leaching elements concentration 	Geology <ul style="list-style-type: none"> exposure to rocks lithological issues
Land and soils <ul style="list-style-type: none"> intended land use soil capabilities sediment load 	Surface water <ul style="list-style-type: none"> affected catchments ground water proximity responses to rainfall 	Ground water <ul style="list-style-type: none"> future groundwater sinks groundwater seeping into the mine voids the rate of groundwater inflows into the final mine voids at mine closure 	Biodiversity <ul style="list-style-type: none"> ecological sensitivities (flora and fauna): range of species in the habitat alien floral invasions
Mine design and structure <ul style="list-style-type: none"> key surface and underground infrastructure engineering structures and their built standards 	Social <ul style="list-style-type: none"> proximity to towns / cities population and its projected growth economy drivers land ownership 	Air quality <ul style="list-style-type: none"> dust impacts 	Stakeholder issues <ul style="list-style-type: none"> complaints / concerns breaches / non-compliance past track record of the operator

Source: QTC

Key considerations in selecting technical experts for the Expert Panel for each specific site's risk assessment¹⁶:

- Limit the number of members

It is important to run the risk assessment workshops in an efficient and effective manner to achieve the ultimate goal of quantifying RR for a site. Only experts necessary to cover key risk areas relevant for each site are invited, with the preference to avoid having more than one technical expert in the same area, noting that some experts may cover more than one discipline if they have relevant experience and qualifications. Generally, Expert Panels of less than 15 people are recommended.

- Have one representative from each relevant discipline

Each expert will make final decisions on risk elements within their non-overlapping responsible technical areas, even though there may be other people on the Expert Panel knowledgeable in those areas / have different opinions but who are assigned to other responsible areas or act as observers.

- Members need relevant experience and qualifications

Experts with hands-on experience in the field and relevant qualifications are preferable candidates as they can bring insights and practical knowledge to risk assessments. Members could, for example, have experience of working in a mining / petroleum and gas company, who are well regarded within the industry and have an established reputation.

- Able to liaise with other experts in their discipline

Risk assessment is a collaborative process. The ability for attendees to liaise with their peers, and to communicate clearly while not dominating the workshop, is critical. Should there be information that requires work to be done outside the workshop to generate the necessary input to complete the risk assessment, the participants should have the ability to work with their peers outside the workshop, explain what is required and why, and to manage the collation and return of that information as efficiently as possible.

- Need to be trusted and respected by the decision maker

It is fundamental that the right people are selected as Expert Panel members. Ideally, they will be trusted and respected by the State, the resource industry and other relevant stakeholders and provide unbiased independent opinion.

¹⁶ Developed in consultation with Lane Associates Ltd

Resource entity

In this proposed approach, the resource entity is represented on the Expert Panel and participates in the risk assessment workshops as they are the custodians of all the key data for the site (including in-depth knowledge of past activities and idiosyncratic features) and can contribute to both risk identification and risk mitigation strategies. The Expert Panel may include company operations staff, such as closure managers or other professionals, as well as contractors who are familiar with the design, operation, and monitoring of the project or activity. Resource entity representatives do not make decisions on the technical experts' responsible areas.

Project Manager

The Project Manager's role could be undertaken by the Regulator or any third party entity with the right skill set and would be responsible for:

- establishing the context of the risk assessments to pass on to the Expert Panel – an overview of the resource site under consideration and introductions of the risk assessment process through an Expert Panel introductory paper, sourcing relevant information from the Risk Advisor
- selecting the Expert Panel – the technical disciplines and experience of panel members need to cover the full range of expertise that was identified during the task of defining the project
- monitoring timeframes and milestones – ensuring the risk assessment is on time and on budget
- acting as a key point of contact for all stakeholders – coordinate the data flow, providing consistent messaging

For large or complex resource sites QTC recommends engaging a dedicated Project Manager to manage the Expert Panel process, while for smaller sites this role can potentially be fulfilled by the Risk Advisor.

Risk Advisor

QTC recommends the Risk Advisor have risk assessment expertise and be responsible for:

- preparing for and facilitating risk assessment workshops
- documenting the Expert Panel's conclusions, and
- providing quantitative modelling to calculate RR Costs based on Expert Panel's inputs and recommending the total RR Cost to the Regulator.

While a range of technical experts can vary depending on specific resource site, the Risk Advisor will be required for, and plays a pivotal role in, every Expert Panel process.

A preferred candidate for the Risk Advisor role should possess the following qualities:

- be experienced in risk analysis (including financial risk) and probabilistic risk modelling
- have a proven capability to develop a bespoke probabilistic risk assessment model and quantify the dollar impact, supported by relevant templates and guidance material for the Expert Panel
- be experienced in facilitating workshops and leading the conversation to achieve outcome effectively and efficiently
- have a track record of swiftly grasping the nuances of the analysed subject, or have experience in and/or knowledge of the resource industry
- be able to communicate in pragmatic non-technical language, and be able to adapt their communication style appropriate for the audience
- have relevant financial, engineering or risk management tertiary and/or post-graduate qualifications, and
- act with integrity and independence and be well regarded in business / Government.

Preparing for the workshops is the first step of every RR assessment and it would involve the following actions:

- The ultimate goal of the panel workshop is to quantify risk events' likelihoods and consequences using the collective judgment of the workshop participants. In order to achieve the aim of the panel workshop efficiently, the Risk Advisor needs to explain to the Expert Panel the broad risk assessment process and the role of the panel in the process. It could be done in collaboration with the Project Manager in setting the context. An Expert Panel introductory paper could provide the necessary context in preparation for the workshop. The Risk Advisor needs to ensure that the Expert Panel members understand that their responsibility is to provide information that, on the basis of their experience, is the best available information, regardless of the remaining uncertainty, and make the Expert Panel comfortable with expressing their expert judgement.
- The Risk Advisor should communicate key examples of the ultimate Expert Panel's outputs that will be used in the risk modelling process and provide specific templates. Filled out templates can be used for documenting and

as primary sources of information for ensuring that all the relevant input is collected and for identifying any data gaps.

- The Risk Advisor should also be prepared to use non-technical, qualitative and easy to understand terms to explain the required input to the Expert Panel, especially when explaining the likelihood of each key credible risk event. For example, the Risk Advisor can use terms such as negligible, very low, low, moderate, significant, and then translate them into probability after the workshops when calculating the RR Cost.

The main goal of the workshop is to identify and quantify the post-closure ongoing activities and credible risk events to be included in the RR Cost. To maximise the value of the Expert Panel's knowledge and experience and achieve the goal, it is critical that the Risk Advisor facilitates the risk assessment workshops.

The length of the workshop will depend on the complexity of a resource site under consideration and will vary from one day for a relatively simple site to up to five days for a more complex one. A typical length of the workshop would be around two to three days and will cover the following topics:

- Introduction: introduction of attendees, key objectives and setting the context about the resource site and the risk assessment process
- Risk identifications: development of a preliminary list of post-rehabilitation risk events, and review and rationalisation of risk events list and selection of those to be carried forward for quantification
- Risk quantification: description of risk scenarios (the physical impact if it occurs and when it can occur), for each event, assigning a cost range to remediate the consequences of the physical impacts as well as a likelihood of occurrence of the median consequence. For consequential costs, panel members should also be asked to provide two estimates of cost that reflect the uncertainty and range of potential costs (the median cost, that is, the best or most likely estimate or the 50th percentile, and a very conservative estimate that indicates a high end cost but not the highest conceivable cost or 95th percentile)¹⁷.
- Progress review: review of progress against completing quantification of remaining risks and prioritisation of the remaining discussion items
- Closing: closing remarks and next steps, if applicable.

The Risk Advisor will document the Expert Panel's conclusions, including a full list of risks, selected risks, descriptions, likelihood and consequence, as this:

- ensures the robustness of the process by providing an opportunity for potential verification and justification
- acts as a reference point for any subsequent RR estimation and when developing a risk management strategy, which may draw upon material provided by the EA holder for post-surrender management
- ensures transparency of the process and the origin of inputs to the risk model, and
- allows for consistency and knowledge transfer across various RR assessments and different experts.

The Risk Advisor will use quantitative risk modelling to provide the Regulator with an estimate of the RR Cost (ie Ongoing Cost Component and Credible Risk Cost Component) for the particular site based on the Expert Panel's key outputs, consistent with the approach adopted for similar sites and the results calculated using the RMCCT.

The Ongoing Cost Component is calculated as a series of future costs to monitor and maintain, discounted over the assumed future period (which may be in perpetuity) to the present value.

The Credible Risk Cost Component is conceptually calculated as:

$$\text{Risk} = \text{Likelihood} \times \text{Consequence}$$

Where: Likelihood = potential probability of a credible risk event happening

Consequence = dollar cost exposure should the credible risk event occur

The Risk Advisor may use Monte Carlo simulations, a statistical technique to allow for the degree of uncertainty in a mathematical model, for the likelihood, consequences and variability of the future costs, to produce a distribution of outcomes rather than a single number for the Credible Risk events proposed by the Expert Panel.

The Risk Advisor will aggregate the total RR Costs and distribution of outcomes, to generate the estimated RR Cost with the appropriate level of confidence, say 80th percentile.

¹⁷Triple bottom line risk management (Bowden, Lane, Martin)

Suggested outputs of the modelling include:

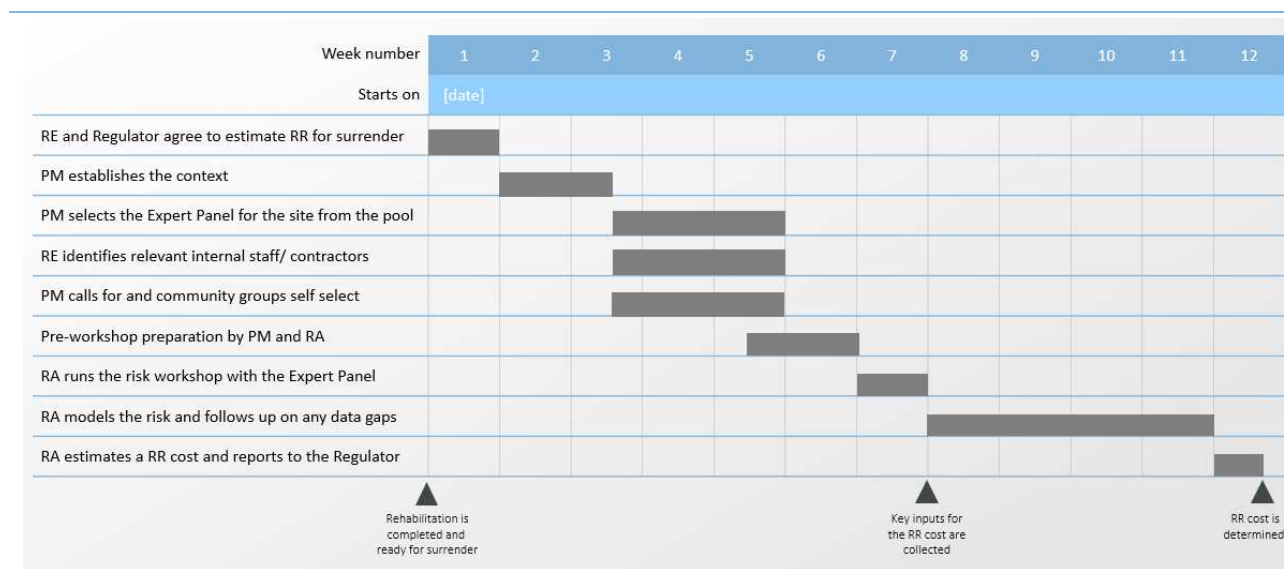
- a recommended RR Cost at the appropriate level of confidence broken down by Ongoing Cost and Credible Risk Cost components
- a chart with a distribution of the RR Cost for the specific resource site, and
- a Pareto chart capturing both bars and a line graph, where individual risk costs in dollar terms are represented in descending order by bars, and the cumulative total is represented by the line.

5.2.2 Process and timing

Under the approach proposed in this paper, the timing of the risk determination process could be split into two main phases:

- Establishment of the pool of technical expert candidates for future Expert Panels. Once the framework is implemented, necessary approvals are obtained and potential contract terms are drafted. As an indication, this phase may take up to 9 months, depending on the availability of certain technical expertise, for selection, shortlisting and interview, negotiation and engagement of the technical experts.
- Subsequent RR Cost determination for individual sites post rehabilitation. Even though the actual time will depend on the complexity of a resource site and the number of technical experts required, Figure 6 describes an example of the key steps involved and how long, on average and in order of magnitude, each step would take. If there is a sufficient number of relevant technical experts in the experts' pool, the Expert Panel process could run in parallel for several sites.

FIGURE 6: INDICATIVE TIMETABLE FOR EXPERT PANEL RR COST DETERMINATION AT OR NEAR SURRENDER



Source: QTC; Notes: RE=Resource entity, PM=Project Manager, RA=Risk Advisor

The resource industry is maturing and the State should be ready for a number of applications for EA surrenders in the near future. As the resource company rather than the State will decide when individual EAs will be surrendered there is no definitive way of accurately estimating the likely number of EAs which may surrender with a material RR cost over the near term.

As indicated in 5.1, QTC believe there may be a need for an Expert Panel for a site approaching surrender that has a potentially significant RR where the RMCCT may not provide an accurate estimate of the likely RR cost. It may be prudent to consider a 'mock trial' of the Expert Panel process around the time that the RR regime is implemented to ensure a smooth transition between the Interim and Final phases illustrated in Figure 3, so that both the alternative RR cost estimation approaches are available should they be required.

In addition to the RR Cost assessment at or near the surrender, QTC propose there could be other triggers for engagement of the Expert Panel throughout the resource site life cycle.

5.2.3 Triggers for engagement of Expert Panel

QTC propose that for sites that are new, complex or generating a relatively high RR cost under the Universal Approach, an Expert Panel review could be triggered (although would not be mandatory) throughout the resource site life when:

- a PRCP¹⁸ is first implemented,
- there is a major amendment¹⁹ to a PRCP, which changes rehabilitation outcomes,
- there is a change in the tenure type to site specific,
- there are changes in the tenure holder (sale/transfer of site),
- a site enters into care and maintenance,
- a site is nearing closure, eg, five years prior to or on cessation of production or when probable remaining reserves reach a certain level, and
- an application for the EA to be surrendered is received, which is recommended as a mandatory trigger.

After each Expert Panel review process, the outcomes (and RR calculation) should be fed back to the Regulator to expand the Regulator's database of reference information on the RR cost estimates. This would allow refinements to the RR cost estimation process, especially during the Interim phase (see Figure 3) of the RR regime when the Expert Panel process is being applied to a range of sites for the first time.

5.2.4 Operation of Expert Panel process

Cost and operational considerations

If it is determined to use the proposed triggers for engaging an expert panel, a site would be assessed under an Expert Panel processes several times throughout its life (eg two Expert Panel processes at a minimum - nearing resource site closure or at production cessation and at EA surrender). The decision to engage Expert Panel process should consider:

- the cost of engaging the panel, both for the State and the EA holder,
- the cost and risk information from the Expert Panel analysis completed on similar sites, resources or operations,
- the benefits derived from improvements in the cost estimates in the Universal Approach from engaging an expert panel,
- the level of refinement of the algorithm used in the RMCCT to estimate the RR Cost for all sites, and hence the likely payment received from EA holders, and
- the time, effort and commitment for participants, which will include resource company and government representation.

While it is very difficult in advance to predict the likely cost of each Expert Panel, it would not be unreasonable to assume that the cost would be at least \$100,000²⁰ and may be many times this amount for large or complex sites.

In principle, reasonable costs of running the Expert Panel process should be recouped from EA holders, covering direct costs of the expert panel (noting that the EA holder would be covering the costs for their own staff empanelled), governance, secretariat and reporting costs. Allocating government process costs such as ministerial or department briefings, legal or regulatory changes and internal staffing costs to the RR Cost Estimate would be difficult to justify and lack transparency.

If the RR regime permits the EA holder to engage an Expert Panel independent to the State's process, the costs would be borne directly by the company.

Expert Panel access to data, insight and rights to information

It is in the interests of all stakeholders that the Expert Panel has the best available information and insight at the time it meets to consider the specific site. It is therefore important that knowledgeable representative(s) from the specific company are included in the Expert Panel membership to provide relevant information and clarification for the technical expert members in their assessment of credible risks in particular.

While it is difficult in advance to establish definitive rules to ensure the Expert Panel gains a complete understanding of the specific site and likely risks, as each case will be different, QTC envisages that site visits, access to satellite and mapping material and published professional reports would be available. A reasonable EA holder would want to make all relevant detail and evidence available to the Expert Panel to undertake its assessment, as this would provide the individual technical experts with greater certainty of outcomes, likelihood and risks.

¹⁸ Noting that the schedule for the rollout of PRCP to P&G operations has not been confirmed.

¹⁹ The definition of 'major amendment' will need to be defined once the rehabilitation standards are finalised

²⁰ As a minimum an Expert Panel would involve at least 5 members considering the risks on the site, including preparation and wrap-up over 10 days.

Whether the Expert Panel can mandate that information be produced, made available or prepared on specific issues is more a policy than financial matter.

5.3 Universal Approach

QTC, on behalf of DES, engaged consultants, Accent Environmental Ltd, to develop a risk assessment methodology and a calculation tool that could be used for the Universal Approach. The product developed has been referred to as RMCCT.

While QTC's scope is to consider the financial implications of residual risk, we are cognisant of other aspects of the RR regime, in particular the importance of the environmental risk assessment to understand the likely risks post-surrender on an individual site, as a preliminary step in estimating the RR Cost.

An effective site operator will have been assessing, monitoring and mitigating the various environmental and operational risks throughout the resource site life continuum (as shown in the diagram in Section 5.1). In addition, the regulator has been involved in the ongoing monitoring of the site considering likely risks during the operations of the resource site, so there is already a degree of knowledge to base the environmental risk assessment well ahead of surrender of the EA.

Having undertaken the environmental risk assessment, potentially in cooperation with the regulator in the lead-up to the surrender of an EA, the entity could determine an estimated RR cost via the RMCCT, which includes:

- data input sheets where EA-holders identify the features and risk factors applicable to each resource site,
- an ongoing cost calculation component that automatically identifies and costs likely maintenance and monitoring activities at the site,
- a risk cost component that automatically identifies credible post-surrender risk events at the site, assigns a likelihood and consequence to each event, and calculates an overall risk cost, and
- data outputs in the form of a summary sheet that shows the sum and breakdown of ongoing costs and risk costs, and provides graphical displays of the risk analysis.

Where applicable, the RMCCT tool was developed in a manner consistent with the existing and proposed ERC calculation tools for mining and P&G projects. In particular, existing cost categories and unit costs from the ERC calculation tools were used where possible.

The RMCCT developed to date has known limitations, such as it cannot possibly consider all factors specific to a particular site. However, with further development, it should be able to provide a means for an estimation of RR Cost at individual sites and to assist with an estimate quantification of overall cost across the Queensland resource industry for the State.

5.4 Allowance for Private Ownership in RR Cost calculation

While formulating a proposed RR framework, QTC received feedback from various stakeholders on the approach adopted where the land, post surrender of the EA would revert to private ownership, including allowance in the RR Cost calculation and management of RR at least a proportion of the risks and costs could be borne by the private land owner rather than the State. Accordingly, DES requested QTC to consider whether specific allowance should be made for private land ownership in the calculation of RR Costs.

The overall principals of the RR regime are predicated on the State assuming all costs, risks and contingencies on the resource site post surrender of the EA, with the State's financial risk covered by a lump sum RR payment from the EA holder at surrender.

Any modifications to the standard framework needs to ensure that it remains consistent with the overall purpose of the RR Payment: to ensure sufficient funds are available, based on credible assumptions about the future, to cover the RR Cost to maintain the rehabilitated site to the desired environmental standards in perpetuity.

Allowance could be made in the RR Cost calculation by an Expert Panel for the specific next land-use²¹ including the assessment of risk for features particular to native eco-systems, pastoral land or other uses given the nature and location of the site.

²¹ The concept of a 'final land-use', while potentially included in the environmental authority conditions may be many years or decades in the future, could change depending upon economic and business conditions and community expectations. The position may be clearer once PCR regime is operational across the breadth of resource types, geographic locations and size of operations.

Overall, QTC does not believe that any specific allowance should be made in the calculation of the RR Cost amount for private land ownership other than the landowner would be anticipated to contribute to the Expert Panel process by providing relevant information given their knowledge of the site and potential post-resource land use purposes.

The application of RR Funds for a site post-surrender of the EA is discussed in Section 7.5, where we outline that the private land owner, or other suitably qualified individual or groups, should not be precluded from being able to access approved funds to maintain the environmental integrity of the site.

6 Residual risk payments

6.1 Residual Risk Payment on EA surrender

QTC recommend the resource entity makes a Residual Risk Payment (RR Payment) in cash on surrender of the EA.

The RR Payment is designed to cover the State's post-surrender financial risk, based on the RR Cost determined at or near the surrender of the EA. While the RR Cost is proposed to have 2 components (Ongoing Cost Component and Credible Risk Cost Component), the RR Cost should be determined as a single value²², with a lump-sum RR Payment made on surrender of the EA.

QTC understands that the lump-sum payment would, subject to very few exceptions (potentially fraud or deliberate misrepresentation of the site conditions by the resource entity or its officers), absolve the resource entity from future liabilities and obligations on the site. While other potential payment streams or forms of payment are possible for the RR Payment, additional complexity is neither warranted, nor consistent with the desired objectives of being pragmatic and transparent. It would also be inconsistent with the transfer of future RR and associated costs to the State only on surrender of the EA.

The RR Payment should be sufficient, based on credible assumptions, to cover the costs to monitor, maintain and repair a resource site post-surrender and rectify the financial consequences of credible risk events in perpetuity. As noted previously, the RR calculation assumes that the surrender will be accepted only when the regulator is satisfied that the rehabilitation work meets the environmental conditions of the EA. In turn the RR payment is not designed to meet pre-surrender risks or costs.

There may be a requirement to cover other RR related costs as part of the RR Payment calculation as discussed below, although in principle the RR Payment should be at least 100% of the RR Cost for a specific site, regardless of whether the cost is determined by an Expert Panel or Universal Approach (using the RMCCT calculation).

A minimum threshold is proposed to improve the administrative and operational simplicity of the RR regime, which would reflect amongst other things, the:

- cost of recouping payments from a number of small players
- difficulty in ascribing individual risk events to sites, even though a degree of ongoing management and monitoring is likely to be needed on all sites
- likelihood that many of the smaller sites will pass to future landowners who will naturally assume costs associated with the maintenance of the site, and
- current review of 'small mining operations' being undertaken, which is unlikely to be fully resolved before the intended introduction of the RR regime in mid-2019.

Below the minimum threshold (say a RR cost estimate of \$1,000 or \$10,000), a notional RR Payment equal to the minimum threshold, or even half the threshold²³ could be collected. The alternative is to request no payment from EA holders who fall below the threshold, with the cost covered by general government revenue or met from the Residual Risk Fund. In the latter case, effectively the costs of smaller (or less complex sites) are funded by larger (or more complex) sites. QTC believes that all sites should make a notional RR payment at EA surrender given that some level of costs will be incurred to monitor and manage any site regardless of the level of disturbance.

Ultimately QTC believe the threshold level is a policy rather than financial issue, while recognising the costs and management effort – for the State and EA holder – of collecting small amounts from a large number of EA holders while maintaining a level of rigour and consistency in the treatment of stakeholders across the overall RR and wider Reform Program. The RR Costs for smaller sites remain unchanged by the imposition of a minimum threshold, the only consequence is the funding of the costs from the former resource site owner²⁴ and how any differences to actual future RR Costs are covered.

²² Based on the net present value of all cost items

²³ That is, with a minimum threshold of \$1,000 any site with a Residual Management cost estimate below \$1,000 would pay \$500.

²⁴ Consideration of the environmental consequences for small sites, which are addressed by other Reform Package initiatives, are beyond the scope of QTC's Phase 3 review.

6.2 Counterparty risk

6.2.1 Overall approach

The State is exposed to potential RR Cost from the start of resource activity, even though that cost may not crystallise until the EA on the site is surrendered, at which time the State would anticipate receiving a RR Payment from the resource entity to cover the RR Cost post-surrender.

However, there is a risk (termed the 'Counterparty Risk') that the resource entity becomes insolvent prior to the surrender of the EA, and no party exists to make the RR Payment. Note that the default of the resource entity does not affect the State's RR Cost, only the funding of the cost. Likewise, the cost of the rehabilitation of the site, pre-surrender, will already be covered under the Financial Provisioning Scheme either as surety or under the Financial Provisioning Pool, so only potential costs post-surrender need to be considered.

As indicated in Section 3, QTC consulted widely on the proposed RR Framework and sought feedback from industry, environmental groups and other stakeholders. There were a range of views on the form and timing of funding the State's total RR Costs, including in determining the quantum of counterparty risk cost. However, in general, stakeholders expressed a preference for simplicity in the design of various components and avoiding the temptation to over-engineer solutions to specific components (as shown in Figure 1), noting that the reform package will be delivered as a suite of solutions.

Importantly, a number of the features of individual components operate together to assist in mitigating the counterparty risk:

- DES has published its Rehabilitation guidelines for mined sites, including requiring a PCR²⁵ linked to EA's with specific rehabilitation milestones, providing greater clarity of outcomes for resource entities.
- The Risk Advisor approach has been developed and an external partner appointed to complete regular financial and resource project risk assessments at the individual EA level, providing greater insight on a regular basis of the level of these risks.
- The ERC calculator is being updated and a specific contingency margin proposed, which will increase the total ERC amounts held to cover rehabilitation costs for defaults prior to surrender.
- The initial contribution rates recommended to apply to EA's in the Financial Provisioning Fund can provide the State with a financial safeguard against adverse default experience.
- The Mineral and Energy Resources (Financial Provisioning) Bill 2018 (MERFP Bill) has been tabled in parliament, which outlines the proposed regulatory approach to managing the Financial Provisioning Scheme.
- The RMCCT will enable EA holders to determine a regular indication of the likely RR Payment applicable at surrender, enabling them to make suitable financial provisions, and will provide the Government with a high level estimate of the State's overall RR Cost at a point in time.

6.2.2 Potential funding of the State's Counterparty Risk

Note that in practice there are only two genuine sources of funding the RR Cost: resource companies and the State (ie Queensland tax-payers)²⁶, so the funding solutions merely shift the onus of responsibility between the two parties or the level of cross-subsidisation within the resources sector.

In broad terms, funding can be designed to cover costs upfront, throughout the resource life cycle or at EA surrender. Recovery upfront does not strike a balance between protecting the State's financial interest and not being a disincentive to investment in the resources sector and owing to the difficulty in assessing and quantifying potential residual risks at the start of resource activity when there is likely to be little or no disturbance, albeit that new EAs will require a PRCP as part of the approval process to explore and extract resources, it was not deemed feasible to fund counterparty risk costs upfront.

QTC consider there are a number of potential ways to fund the State's expected counterparty RR Cost, noting that several are variations on a similar theme:

- i) Counterparty RR Contribution or Counterparty additional surety
- ii) Additional margin in the RR Payment calculation
- iii) Implicit additional 'contingency margin' in the ERC calculator

²⁵ Progressive Rehabilitation and Closure Plan

²⁶ Any subsidy from the Commonwealth from disaster recovery or from exercising financial market products (general insurance or derivatives) which in any case need to be covered by a premium to the financial risk provider falls on tax-payers anyway.

- iv) Additional allowance in the contribution rate for the Financial Provisioning Fund
- v) Retain any defaulting resource sites within the Financial Rehabilitation Scheme, so the RR cost never crystallises
- vi) No explicit allowance and the State manages the credible risk events risk via external market instruments

A description and assessment of each of these funding sources, considering the four desired outcomes of the Reform Package and the five specific principles applied to the RR Regime: transparent, consistent, justifiable, pragmatic and reportable is provided in Appendix B.

6.2.3 Recommended Counterparty Risk payment approach

QTC recommends approach v) *Retain any defaulting resource sites within the Financial Provisioning Fund, so the RR cost never crystallises* be adopted to manage the counterparty risk.

This approach significantly simplifies the overall RR regime, has precedent in the way that the current abandoned mines program operates (and the likely future approach to abandoned mines) from a financial perspective and would be a continuity in approach for the ongoing management of sites where the EA holder defaults prior to satisfactory rehabilitation. In addition, the matching of the timing of costs and income within the Financial Provisioning Fund means that there is lesser need for contingencies in the pricing of the recoupment of potential counterparty risk. There are little or no financial consequences on transfer of the site to another land-holder for an alternative use given the cash-flow matching.

The lack of transparency in approach, including that the experience variation costs are borne within the Financial Provisioning Fund, and any concerns about the absence of a specific active measure to cover defaults, should be reduced given that the different components of the reform package are designed to operate as a suite rather than siloed solutions to address each issue individually. A robust Financial Provisioning Scheme (including risk advisor reviews), clear rehabilitation guidelines and operational rules on care and maintenance work together to better manage the State's resource site financial exposure well in advance of the State assuming responsibility for RR.

7 Residual Risk Fund

7.1 Objectives of a Residual Risk Fund

QTC recommend that a RR Fund is established to pool RR Payments, and meet the RR Costs as they fall due. Further, QTC propose that interest accrued would be retained in the RR Fund.

The State may decide to insure a proportion of the risks within the RR Fund with insurance premiums and claims also flowing from and into the RR Fund. This, and many of issues discussed below, are decisions for the State and therefore do not necessarily require direct public or industry consultation.

The RR Fund would need to be managed over several decades, with infrequent substantial lump-sum deposits on surrender of an EA, regular ongoing management and maintenance costs, scheduled repair cost with potential uncommon credible risk event cost all accumulated to achieve a reasonable but secure investment return.

Given the intention is to ensure that sufficient funds are available to address environmental and financial risks on sites through ongoing monitoring and maintenance and remediation of any potential, credible rehabilitation failures, if the RR Payments on a single site could be tracked individually, success would be defined such that at the expiry of the monitoring and maintenance period (which could be in perpetuity or several decades/centuries) all funds would have been spent. In practice, this may not occur although the intention should be to meet this desired outcome.

7.2 Operation of RR Fund

The RR Fund pools RR Payments and would meet the RR Costs as they fall due.

As the RR payments are required to meet the assumed future costs associated with residual risks on specific sites the funds, once received, need to be set aside and invested separately to State consolidated revenue.

Importantly, funds accumulating within the RR Fund, including the interest earned on the fund, will be required to meet future residual risks in perpetuity. It is therefore essential that funds are quarantined and to avoid the scenario where the RR payment methodology is relaxed as the RR Fund grows.

Payments from the RR Fund cover ongoing monitoring, maintenance and repair of a previously rehabilitated site, payments to specified credible risk events, and any other costs specifically identified when the original RR Payment was determined. The categorisation of all these costs will be pre-approved in terms of the RR Fund to not only ensure that funds are dispersed to manage the stipulated residual risks in accordance with the advice provided by the Expert Panel, but also to apply funds to meet the anticipated RR costs, including administration, monitoring and management at individual sites into the future to minimise the potential occurrence of credible risks events.

Pooling of RR Payments within the RR Fund provides a degree of flexibility in cash flow management of sites albeit the RR Payment received for each site should be applied to cover the actual costs associated with that site. In practice there will be a divergence in the outcomes between what was allowed for in determining the RR Cost and the actual experience over time (even allowing for the advantage of pooling). The recommended approach in mitigating this divergence is discussed in Section 7.4.

7.3 Governance of RR Fund

The environmental regulator has overall responsibility for the RR regime including ensuring that appropriate actions are taken on each individual site, whether this work is completed by the Government or an external contractor. However, specialist expertise will be required outside the direct control of the environmental regulator to ensure appropriate long-term management of residual risks.

QTC recommends the ongoing financial management of the RR Fund be undertaken outside the environmental regulator (potentially by the FA Scheme Manager), consistent with the approach to financial management of the rehabilitation process under the Financial Provisioning Scheme.

The investment operations for the RR Fund will be critical to the overall success of the RR regime, given the long-term nature of the arrangement and the need to cover costs over many decades. Existing specialist skills exist within Government and have been proposed to provide advice on the investment objectives, investment strategies and policies to achieve the objectives for the Financial Provisioning Fund²⁷. QTC recommends that similar advice is sought for the investment management of the RR Fund given:

²⁷ Section 23 of the *Minerals and Energy Resources (Financial Provisioning) Act 2018* directs the (Financial Provisioning) Scheme Manager to seek advice from the Long Term Asset Advisory Board, which is established under Section 10 of the *Queensland Treasury Corporation Act 1988*.

- The long-term duration of the cash-flows which extend over several decades.
- The need for a high level of security of investments and returns for a proportion of the cash-flows, while requiring a degree of diversity in investments given the dearth of long-dated high credit rated fixed interest securities in Australia.
- The lumpiness of cash-flows, with intermittent RR payments in the initial years and potentially large RR cost outflows should a credible risk event occur.
- The requirement to maintain returns based on contemporary earnings rates. This is exacerbated by the fact that the discount rate used to determine the net present value of future ongoing and credible risk costs for RR Payments on individual sites needs to reflect anticipated investment returns on the portfolio of assets once the payment is received.

The governance and operational approach need to be able to demonstrate that funds are applied for the purposes that they were intended, either in terms of directions from the Expert Panel or the general guidelines established via the Universal Approach for each site. An Advisory Committee has been established for the management and oversight of payments to and from the Financial Provisioning Fund. QTC recommends that DES, via the FA-IDC, should propose expanding the terms of reference of the Advisory Committee to permit it to also oversee the operational payments approach for the RR Fund, rather than duplicating the governance approach.

Relevant reporting of the RR Fund operations is critical to ensure the transparency of the overall RR regime and to meet stakeholder expectations, in particular local communities, Indigenous groups and land owners to demonstrate that the RR package is being managed as intended. Reporting could be completed directly by the environmental regulator or delegated to other parties within the governance framework.

Once the framework is implemented and a number of resource owners have surrendered their EAs in exchange for RR Payments, the State may wish to consider streamlining the ongoing monitoring and maintenance approach by using its economies of scale in procurement and maintenance scheduling, eg, personnel and equipment are scheduled to be deployed to the same areas for multiple resource sites to deliver savings and synergies in monitoring and maintenance costs.

It is important that the decisions on the risk treatment are made in collaboration amongst Queensland central agencies and DES and balance the four desired outcomes of:

- delivering a high level of environmental performance
- protecting the State's financial interest
- not a disincentive to Industry, and
- satisfying community expectations.

As with other components of the reform package, clear responsibility for various roles in managing the RR program is key to success. As responsibility will likely extend across several parts of government, which in all likelihood may be amended in future as part of any machinery-of-government changes, both the legislative/regulatory and the operational responsibilities will need to be agreed, documented and implemented as part of the RR program rollout.

7.4 Variation in RR Cost experience

Once received, the RR Payment should be sufficient, if experience proves to be in line with the assumptions made in determining the RR Cost, to cover the actual costs – administrative, monitoring and maintenance and expenditure related to the credible risk events – over the future time period specified by the Expert Panel or implicit in the Universal Approach algorithm.

Assumptions used in determining RR Payments need to remain contemporary, reflecting current risk factors, interest and inflation rates, administration and monitoring costs and credible risk event costs. In practice, the actual RR cost will vary from that estimated in the RR payment calculation to the extent that experience proves to be different to that assumed.

Mitigation of financial impact of temporary or permanent variation in experience

The State does not need to assume responsibility for any variations in costs such as cost inflation, unexpected or unforeseen deterioration in the rehabilitation or catastrophic events. By aggregating the risks, the State could take advantage of external insurance arrangements to cover its overall risk management at a whole-of-state level. Premia to cover these insurance arrangements could be deducted from the RR Fund with proceeds from claims made credited to the RR Fund to offset the costs associated with aggregated credible risk events.

Likewise, a material change in experience, which had not been incorporated in the original calculation of the RR Payment could be recouped from future RR payment calculations by building in an extra margin. While this is not necessarily in the spirit of the RR regime which is a best estimate of future costs on a specific site, the alternative is for

the State, potentially via the FA Scheme to ‘underwrite’ the shortfall and be duly compensated for the risks borne. This may achieve a similar outcome to a specific contingency margin.

The RR Payment approach, covers future RR costs whether determined by the Expert Panel or under the Universal Approach algorithm for a specified number of years. Once the RR Payment is received by the State the resource owner is absolved²⁸ from future liability and obligations on the site. Likewise they should not be able to share in any favourable savings or benefits on the site.

In the situation where the relevant land, in whole or part, is sold or transferred to another land-owner within the specified period of years the RR Fund has additional assets which will not be required to meet the anticipated future RR costs. While payment could be made to the future land-owner, the prudent approach would be to retain the additional assets as a buffer against future adverse experience, including the RR regime administration costs such as engaging expert panels.

Importantly, if there is anticipated to be a shortfall in funding arising from a deterioration of experience compared with that allowed for in setting the RR Payment, costs for ongoing monitoring, maintenance and repairs still need to be incurred, as to do otherwise will inevitably lead to higher credible risk event costs in future, thereby merely shifting the shortfall to another source.

RR costs for resource sites below the minimum threshold

As mentioned in Section 6.1, QTC recommends that a minimum threshold for the estimated RR cost at surrender be set below which a notional RR Payment would be requested. Any costs arising from these sites could either be covered by general government revenue or met from the RR Fund, in the latter case this represents an experience cost item that has not been previously covered by direct funding.

Depending upon the financial significance of the cost, which is likely be the occurrence of a credible risk event rather than the ongoing monitoring and maintenance activity, and assuming that the costs could, under the governance and operational regime for the RR Fund (see Section 7.3) the cost experience variation could be recouped by an allowance in future RR Payment calculations. Effectively, the costs of smaller (or less complex sites) would be funded via payments from larger (or more complex) sites.

A minimum threshold improves the administrative and operational simplicity of the RR regime: the State doesn’t need to focus on confirming and collecting small amounts from a large number of EA holders on surrender. One approach to reduce the administrative burden on both the State and resource companies is to nominate that sites with RR Costs estimates below a minimum threshold (say \$1,000 or \$10,000), make a notional RR Payment of the minimum threshold, or even half the threshold²⁹. All sites will therefore be making some contribution to the RR costs across the State.

7.5 Costs associated with post-mining land use

In all likelihood, a portion of land within the RR Fund will be used by agriculturalists, developers and individuals for other than resource extraction activity. It is anticipated that restrictions would be placed on the range and breadth of activities that could be undertaken on this land, although these restrictions may not be enforceable under the current suite of legislation governing the resources sector or the reform package operations.

In the situation where previous rehabilitation work prior to the EA Surrender has been completed to the standard envisaged by the Expert Panel results in additional future costs on a site, even though it may have been certified by the government as satisfactory at the time, the costs would ordinarily be met from the RR Fund. It is less clear whether the costs should be recouped from the land-owner if they have arisen from the actions or omissions of that landholder, although if costs are recovered they should be deposited into the RR Fund.

DES requested QTC provide advice on the financial management of RR where post surrender of the EA the site reverted to private ownership. The calculation of the RR Cost was discussed in Section 5.4.

Having considered a range of stakeholder and independent professional views, the principles proposed in managing these potential RR costs for private land-ownership are outlined below:

- The calculation of RR cost would be completed irrespective of the land-owner of the relevant property, including the whether an Expert Panel is engaged or not. Note that the land-owner may provide valuable insight to the Technical Experts on the Expert Panel in their consideration of credible risk events including their likelihood and consequences. (see section 5.4)

²⁸ With few exceptions such as fraud or deliberate misrepresentation of the site conditions

²⁹ That is, with a minimum threshold of \$1,000 any site with a Residual Management cost estimate below \$1,000 would pay \$500.

- The RR Payments would be made to the State, which assumes responsibility for the cost of managing post-surrender RR in perpetuity.
- The State will ensure that RR Payments are managed within the RR Fund and used for the purpose that they were intended regardless of who (government, private landowner and contractor) undertakes the monitoring, maintenance or mitigation work.
- There should not be any features that preclude tasks (eg, monitoring and management or repair of structures) being undertaken by any suitably qualified or experienced individual or group, including the land owner and the intention would be that funds from the RR fund would be made available to complete those tasks.
- A mechanism to ensure that the work has been completed satisfactorily will need to be in place at no expense to the government, without being onerous on the land owner in terms of time or effort nor an unreasonable cost to the RR Fund.
- Decisions about suitable parties to undertake components of the RR work would be made by using the Government's assessment and, if appropriate, risk and procurement processes.
- The approach and briefing for the Expert Panel process would recognise that the credible risks and issues, and quantification may relate to specific areas on the site. Therefore, there may be areas that fall outside the specific areas which had the key residual risks, where the landowner could carry out necessary monitoring and maintenance to ensure that environmental harm does not occur at the expense and discretion of the landowner.
- Following the EA surrender and successful relinquishment of the tenure by the proponent, if the State determined that there is no suitable pre-existing party willing and able to take over the site, the State will take responsibility for ownership and residual risk management of the land until it decides to transfer to a suitable next landholder, who bears future liabilities on the site.
- The transfer of the land and the accompanying residual risk management responsibilities will need to be established via a legally binding mechanism/ agreement to ensure that access to the land can be obtained to carry out any work associated with management of residual risk.
- Compliance requirements for the landholder must be reasonable and not onerous.

An alternative view was expressed that the quantum of RR Cost, once determined under the standard framework, could be split between the State and the private land owner reflecting the relevant risks that both parties would choose to bear in future. While this could be valid, it is important to consider the most appropriate party to take the financial risk given the need to maintain sufficient funds to cover costs on the rehabilitated site in perpetuity, which in this case is the State. As indicated above, while the money may be retained within the RR Fund, payments could be made available to any suitably qualified or experienced individual or group, including the land owner, to complete monitoring and maintenance activities to manage residual risks on the site.

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Appendix A: Stakeholder consultation

The stakeholder engagement was generally conducted face to face, either with individual entities or in group forums. Discussions with interstate insurers and rehabilitation consultants were undertaken over the phone.

STAKEHOLDERS ENGAGED

Segment	Entities			
Industry participants ³⁰	<ul style="list-style-type: none"> AARC APPEA Arrow Energy Batchfire Resources BHP Billiton Evolution Mining Glencore Henderson Geotechnical 	<ul style="list-style-type: none"> Ison Environmental King & Wood Mallesons Klohn Crippen Berger LBL McCullough Robertson Metro Mining 	<ul style="list-style-type: none"> Metserve Minter Ellison MMG Origin Padanus Solutions Peabody QCoal QER 	<ul style="list-style-type: none"> QGC/Shell QRC Rio Tinto (coal and Alcan) Santos Sibelco Stanwell U&D Mining
Environmental groups ³¹	<ul style="list-style-type: none"> EDO QCC 	<ul style="list-style-type: none"> Lock the Gate WPS 	<ul style="list-style-type: none"> Mackay Conservation Group WWF 	
Finance	<ul style="list-style-type: none"> Aon Australia JLT-Re 	<ul style="list-style-type: none"> APRA Marsh 	<ul style="list-style-type: none"> Assetinsure Munich Reinsurance 	<ul style="list-style-type: none"> Dual Australia
Industry consultants	<ul style="list-style-type: none"> Accent Environmental Australian Coal Industry's Research Program Lane Associates Queensland University of Technology University of Queensland Virentia 			

QTC engaged with stakeholders as part of the design and refinement of the Residual Risk framework, in many cases, their views were considered in shaping components of the solution.

³⁰ These industry players were collectively engaged in workshops co-ordinated by QRC on 1 March 2017 and 28 March 2017.

³¹ The environmental groups have been engaged collectively, including in a workshop facilitated at QTC's offices on 28 March 2017.

Appendix B: Description and assessment of options for funding Counterparty Risk

The State is exposed to Counterparty Risk from the start of resource activity, which represents the risk that the EA owner becomes insolvent prior to the surrender of the EA, and no party exists to make the RR Payment.

Seven options to fund the potential Counterparty Risk costs were listed in Section 6.2.1. A description and an assessment of the pros and cons of these seven options is provided below.

The assessment considers the four desired outcomes of the Reform Package and the five specific principles applied to the RR Regime listed below.

Reform Package Desired Outcomes	RR Regime Principles
<ul style="list-style-type: none">▪ Delivers a high level of environmental performance▪ Protects the State's financial interest▪ Does not present a disincentive to investment in resources sector▪ Provides an outcome that satisfies community expectations	<ul style="list-style-type: none">▪ Transparent▪ Consistent▪ Justifiable▪ Pragmatic▪ Reportable

Option i) Counterparty RR Contributions or Counterparty additional surety

Under this option, the resource entity is required to pay a Counterparty RR Contribution (for those EAs where the rehabilitation liability on default is funded within the Financial Provisioning Fund) or provide additional surety (for other EAs) from inception of the resource activity until the surrender of the EA or default of the resource entity.

The Counterparty RR Contribution amount or additional surety could be expressed as a proportion of the ERC³², the estimated RR Cost determined under the Universal Approach by the RMCCT or another appropriate measure of risk cost.

Depending on the level of the Counterparty RR Contributions, the RR Payment on EA surrender could be reduced in part or whole by the total amount payable by the respective owners of the site. Effectively, ongoing amounts are contributed throughout the resource life cycle to fund the cost of final RR Costs for those EAs where the owner defaults any time prior to EA surrender.

Alternatively, the Counterparty RR Contribution could be treated as a 'pure insurance risk' premium sufficient to cover the defaults in the next year, in which case no adjustment to the final RR Payment would be made. In explaining Option a) below it will be assumed that no adjustment is made to the Final RR payment, although in assessing the pros and cons of Option a) at the end of this section, the relative merits and difficulties of making relevant adjustments to the Final RR payment will be considered and documented.

A Counterparty Fund would be established to pool Counterparty RR Contributions, separate from the RR Fund, with the accumulated money from ongoing Counterparty RR Contributions in the Counterparty Fund used to meet the anticipated RR Costs on individual sites where the EA holder has defaulted and the State needs to meet RR costs once the site has been rehabilitated to an acceptable standard.

The segregation of the moneys into the RR Fund and Counterparty Fund is designed to provide a degree of transparency in the presentation of the application of funds to fully rehabilitate sites (covered by the RR Fund) and current sites still being rehabilitated.

Once a site allocated to the Counterparty Fund the site is rehabilitated to prevent environmental harm (funded from the Financial Rehabilitation Scheme), sufficient funds should be available to cover the actual RR costs – administrative, monitoring & maintenance and expenditure related to the future risk events - over the future as they fall due. At that point funds could potentially be transferred from the Counterparty Fund to the RR Fund.

To illustrate the operations and interactions of the two Funds, the approach is outlined considering two alternative scenarios.

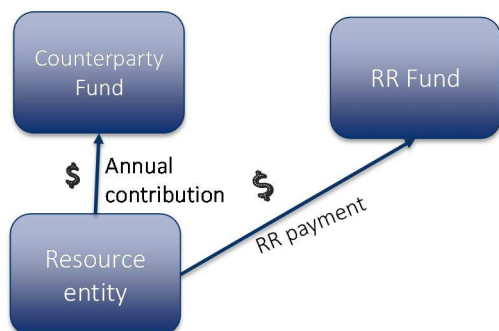
Scenario 1 – Resource Entity does not default prior to surrender of the EA

³² Estimated Rehabilitation Cost, determined to cover the cost to the State of rehabilitating a resource site should the EA holder default and the site could not be sold to another entity.

Under ordinary circumstances, where the resource entity is still in existence at surrender:

- The resource entity has made annual Counterparty RR Contributions to the Counterparty Fund³³ from the start of operations until surrender of the EA when the RR Payment falls due.
- The resource entity successfully completes the rehabilitation, the EA is surrendered and the final RR Payment is made to the RR Fund.
- The annual contributions are retained within the Counterparty Fund.

FIGURE 9: FUNDS FLOW FOR ENTITY WHICH COMPLETED REHABILITATION BEFORE SURRENDER



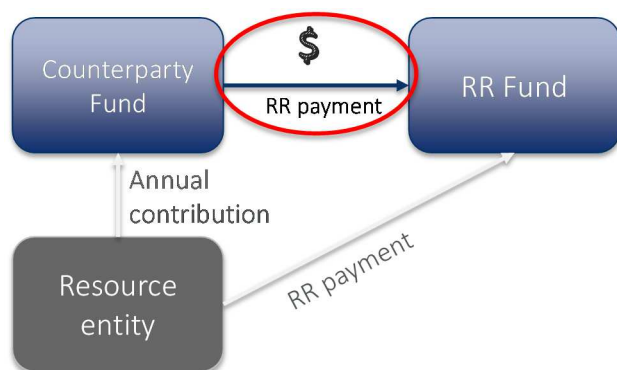
Source: QTC

Scenario 2 – Resource Entity defaults prior to surrender

In the event that the resource entity fails prior to surrender and no new entity can be found to assume responsibility for the site:

- Annual contributions cease into the Counterparty Fund³⁴ at or around the date of default.
- The State would rehabilitate the site from the Financial Provisioning Fund (in terms of the Financial Provisioning Scheme under the Reform Package) to prevent environmental harm.
- In accordance with the approach outlined in Section 3, the final RR Cost would be determined, and this amount transferred from the Counterparty Fund to the RR Fund to cover the future RR costs on a now rehabilitated site.

FIGURE 10: FUNDS FLOW FOR ENTITY WHICH DEFAULTS BEFORE SURRENDER



Source: QTC

A similar approach would be adopted for resource entities that were required to post a surety under the Financial Provisioning Scheme to cover their pre-surrender ERC obligations. Under scenario 1, the resource entity the surety would be released and the final RR Payment is made at surrender. Under scenario 2, the surety amount would be collected from the surety provider and split with the proportionate amount provided to the Financial Provisioning Scheme to cover the Estimated Rehabilitation Costs to rehabilitation the site and the remainder transferred to the RR Fund to cover future RR costs on the rehabilitated site.

³³ The entity is also making contributions at the rate of 0.5%/1%/2.75% of the Estimated Rehabilitation Cost to the Financial Provisioning Fund to cover the rehabilitation of the environmental damage prior to surrender of the EA.

³⁴ FA contributions into the RF would also cease covering rehabilitation and the RF would be called upon to complete the rehabilitation in accordance with the EA.

Pros	Cons
<ul style="list-style-type: none"> Costs, or a proportion of estimated costs, are funded throughout the resource life cycle via an explicit fee Provides some protection of the State's financial interest The segmentation of money with two distinct funds – RR Fund and Counterparty Fund – provides a degree of transparency 	<ul style="list-style-type: none"> Administrative burden of collecting, administering and crediting ongoing payments. Mismatch of timing of costs and recoupment – the former occurs later in all cases Complexity in tracking Counterparty Payments from potentially multiple owners, which is exacerbated if any adjustment of the final RR Payment is contemplated, or if a mix of surety and contributions have been made over time. There is no guarantee that the eventual RR costs, which may be incurred many years into the future will equal the funded amount available in the Counterparty Fund. The RMCCT needs to play the dual role of estimation tool and charging tool, and it is less clear how Expert Panel estimates may be updated regularly for charging purposes, thereby lacking consistency. There is a potential that total Counterparty Payments may exceed the final RR Payment at surrender.

Option ii) Additional margin in the RR Payment calculation

In principle the RR Payment is the best estimate of the future ongoing maintenance, monitoring and repair costs and credible risk event costs. This best estimate would be increased by a specified percentage as an allowance to cover default costs. The allowance is akin to a contingency margin, noting that the estimate of the RR Cost may already have inbuilt conservatism especially in the calculation of the Credible Risk Cost Component.

Pros	Cons
<ul style="list-style-type: none"> Avoid the need for an explicit fee Pragmatic and simplified approach Avoids the need for a separate fund, which in all likelihood would not accumulate the required amount to meet the lumpy cash flows on default 	<ul style="list-style-type: none"> Default costs borne by entities who surrender EA Mismatch of timing of costs and recoupment Administrative burden in tracking and recouping the State's counterparty costs from future RR Payments Lack of transparency

Option iii) Implicit additional 'contingency margin' in the ERC calculator

The current proposal is that a 10% contingency margin would be applied to ERC calculations in the 2018 version of the calculator.

While this contingency margin has been proposed to cover the uncertainty in the estimation of rehabilitation costs prior to surrender of the EA, a proportion of the contingency could be notionally set aside to avoid potential RR costs post surrender. This was effectively what was proposed under Option a) although there would not be an explicit allocation for RR.

Note that the contingency margin would generate additional contributions in the Financial Provisioning Fund - the contribution rates would be applied to 110% of the Estimated Rehabilitation Costs – which could be used across any sites, while the additional surety could only be applied to the individual site providing the surety.

Pros	Cons
<ul style="list-style-type: none"> Avoids an explicit fee Pragmatic and simplified approach Avoids the need for a separate fund Replicates the Existing Counterparty Risk approach 	<ul style="list-style-type: none"> The contingency margin was earmarked for a purpose other than RR ERC and RR are not correlated (eg ERC tends to zero as surrender approaches whereas RR reaches a maximum)

Pros	Cons
<ul style="list-style-type: none"> ▪ Source of funding (but not necessarily the correct amount) received ahead of the RR costs being incurred. ▪ Improved rehabilitation flows through to lower contribution towards RR and ERC 	<ul style="list-style-type: none"> ▪ Inconsistency of approach to costs and payment, across sites, commodity types and quality of rehab. ▪ Lack of transparency

Option iv) Additional allowance in the contribution rate for the Financial Provisioning Fund as part of the periodic actuarial review

Under this funding source, the cost of RR would be an explicit claims item to be covered when the Financial Provisioning Fund contribution rates are reassessed.

The current Financial Provisioning Fund contribution rates include various buffers above the rates required to meet pure insurance rate costs plus administration and good causes so any RR costs arising from potential defaults before the first actuarial review would represent claims experience above the expected (rehabilitation) losses, albeit that the costs would not crystallise nor cash outflows occur until the relevant site is rehabilitated.

Pros	Cons
<ul style="list-style-type: none"> ▪ Avoid the need for an explicit fee ▪ Pragmatic and simplified approach ▪ Funding occurs ahead of costs being incurred ▪ Consistent with the risk based approach for ERC ▪ Transparency in the representation of the call on the Financial Provisioning Fund 	<ul style="list-style-type: none"> ▪ A further call on Financial Provisioning Fund, with necessarily an increase in the underlying contribution rates and payments. ▪ No funding from surety participants

Option v) Retain any defaulting resource sites within the Financial Provisioning Fund, so the RR Cost never crystallises

This approach is predicated on the basis that the standard of rehabilitation to enable an EA to be ordinarily be surrendered (if the entity had not defaulted previously) is not achieved. In effect the costs associated with the site are portrayed as rehabilitation costs and expenses to maintain the site as safe, stable and non-polluting into the foreseeable future, and therefore are met from the Financial Provisioning Fund or from surety (at least until those funds are fully expended at which time the cost becomes a future liability of the Financial Provisioning Fund).

Effectively, the State would adopt a position whereby the funding of the Counterparty Risk would be the responsibility of the current and future resource providers, with the attribution of costs apportioned across all providers regardless of the categorisation of the defaulting entity. This is akin to the approach currently adopted for abandoned mines.

Pros	Cons
<ul style="list-style-type: none"> ▪ Avoid the need for an explicit fee ▪ Simple approach ▪ Cedes collective responsibility to the industry for defaults. ▪ Consistent with abandoned mines process ▪ Costs are met as they fall due 	<ul style="list-style-type: none"> ▪ There is no active measure to fully remediate the issue of rehabilitation and RR for sites where the owner defaults as part of the RR package. ▪ Lack of transparency

Option vi) No explicit allowance and the State manages the credible risk events via external financial instruments

While this approach can be adopted as a component of any of the previously discussed funding sources, the solution envisages that a combination of the State and the industry would meet a proportion of the predictable and regular ongoing monitoring and maintenance costs, while the more variable credible risk event costs are covered by an external insurance arrangement – either at an aggregate or individual claims level – as a defined strategy.

In effect, the State is ceding the highly unlikely although financially significant Credible Risk Costs to an insurer, while continuing to meet the predictable ongoing costs.

Pros	Cons
<ul style="list-style-type: none"> ▪ Greater transparency ▪ A sense of sharing of costs ▪ Looks to address the liability issue of a geographical and commodity type concentration risk that the State is unable to diversify internally. 	<ul style="list-style-type: none"> ▪ More complex than other solutions ▪ Increases the financial exposure to the insurance sector ▪ Difficult to explain and justify, including demonstrating the relative benefits and costs for the industry

Appendix C: Residual Risk terminology and nomenclature

Expression	Meaning or Usage
Counterparty Fund	Fund established into which Counterparty Payments are made.
Counterparty RR Payment	Ongoing payments made during the period when the EA is inforce to cover the Counterparty Risk
Counterparty Risk	The risk that the resource entity becomes insolvent prior to the surrender of the EA, and is unable to make the RR payment
Credible Risk Cost Component	The costs of unplanned credible risk events
Credible Risk Event	An event that represents a plausible likelihood of occurrence and reasonable magnitude of consequences based on information available at the time
EA	Environmental Authority
Fulfilment Residual Risk Payment	The RR Payment made coincident with the surrender of the EA or the completion of rehabilitation to the agreed standard.
Ongoing Cost Component	Monitoring, maintenance and regular repair costs and costs of near-certain or regular risk events
PM	Project Manager
RA	Risk Advisor
RE	Resource Entity
Residual Risk Cost ('RR Cost')	Residual Risk Management cost, or the residual risk cost to the State = Ongoing Cost Component + Credible Risk Cost Component
Residual Risk Fund ('RR Fund')	Fund established into which RR Payments are made and RR Costs are taken
Residual Risk Payment ('RR Payment')	The charges made by the EA holder, either as a one-off or regular payment, to the State in order to meet the Residual Risk Cost.
RMCT	Risk Management Cost Calculator Tool