Constellation Project

Environmental Impact Statement

Chapter 2 – Strategic Context

2 Strategic context

2.1 Introduction

This chapter describes the key strategic context relating to the Project in accordance with the State significant development guidelines – preparing an environmental impact statement (DPIE 2022a) and the Project SEARs. Strategic context requirements from the Project SEARs are provided in Table 2-1, with references to identify where each item has been addressed.

Table 2-1: Strategic context requirements

Assessment matter	Report locations
A strategic justification of the development, focusing on site selection and the suitability of the proposed site;	Sections 2.3, 2.4, 2.5 and 2.8 and Chapter 9, Evaluation and justification
The terms of any proposed voluntary planning agreement with the relevant local council;	Section 2.7.1
The suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses and significant mineral resources;	Section 1.5.2, Sections 2.4 and 2.7 and Section 9.3.6
The strategic need and justification for the development, having regard to the relevant NSW and national policies and guidelines;	Section 2.2 and Chapter 9, Evaluation and justification
Feasible alternatives to the development and its key components, including the consequences of not carrying out the development; and	Section 2.8
An assessment of the likely impacts of all stages of the development, including likely interactions between the development and any other existing, approved or proposed developments in the vicinity, including any cumulative impacts, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice.	Section 2.3, 2.4, 2.6, Chapter 5, Statutory context and Section 6.17

2.2 Need for the Project

Under existing approvals, resources at Tritton Copper Operations are anticipated to be exhausted in approximately three years. Without development of additional resources, Tritton Copper Operations would begin to move towards closure, resulting in significant impacts to local and regional employment, as well as presenting financial impacts to local, regional and state economies.

Copper is an important resource in respect of promoting a higher standard of living domestically and internationally. One tonne of copper is estimated to bring:

- functionality to 40 cars; and
- power 100,000 mobile phones;
- enable operations in 400 computers; and
- distribute electricity to 30 homes (Copper Alliance 2024).

Copper is also identified as a ‘critical mineral and tech metal’ for NSW, as per the NSW Government’s Critical Minerals and High-Tech Metals Strategy (DRNSW 2021).

Investments in critical minerals are vital in enabling NSW's growth industries, like:

- advanced manufacturing;
- batteries;
- defence and aerospace;
- technology-enabled primary industries; and
- renewables.

The future global economy and the pathway to lower emissions will be founded on minerals that NSW is rich in, such as cobalt, rare-earth elements and copper (DRNSW 2021).

Given the strong outlook for copper demand and declining ore reserves, copper supply will have increasing importance over the coming decade due to global electrification driven by decarbonisation and increasing demand from growth of electric vehicles and the renewable energy sector. Given the abundance of copper in NSW and the large, established nature of its market, there is a significant value proposition for NSW from investment in copper (DRNSW 2021).

The proposed Project will, therefore, provide important copper supplies that are consistent with the NSW Government's strategy. Further to this, the Project will:

- provide ongoing employment for the Tritton Copper Operations workforce, supporting employment in the Bogan Shire local government area and surrounding regions;
- contribute to economic growth and community resilience locally while also supporting the regional and state economies (including through payment of taxation and royalties);
- enable the continuation of Tritton Copper Operations, including utilisation of the existing processing facility to maintain operational efficiencies while also reducing environmental impacts associated with developing such new infrastructure; and
- enable the continuation of a regional exploration project designed to discover and define new deposits, further supporting the longer-term provision of social and economic benefits identified above.

2.3 Alignment of the Project to government strategy

This section demonstrates how the Project will align with international conventions and Commonwealth, State and Local Government strategies and policies.

2.3.1 International and Commonwealth strategic considerations

2.3.1.1 United Nations Framework Convention on Climate Change

The 'United Nations Framework Convention on Climate Change' (UNFCCC) entered into force on 21 March 1994, with the ultimate objective being to stabilise greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system" (UNFCCC 1994). The Kyoto Protocol subsequently operationalised the UNFCCC by committing industrialised countries (and economies in transition) to limit and reduce greenhouse gas emissions in accordance with agreed individual targets. Under the protocol, countries must meet their targets primarily through national measures. Australia became a signatory to the Kyoto Protocol in 1997, subsequently ratifying its commitment in 2007.

On 16 June 2022, Australia lodged an updated 'nationally determined contribution' with the UNFCCC Secretariat to formalise our commitment to greenhouse gas emissions targets post-2020. Australia has committed to achieve net zero emissions by 2050 (Australian Government 2022). Greenhouse gas emissions will also be reduced by 43% below 2005 levels by 2030 (Australian Government 2022). Each Australian state has committed to reach net zero by 2050 or earlier. In addition to Australia's 2030 emissions reduction target of 43% below 2005 levels, each state has set interim emissions reduction targets by 2030, with NSW setting their target at 50%. To support the achievement of these reduced emissions, the Australian Government

enacted the *Climate Change Act 2022* to legally establish greenhouse gas emission reduction targets (refer to Chapter 5, Statutory context, Section 5.4.3.2). The NSW Government has legislated emission targets through the *Climate Change (Net Zero Future) Act 2023* (refer to Chapter 5, Statutory context, Section 5.4.3.3).

While the proposed Project will contribute to greenhouse gas emissions, copper is considered an essential metal to support the development of renewable energy technologies. Indeed, copper ore will support Australian and global infrastructure development to produce renewable energy, ultimately facilitating reduced greenhouse gas emissions.

Further, Aeris has made a series of commitments to minimise greenhouse gas emissions produced by the Project; refer Chapter 1, Introduction, Section 1.5.4.

2.3.1.2 Regions at the Ready: Investing in Australia's Future

In 2018, the Commonwealth House of Representatives commissioned a 'Select Committee on Regional Development and Decentralisation'. The intention of this committee was to address the importance of regional development as a support to population decentralisation. The work of the committee culminated in a report entitled 'Regions at the Ready: Investing in Australia's Future' (Commonwealth of Australia 2018). The report identified three critical factors influencing decentralisation being achieved:

1) connectivity;
2) base level services; and
3) amenities of regional cities and towns.

The report also identified types of regional investment that were seen as priorities. Specifically, investment to maintain the status quo was seen as critical. This type of investment is expected to assist in enabling regional towns and cities to provide a universal base level of service and amenity. Indeed, Tritton Copper Operations is an important contributor to the central-western region of NSW and supports significant investment in local and regional centres.

Critically, the proposed Project will provide ongoing employment in the region, and as a result, will maintain and attract population within regional NSW. By providing ongoing employment, the Project will support the commitments of the Commonwealth to maintain the status quo of regional investment (that is already occurring through Tritton Copper Operations). The proposed Project is therefore considered to support the goals of regional development and decentralisation under the Regions at the Ready policy.

2.3.1.3 Orana Strategic Regional Plan 2023-2026

The Commonwealth Government (through the 'Department of Infrastructure, Transport, Regional Development, Communications and the Arts') invests in strategic planning for regional areas (including NSW) through the entity of 'Regional Development Australia'.

Regional Development Australia has developed a strategic regional Plan for the NSW region identified as 'Orana', which extends from Mudgee in the east to Bourke in the west. It comprises the local government areas of:

- Bogan
- Bourke
- Brewarrina
- Cobar
- Coonamble
- Dubbo Region
- Gilgandra
- Mid-Western Region

- Narromine
- Walgett
- Warren; and
- Warrumbungle.

The Orana Strategic Regional Plan 2023–2026 provides a consolidated plan that aims to support the development of the region by:

- increasing regional economic output;
- increasing investment into existing businesses;
- attracting new businesses; and
- ensuring the attraction and retention of the regional workforce and population.

The proposed Project, therefore, aligns with the intent of the Orana Strategic Regional Plan as a key existing and future contributor to the regional economy, employment and population retention.

The Orana Strategic Regional Plan is considered in more detail, with the social impact assessment undertaken for the Project (refer to Chapter 6, Environmental assessment, Section 6.13).

2.3.2 NSW strategic considerations

2.3.2.1 Net Zero Plan

The NSW 'Net Zero Plan' is the foundation for NSW's action on climate change and its goal to reach net zero emissions by 2050. The Net Zero Plan supports initiatives, such as electric vehicles and the development of primary industries (including mining), to support the transition towards renewable energy.

Renewable energy technologies have been developed and introduced to promote net zero emissions in households and industries. Solar panels can now be manufactured on a large scale, and electric vehicles have become more popular—all requiring more supplies of mineral resources, such as copper. The proposed Project can provide copper resources to the market to support the development of renewable energy technologies and assist NSW in achieving net zero goals.

2.3.2.2 Environmental Protection Agency (EPA) Climate Change Policy

The NSW EPA Climate Change Policy has been developed to address climate change and protect the environment, thereby strengthening the regulatory response to acute and chronic impacts of climate change. The policy seeks to achieve the EPA's statutory duty to ensure environmental protection under the Protection of the Environment Operations Act 1997 when exercising its environmental protection licensing functions. The objectives of the policy are detailed in the Climate Change Action Plan.

2.3.2.3 Climate Change Action Plan 2023–26

The NSW EPA Climate Change Action Plan describes how the objectives of the EPA Climate Change Policy will be delivered until the policy and plan are reviewed in 2026, as NSW moves towards achieving net zero emissions by 2050. The plan outlines regulatory actions that will be taken until 2026, including staged actions, starting with initial information gathering from environment protection licensees.

Subsequent actions under the plan include:

- setting emission reduction targets for key industry sectors;
- setting requirements for climate change mitigation; and
- enabling adaptation plans to support the management of change.

2.3.2.4 NSW Minerals Strategy

Global demand for metals is growing. High technology industries require a broad range of elements for smartphones, electric cars, solar panels, batteries, satellites and other applications. Fuelled also by a growing world population, the demand for many minerals is already outstripping supply (DRNSW 2021).

The NSW Minerals Strategy was developed by the NSW Government in 2019 to support the government's development of its natural resources and unlock the state's metals potential. The global demand for copper is projected to steadily increase in the next decade as it is considered an essential resource to support renewable energy technologies and the development of electric vehicles. Australia has the second largest known reserves of copper in the world and is currently the fourth largest producer globally (DPIE 2019). This provides a significant opportunity for the NSW Government to support future renewable energy demand by supplying critical metals such as copper.

From an economic perspective, the NSW Minerals Strategy suggests that greenfield mineral exploration of metals (including copper) should be encouraged, as many current copper mining operations are expected to close over the next 20 years. Further, the NSW Government is targeting to increase the proportion of greenfield exploration (relative to brownfield exploration) by 10 per cent on 2018 levels by 2025. Aeris has made a significant investment into greenfield exploration (remote from its centralised processing hub), aligning with the NSW Minerals Strategy goal of broader exploration activity (consistent with Aeris' hub and spoke model). This is supporting improved exploration coverage across NSW.

In addition to promoting greenfield exploration, the NSW Minerals Strategy seeks to promote investment in the minerals industry of NSW to establish NSW as an attractive destination for mineral explorers and investors. The proposed Project, therefore, supports the NSW Minerals Strategy.

2.3.2.5 Critical Minerals and High-tech Metals Strategy

The NSW Government has developed a Critical Minerals and High-Tech Metals Strategy (DRNSW 2021). This strategy outlines the NSW Government's vision to build on existing potential and position NSW as a major global supplier and processor of critical minerals and high-tech metals well into the future. The strategy defines specific metals as 'critical and high-tech minerals', the demand of which is projected to increase. For NSW, there is strategic interest to invest in developing these metals along with downstream processing and technologies.

Copper is identified as a critical mineral for NSW, particularly for its role in renewable energy technologies and the electric vehicle industry. Combined with having a high recycling rate, copper can promote decarbonisation projects, supporting the ongoing progression towards more sustainable development. The proposed Project, therefore, aligns with the NSW Strategy for sourcing critical minerals.

2.3.2.6 Western Plains Regional Economic Development Strategy

The NSW Government has supported local councils and communities across regional NSW by developing 'Regional Economic Development Strategies' for 38 functional economic regions. The proposed Project (and the Bogan Shire Council area) is within the Western Plains functional economic region.

The government initially released the 'Western Plains Regional Economic Development Strategy' in 2018. The strategy has since been updated in 2023 to capture new data releases and analysis of key events that have occurred since 2018.

Under the 'Western Plains Regional Economic Development Strategy 2023', mining is identified as a key component of the regional economy, presenting a significant opportunity for future regional development. Indeed, a key opportunity identified by the strategy is the continued exploration and approval of new mines and mine expansion projects to support long-term growth in the mining sector (DRNSW 2023).

Further, extension of Tritton Copper Operations (through the Constellation Project) is expressly referenced in the Western Plains Regional Economic Development Strategy 2023 as part of major private investments occurring since 2018. As such, the proposed Project is an important component of the strategy, with any future approval recognised as an opportunity for the region.

2.3.3 Local strategic considerations

2.3.3.1 Bogan Shire Community Strategic Plan 2032

The Bogan Shire Community Strategic Plan 2032 (BSCSP) was adopted on 28 April 2022 to identify the community values, priorities and aspirations for the future. The main purpose of the strategic plan is "to define a particular direction or goal and so to make the necessary decisions on how to allocate our limited resources, including time and money to achieve this goal" (Bogan Shire Council 2022).

The BSCSP was prepared with significant community input, being reflective of shared community values while providing local insight into specific values within the region. The identified community vision is articulated as follows:

> *To provide a comfortable country lifestyle by progressively improving the level of appropriate facilities and services and encouraging growth and economic development that is responsive to the needs of the community.*

Tritton Copper Operations is a key employer and economic contributor to the Bogan Shire and plays an integral role in supporting the achievement of the Bogan Shire Community Strategic Plan 2032. This plan is considered in more detail with the social impact assessment undertaken for the Project (refer to Chapter 6, Environmental assessment, Section 6.13).

2.4 Land use planning considerations

2.4.1 NSW 2021

In 2021, NSW developed a 10-year plan for the state, entitled NSW 2021. The plan was developed around five key strategies:

1) rebuilding the economy;
2) returning quality services;
3) renovating infrastructure;
4) restoring government accountability; and
5) strengthening our local environment and communities (DPC 2011).

A key goal for the rebuilding of the economy was identified to be driving economic growth in regional NSW.

Under NSW 2021, the state is divided into nine planning regions, each with a long-term plan and a supporting implementation plan. The proposed Project is within the Central West and Orana region and managed under the 'Central West and Orana Regional Plan 2041' (DPIE 2022b).

2.4.2 Central West and Orana Regional Plan 2041

The Central West and Orana Regional Plan 2041 provides a guide for land use planning decisions in the region through to 2041. The plan includes 19 local government areas, including the Bogan Shire Council area.

The plan provides a strategic framework to create a healthy, connected and resilient region with a prosperous economy. It focuses on sustainable growth through adaptation to challenges in climate, housing markets and the economy. The plan will be achieved by implementing 23 objectives that target five overarching goals:

1) region-shaping investment;
2) sustainability and resilience;
3) people, centres, housing and communities;

4) prosperity, productivity and innovation; and
5) local government priorities.

The Central West and Orana Regional Plan 2041 recognises the region's strong historical connection with mining and the opportunity presented through the state's critical mineral resources. A key objective of achieving region-shaping investment, therefore, is to sustainably manage extractive resource land and grow the critical minerals sector (DPIE 2022b).

Under the Central West and Orana Regional Plan 2041, natural resource extraction is recognised as a transitional land use, requiring planning throughout the physical and economic life cycle of projects. Several strategies have been developed through the plan to consider and support the sustainable growth of mining in the region, including:

- protecting potential mineral and energy resources from land uses that would sterilise this potential;
- protecting existing and proposed resource extraction projects from land uses that could impact operations;
- protecting road, rail and freight routes from development that could affect current or future extraction and supply-chain movements;
- promoting opportunities for minerals processing within the region;
- addressing water resource constraints and impacts;
- identifying future mine closure dates;
- understanding potential changes to water, economic/skill profiles and demographics; and
- considering land use changes, mine rehabilitation activities and post-mining land use opportunities.

These strategies support the development of the proposed Project and the continued progression of Tritton Copper Operations.

2.4.3 Bogan Local Environmental Plan 2011

Local environmental planning provisions for the Bogan Shire Council area are made under the 'Bogan Local Environmental Plan 2011' (LEP), which aims to:

- protect and promote the use and development of land for arts and cultural activity, including music and other performance arts;
- protect, enhance and conserve agricultural land through the proper management, development and conservation of natural and man-made resources;
- encourage a range of development, including housing, employment, recreation and community facilities, to meet the needs of existing and future residents of Bogan; and
- promote the efficient and equitable provision of public services, infrastructure and amenities.

Under the LEP, the Project site is located within lands classified as Zone RU1 (Primary Production). The objectives of lands zoned RU1 are:

- to encourage sustainable primary industry production by maintaining and enhancing the natural resource base;
- to encourage diversity in primary industry enterprises and systems appropriate for the area;
- to minimise the fragmentation and alienation of resource lands; and
- to minimise conflict between land uses within this zone and land uses within adjoining zones.

Under the LEP, extractive industries are a permitted land use within Zone RU1 (subject to consent). Consent for the development will be via a Development Application, as set out in Chapter 5, Statutory context. This EIS is a key document to support the development application for the proposed Project.

Further, Bogan Shire Council is identified as the owner of key road infrastructure that the Project is proposing to utilise to support haulage activity. While discussions with Bogan Shire Council are currently ongoing, it is anticipated a voluntary planning agreement will be utilised to effect proponent commitments towards upgrading and/or maintaining road infrastructure.

2.4.4 Bogan Shire Council Local Strategic Planning Statement

Existing alongside the LEP, Bogan Shire Council has also developed a Local Strategic Planning Statement 2019 to provide a framework for economic, social and environmental land use needs over the next 20 years (Bogan Shire Council 2022). The statement implements the directions and actions at a local level, based on the Central West and Orana Regional Plan 2036 (revised to 2041).

Mining is one of the largest economic contributors to the Bogan Shire. It drives population growth and provides significant employment. Indeed, Tritton Copper Operations is identified as a major employer for the Bogan Shire, with 22.7% of the workforce employed in mining, with further potential for this to increase. Therefore, the continued operation of the Tritton Copper Mine is not only critical to local economic development, it is also critical to maintaining population and delivering the goals set out in Bogan Shire Council's Local Strategic Planning Statement.

2.4.5 Dark Sky Planning Guideline 2023

An important planning instrument relevant to the Project is the NSW Department of Planning and Environment's Dark Sky Planning Guideline 2023 (DPIE 2023).

The proposed Project is approximately 200 km west of the Siding Spring Observatory, which is on an important vantage point for studying astronomical sources and phenomena. The observatory is on the eastern boundary of the Warrumbungle National Park, and the observatory and the national park are part of Australia's first internationally accredited Dark Sky Park (DPIE 2023).

To protect the dark sky values of the Siding Spring Observatory, the NSW Department of Planning and Environment has developed the 'Dark Sky Planning Guideline 2023' (DPIE 2023). This guideline informs development controls that apply to land within 200 km of the observatory. A consent authority must consult with the observatory director when a development (within 200 km) has the potential to affect the observing conditions at the observatory.

The proposed Project is on the edge of the dark sky region within Bogan Local Government Area (LGA). Lighting design in accordance with the principles suggested in the guideline and mitigation measures of dust emissions have been considered to minimise light pollution, including skyglow, light spill, and glares. Potential impacts to the dark sky region are discussed further in Appendix 16, Visual impact assessment.

2.5 Key features of the surrounding area

The key features of the Project site have been described in Chapter 3, Project description, Section 3.4. The following sections also describe the key features in the surrounding area that could affect the Project or may be affected by the Project.

2.5.1 Local and regional community

2.5.1.1 Population centres

Located in the Bogan Shire Council area, the Project site and the surrounding areas are sparsely populated. The nearest population centre is Nyngan, which is approximately 55 km south-east of the Project. Nyngan is the

administrative centre of the Bogan Shire Council area. The estimated resident population in the town is 1,761 (ABS 2021), with 2,467 people reported as living in the Bogan Shire Council area. The largest industry of employment in the area is copper ore mining (13.2% of the population), followed by:

- sheep and beef farming (7.1%);
- local government administration (5.3%);
- primary education (5.0%); and
- specialised sheep farming (4.0%).

Other towns close to the Project site include:

- Girilambone—approximately 20 km south-west of the Project and adjacent to the infrastructure corridor, with a population of 86;
- Coolabah—approximately 20 km north-west of the Project, with a population of 32; and
- Hermidale—approximately 40 km south-west of the Project, with a population of 127.

2.5.1.2 Land ownership

The Project site is on freehold land that forms part of the 'Okeh' and 'Windella' properties. Aeris is currently negotiating land access agreements with property owners, consistent with the requirements of the Mining Act.

The infrastructure corridor will primarily work within existing road reserves, adjoining a number of freehold and Crown land parcels. Impacts to land are considered in Chapter 6, Environmental assessment, Section 6.1. Potential impacts on Crown land and Crown land covenants are considered in Chapter 1, Introduction, Section 1.5.3.

2.5.1.3 Land uses

Agriculture (cropping and grazing) is the existing land use on the Project site and the predominant land use of the surrounding area. There are several mining operations close to the Project, two of which include the:

- Murrawombie Mine—approximately 18 km south-southwest; and the
- Avoca Tank Mine—approximately 15 km south-west.

Other mining activities in the immediate or local area are part of Tritton Copper Operations.

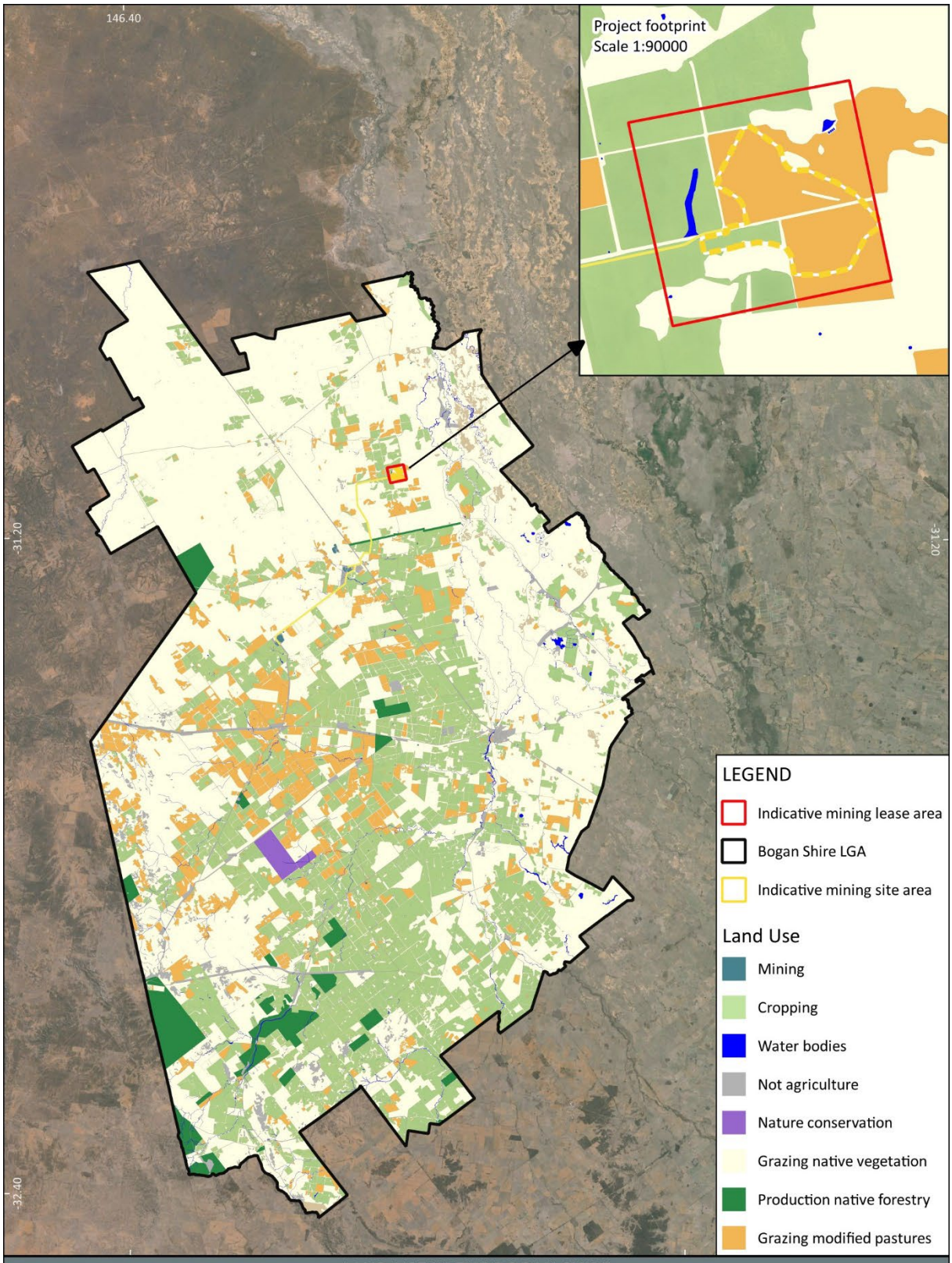
The next operating mining complex (which is not owned or operated by Aeris) is approximately 110 km to the south-west of the proposed Project.

In addition to mining and agriculture, other surrounding land uses include forestry, transportation and residential land. Land uses on the Project site and the surrounding areas are depicted in Figure 2-1.

2.5.2 Natural or built features

In the local and regional surrounds of the Project, key natural features include the:

- the Bogan River and associated tributaries (approximately 8 km north-east of the Project);
- Nalbaugh/Girilambone State Forest (approximately 15 km south-west of the Project, intersecting the haulage and access routes along Okeh Road);
- Thorndale State Forest (approximately 30 km south of the haulage route);
- Macquarie Marshes Nature Reserve (approximately 50 km east of the Project);
- Warrambungle National Park (approximately 190 km east of the Project); and
- Siding Spring Observatory (approximately 200 km east of the Project).



LAND USE IN THE BOGAN SHIRE

CONSTELLATION PROJECT

Client	Aeris Resources Ltd
Date	21-06-2024
Author	M.jimenez
Projection	GDA94 / MGA zone 55
Scale	1:1,200,000

Figure 2-1: Land use in the Bogan LGA

In the local and regional surrounds of the Project, key built infrastructure includes the following:

- Mitchell Highway (approximately 15 km west of the Project), forming part of the haulage route and infrastructure corridor);
- Girilambone township (approximately 20 km south-west of the Project), comprising residential dwellings, a school, a church and other community places);
- Nyngan Solar Plant (approximately 60 km south-east of the Project), one of Australia's largest solar plants; and
- Burrendong Dam (approximately 270 km south-east of the Project), the largest water storage within the broader Macquarie–Bogan Catchment).

2.5.3 Risks and hazards

An environmental risk assessment has been undertaken for the proposed Project, consistent with AS/NZS ISO 31000:2018 and the Multi-level Risk Assessment. This risk assessment is provided as Appendix 12, Environmental risk assessment.

The Project risk assessment has analysed the potential consequences and likelihood of each risk prior to the consideration of any controls or mitigations. A final risk classification was then assigned (based on the consequence and likelihood scores determined) as per Table 2-2.

Table 2-2: Risk classification scheme adopted

			Consequence				
			1	2	3	4	5
			Very Low	Low	Moderate	High	Very High
Likelihood	5	A. Almost certain	Class II	Class II	Class III	Class IV	Class IV
	4	B. Likely	Class I	Class II	Class III	Class IV	Class IV
	3	C. Possible	Class I	Class I	Class II	Class III	Class III
	2	D. Unlikely	Class I	Class I	Class I	Class II	Class III
	1	E. Rare	Class I	Class I	Class I	Class II	Class II

Approximately 75 environmental risks have been identified through the Project risk assessment, with the majority of these risks considered to be Class I and Class II risks (being 'generally acceptable' and 'easily mitigated'). A description of risk classes/rankings is provided in Table 2-3.

Table 2-3: Risk ranking descriptions

Risk ranking	Action
Class IV	**Risk is unacceptable**. The risk requires in-depth technical assessment and planning such that the risk is either avoided through Project design changes or that specific and targeted mitigation measures are detailed and implemented to reduce the risk to an acceptable level. The risk needs to be brought to the attention of the Project Director/CEO for managerial involvement. Very high risks that cannot be reduced are likely to prevent the development of the Project.
Class III	**Risk is generally unacceptable**. Detailed technical assessment should be completed that further evaluates and quantifies the risk, for which appropriate mitigation and management measures can be designed and implemented.

Risk ranking	Action
Class II	**Risk is generally acceptable**. However, investigation is desirable to further understand the risk. The risks can generally be mitigated through the implementation of standard industry mitigation and management measures.
Class I	**Risk is acceptable**. Specialist technical investigation is likely not required. The risk could be managed through routine policies and procedures and industry-standard measures.

Through the Project risk assessment, a total of 14 risks have been classified as Class III, representing the highest level of risk identified for the Project:

- noise (4);
- blasting and vibration (1);
- air quality (2);
- water (1);
- rehabilitation (2);
- biodiversity (1);
- traffic (1);
- social (1); and
- others (1).

Note: All these risks were assessed without mitigations to inform technical studies.

As an outcome of technical studies, the controls (mitigations and management measures) are then proposed to manage residual risks. Further details on the Project risk assessment can be found in Appendix 12, Environmental risk assessment. A summary of all mitigations adopted for the Project is provided in Chapter 7, Mitigation and management.

2.6 Cumulative impact potential

The Cumulative Impact Assessment Guideline for State Significant Projects (DPIE 2022c) provides a framework for assessing cumulative impacts. Approaches to cumulative impact assessments are discussed in detail in Chapter 6, Environmental assessment, Section 6.17.

2.7 Planning agreements

2.7.1 Voluntary planning agreements

While discussions with Bogan Shire Council are ongoing, it is currently anticipated that Aeris will adopt a voluntary planning agreement with the Bogan Shire Council to effect an agreement on road maintenance and upgrade contributions associated with the Project's proposed haulage activity.

2.7.2 Voluntary Land Acquisition and Mitigation Policy

The Voluntary Land Acquisition and Mitigation Policy (VLAMP) must be considered for any state significant development and has been considered for the proposed Project.

Should noise and dust impacts exceed relevant criteria, the VLAMP provides affected landowners with a process to negotiate their agreement with the proponent (including mitigations or management actions), or alternatively, obligations are placed on the proponent to acquire land impacted by the Project.

The Project design has considered and incorporated a number of alternatives as part of seeking to avoid or minimise environmental and social impacts. Community consultation has also informed the proposed Project design.

Assessment of matters that may be subject to the VLAMP is provided in Appendix 8A, Air quality impact assessment and Appendix 9, Noise impact assessment. Outcomes of these assessments are provided in Chapter 6, Environmental assessment, Sections 6.8 and 6.9.

Note: Assessments for the Project have predicted that both the noise and dust levels will comply with assessment criteria, and therefore, the VLAMP will not be applicable for any sensitive receptors.

2.7.3 Landholder bore agreements

As part of the groundwater impact assessment undertaken for the Project, groundwater drawdown has been predicted to occur during mining operations (over 10 years) and for 600 years after the end of mining.

At the end of mining, drawdown in the groundwater table of 1 m is predicted to extend approximately 1,700 m away from the mine workings. Since the closest registered bore to the Project is approximately 8 km to the south, there is no predicted groundwater drawdown at any registered bore at the end of mining.

At 600 years after the end of mining, drawdown in the groundwater table of 1 m is predicted to extend approximately 6,500 m away from the mine workings. Three registered bores are predicted to record some groundwater drawdown at that point in time, although the predicted drawdown at each location is less than 2 m.

Since the modelled groundwater drawdown is less than 2 m at all registered bores, the NSW Aquifer Interference Policy, Level 1 minimal impact considerations for water table/water pressure decline at a water supply, are met, and the impact is considered to be acceptable. As such, no agreements with landholders to address impacts on bore infrastructure are required.

2.8 Feasible alternatives

This section summarises the alternatives that have been considered and justifies why the current Project design is the most optimal.

2.8.1 Do nothing alternative

Should the Project not proceed, ore resources required to maintain Tritton Copper Operations are anticipated to be exhausted within the next three years. This would result in Tritton Copper Operations ceasing operations. The alternative for the Project not to proceed, would therefore result in the following outcomes:

- the identified critical mineral resource would remain undeveloped (impacting strategic plans for regional growth);
- existing employment would significantly reduce as Tritton Copper Operations move towards final rehabilitation and closure (providing a significant financial impact to local and regional communities);
- additional tax revenue from the development would not be realised;
- additional royalties for the state of NSW would not be created;
- negative social impacts may arise for the local community (due to the loss of a major employer); and
- predicted social and environmental positive impacts of the proposed Project would not occur.

2.8.2 Project alternatives considered

2.8.2.1 Site layout alternatives

The Project has adopted an iterative Project design process to enable impacts to be avoided/minimised during design works. This has extended to analysing a number of potential layout alternatives, as well as undertaking technical studies within areas that have ultimately not formed part of the proposed Project design. Alternatives considered for the Project are discussed as follows.

2.8.2.2 Mining method alternatives

During Project feasibility studies, various mining methods were evaluated. This analysis considered:

- geotechnical constraints;
- ore productivity;
- mining parameters; and
- potential environmental impacts.

Design options with and without the open cut pit were evaluated, including various open cut pit sizes.

A design option that included open cut and underground mining methods (with a smaller open cut pit shell) was ultimately identified as the most feasible mine design. This alternative was considered optimal based on:

- overall production;
- an earlier ore production date for supplying feed to the Tritton processing plant (while the Project underground site is developed); and
- the economic value generated by the additional production of the heap leach.

2.8.2.3 Underground stoping

With the design and backfilling of underground stopes (mined tunnels), the availability of backfilling material and costs options were considered. Long-hole stoping with cemented paste backfill was identified as the most suitable alternative based on:

- geometry;
- mining recovery;
- mine waste disposal;
- future environmental risk; and
- cost.

Backfilling underground stopes with cemented paste will minimise the amount of waste being disposed of on the land surface, effectively eliminating subsidence while managing the risk associated with higher sulphide wastes. As it is not practicable to dispose of all mining waste in this manner (due to the later timing of the underground development after the open cut), some waste will still be managed through tailings facilities at Tritton Copper Mine (following processing).

2.8.2.4 Haulage access and pipeline route

Assessment of three potential haulage routes to transport mined ore from the Project to the Tritton processing facility was undertaken during ecological and cultural heritage studies. Ultimately, this approach has informed a decision to utilise existing road networks as far as practicable, significantly reducing the potential impact to biodiversity and cultural heritage values.

The Project haul route (originally designed to be 50 m wide) has been reduced to a maximum of 18 m wide to minimise existing road disturbance. This strategy has enabled significant avoidance of additional land disturbance.

The Project design has responded to potential community concerns relating to haulage trucks travelling through Girilambone township by proposing a new section of road to be developed north of Girilambone township. As such, the impact on noise, dust, traffic and visual amenities will be significantly reduced for Girilambone residents. This is a higher cost option than hauling through Girilambone; however, it has been adopted in response to community engagement regarding the Project.

Pipeline installation and route options were considered, including routes integrated with the proposed access road route and separate from it. An underground pipeline route was ultimately located within existing road disturbance (as far as possible) to avoid the need for new disturbance—further minimising potential impacts to biodiversity and Indigenous heritage. The pipeline will connect to Murrawombie Copper Mine.

While an underground pipeline is a higher cost option than a pipeline on the surface, it will provide an improved safety outcome while also supporting a minimisation of disturbance.

Constructing a new powerline from the Mitchell Highway to the Project site, following the shortest route across remnant vegetation, was also considered. However, alternative plans for on-site power generation were identified as preferred, supporting the minimisation of impacts to biodiversity and Indigenous heritage and the reduced greenhouse gas impacts generated by the selected option of on-site solar and diesel power generation.

2.8.2.5 Processing

Processing of all ore on-site (through development of a new processing plant) was evaluated. Ultimately, however, this was not appealing for the following reasons:

- the relatively short life of the mine;
- availability and utilisation efficiency of the Tritton processing plant;
- increased environmental impact of the Project;
- future development targets; and
- Project capital costs.

Heap leaching of oxide ore at the Project site and processing of sulphide ore at the Tritton processing plant were, therefore, determined to provide the best use of existing infrastructure. It will provide optimal resource recovery and minimise risk of geochemical and environmental impacts from processing sulphide ore at the Project site.

Not having the heap leach pad was also considered likely to result in the lower-grade ore being discarded rather than recovered while increasing the amount of material transported to Tritton Copper Mine for processing. As such, heap leaching at the Project site is proposed.