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Developing a collaborative closure vision: a stakeholder-driven approach in Teck's Carmen de Andacollo

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Abstract

This article describes the process carried out between 2023 and 2025 to develop the first closure vision for the Carmen de Andacollo mining operation, located in northern Chile. The development of the closure vision began with the formation of a multidisciplinary team from the operation and the Teck Chile corporate office, which received targeted training in mine closure principles, corporate standards and regulatory requirements. Using a collaborative methodology inspired by the stakeholder engagement methodology developed by the World Cafe Community Foundation, a dedicated closure workshop was conducted to gather insights, expectations and priorities from the internal stakeholders. Based on the information collected during the workshop, a first draft of the closure vision for Carmen de Andacollo was developed internally and later endorsed by the operation's senior management. In 2025 the validated closure vision was presented to neighbouring communities through a series of participatory workshops. These sessions provided an opportunity not only to communicate the proposed vision but also to collect valuable feedback from community representatives. By actively involving both internal and external stakeholders, the process enabled the development of a comprehensive and shared closure vision. Participants expressed appreciation for the invitation to contribute and demonstrated strong engagement throughout the process. This collaborative approach helped clarify expectations and address concerns from workers, contractors, suppliers and local communities regarding the future of the Carmen de Andacollo operation. The experience highlights the value of early, transparent and inclusive engagement in the formulation of the mine closure vision.

Keywords: *mine closure vision; stakeholder engagement; integrated mine closure; socio-economic transition*

1 Introduction

Engagement between mining operations and stakeholders has evolved from one-way information sharing to participatory processes that influence decisions across the asset life cycle. International guidance and assurance schemes (International Council on Mining and Metals [ICMM] 2025) encourage early and ongoing engagement to anticipate closure-related impacts and to agree on post-closure outcomes. Organisations such as the ICMM and certifications such as The Copper Mark recommend achieving this integration with stakeholders from early stages and throughout the entire life cycle of the operation.

In this context, one of the criteria established by The Copper Mark specifies:

> *'To implement an action plan to manage mine closure and reclamation, a Site´s plan should include, but not be limited to: A vision for post-closure that is supported by affected stakeholders, which means to articulate what the Site and its stakeholders agree to achieve after decommissioning and the legacy it will leave behind. This vision should serve as an overarching guide for the decisions and their implications throughout the Site's life. 'It should be developed as early as possible in the process and as a part of early and*

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ongoing stakeholder engagement, with the intention of preventing, mitigating or remediating adverse impacts of mine closure.' (The Copper Mark 2024).

Within this context, Teck requires each operating site to define a closure vision that articulates the desired post-closure legacy and provides a unifying reference for closure decisions. This paper presents an integrated approach applied at Teck Carmen de Andacollo (CDA) for: (i) internal co-creation of a closure vision through a structured, multidisciplinary process; and (ii) territorial engagement to socialise and validate the vision with external stakeholders, strengthening legitimacy and actionable relevance.

1.1 Site and territorial context

CDA is an open pit copper operation located in the Municipality of Andacollo, within Coquimbo Region in northern Chile. The municipality has approximately 10,000 inhabitants and the operation has been active since 1996. Prior to Teck´s ownership, artisanal mining was the main economic activity; however, CDA is now the primary economic driver in the area. Approximately 700 employees are directly contracted by Teck, along with around 1,200 indirect workers.

As shown in Figure 1, CDA´s facilities are distributed across 2 main sectors: the pit, tailings storage facility and process plant are located in Andacollo, while the water extraction wells are located in the Alfalfares sector, within the city of La Serena.

Andacollo is situated in a mountainous area at approximately 1,000 metres above sea level, within a semi-arid climate characterised by water scarcity. It is a small city widely known in Chile for the Virgen de Andacollo (Andacollo Virgin) Festival, which attracts around 200,000 visitors each year. CDA's area of influence includes the town of Andacollo, as well as nearby rural localities such as Chepiquilla and El Sauce (each with approximately 250 inhabitants) which are functionally connected to Andacollo for goods and services.

The environmentally approved operational mine life currently extends to 2031, and Teck is now conducting an internal evaluation regarding the potential submission of an operational continuity project aimed at extending the existing environmental permit.

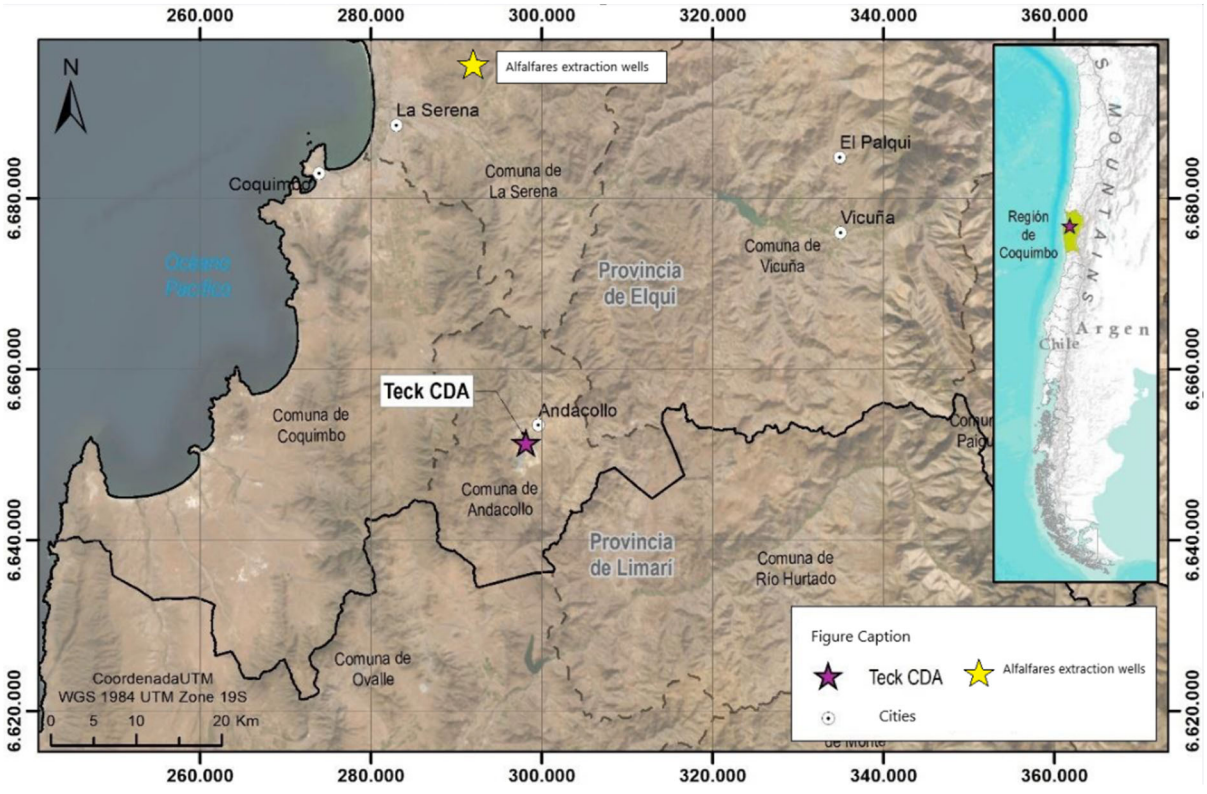

Figure 1 Carmen de Andacollo (CDA) mine's facilities location

2 Phase 1: co-creation of the closure vision by internal stakeholders (2023)

Phase 1 of this process was initiated to comply with Teck's internal closure standard (Teck 2021) and to improve organisational readiness for closure planning. A multidisciplinary internal team was assembled, spanning operational and corporate functions (e.g. hydrogeology, geomechanics, mine and plant operations, environment, tailings, water resources, permitting, contracts, finance, planning, biodiversity, communities and labour relations).

2.1 Methodology

To establish a common and consistent understanding of closure, the process began with targeted training on Chilean closure regulations (Ministry of Mining 2011), Teck´s closure standard (Teck 2021), and relevant international guidance (ICMM 2025). This training also clarified the importance of defining an early closure vision to support measurable objectives throughout the mine life.

After the training, a closure workshop day was conducted in Andacollo. It combined technical briefings and a facilitated workshop based on an adapted World Cafe methodology (The World Café Community Foundation 2026), which is a flexible participatory approach designed to facilitate collaborative dialogue. It involves small group discussions in a café-style setting, guided by targeted questions over multiple rounds, where participants rotate between tables to share perspectives. The process is supported by a host, structured conversations and a final 'harvest' phase in which key insights are collectively shared and visually captured.

The workshop was structured around 5 working groups (tables). The adaptation of the World Cafe method for its engagement purposes was developed as shown in Figure 2, and included: (i) initial plenary brainstorming to define with the participants the 'dimensions' that must be reflected in the closure vision; (ii) rotating the 5 working tables in small group conversations across the agreed dimensions to add concepts and themes; (iii) drafting a summary phrase for each dimension; and (iv) collective prioritisation of the phrases using real-time voting to generate a ranked list of what matters most. The ranked output was synthesised offline into a concise draft vision, which was reviewed by participants and subsequently approved by CDA´s senior management.

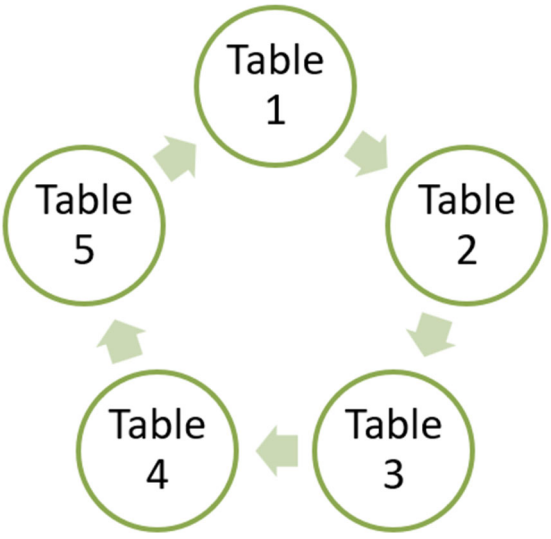

Figure 2 Schema of the working tables rotation

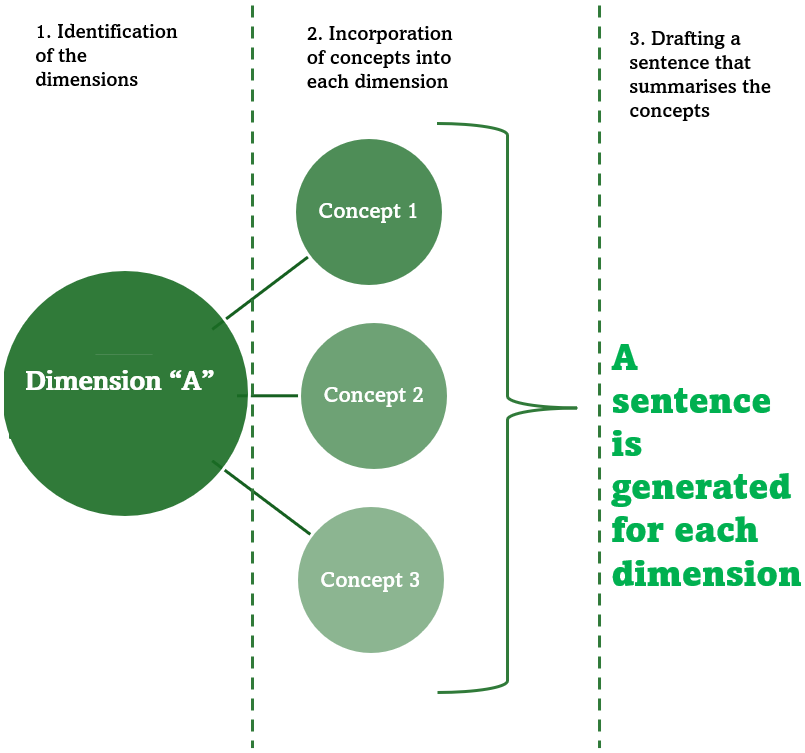

Figure 2 Schema of the adapted workshop methodology used to develop the closure vision (Zepeda 2024)

2.2 Output: The Carmen de Andacollo first closure vision statement

The internal process resulted in a site-level closure vision centred on legacy and place-based values, as follows:

> *'We aim to be recognised for leaving a positive legacy in the territory where we operate, protecting cultural and heritage values, developing capabilities, and promoting sustainable local development. We will implement cost-effective measures that contribute to the rehabilitation and recovery of biodiversity, based on industry best practices and compliance with applicable legal regulations.'* (Zepeda 2024)

3 Phase 2: territorial stakeholder engagement and validation (2025)

3.1 Stakeholder mapping and engagement mechanisms

In 2025 CDA disseminated the approved closure vision to, and sought territorial feedback from, representative stakeholder groups. These comprised the Municipality of Andacollo, the Teck Andacollo Community Table, the Alfalfares working group (linked to the area where CDA water extraction wells are located), local contractor companies based in Andacollo and directly affected territorial organisations located adjacent to Andacollo (Chepiquilla and El Sauce localities).

The Municipality of Andacollo is one of CDA's key stakeholder institutions. Among the community organisations within the municipality, the Teck Andacollo Community Table, is the most relevant as it brings together neighbourhood organisations and local community leaders from the area surrounding the mining operations. The Alfalfares working group includes local residents and non-governmental organisations representing stakeholders from the groundwater extraction area.

Finally, in selecting the groups to be included in the engagement process, local contractor companies were involved because they could be among the groups most affected by the closure of CDA. Two neighbouring communities near Andacollo, with which CDA maintains an ongoing and longstanding relationship, were also considered in the engagement.

As its shown in Figure 3, 3 complementary mechanisms were used. These were a formal municipal meeting, participatory workshops and structured surveys with directly affected organisations. Each mechanism aimed to introduce key closure concepts to establish a shared understanding, present the current closure vision, and collect questions, concerns and suggestions in a safe dialogue space.

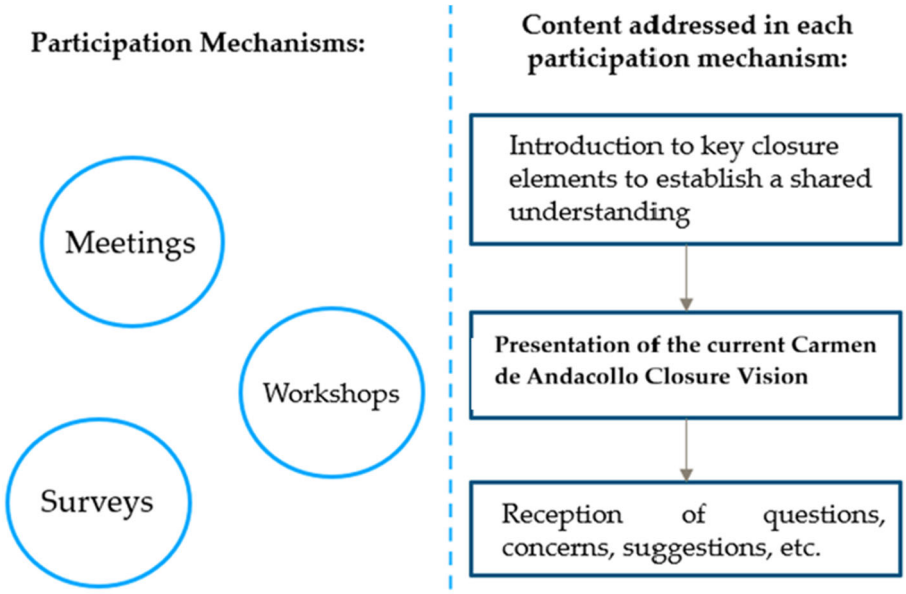

Figure 3 Summary of participation mechanisms and the content addressed within each mechanism

3.2 Implementation details

The municipal meeting held at CDA facilities focused on closure fundamentals and stages, and presented the closure vision for discussion. Three participatory workshops were conducted: two with community working groups (48 participants from community organisations) and one with local contractor companies (17 local contractor companies participated). The workshops combined technical presentations with rotating group exercises and prioritisation using posters, sticky notes and brainstorming (Figure 4 shows an example of this work with the Reck Andacollo Community Table).

Figure 4 Example of a working group

Structured surveys were administered to 2 local territorial organisations to assess participants' knowledge, trust, environmental and social priorities, expectations for participation about closure planning, and preferences for post-closure land uses, using Likert scales and ranking questions. A Likert scale is a survey measurement tool used to assess respondents' attitudes, opinions or perceptions regarding a specific statement. Participants indicate their level of agreement, satisfaction, importance or frequency using a graded scale, typically ranging from 1 to 5 or 1 to 7 points (e.g. from strongly disagree to strongly agree). It enables quantitative analysis of subjective views and helps identify trends and patterns across respondents. A ranking survey is a survey method in which respondents are asked to order a list of options according to their preference, importance or priority. Instead of rating each item independently, participants compare the options and assign a rank (e.g. 1st, 2nd, 3rd), helping to identify the relative importance of different factors and revealing clear priorities among respondents.

4 Results and discussion

Across mechanisms, stakeholders valued being invited to participate early and interpreted the closure vision through their own lived priorities. In general, participants commented that this type of meeting was very new to them. They also mentioned that they were aware of another mining company in the area that had closed operations without carrying out any engagement or consultation work with external stakeholders.

The Teck Andacollo Community Table emphasised safeguarding cultural, religious and mining heritage; the Alfalfares working group prioritised water availability, traditional agriculture and ecosystem protection; and contractors associated closure with labour uncertainty as well as opportunities for skills development and economic diversification. Survey responses indicated a cautiously positive level of trust, combined with expectations for clearer guarantees, continued participation and transparent monitoring.

Key crosscutting themes identified during workshops and surveys included:

- concern about closure impacts and the future of key facilities (e.g. tailings storage)
- consensus that closure should leave a positive legacy and avoid a 'ghost town' outcome
- a desire to preserve historical identity, traditions and local trades
- interest in technical training, support to small-scale mining and workforce transition pathways
- opportunities for religious, astronomical, mining and rural tourism
- a need for improved education, health, sport and community infrastructure
- a high value placed on continuous participation, clear timelines, success criteria and monitoring.

5 Conclusion

Integrating an internally co-created closure vision with structured territorial engagement provided Carmen de Andacollo (CDA) with a practical pathway to strengthen closure governance and social licence for closure decisions. Phase 1 demonstrated that an adapted World Cafe approach can efficiently align multidisciplinary perspectives and produce a concise, management-approved vision. Phase 2 showed that early socialisation of the vision can build shared understanding, identify differentiated stakeholder priorities and generate a robust social information baseline for vision updates. The consistent combination of positive reception and 'watchful expectation' underscores the importance of ongoing participation, transparent scheduling and credible monitoring as CDA progresses from visioning to implementation and just-transition planning.

Next steps consider the incorporation of the results of the external stakeholders suggestions (phase 2) into a new version of the closure vision.

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