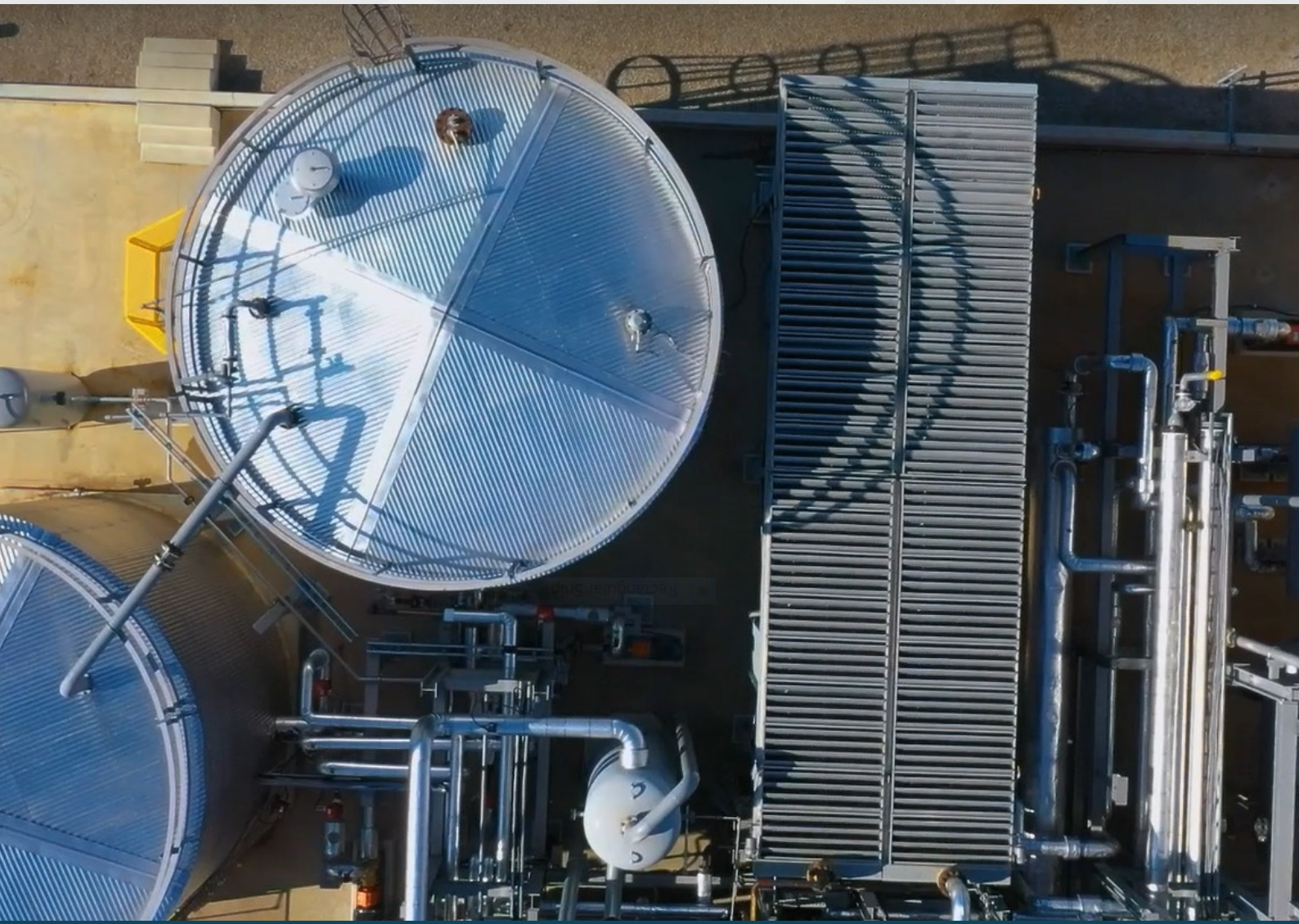
SILVER CITY
ENERGY STORAGE

Silver City Energy Storage Project

AMENDMENT REPORT

AUGUST 2024



HYDROSTOR

umwelt
Environmental & Social Consultants

SILVER CITY ENERGY STORAGE PROJECT

Amendment Report

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
A-CAES NSW Pty Ltd

Project Director: John Merrell
Project Manager: Penelope Williams
Report No. 21982/R14
Date: August 2024

75 York Street
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This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
FINAL	John Merrell	22/08/24	John Merrell	22/08/24

Summary

A-CAES NSW Pty Ltd (A-CAES NSW, the Proponent) is proposing the Silver City Energy Storage (SCES) Project (the Project) which will use Hydrostor's proprietary advanced compressed air energy storage (A-CAES) technology to provide large-scale, long duration energy storage for Broken Hill and the broader region (200 mega-watt (MW) and 1,600 mega-watt hours (MWh)). This technology uses excess energy from the electricity grid (when power generation exceeds demand) to compress air from the atmosphere and store it before later releasing this air through a generator to create power. Effectively the system operates as a large-scale, low emission energy storage system that will support two purposes:

- At a regional and national scale, the Project is an enabler in NSW's energy transition. It will provide the firming (maintenance of output from variable and intermittent power sources) and storage needed as the energy market transitions away from fossil-fuel dependency to more intermittent and renewable sources.

- At a regional and local scale, the Project provides security of energy supply to Broken Hill and the Far West region by replacing the existing diesel-fired turbines that currently provide backup power in the event of an outage. In turn, this has a flow-on effect of providing greater certainty for additional local renewable energy generation investment as the Project can take excess energy generated and use this to create compressed air, providing a market for this otherwise excess energy.

The Project includes the SCES Facility and an approximately 16 kilometres (km) 220 kV electricity transmission line. The SCES Facility is proposed to be co-located on the Potosi Mine site approximately 3 km northeast of Broken Hill. The proposed transmission line passes to the south of the City of Broken Hill to connect to an existing Transgrid substation to the southwest.

The Project is State significant Development (SSD) as defined under State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) and consent is being sought under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Environmental Impact Statement (EIS) was publicly exhibited between 19 September 2023 and 16 October 2023 by the NSW Department of Planning, Housing and Infrastructure (DPHI). During the preparation of the Submissions Report (Umwelt 2024), Hydrostor has progressed the engagement of a civil contractor to undertake further detailed design and detailed construction scheduling. Through this process A-CAES NSW has identified a requirement to refine both the layout and the proposed construction activities. The optimisation of the SCES Facility site layout provides for some minor design refinements to the proposed surface infrastructure and ensures appropriate working space is provided during construction. These refinements have not changed the components of the SCES Facility and involve minor changes to the positioning and layout of the facility. The changes have also included reducing the overall height of the SCES Facility as well as a revised lighting plan to reduce the extent of night lighting, reducing Project visibility, responding to concerns raised by a community member in their submission on the EIS.

The proposed amendment to the construction working hours only relate to the SCES Facility with no changes to transmission line construction. The SCES Facility is located in an existing mining area with limited nearby sensitive receivers.

The proposed changes include allowing all construction activities 7 days per week and specific activities 24 hours per day 7 days per week to align the delivery of the Project with required energy security timeframes for Broken Hill. The extended construction hours will be managed to comply with relevant noise criteria and additional noise assessment has been completed to demonstrate that this can be achieved.

This Amendment Report has been prepared to provide an analysis of the proposed amended SCES conceptual layout (and amended disturbance area) and proposed change to construction working hours. The remaining elements of the Project remain unchanged from that presented in the EIS. This report also provides an updated assessment of the justification of the Project, taking into consideration the associated environmental and social impacts and the suitability of the site, to assist the consent authority to determine whether or not the Project is in the public interest.

The overall justification for the Project, remains unchanged from that outlined in the EIS. The Project fits within the current strategic direction of the NSW and Australian government's approaches to energy generation, being the transition to renewables and ensuring the reliability of the grid. The low emission dispatchable electricity from the Project will assist with improving the stability and reliability of the electrical grid within the Broken Hill Region, whilst replacing the existing diesel-fired turbine electricity back up system and reducing greenhouse gas emissions.

A-CAES NSW has proceeded with the Project as a direct response to electricity reliability supply issues in Broken Hill and as the preferred option identified by Transgrid through the Regulatory Investment Test for Transmission (RIT-T) process. The proposed co-location of the SCES Facility within the Potosi Mine site was selected due to favourable geological conditions, utilisation of existing mining areas, existing mine infrastructure for access and ability to suitably manage environmental and social impacts. Specifically in relation to the proposed amendment, 24 hour operation is common with mining activities and is a familiar occurrence within and surrounding Broken Hill. The Project will also provide a diversified post-mining land use for the Potosi Mine site.

The amended construction hours are proposed following detailed construction scheduling and are required in order to meet the construction timeframe presented in the EIS and committed to under contract with Transgrid and the LTESA with ARENA. This timeframe is required to ensure energy supply security for Broken Hill. The EIS proposed that cavern excavation activities would be undertaken 24 hours per day 7 days per week (consistent with the currently approved mining activities on the site), with additional select surface construction activities including shaft construction now also proposed to be undertaken 24 hours per day. The remaining construction activities will be undertaken during daytime hours (7am to 6pm). Detailed construction scheduling has been undertaken to determine the construction scenarios required under extended construction hours and detailed assessment indicates the activities undertaken in these extended hours are predicted to comply with all relevant noise criteria. Following standard construction hours, as outlined in the EIS is not a viable option for these selected construction activities and would add an additional 12 months to the 36-month construction timeframe affecting the energy security supply timeline and also impacting the economic viability of the Project.

It is also noted that the existing mining operations and the SCES Facility, once operational, will operate 24 hours per day. The noise criteria for the extended construction hours proposed are consistent with the operational noise criteria. That is, any work undertaken during the evening and night-time periods during construction must meet the same criteria at operations undertaken in the evening and night.

In effect, the proposed changes to construction hours do not result in any greater noise impacts than those proposed for operations in these periods and Hydrostor has committed to manage construction noise to meet these criteria.

Consistent with the justification presented in the EIS, the potential environmental, cultural and social impacts associated with the Amended Project can be appropriately managed through the implementation of appropriate management, mitigation and monitoring measures.

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1.0 Introduction

A-CAES NSW Pty Ltd (A-CAES NSW, the Proponent) is proposing the Silver City Energy Storage (SCES) Project (the Project) which will use Hydrostor's proprietary advanced compressed air energy storage (A-CAES) technology to provide large-scale, long duration energy storage for Broken Hill and the broader region (200 mega-watt (MW) and 1,600 mega-watt hours (MWh)). This technology uses excess energy from the electricity grid (when power generation exceeds demand) to compress air from the atmosphere and store it before later releasing this air through a generator to create power. Effectively the system operates as a large-scale, low emission energy storage system that will support two purposes:

- At a regional and national scale, the Project is an enabler in NSW's energy transition. It will provide the firming (maintenance of output from variable and intermittent power sources) and storage needed as the energy market transitions away from fossil-fuel dependency to more intermittent and renewable sources.
- At a regional and local scale, the Project provides security of energy supply to Broken Hill and the Far West region by replacing the existing diesel-fired turbines that currently provide backup power in the event of an outage. In turn, this has a flow-on effect of providing greater certainty for additional local renewable energy generation investment as the Project can take excess energy generated and use this to create compressed air; providing a market for this otherwise excess energy.

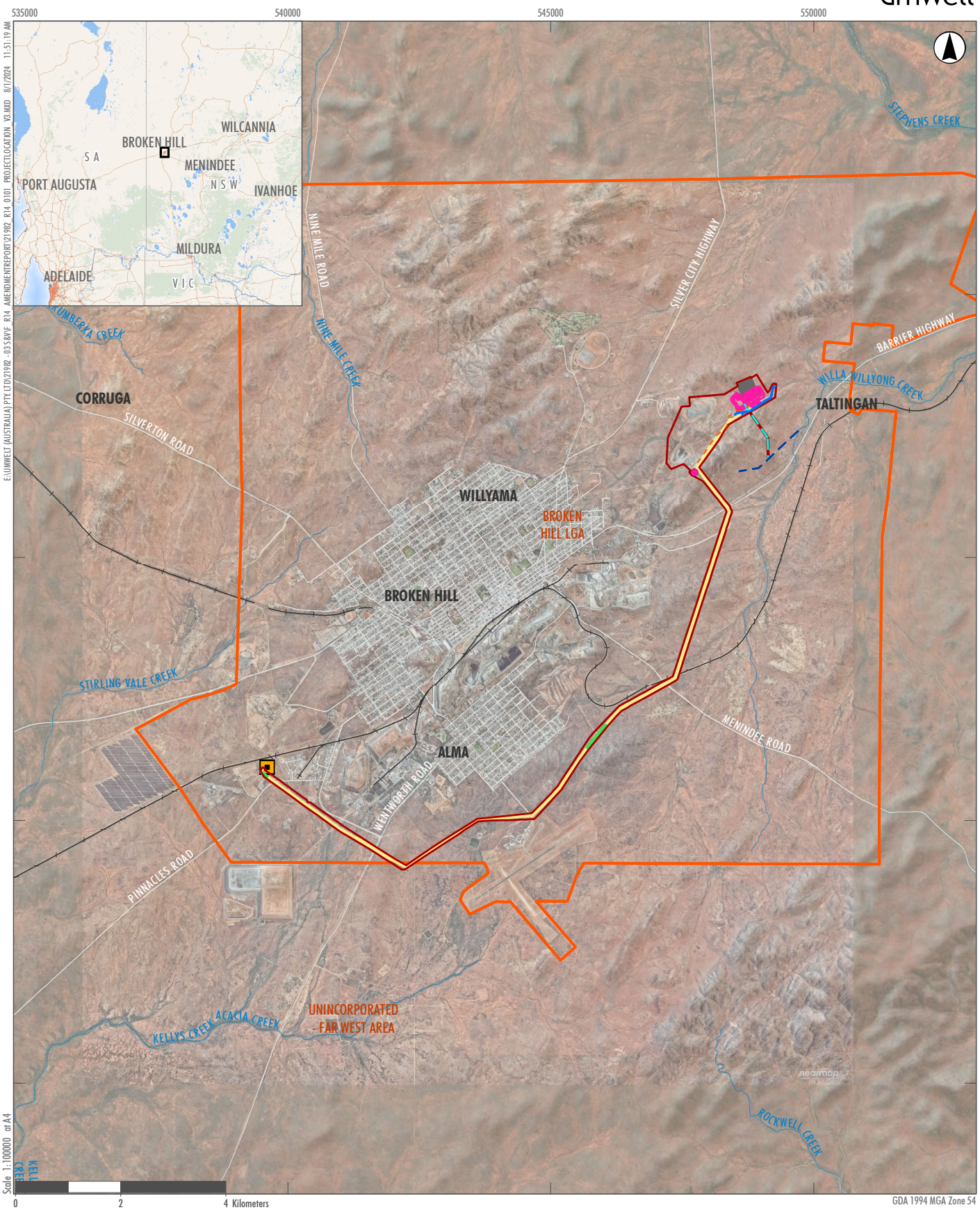
The Project includes the SCES Facility and an approximately 16 km 220 kV electricity transmission line. The SCES Facility is proposed to be co-located on the Potosi Mine site approximately 3 km northeast of Broken Hill. The proposed transmission line passes to the south of the City of Broken Hill to connect to an existing Transgrid substation to the southwest (refer to **Figure 1.1**).

The Project is State significant Development (SSD) as defined under State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP) and consent is being sought under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

An Environmental Impact Statement (EIS) (Umwelt 2023) was prepared for the Project and was publicly exhibited between 19 September 2023 and 16 October 2023 by the NSW Department of Planning, Housing and Infrastructure (DPHI).

During the preparation of the Submissions Report (Umwelt 2024), Hydrostor has progressed the engagement of a civil contractor to undertake further detailed design and detailed construction scheduling. Through this process A-CAES NSW has identified a requirement to refine both the layout and the proposed construction activities. The optimisation of the SCES Facility site layout provides for some minor design refinements to the proposed surface infrastructure and ensures appropriate working space is provided during construction. These refinements have not changed the components of the SCES Facility and involve minor changes to the positioning and layout of the facility. The changes have also included reducing the overall height of the SCES Facility as well as a revised lighting plan to reduce the extent of night lighting, reducing Project visibility, responding to concerns raised by a community member in their submission on the EIS. The proposed amendment to the construction working hours to allow all activities 7 days per week and specific activities 24 hours per day 7 days per week is proposed to align the delivery of the Project with required energy security timeframes for Broken Hill.

This Amendment Report has been prepared to describe and assess the refinements made to the Project layout and the proposed change to the construction work hours for select activities. This Amendment Report has been prepared concurrently with the Submissions Report having regard to the State Significant Development Guidelines – Preparing an Amendment Report (Appendix D of the State Significant Development Guidelines). This report provides a revised Project Description, overview of the engagement undertaken in relation to the Project change, an assessment of the associated impacts and updated project justification.



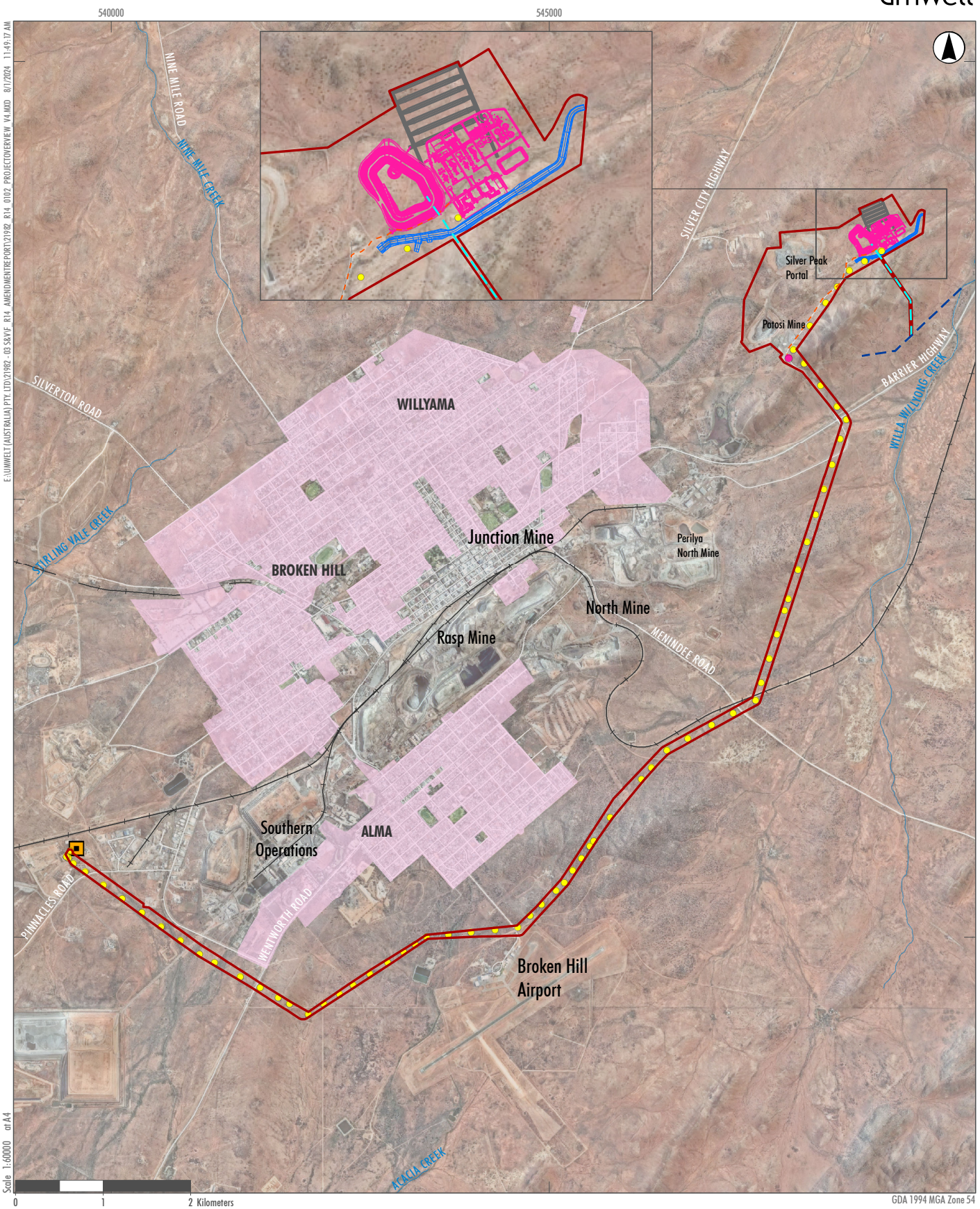
Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Proposed Transmission Line (Above Ground Section)
- Proposed Transmission Line (Underground Section)
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Site Access Point
- Access Road
- Local Government Area boundary
- Drainage Line
- Railway Line
- Road

FIGURE 1.1

Project Location

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Tranmission Pole Location
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Broken Hill Residential Area (zoned R1 General Residential Broken Hill LEP)
- Site Access Point
- Access Road
- Drainage Line
- Railway Line
- Road

FIGURE 1.2

Project Overview

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

2.0 Strategic Context

The strategic context associated with the Project is outlined in Section 2.0 of the EIS, the proposed amendments to the Project do not change the strategic context and justification for the Project.

The Project fits within the current strategic direction of the NSW and Australian government's approaches to energy generation, being the transition to renewables and ensuring the reliability of the grid to build a reliable, affordable and sustainable electricity future for NSW. The low emission dispatchable electricity from the Project will assist with improving the stability and reliability of the electrical grid within the Broken Hill Region, whilst replacing the existing diesel-fired turbine electricity back up system and reducing greenhouse gas emissions.

A-CAES NSW has proceeded with the Project as a direct response to electricity reliability supply issues in Broken Hill and as the preferred option identified by Transgrid through the Regulatory Investment Test for Transmission (RIT-T) process. The RIT-T process concluded that the continued operation of the existing diesel-fired turbines would be pursed as an interim measure, followed by the implementation of the Project as the top ranked energy supply option.

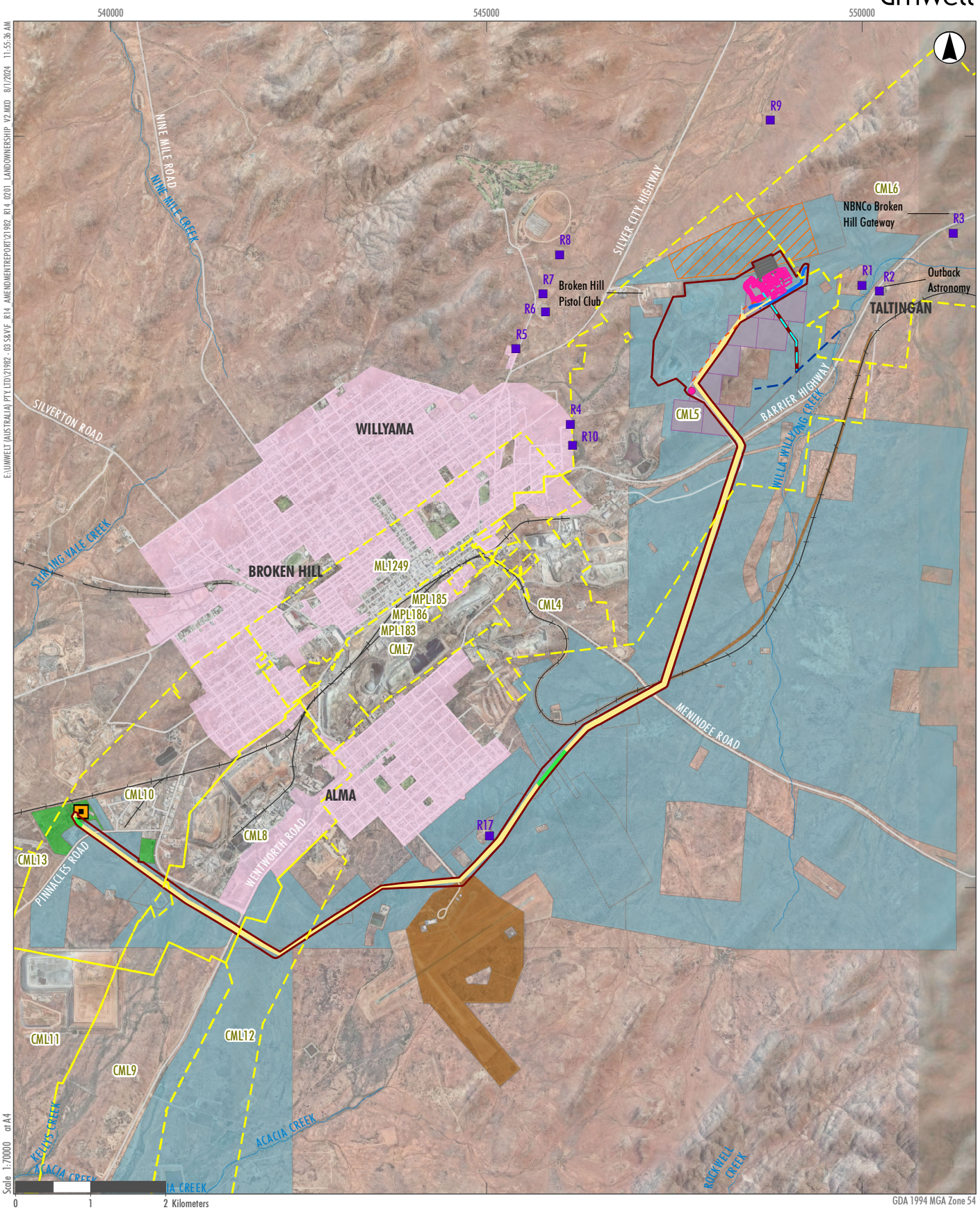
2.1 Environmental Context

The Regional and Land Use context of the Project including the relevant natural, cultural and built features of the Project Area are outlined in detail in Section 2.6 of the EIS. The key aspect of this relevant to the proposed amendments are the land use context surrounding the proposed SCES Facility.

The proposed co-location of the SCES Facility within the Potosi Mine site was selected due to favourable geological conditions, utilisation of existing mining areas, existing mine infrastructure for access and ability to suitably manage environmental and social impacts. The Project will also provide a diversified post-mining land use for the Potosi Mine site. The SCES Facility is surrounded predominately by vacant mining land. There are commercial properties located to the north and west with the closest property associated with the Broken Hill Pistol Club. A telecommunications (NBNCo Satellite Compound) is located to the northeast and Outback Astronomy (outdoor stargazing business) located approximately 1.2 km to the east.

The closest residence (R1) is located approximately 900 m east of the SCES Facility. There is also a residence (R2) located within the Outback Astronomy business approximately 1.2 km east and an additional residence (R9) approximately 1.9 km east of the SCES Facility across the Barrier Highway. An additional five residences (R3, R4, R6, R7, and R8) are located between 2 km and 3 km from the SCES Facility. All other residences and the main residential areas within Broken Hill City are located >3 km from the SCES Facility (refer to **Figure 2.1**).

The proposed amendment to the Project particularly the proposed change to the construction working hours requires consideration of potential land use conflict with the surrounding land uses and potential amenity impacts (noise, air quality and visual impacts (particularly lighting)). 24 hour operation is common with mining activities and is a familiar occurrence within and surrounding Broken Hill. However, the surrounding residential dwellings and potential impacts to the operation of the Outback Astronomy, have been a particular focus in revising the specialist assessments to address the proposed extended working hours for selected activities.



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Proposed Transmission Line (Above Ground Section)
- Proposed Transmission Line (Underground Section)
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Site Access Point
- Access Road
- Perilya Owned Land
- Freehold Land
- Crown Land
- Government Authority Controlled Land
- Broken Hill Residential Area (zoned R1 General Residential Broken Hill LEP)
- Mining Lease Boundaries
- Rifle Club Exclusion Zone
- Residential Receiver
- Drainage Line
- Railway Line
- Road

FIGURE 2.1

Land Ownership

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023); MinView (2023)

2.2 Alternatives Considered

The EIS discussed a number of alternatives for the Project, with this section focussed on alternatives to the proposed amendments.

As discussed in the EIS, Transgrid applied the RIT-T process to assess the long-term options for maintaining reliable energy supply to Broken Hill. The RIT-T process concluded that the continued operation of the existing diesel-fired turbines would be pursed as an interim measure, followed by the implementation of the Project as the top ranked energy supply option. The Project is a direct response to this process and A- CAES NSW has committed to a timeframe for the implementation of the Project to meet the energy security needs for Broken Hill. To meet this timeframe a Principal Construction Contractor was engaged to undertake the detailed design of the Project and plan the construction phase. This detailed design has led to both the minor refinement to the layout and proposed disturbance area, and the preparation of a detailed construction schedule.

With regard to the minor refinements to the layout, these involve minimal changes including positive changes including reducing the overall height and reduced night lighting. The overall impact of these changes are positive and therefore are considered a preferred alternative to the concept layout outlined in the EIS.

With regard to the proposed increased disturbance footprint, A-CAES NSW sought to minimise the disturbance footprint as part of the EIS process and made substantial reductions in the proposed footprint during the Project development and environmental assessment process. The detailed design work has, however, found that while some disturbance areas did not provide the required working room to practically construct the Project. Therefore, some increases were required. Without these increases, the Project would have been heavily constrained.

With regard to the proposed changes to construction hours for certain construction activities, to meet the construction timeframe presented in the EIS and committed to under contract with Transgrid and the Long-Term Energy Service Agreement (LTESA) with the Australian Renewable Energy Agency (ARENA), these alternate construction working hours are required. Detailed construction scheduling has been undertaken to determine the construction scenarios required including consideration of compliance with relevant criteria, particularly noise. Following standard construction hours, as outlined in the EIS is not a viable option for the Project and will add an additional 12 months to the 36-month construction timeframe affecting the energy security supply timeline and also impacting the economic viability of the Project.

The proposed co-location of the SCES Facility within the Potosi Mine site was selected due to favourable geological conditions, utilisation of existing mining areas, existing mine infrastructure for access and ability to suitably manage environmental and social impacts. Specifically in relation to the proposed amendment, 24 hour operations are common with mining activities and is a familiar occurrence within and surrounding Broken Hill and the SCES Facility itself will operate 24 hours per day.

3.0 Description of the Amendments

This section describes the proposed minor amendments to the layout, location and function of all relevant infrastructure to be constructed and operated as part of the Project. A revised description of the construction phase of the Project is also provided.

A detailed revised Project description covering all aspects of the Project (including those which have not been amended since the exhibition of the EIS) is included as **Appendix A**.

3.1 Project Summary

A summary of the project presented in the EIS and the Amended Project is provided in **Table 3.1**.

Table 3.1 Project Overview Comparison

Key Element	A Described in EIS	Amended Project
Life of the Project	50 years (operations)	No change
Project Area	Approximately 200 ha. The Project is located across 30 cadastral lots.	Approximately 310 ha. Increase of ~ 110 ha to incorporate larger areas of the Potosi mine site including to provide for proposed internal road upgrades. No change to relevant cadastral lots. Schedule of Land attached, refer to **Appendix B**. It is noted there is only minor changes to the proposed infrastructure and no material changes to activities.
Disturbance Area	Approximately 46 ha (SCES Facility ~31 ha, transmission line corridor ~15 ha – including areas of temporary disturbance associated with access and laydown areas).	Approximately 58 ha (SCES Facility ~39 ha including areas associated with internal access road and temporary disturbance associated with construction, transmission line corridor ~19 ha – including areas of temporary disturbance associated with laydown areas). Increase of 8 ha SCES Facility and 4 ha Transmission Line.
Project Area Access	SCES Facility – Silver Peak Road (existing Potosi Mine access road) via the Barrier Highway. Transmission Line – key access points from Kanandah Road/Pinnacles Road, Silver City Highway, Wentworth Road/Picton Street and Menindee Road.	No change. Disturbance area amended to allow upgrade to internal Potosi Mine access road to SCES Facility as part of the Project.
SCES Facility	SCES Surface Facility: • 2 x 100 MW Turbine/Generator/Compressor Trains. • Switchyard, Office, Warehouse and Guardhouse and other facilities	Increase in size of underground Cavern to ~275,000 m^2 (~600 m below ground level).

Key Element	A Described in EIS	Amended Project
	associated with the operation of the SCES Facility. • Utilities storage (fuel/water). • Water Reservoir ~300 ML. • Underground Cavern ~250,000 m^2 (~600 m below ground level). • 1 Air and 1 Water shaft connecting the underground cavern and surface infrastructure. • Above ground water pipeline (~1 km long, 100 – 150 mm diameter) to connect to existing Stephens Creek Pipeline.	
Transmission Line	~16 km 220 kV transmission line • Overhead line (18 – 25 m in height Pole No. 33 – 40) with 50 m easement. • Overhead line (30 – 36 m in height Pole Nos. 1 – 32 and 41 – 70) with 50 m easement. • Inground section between pole No. 29 and 30 and both overhead and inground options relating to connection to existing substation (to be confirmed during detailed design) with 20 m easement.	No change.
Ancillary transmission connection works	Ancillary works within substation including creation of hardstand, installation of connection infrastructure and re-configuration works.	No change.
Temporary Construction Facilities	Temporary construction facilities include: SCES Facility: • site compound including storage areas, offices, ablution facilities, and car parking • laydown areas for storing plant and equipment, and for deliveries • areas to store excavated material and construction waste storage areas. Transmission Line: • access roads for pole erection and maintenance • brake and winch pads for conductor installation • laydown and storage areas.	No change. The disturbance area has been amended to allow sufficient space for temporary disturbance associated with construction activities (laydown, heavy machinery manoeuvring etc).
Construction water use and supply	Water for construction will be supplied via water tanker from Potosi Mine (for non-potable usage). Potable water will be	No change.

Key Element	A Described in EIS	Amended Project
	supplied via water tanker and stored in the construction compound. First fill of Water Reservoir will be supplied via the proposed pipeline (subject to water supply agreement with Essential Water). Approximately 250 – 300 ML will be required over a 12-month timeframe.	
Construction Timeframe	Approximately 36 months.	No change.
Construction hours	Construction activities associated with the SCES surface facilities and transmission line would be undertaken during standard construction hours i.e.: • 7:00 am to 6:00 pm Monday to Friday. • 8:00 am to 1:00 pm on Saturdays. • No works on Sunday or public holidays. With the exception of activities which are inaudible at any neighbouring receivers, emergency work, and deliveries and dispatches where required by authorities for safety reasons – these would be undertaken on a 24-hour basis. Underground works associated with establishing the cavern will be conducted on a 24-hour basis.	Transmission Line: standard construction hours: • 7:00 am to 6:00 pm Monday to Friday • 8:00 am to 1:00 pm on Saturdays. • No works on Sunday or public holidays. With the exception of activities which are inaudible at any neighbouring receivers, emergency work, and deliveries and dispatches where required by authorities for safety reasons – these would be undertaken on a 24-hour basis. SCES Facility: Revised construction hours: • Underground works and shaft construction (connection between surface facilities and underground cavern) and related construction activities at surface and underground - includes drilling, crane/rig Welding, compressors/generators, air tools, concrete pumps) – 24 hours per day / 7 days per week • All other construction activities 7 days per week (daytime only 7am to 6pm) with the exception of critical activities only e.g., concrete pours.
Construction Transport Route	Project components will be delivered via road from the Port of Adelaide via the Barrier Highway.	No change.
Construction workforce	Up to 400 (during peak construction period – ~6 months).	No change.
Operational water use	Water usage associated with ongoing operations will be provided through recovery of water from the compression of air, captured surface water, groundwater inflows associated with Perilya Mining operations and/or continued supply from the Stephens Creek Reservoir, subject to licence requirements.	No change.

Key Element	A Described in EIS	Amended Project
Operations workforce	Approximately 26.	No change.
Capital investment Value	$639 Million.	No change.

3.2 Project Area and Revised Disturbance Area

The Project Area presented in the EIS was approximately 200 ha, extending from the Potosi Mine located approximately 3 km northwest of Broken Hill to the existing Transgrid substation located on the western side of Broken Hill. The Project Area has been revised to capture the Potosi Surface Operational Area located within Lot 7320 DP 1201053, refer to **Figure 3.1**. The amended Project Area also extends further into Lot 1620 DP 763339 associated with the amended underground cavern design. As outlined in Section 1.6 of the EIS, the Project will interact with the Perilya operations through the use of existing infrastructure, including the use of the existing mine access portals and rock crushing, however these are associated activities, and no additional disturbance is required. This change to the Project Area is administrative in nature and does not capture any additional land lots than that included in the Schedule of Land attached to the EIS as Appendix 1. The Project Area continues to comprise of 30 land lots including freehold and Crown Land.

As discussed in **Section 1.0**, the Project Layout has been subject to further detailed design, which has refined the associated disturbance area. A total disturbance area of approximately 58 ha (39 ha SCES Facility and 19 ha Transmission Line) is now proposed. This presents a total increase in disturbance of approximately 12 ha, a total of approximately 46 ha was previously proposed (31 ha SCES Facility and 15 ha Transmission Line).

This revised disturbance area is based on a refinement to the areas of disturbance required along the Transmission Line and also provision for sufficient space associated with the SCES Facility to provide for temporary disturbance for laydown and manoeuvring of vehicles and equipment. Within the SCES Facility, ~24 ha is associated with the permanent infrastructure proposed as part of the Project, ~13 ha provides temporary disturbance area for construction activities and ~2 ha is associated with the upgrade of the internal access road. Along the transmission line an additional 4 ha of temporary disturbance is proposed to facilitate construction of the infrastructure and provide construction laydown areas. No additional infrastructure is proposed to that presented in the EIS, the disturbance area captures all disturbance associated with the SCES Facility and the Transmission Line, including:

- the SCES Facility, underground cavern, creek diversion, above ground pipeline and access, upgrade to the existing internal access road and temporary disturbance associated with construction laydown and equipment and machinery manoeuvring
- transmission line and all associated works:
    - access track along the transmission line (approximately 4 m wide)
    - underground line sections (approximately 8 m wide)
    - transmission line pole locations and areas required for pole erection and conductor installation

- construction laydown and storage areas.

The proposed revised disturbance area is shown on **Figure 3.2, Figure 3.4, Figure 3.5** and **Figure 3.6**.

The proposed transmission line has an associated 50 m easement, however, given the nature of the vegetation (low height) along this proposed easement, A-CAES NSW has committed to limit the removal of vegetation within the proposed disturbance area and within limited locations within the easement where vegetation is over 10 m in height (comprising Plant Community Type (PCT) 41 River Red Gum Open Woodland in condition zones high weed cover and planted, along with planted street trees). Vegetation under 10 m in height, within the easement (and outside of the disturbance area) will be retained.

This vegetation within the easement will either be removed or pruned depending on location. For the purposes of the EIS assessment, it was assumed that this vegetation will be removed (as a worst-case scenario). The total area applicable to the easement is approximately 80 ha, with vegetation removal along the transmission line limited to approximately 19 ha.

3.3 Revised SCES Facility Layout

The SCES Facility includes the following components (as described in the EIS):

- two 100 MW Air-Expansion Turbine Generator/Compressor Trains
- heat exchangers and thermal storage tanks (hot and cold)
- switchyard, office/warehouse/guardhouse and other facilities associated with the operation of the SCES Facility
- utilities for fuel and water storage
- internal access road, parking and security fencing.

Through detailed design to optimise the site layout the location of the components has been subject to some minor revisions from what was presented in the EIS. The location of noise generating equipment has been maintained with minor changes only and is generally consistent with that presented in the EIS. The proposed underground cavern has also shifted a small distance north to align with the associated surface infrastructure. The design of the proposed above ground water reservoir has been amended however the total capacity of 350 ML, as proposed in the EIS has not changed. To accommodate the revised SCES Facility layout, an amendment to the alignment and design of the proposed creek diversion is also required. Further detailed design has also been undertaken to better integrate the proposed creek diversion into the landform.

The indicative amended layout is provided in **Figure 3.2**, with a comparison to the layout presented in the EIS, with a more detailed conceptual amended layout of the SCES Facility and associated creek diversion provided in **Figure 3.3**. The Project may still be subject to further detailed design prior to construction with the potential for some further design refinements to the conceptual layout shown.

The key design aspects of the Project as presented in the EIS remain unchanged. The Project description presented in the EIS has been revised to reflect the proposed amendments and is presented in **Appendix A**.



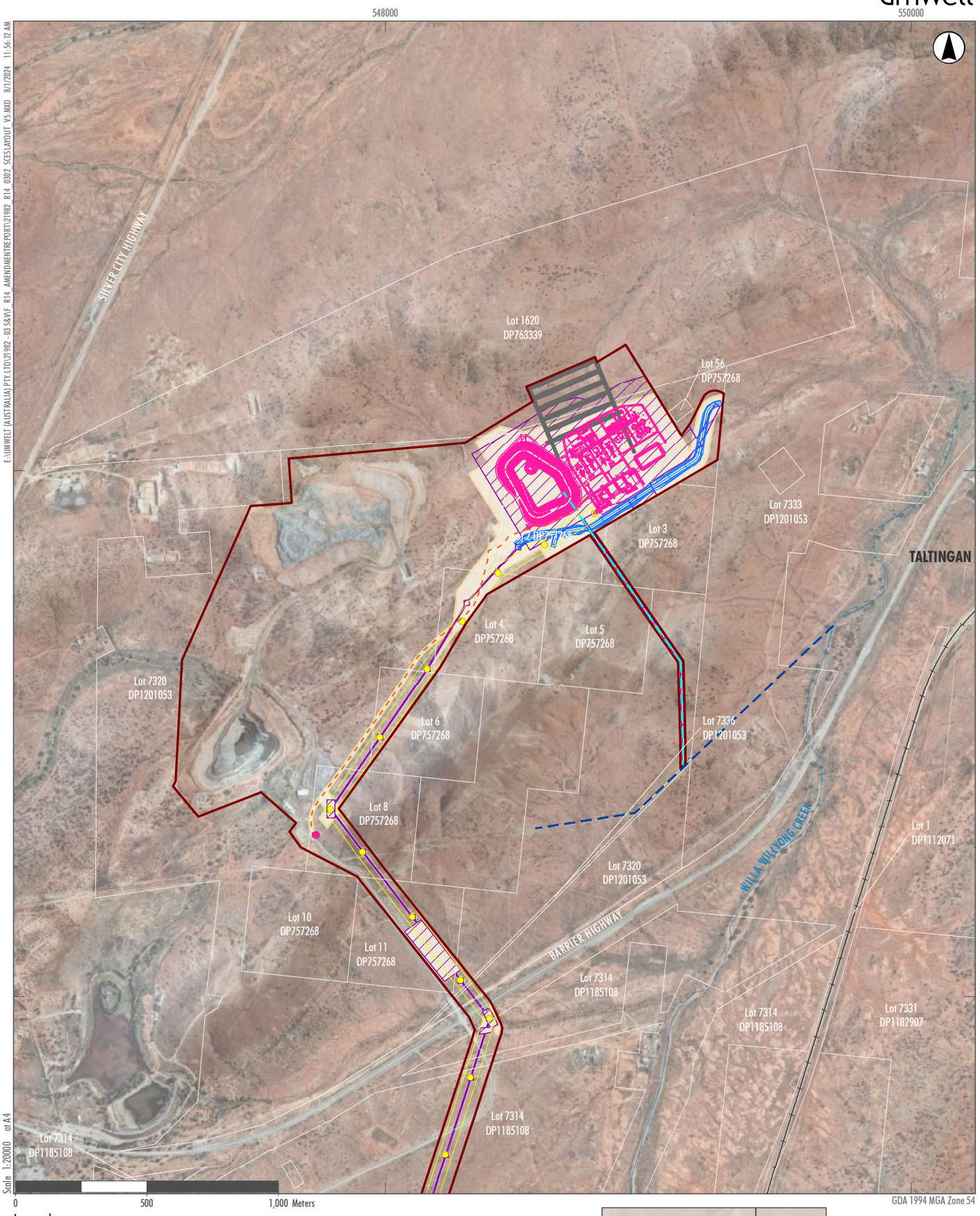
Legend

- Amended Project Area
- EIS Project Area
- Transgrid Substation
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Property Boundaries
- Drainage Line
- Railway Line
- Road

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

FIGURE 3.1

Project Area Comparison



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Transmission Line Easement
- Tranmission Pole Location
- Amended Layout Disturbance Area
- EIS Disturbance Area
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Site Access Point
- Access Road
- Property Boundaries
- Drainage Line
- Railway Line
- Road

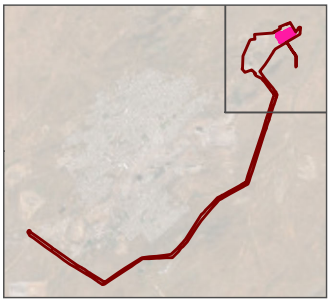
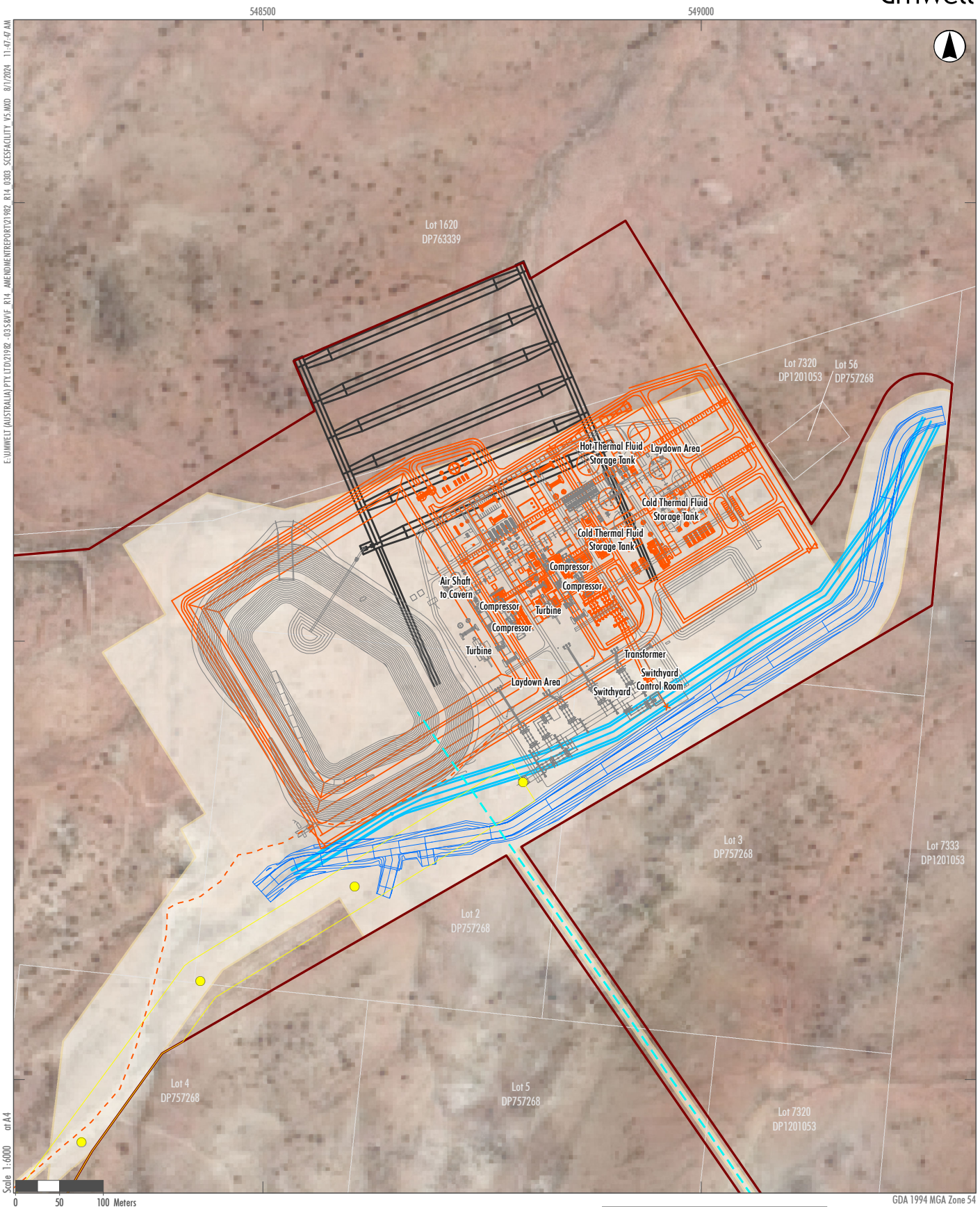


FIGURE 3.2

Project Layout
SCES Facility

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)



Legend

- Project Area
- Amended Layout Silver City Energy Storage Facility
- EIS Silver City Energy Storage Facility
- Underground Cavern
- Transmission Line Easement
- Transmission Pole Location
- Disturbance Area
- Amended Layout Proposed Creek Diversion
- EIS Proposed Creek Diversion
- Proposed Above Ground Water Pipeline
- Access Road
- Property Boundaries

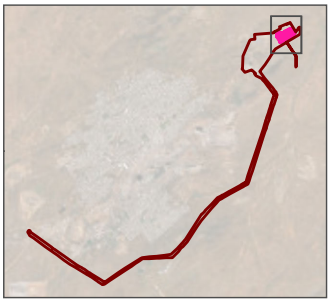


FIGURE 3.3

SCES Facility

Image Source: Nearmap (2022) Data source: DSFI (2023)

3.3.1 200 kV Transmission Line

Through consultation with Transgrid the proposed disturbance area associated with the proposed transmission line has been refined to ensure sufficient space is provided for construction activities. The design of the proposed transmission line has not changed and remains as presented in the EIS. This design includes sections of both overhead and underground line with the overhead line sections designed at a varying height including:

- overhead line (varying from 18 – 25 m in height for Pole No. 33 – 40) with 50 m easement – to avoid impact to obstacle surface limitation (OSL) heights associated with Broken Hill Airport
- overhead line (30–36 m in height for Pole Nos. 1 – 32 and 41 – 70) with 50 m easement
- inground section between pole No. 29 and 30 – to avoid exclusion area associated with existing gun club
- overhead and inground options relating to connection to existing substation (to be confirmed during detailed design) with 20 m easement.

The transmission line layout with revised disturbance area is shown in **Figure 3.2, Figure 3.4, Figure 3.5** and **Figure 3.6.**

As presented in the EIS, the transmission line design is based on the installation of a single monopole, except for the transition areas from overhead to underground. To facilitate the transition from overhead line to underground, the line will split to three poles at pole location No. 29, then transition back to one pole between location numbers 30 to 40. The monopoles are planned to be constructed from galvanised steel with mat finish. These types of monopoles have a slim line appearance offering the best aesthetic option as well as reduced disturbance footprint.



Legend

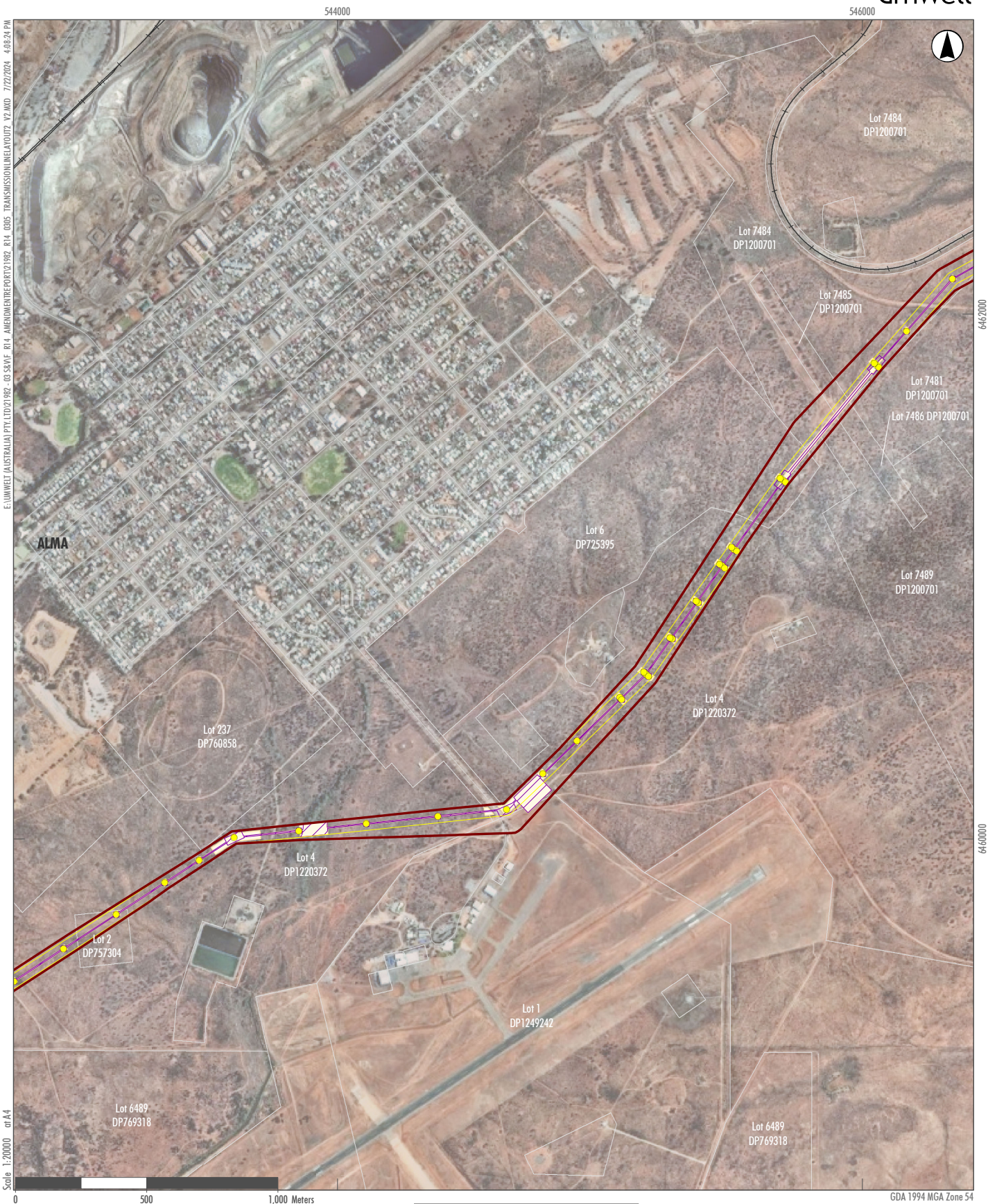
- Project Area
- Transmission Line Easement
- Transmission Pole Location
- Amended Layout Disturbance Area
- EIS Disturbance Area
- Property Boundaries
- Drainage Line
- Railway Line
- Road



FIGURE 3.4

Project Layout
Transmission Line

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)



Legend

- Project Area
- Transmission Line Easement
- Transmission Pole Location
- Amended Layout Disturbance Area
- EIS Disturbance Area
- Property Boundaries
- Railway Line
- Road

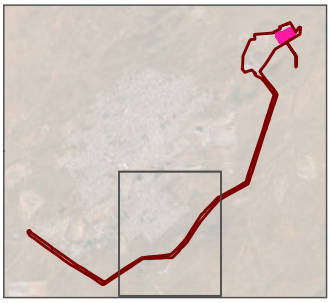


FIGURE 3.5

Project Layout
Transmission Line

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)



Legend

- Project Area
- Transmission Line Easement
- Tranmission Pole Location
- Amended Layout Disturbance Area
- EIS Disturbance Area
- Transgrid Substation
- Property Boundaries
- Railway Line
- Road

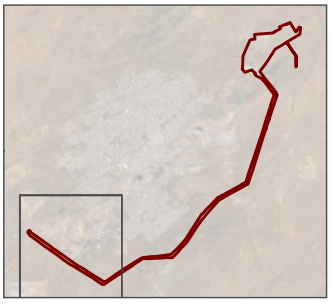


FIGURE 3.6

Project Layout
Transmission Line

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

3.4 Construction Activities

3.4.1 Construction Staging, Duration and Hours

The EIS proposed a total construction period of approximately 36 months, with a peak construction phase of 10 months undertaken within standard construction hours only (with exception of underground works which were proposed to occur 24 hours per day, 7 days per week (24/7). The construction period remains approximately 36 months, however, to achieve this construction timeframe amended construction working hours are proposed. The following construction working hours are proposed:

Transmission Line - Standard Construction Hours:

- 7:00 am to 6:00 pm Monday to Friday
- 8:00 am to 1:00 pm on Saturdays
- No works on Sunday or public holidays.

With the exception of activities which are inaudible at any neighbouring receivers, emergency work, and deliveries and dispatches where required by authorities for safety reasons – these would be undertaken on a 24-hour basis.

SCES Facility - Construction Hours:

- Underground works and shaft construction (connection between surface facilities and underground cavern) and related construction activities at surface and underground - includes crane/rig welding, compressors/generators, air tools, concrete pumps) – 24/7.

All other construction activities 7 days per week (daytime only 7am to 6pm) with the exception of critical activities only at night e.g., concrete pours.

3.4.2 Traffic Generation

Based on the detailed construction planning undertaken by A-CAES NSW the expected traffic generation associated with the Project has been revised from what was presented in the EIS. Traffic generation will vary across the construction timeframe (36 months) with the peak traffic generation coinciding with the peak construction period of approximately 10 months, the maximum volume has been revised as follows:

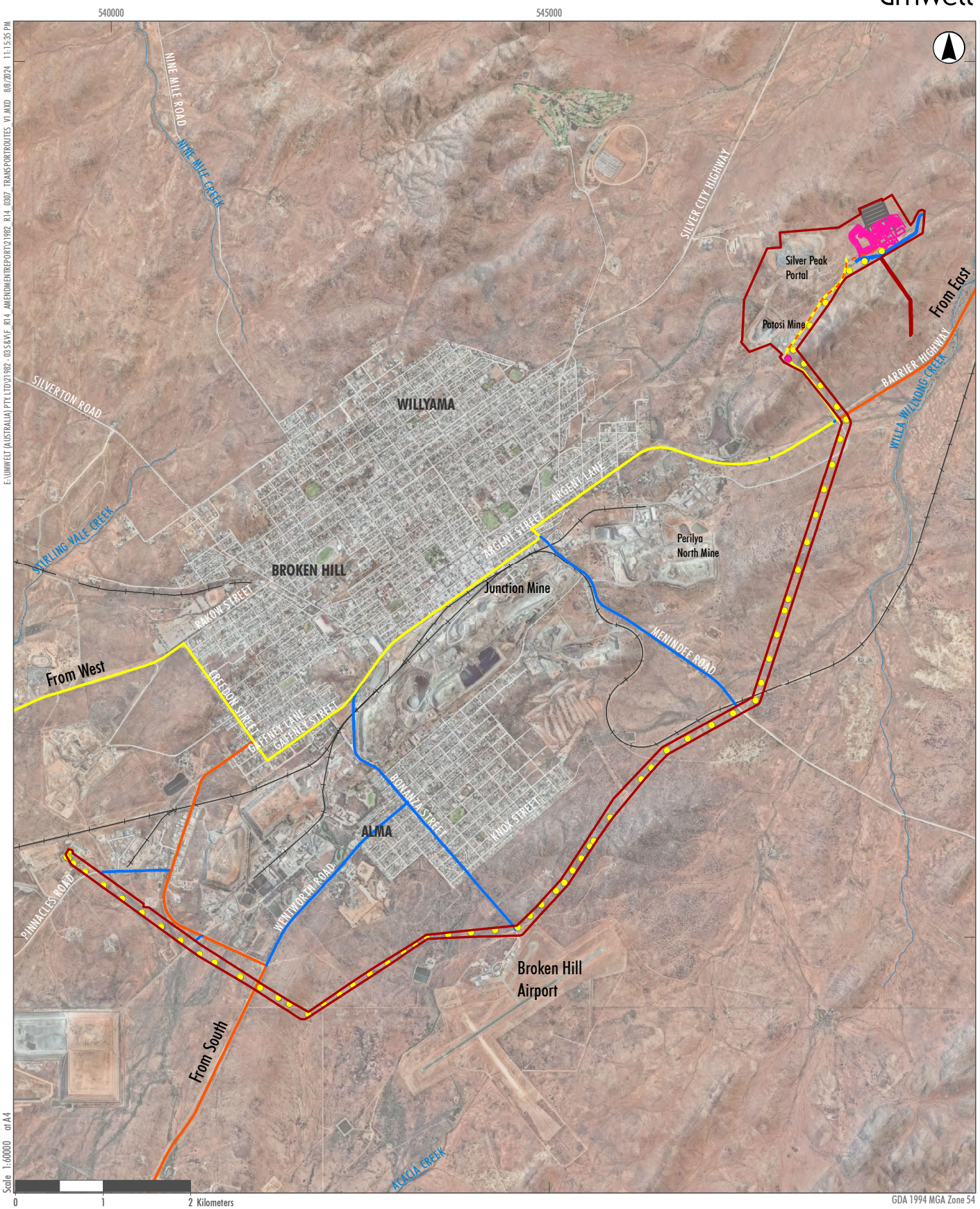
- Consistent with the original assessment – up to a maximum of 424 staff in total, inclusive of transmission line works – maximum (peak) movements arriving at start of shift and departing at end of shift, although transmission line works shifts would not coincide with SCES site works shifts. It is assumed that 90% of the workforce will be sourced from outside the region and will utilise the workers accommodation facility. The original assessment assumed 424 light vehicle movements associated with both the SCES Facility and the Transmission line. The assessment has been revised based on the planned use of an accommodation facility to account for staff using private vehicles to access the SCES facility site (maximum of 54 light vehicle movements per day (20 per hour)) as well as A-CAES NSW providing a shuttle service (32 bus movements per day (16 per hour) during peak construction period).
- Maximum of 30 light vehicle movements (12 per hour) associated with the Transmission Line.

- Up to 12 heavy (non-OSOM) vehicle movements per day associated with the SCES facility works (2 per hour) and 32 heavy (non-OSOM) vehicle movements associated with the transmission line works (2 per hour) spread out across a working day. The original assessment contemplated 34 heavy vehicle movements per day (total), this represents an increase in movements associated with the transmission line works following detailed construction planning with Transgrid.
- Two OSOM vehicle movements per day (one single load per day) outside of background peak traffic periods. The original assessment contemplated up to 24 OSOM vehicle trips per day with the revised estimate based on additional construction planning work representing a material decrease in OSOM vehicle movements.

The OSOM transport route includes the Barrier Highway (west)/Rakow Street, Creedon Street, Gaffney Street, South Road, Crystal Street, Menindee Road, Argent Street, Barrier Highway (east) and Silver Peak Road. Heavy and light vehicles will also utilise this route.

Transport routes (heavy and light vehicles) and access points associated with the transmission line include Kanandah Road, Pinnacles Road, Silver City Highway, Wentworth Road, Bonanza Street, Pro Hart Way, Knox Street and Menindee Road.

The vehicle routes and access points are show on **Figure 3.7**



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Tranmission Pole Location
- Proposed Creek Diversion
- Site Access Point
- Access Road
- Drainage Line
- Railway Line
- Road
- OSOM Route
- Standard HV Route
- Transmission Line Access

FIGURE 3.7

Proposed Transport Routes through Broken Hill Urban Area

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

4.0 Statutory Context

4.1 Commonwealth Legislation

The *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) is the primary environmental and planning regulatory instrument relevant to the Project at the Commonwealth level. Under the EPBC Act, approval from the Commonwealth Minister for the Environment and Water is required for any action that may have a significant impact on Matters of National Environmental Significance (MNES). If an 'activity' is likely to have a significant impact on a MNES then it may be a 'controlled action' and require approval from the Commonwealth Minister for the Environment and Water.

The Project was referred under the EPBC Act to the Minister via the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and was determined to not be a controlled action (EPBC 2022/09415) on 20 June 2023. The proposed amendments to the Project do not materially change the nature of the impacts that were included in the referral and therefore further assessment and approval under the EPBC Act is not required.

4.2 NSW Legislation

The NSW EP&A Act is the primary instrument which regulates the environmental impact assessment and approval process for development in NSW.

The Project requires development consent under Part 4 of the EP&A Act. Being development for the purpose of electricity generation with a capital investment value of more than $30 million, the Project is declared to be SSD under the provisions of the Planning System SEPP. As SSD, the Project is currently under assessment with the Department of Planning, Housing and Environment (DPHI).

Section 4 and Appendix 5 of the EIS provide a detailed review of the statutory context for the Project and discusses the application of key legislation and planning provisions to the Project. The proposed amendments to the Project do not change the Statutory Context nor the approvals required.

Section 4 of the EIS provides a summary of compliance requirements under Commonwealth, State and local legislation relevant to the Project including NSW State Environmental Planning Policies (SEPPs) and Local Environmental Plans. A review of relevant mandatory considerations and pre-conditions is provided in **Appendix D**, identifying the relevant statutory requirements for the Project which remain unchanged since exhibition of the EIS.

5.0 Stakeholder Engagement

A summary of the stakeholder engagement undertaken as part of the EIS was provided in Section 5 of the EIS. The following sections outline the engagement undertaken since the exhibition of the EIS.

A-CAES NSW has undertaken further engagement with the community, Broken Hill Local Aboriginal Land Council, DPHI and Broken Hill Council specifically relating to the proposed amendments.

5.1 Community Engagement

A-CAES NSW prepared an overview of the proposed amendment, responses to frequently asked questions (FAQ) and community survey which was distributed to the community via the Project website on 7 June 2024. The website was promoted by Broken Hill Council on its website and A-CAES NSW provided links directly to the owners of Outback Astronomy, Broken Hill Local Aboriginal Land Council (BHLALC), the Barkandji Prescribed Body Corporate (PBC) and Perilya.

The survey was open for feedback from 6 June 2024 to 27 June 2024, a total of 28 people visited the site and 17 people completed the survey. Twelve respondents indicated they had no concerns relating to the proposed amendments, five indicated they were concerned about the amendments including the change to the construction hours, lighting impacts and requiring more time to review and understand the amendments. A-CAES NSW contacted the respondents that requested further information (where contact details had been provided) and answered questions and provided information as required.

A-CAES NSW also met with Outback Astronomy on two separate occasions to discuss their concerns with the Project and provide additional information where requested. A-CAES NSW also offered a negotiated agreement to the owners of Outback Astronomy during the preparation of the EIS to address the perceived impact on their property.

5.2 Broken Hill Local Aboriginal Land Council

ACAES-NSW held a workshop with the BHLALC on 6 and 7 April 2024 to discuss the amendments to the Project layout, refinements to the Aboriginal Cultural Heritage Assessment (ACHA) to address the submission from Heritage NSW and to discuss the preparation of the Aboriginal Cultural Heritage Management Plan (ACHMP). Further consultation was undertaken with BHLALC in June to discuss further refinements to the proposed disturbance area. Consultation in relation to the proposed community benefit fund has also progressed through the submissions phase.

5.3 Registered Aboriginal Parties

Further consultation with all Registered Aboriginal Parties (RAPs) was also undertaken to advise all RAPs of the proposed amendments to the Project and request feedback. No feedback was received.

5.4 DPHI

A-CAES NSW met with DPHI on 21 May 2024 to discuss the proposed amendments to the Project, gave an overview of the outcomes of the relevant environmental assessments and provided an update on timing of submission of this Amendment Report and the Response to Submissions.

5.5 Broken Hill Council

A-CAES NSW met with Council on 29 May 2024 to discuss the proposed amendments to the Project. At the meeting Council indicated support of the proposed amendment.

Council at its meeting held on 26 June 2024 noted the proposed amendments and resolved to provide a letter of support. The letter of support is provided as Appendix 3 of the Submissions Report.

6.0 Assessment of Impacts

Section 6 of the EIS included a detailed assessment of the Project based on the identification of:

- the environmental and planning context for the locality
- outcomes of the stakeholder engagement process
- the Project scoping stage assessment and the SEARs for the Project
- the specialist technical studies completed as part of the preparation of the EIS.

A review of the proposed amendments to the Project was undertaken for each of the relevant technical assessments to identify if the changes required further assessment with the findings outlined in **Table 6.1**. An assessment of also undertaken of any potential new issues that required assessment, however, no new issues were identified.

This section provides a summary of the revised assessments undertaken to assess the potential construction and operational impacts associated with the amendments proposed to the Project. Where required, additional or revised mitigation measures have been proposed. A revised consolidated summary of all proposed management and mitigation measures for the Project is presented in **Appendix C**.

Table 6.1 Assessment of Potential Impact of the Amended Project

Specialist Assessment	Potential Impact Review	Reference
Biodiversity	The Biodiversity Development Assessment Report (BDAR) has been updated to provide for the assessment of the revised disturbance area. The original disturbance area was approximately 47 ha, the proposed amendment requires disturbance to an additional 12 ha. Approximately 1.2 ha of this additional disturbance is within areas already cleared of vegetation, with impact to an additional ~10.8 ha of vegetation.	**Section 6.1** **Appendix E**
Aboriginal Cultural Heritage	The Aboriginal Cultural Heritage Assessment and Archaeology Report have been updated to provide for the assessment of the revised disturbance area. In total 34 Aboriginal archaeological sites would be impacted by the Project (reduced from 47 associated with the impact assessment presented in the EIS). The impacts outlined in the EIS were based on total impact within the Project Area, the assessment has now been updated to define the impacts of the Project associated with the amended disturbance. The proposed Aboriginal cultural heritage management and mitigation measured remain consistent with that presented in the EIS.	**Section 1.** **Appendix F and Appendix G**
Historic Heritage	The amendments will not change the potential impact of the Project in relation to historic heritage. As outlined in Section 6.4.4 and Appendix 8 of the EIS, the Project has been assessed as not having any impacts, or the potential to impact, on the National heritage values of the City of Broken Hill or on any other heritage sites and the amendments do not change this outcome. No further assessment is required.	NA

Specialist Assessment	Potential Impact Review	Reference
Noise and Vibration	The Noise Impact Assessment has been revised to include the assessment of the revised SCES layout and the proposed amendment to the construction working hours due to potential increased noise impact to neighbouring residential properties. Modelling results indicate noise levels can comply with the relevant noise criteria.	**Section 6.3** **Appendix H**
Air Quality	The Air Quality and Greenhouse Gas Impact Assessment has been revised to included detailed Air Quality Modelling of the construction phase of the Project including the proposed amendments to the Project. There are no changes to the impact assessment findings, however, further assessment outcomes have been provided including quantitative assessment. Consistent with the findings in the EIS, the updated AQGHGIA found that the Project would not cause adverse construction or operational impacts with respect to dust concentrations or deposition levels, based on a risk assessment that determined a "Low" air quality risk. Based on the air dispersion modelling results the Project would not cause adverse construction impacts with respect to dust concentrations or deposition levels, which predicted compliance with the relevant assessment criteria at all sensitive receptors.	**Section 6.4** **Appendix I**
Traffic and Transport	The Traffic Impact Assessment has been revised to consider the change to the proposed traffic movements associated with the revised construction work hours and revised schedule of traffic movements. Detailed construction planning has resulted in significant reduction in light vehicle, standard heavy vehicle and OSOM vehicle traffic (in comparison with that presented in the EIS) which has decreased the already insignificant traffic impacts identified in the EIS.	**Section 6.5** **Appendix J**
Water Resources	The Surface Water Impact Assessment has been revised to update the flood modelling and associated assessment based on the revised creek diversion alignment and detailed design. The results of the flooding assessment are generally consistent with the EIS findings with the updated results indicating that in general less than 160 mm localised increase in water levels and less than 1.5 m/s increase in velocities are predicted as a result of the Project at the Probable Maximum Flood (PMF) level, with relative impacts considerably reducing for the lower order flood events. The amended project does not change the water demand associated with the construction and operation of the Project and the associated water balance presented in the EIS. The amended Project will not increase any impacts to groundwater resources than that outlined in the EIS and therefore a revised groundwater assessment is not required.	**Section 6.6** **Appendix K**
Preliminary Hazard Screening (PHA)	The Amended Project does not change the proposed storage inventories and transport quantities and frequencies of hazardous materials. Therefore, no further preliminary hazard screening is required.	NA

Specialist Assessment	Potential Impact Review	Reference
Geotechnical Stability	The geotechnical conditions of the Project Area and risk associated with the Project are outlined in Section 6.9.2 of the EIS. The Amended Project does not change any assessment, design requirements or proposed management and mitigation in relation to geotechnical stability and no further assessment is required.	NA
Public Safety	There is no change to the potential public safety issues associated with the Amended Project as outlined in Section 6.9.3 of the EIS and no further assessment is required.	NA
Bushfire	The proposed Bushfire Management and Mitigation measures as outlined in Section 6.9.4 of the EIS and Appendix 4 of the Submissions Report will continue to apply to the Amended Project and no further assessment is required.	NA
Land Contamination	There is no change to the potential land contamination issues associated with the Amended Project as outlined in Section 6.9.5 of the EIS and no further assessment is required.	NA
Electromagnetic Fields (EMF)	The Amended Project does not propose any amendment to the alignment or design of the proposed transmission line. As outlined in Section 6.9.6 the proposed transmission line will be built and operated to relevant current Australian Standards will not pose any EMF exposure risk to human health. No further assessment is required.	NA
Aviation Safety	The revisions to the proposed disturbance area along the transmission line do not include any movement of poles or changes to pole design or height. The SCES Facility has reduced in height. Therefore, a revised Aviation Impact Assessment (Appendix 18 of the EIS) is not required for the amended Project.	NA
Dam Safety	The design of the water reservoir has been refined however the same design principals apply. As outlined in Section 6.9.8 of the EIS, the walls of the proposed reservoir will not exceed 15 metres in height and will be designed, constructed and implemented in accordance with relevant construction standards and management requirements. During detailed design A-CAES NSW will consult with Dam Safety NSW to confirm the consequence category and whether declaration of the reservoir is required.	NA
Social Impact Assessment	The Social Impact Assessment undertaken to support the EIS concludes that the identified negative social impacts of the Project can be reasonably mitigated or managed to reduce their significance, with positive impacts having the potential to be enhanced if appropriate strategies are put in place. Potential impacts associated with Amenity (Noise, Air Quality, Visual and Traffic) have been addressed through the revised assessment which demonstrate compliance with relevant criteria and continued implementation of required management and mitigation measures. The impacts associated with these issues are substantially the same as the EIS, or in the case of visual, lighting and traffic are reduced. Therefore, the findings of the Social Impact Assessment remain applicable to the Amended Project. As outlined in **Section 5.0**, the proposed amendment has been communicated to the community and any further queries responded to by A-CAES NSW.	NA

Specialist Assessment	Potential Impact Review	Reference
Economic	The Amended Project does not change the outcomes of the Economic Assessment and estimated economic output, as outlined in Section 6.11 of the EIS. A-CAES NSW has committed to a number of key strategies to manage the negative social impacts associated with the Project and to enhance the positive economic benefits of the Project to the community. These measures include a variety of community benefit funds to appropriately distribute additional economic benefit to the local Broken Hill Community. A-CAES NSW has also commenced investigating dedicated workforce accommodation (subject to separate approval process) to directly address and respond to the social impacts and opportunities of the Project as they relate to construction workforce matters and associated cumulative impacts. The proposed amendment will facilitate the construction of the Project and contribute to the financial viability, assisting with realising the potential financial benefits of the Project.	NA
Visual Amenity	The refined SCES Facility layout has resulted in the re-configuration and size of some plant and equipment that could be visible from both public and private view points, including a reduction in overall height. The relevant photomontages and aspects of the visual impact assessment have been revised based on the refined layout. Consistent with the visual assessment presented in the EIS, overall, the Project is assessed as having low visual impact and is not predicted to impact on the existing visual character, which, in the areas where the Project will occur, is dominated by existing mining/industrial land uses. Due to surrounding topography and distance, views of the proposed SCES Facility from sensitive receivers are restricted and therefore no material visual impacts are predicted associated with the SCES Facility. A detailed Lighting Impact Assessment has also been prepared to assess the potential impact of night lighting associated with SCES Facility. Overall, the Lighting Assessment found that the risk of impact on neighbouring receivers is considered low with the proposed mitigation measures applied. Additional lighting mitigation measures have been committed to, reducing the extent of lighting impact from that assessed in the EIS.	**Section 6.7** **Appendix L**
Land Resources and Land Use	An assessment of site suitability, land use assessment and compatibility with existing land uses associated with the Project is outlined in Section 6.13 of the EIS. The land use risk identification and ranking process undertaken in accordance with the DPI Land Use Conflict Risk Assessment (LUCRA) Guide (2011) presented as Appendix 21 of the EIS has been updated. These updates reflect the changes to traffic movements and noise associated with the change to the construction work hours. There was no change to the outcomes of the previous assessment, with the key land use conflict risks continuing to be those associated with traffic (during construction and decommissioning), air quality, noise and lighting. The minor updates consist of changes to the description of the development and reflection of the updates to the proposed management and mitigation. The outcomes of the LUCRA remain generally consistent with that included in the EIS, however, it is noted that the area of land disturbance has increased as discussed above.	**Appendix M**

Specialist Assessment	Potential Impact Review	Reference
Waste Management	The waste quantities and proposed management and mitigation, as outlined in Section 6.14 of the EIS will continue to apply to the Amended Project.	NA
Cumulative Impact	As outlined in Section 6.15 of the EIS, the key cumulative considerations relevant to the Project are associated with the construction phase and potential overlap with the construction phase of other major projects in the region. The potential impacts relate to traffic, noise and socio-economic impacts. Updated traffic and noise assessments have been completed for the Project including updates as applicable to cumulative impact assessments. As noted above, the outcomes of the Social Impact Assessment remain applicable to the Amended Project. Consistent with the EIS, proposed management and mitigation measures have been developed to address the potential cumulative impacts associated with the construction phase of the Project. These proposed management and mitigation measures will continue to apply to the Amended Project.	Noise – **Appendix H** Traffic – **Appendix J**

6.1 Biodiversity

The Biodiversity Development Assessment Report (BDAR), prepared by Umwelt, has been amended as follows:

- updates to remove previously assumed presence species, following completion of further targeted threatened species survey
- revised impact assessment based on the amended disturbance area.

The outcomes of the amended BDAR are summarised in the following sections with the amended BDAR attached as **Appendix E**.

6.1.1 Existing Biodiversity Values

As reported in the EIS, the Project Area largely comprises areas that have previously been disturbed and historically cleared for mineral extraction purposes. Overall, the Project Area is dominated by native remnant arid land vegetation, with creek lines generally having a high level of exotic flora species present. Fauna habitat is limited with no large hollow bearing trees observed and minor areas of low-lying rocky habitat.

The vegetation communities (using descriptions aligned with NSW Government defined Plant Community Types (PCTs)) that are located in the amended disturbance area are identified in **Table 6.2** and shown on **Figure 6.1**. Detailed descriptions of each PCT are provided in the BDAR (refer to **Appendix E**).

Table 6.2 Plant Community Types Identified Within the Proposed Disturbance Area

PCT ID	Plant Community Type	Vegetation Zone and Condition	Area (ha) in Development		
			SCES Facility	Transmission	Total
41	River Red Gum open woodland wetland of intermittent watercourses mainly of the arid climate zone	Derived Shrubland	0	0.05	0.05
41		High Weed Cover	0	0.47	0.47
41		Planted	0	0.15	0.15
123	Mulga - Dead Finish on stony hills mainly of the Channel Country Bioregion and Broken Hill Complex Bioregion	Dieback	0	0.25	0.25
123		Good	6.23	5.46	11.70
136	Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone	Disturbed – High Weed Cover	0	0.12	0.12
136		Good	3.32	0.08	3.40
150	Bottlewasher - Copperburr grassland of the arid zone	Good	0	1.05	1.05
155	Bluebush shrubland on stony rises and downs in the arid and semi-arid zones	Disturbed	0	0.93	0.93
155	Bluebush shrubland on stony rises and downs in the arid and semi-arid zones	Good	27.71	8.71	36.42
158	Old Man Saltbush - mixed chenopod shrubland of the semi-arid hot (persistently dry) and arid climate zones (north-western NSW)	Good	0	0.54	0.54
Nil	Cleared		1.45	1.30	2.75
	Planted Street Trees		0	0.01	0.01
		Total Vegetation	**38.71**	**19.09**	**57.81**

6.1.1.1 Threatened Ecological Communities

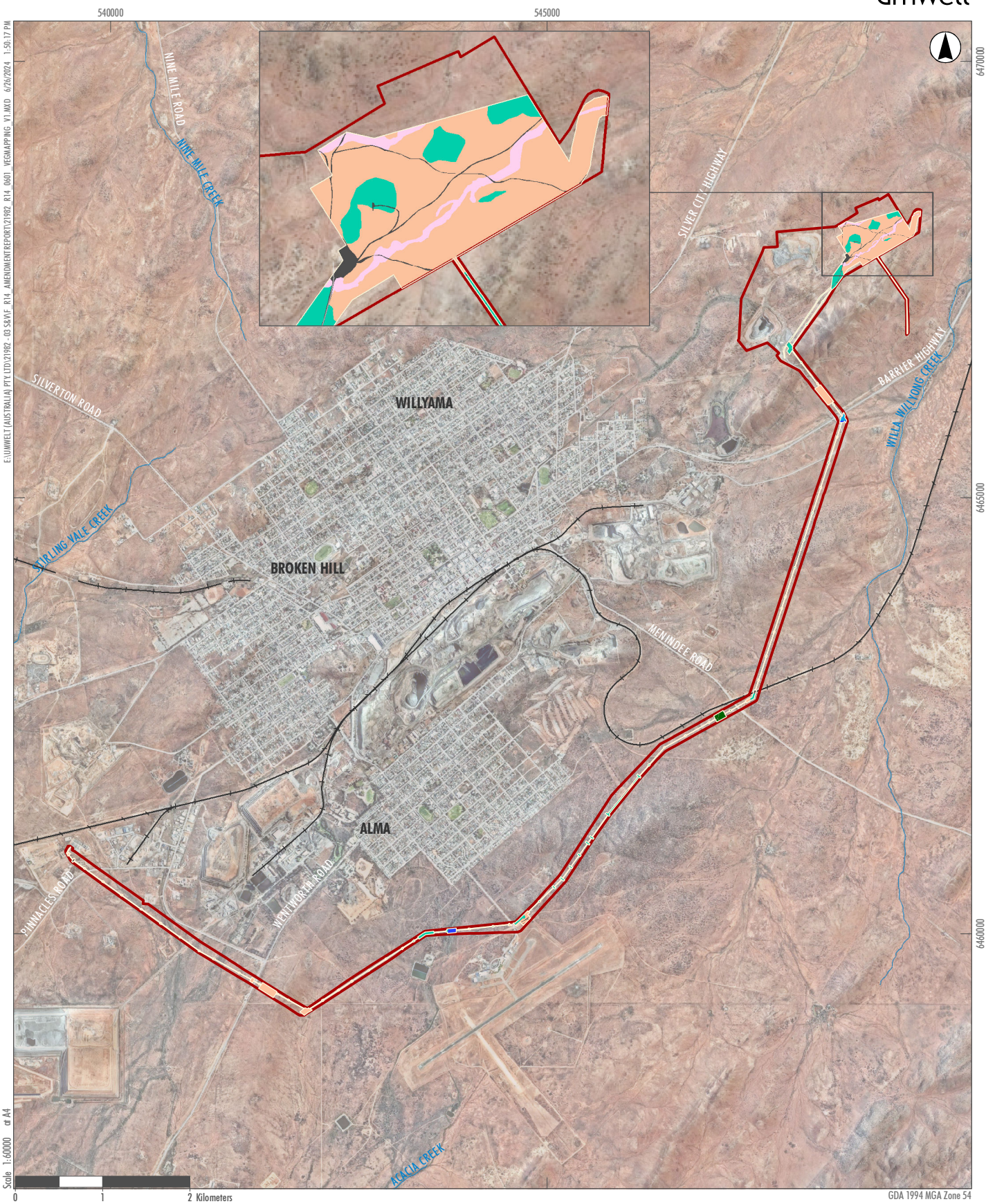
No threatened ecological communities (TECs) have been identified in the Project Area, including no TECs listed in NSW (BC Act) or at a Commonwealth level (EPBC Act).

6.1.1.2 Threatened Species

No threatened fauna species were recorded within the Project Area during the targeted surveys.

No threatened flora species were recorded within the Project Area during surveys and targeted surveys have been completed for all required threatened flora species as per the NSW Biodiversity Assessment method (BAM).

Five threatened flora species had been previously assumed present within the BDAR exhibited with the EIS for areas due to some small areas lacking adequate seasonal survey effort. These areas have been surveyed during the Submissions Phase and no threatened flora were identified, and therefore there will be no impacts to these species.



Legend

- Project Area
- Disturbance Area

Plant Community Type

- 41 - River Red Gum open woodland wetland of intermittent watercourses mainly of the arid climate zone
- 123 - Mulga - Dead Finish on stony hills mainly of the Channel Country Bioregion and Broken Hill Complex Bioregion
- 136 - Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone
- 150 - Bottlewasher - Copperburr grassland of the arid zone
- 155 - Bluebush shrubland on stony rises and downs in the arid and semi-arid zones
- 158 - Old Man Saltbush - mixed chenopod shrubland of the semi-arid hot (persistently dry) and arid climate zones (north-western NSW)
- Cleared
- Planted Street Trees

FIGURE 6.1

Vegetation Mapping

Image Source: ESRI Basemap (2021); Nearmap (2022) Data source: DPIE (2023)

6.1.1.3 Aquatic Habitat

All watercourses within the Project Area were dry during surveys and are ephemeral. Minimal to absent aquatic habitat exists within the extent of the Project Area due to the highly ephemeral watercourses.

DPI Fisheries define key fish habitat as most permanent and semi-permanent freshwater habitats up to the top of the bank, excluding headwater creeks and gullies. Within the Project Area:

- the first and second order streams along the transmission line are not key fish habitat
- third order streams may meet definition of key fish habitat as semi-permanent, following rainfall events.

The third order streams are classified as class 4 (unlikely key fish habitat) under the Guidelines for Fish Habitat Conservation and Management (DPI, 2013), that is dry gullies or shallow floodplain depressions with intermittent flow following rainfall events only, little or no defined channel, little or no flow or free-standing water. The third order streams are also classed as minimally sensitive key fish habitat being ephemeral aquatic habitat no supporting native aquatic or wetland vegetation.

6.1.2 Avoidance and Minimisation of Impacts

As discussed in the EIS, the proposed SCES Facility has been sited to reduce the level of associated new ground disturbance as far as practicable. The SCES Facility will be located within an existing brownfield mine site and will partly utilise existing mine infrastructure (access portals) and underground mining areas reducing the area of disturbance required. Additionally, three transmission alignments were considered with the proposed alignment selected based on reduced impact to biodiversity values, land use conflict (including land subject to determined Native Title) and separation from sensitive receivers including residential land use, tourism and historic heritage values.

Through further Project design and assessment, the amended disturbance area has been established for the Amended Project. Since exhibition of the EIS, the total disturbance area is now approximately 58 ha (increase of 12 ha). While the proposed disturbance area has increased, the overall size of the proposed SCES Facility has decreased, the additional disturbance is temporary disturbance associated with providing sufficient space for construction activities. These areas will be rehabilitated following completion of the construction phase.

The transmission line has an associated 50 m easement, however, given the nature of the vegetation (low height) along this proposed easement, A-CAES NSW continues to commit to limiting the removal of vegetation within the proposed disturbance area and within limited locations within the easement where vegetation is over 10 m in height (comprising PCT 41 River Red Gum Open Woodland in condition zones high weed cover and planted, along with planted street trees). This vegetation within the easement will either be removed or pruned depending on location. For the purposes of BDAR it is assumed this vegetation will be removed. The total area applicable to the easement area is approximately 80 ha, with vegetation removal limited to approximately 19 ha.

The transmission line also incorporates a low height monopole design which requires the least disturbance, with the narrow tubular design reducing the materials and footing size required for construction in comparison to a tower design.

A-CAES NSW has also committed to the development and implementation of biodiversity management measures as part of the CEMP which will include pre-clearance and tree-felling procedures, non-inhibiting fauna fencing, traffic control, weed management, fencing and access control, erosion and sediment control and workforce education and training.

6.1.3 Impact Assessment

6.1.3.1 Direct Impacts

The Amended Project will result in direct impacts on biodiversity values including the loss of native vegetation and fauna habitat as a result of clearance works required to construct the Project. **Table 6.3** and **Table 6.4** summarise the extent of proposed residual direct impacts to PCTs observed within the proposed disturbance area for the SCES Facility and the transmission line, respectively.

Table 6.3 Summary of Residual Direct Impacts for the SCES Facility

Direct impact to PCT	BC Act status	EPBC Act status	Project phase / timing of impact	Extent
123 Mulga - Dead Finish on stony hills mainly of the Channel Country Bioregion and Broken Hill Complex Bioregion	-	-	Construction Phase	**Condition zones:** **Good** = 6.23 ha **Total extent** = 6.23 ha
136 Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone	-	-	Construction Phase	**Condition zones:** **Good** = 3.32 ha **Total extent** = 3.32 ha
155 Bluebush shrubland on stony rises and downs in the arid and semi-arid zones	-	-	Construction Phase	**Condition zones:** **Good** = 27.71 ha Total extent = 27.71 ha

Table 6.4 Summary of Residual Direct Impacts - Transmission Line

Direct impact to PCT	BC Act status	EPBC Act status	Project phase / timing of impact	Extent
41 River Red Gum open woodland wetland of intermittent watercourses mainly of the arid climate zone	-	-	Construction Phase	**Condition zones:** **Derived Shrubland** = 0.05 ha **High Weed Cover** = 0.47 ha **Planted** = 0.15 ha **Total extent** = 0.67 ha
123 Mulga - Dead Finish on stony hills mainly of the Channel Country Bioregion and Broken Hill Complex Bioregion	-	-	Construction Phase	**Condition zones:** **Dieback** = 0.25 ha **Good =** 5.46 ha **Total extent =** 5.70 ha

Direct impact to PCT	BC Act status	EPBC Act status	Project phase / timing of impact	Extent
136 Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone	-	-	Construction Phase	**Condition zones:** **Disturbed- High Weed Cover =** 0.12 ha **Good =** 0.08 ha **Total extent =** 0.21 ha
150 Bottlewasher - Copperburr grassland of the arid zone	-	-	Construction Phase	**Condition zones:** **Good =** 1.05 ha **Total extent =** 1.05 ha
155 Bluebush shrubland on stony rises and downs in the arid and semi-arid zones	-	-	Construction Phase	**Condition zones:** **Disturbed =** 0.93 ha **Good =** 8.68 ha **Total extent =** 9.61
158 Old Man Saltbush - mixed chenopod shrubland of the semi-arid hot (persistently dry) and arid climate zones (north-western NSW)	-	-	Construction Phase	**Condition zones:** **Good** = 0.54 ha **Total extent =** 0.54 ha

6.1.3.2 Indirect Impact

The BDAR includes consideration of potential indirect impacts that may occur associated with the Project. These indirect impacts include habitat connectivity, light spill, noise, air quality, water and weed/pest invasion. The BDAR concludes there is potential for these impacts to occur in the areas adjacent to the direct impact areas, however, significant indirect impacts are not predicted considering the biodiversity values present, the nature of the Project and indirect impacts and the management and mitigation measures proposed. All indirect impacts are considered to be manageable with the implementation of appropriate mitigation measures proposed by A-CAES NSW.

6.1.3.3 Aquatic Ecology Impacts

Given the ephemeral nature and low quality of the aquatic habitats and considering the design controls in place as part of the Project, impacts to aquatic ecology are anticipated to be limited. Environmental management measures will be implemented to manage water flows and quality and are expected to sufficiently manage any impacts. Water and erosion management controls will be employed to minimise erosion and discharge of sediment and other pollutants during construction and operation, as outlined in Section 6.8.1 of the EIS.

6.1.3.4 Serious and Irreversible Impact

Five species identified in accordance with the NSW BAM as requiring assessment for the Project are listed as serious and irreversible impact (SAII) entities in the Guidance to Assist a Decision-Maker to Determine a Serious and Irreversible Impact (OEH 2017). These are:

- Creek Wattle (*Acacia rivalis*)
- *Convolvulus tedmoorei*

- Showy Indigo (*Indigofera longibractea*)
- Yellow-Keeled Swainsona (*Swainsona flavicarinata*)
- Creeping Darling Pea (*Swainsona viridis*).

These species were not recorded within the Project Area despite appropriately timed surveys and as such, no further assessment of these SAII entities is required.

6.1.4 Biodiversity Management and Mitigation

The CEMP and OEMP will include biodiversity mitigation and management measures comprising workforce education and training, vegetation protection zones, pre-clearance surveys and supervision of clearing works, fencing and access control, erosion and sediment controls, and weed management and fauna exclusion to prevent entrapment within proposed infrastructure areas. Further detail relating to the proposed mitigation and management measures is included in **Appendix C**.

6.1.5 Biodiversity Credit Summary

Following the application of avoidance and mitigation measures, the biodiversity assessment of the Amended Project identified that the biodiversity credits listed in **Table 6.5** are required to offset the residual biodiversity impacts of the Project.

Table 6.5 Biodiversity Credit Summary

Entity	Credits Required	
	SCES Facility	Transmission Line
PCT 41 River Red Gum open woodland wetland of intermittent watercourses mainly of the arid climate zone	-	12
PCT 123 Mulga – Dead Finish on stony hills mainly of the Channel Country Bioregion and Broken Hill Complex Bioregion	132	95
PCT136 Prickly Wattle open shrubland of drainage lines on stony rises and plains of the arid climate zone	68	4
PCT150 Bottlewasher – Copperburr grassland of the arid zone	-	13
PCT155 Bluebush shrubland on stony rises and downs in the arid and semi-arid zones	371	328
PCT158 Old Man Saltbush – mixed chenopod shrubland of the semi-arid hot (persistently dry) and arid climate zones (north-western NSW)	-	15

A-CAES NSW currently proposes to retire biodiversity credits associated with the Project through a combination of payment into the Biodiversity Conservation Fund (BCF) and generation of biodiversity credits through the establishment of a Biodiversity Stewardship Agreement (BSA). An application for a price estimate using the BCF has been submitted to Biodiversity Conservation Trust (BCT) and A-CAES NSW is aware of the costs associated with this offsetting approach. A-CAES NSW will also consult with the NSW Credit Supply Taskforce in relation to credit retirement.

6.2 Aboriginal Cultural Heritage

The Project Area falls on the land of the Wilijakai or Wiljaali people and within the Broken Hill Local Aboriginal Land Council (LALC) area.

An Aboriginal Cultural Heritage Assessment (ACHA) was undertaken by Lantern Heritage to assess the potential impact of the Project on Aboriginal cultural heritage (both archaeological and cultural) in consultation with the registered Aboriginal parties for the Project. The ACHA has been revised to address the submission received from Heritage NSW during the exhibition period of the EIS and to capture the amended disturbance area. The response to the Heritage NSW submission is outlined in Section 4.9 of the Submissions Report.

The following section provides a summary of the potential impacts of the Amended Project to Aboriginal cultural heritage and of the proposed management and mitigation measures. The revised ACHA is attached as **Appendix F**. The revised Archaeology Report is attached as **Appendix G**.

The ACHA was undertaken in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010).

6.2.1 Consultation

During the consultation process associated with the preparation of the ACHA, BHLALC requested a number of changes to the report, the draft ACHA was updated to address this request and the ACHA was finalised and submitted with the EIS for exhibition. During the exhibition period Heritage NSW provided a submission and requested further information in relation to the BHLALC submission and indicated further information was required particularly in relation to relevant contextual information on the local Aboriginal history of the region and also regarding potential cumulative impacts.

To address this issue the ACHA was updated to provide more information regarding Aboriginal history in the areas and an extensive overview of previous assessments undertaken in the region and associated impact to provide further background to the potential cumulative impacts associated with the Project.

A-CAES NSW met with the BHLALC on 6 April 2024 to discuss the Heritage NSW submission and the revised ACHA. BHLALC requested further updates to the ACHA which have been made. This included that the additional content created to provide further context in relation to the Aboriginal history of the region was deleted at the request of the BHLALC. Further detail is provided in the ACHA, refer to **Appendix F**.

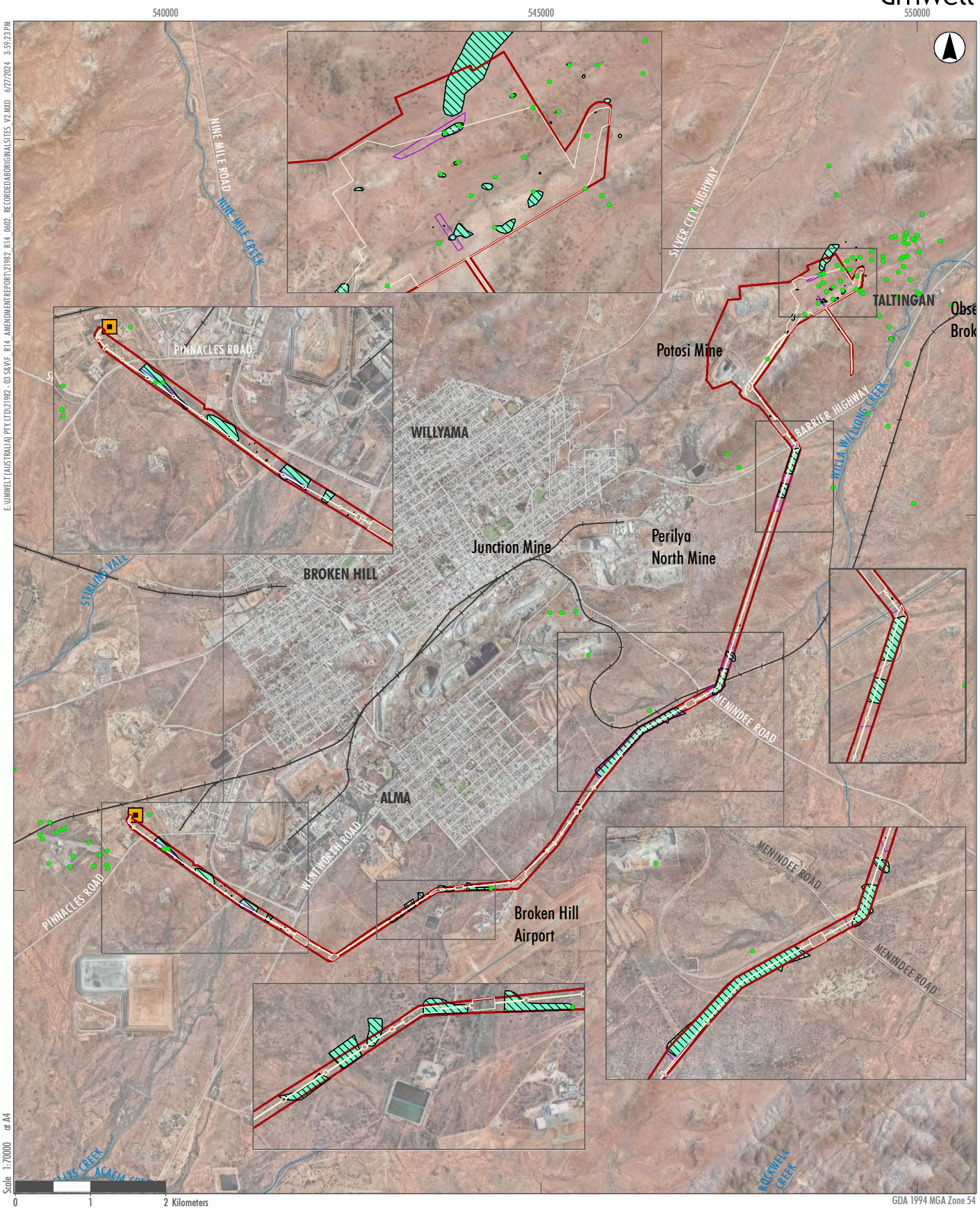
Further consultation with all Registered Aboriginal Parties (RAPs) was also undertaken via email by Lantern to advise all RAPs of the proposed amendments to the Project and request feedback during the submissions phase of the Project. No further feedback was received.

6.2.2 Survey and Test Excavation Results

A total of 65 sites were recorded during field survey, including previously recorded and newly recorded sites. Site features recorded during survey included a stone arrangement, grindstone fragments, stone artefact scatters, heat retainer hearths, stone quarries and potential archaeological deposits (PADs). Of the previously recorded sites located within the area surveyed, two hearth features and six artefact scatters could not be relocated during the survey. The recorded sites are shown on **Figure 6.2**. No additional sites have been identified since exhibition of the EIS.

A total of seventy (70) test pits were excavated across seven test zones within four landforms. The presence of artefacts was confirmed at four test zones and within three of the four landforms. 15 of the 70 pits contained artefacts, and 69 artefacts were recovered. The results of the test excavation indicate that despite the various levels of disturbance throughout the area surveyed, subsurface archaeological deposits have been shown to occur.

Based on the synthesis of the evidence collected during field survey and test excavation, the ACHA recommends a program of staged salvage with surface salvage occurring across the disturbance area and subsurface salvage within landforms with predicted high archaeological sensitivity and sites with moderate-high (or greater) archaeological potential (refer to **Figure 6.3**) are subject to a staged salvage program prior to construction.



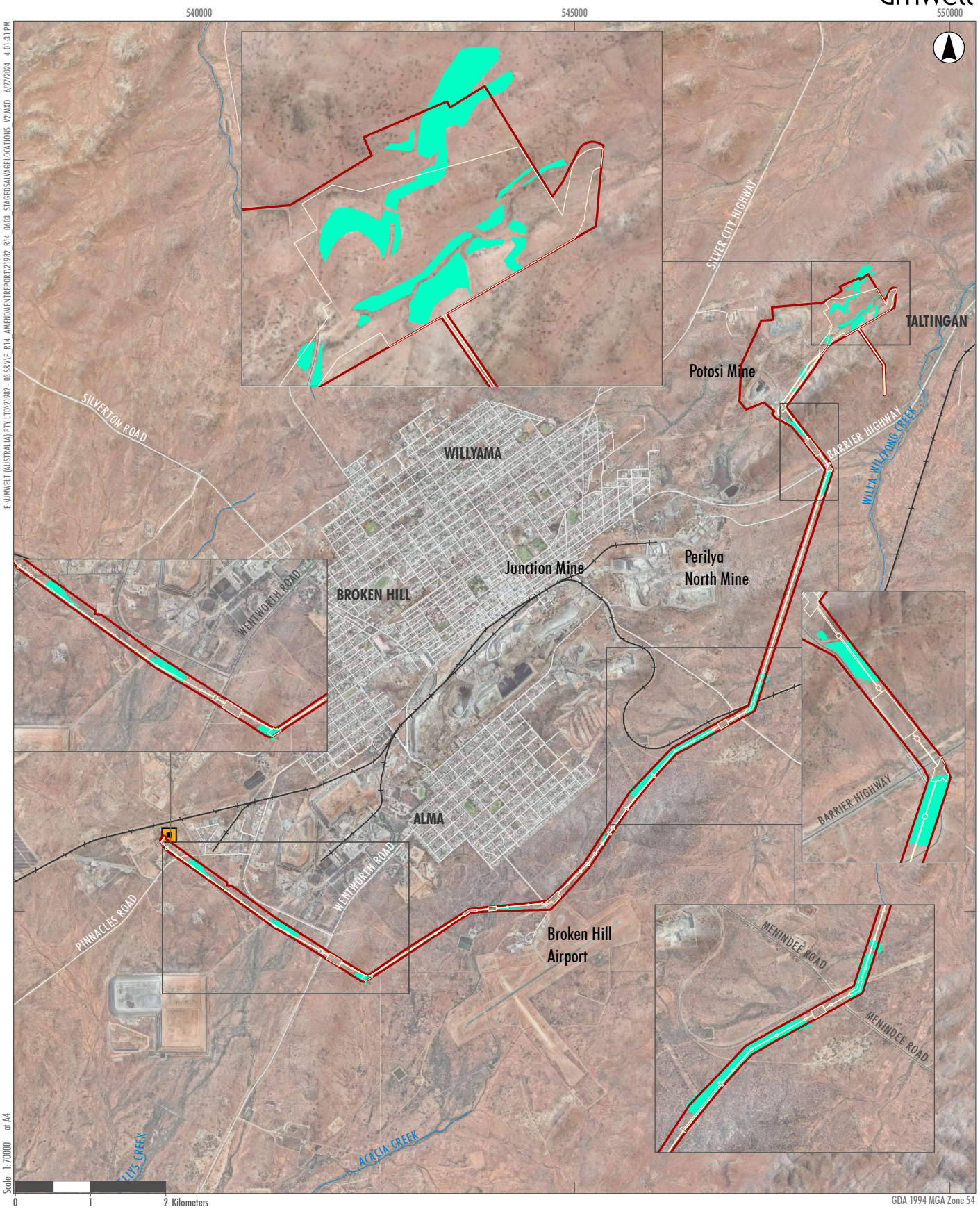
Legend

- Project Area
- Disturbance Area
- Transgrid Substation
- Drainage Line
- Railway Line
- Road
- Recorded Site and/or Site Boundary
- Test Excavation Zones
- Potential Archaeological Deposit
- Previously Recorded AHIMs Sites

FIGURE 6.2

Recorded Aboriginal Sites

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)



Legend

- Project Area
- Disturbance Area
- Transgrid Substation
- Drainage Line
- Railway Line
- Road
- Subsurface Salvage Area

FIGURE 6.3

Staged Salvage Locations

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

6.2.3 Revised Assessment of Significance and Impacts

Aboriginal cultural heritage sites are assessed under the following categories of significance, derived from the International Council on Monuments and Sites (ICOMOS) Burra Charter (ICOMOS, 2013):

- social or cultural value to contemporary Aboriginal people
- historical value
- scientific/archaeological value
- aesthetic value.

Within the context of assessing Aboriginal cultural heritage, spiritual values are often closely tied to social values. During the consultation process RAPs indicated that the Project Area is part of a broader landscape of cultural significance utilised for foraging activities. The Project Area contains archaeological sites that establish a link to these traditional cultural activities. The various sites recorded within the Project Area and the broader landscape of Broken Hill are assessed as being of high Aboriginal cultural value.

The Project Area is considered to have low-moderate historic values as part of the landscape that contributes to the overall heritage value the City of Broken Hill.

Aesthetic values within the Project Area are most identifiable in terms of the overall landscape. So, while the identified sites may not be important in terms of the aesthetics of the archaeological deposits within them, or particular Aboriginal objects that are present, the vistas from those sites located on crests and in valleys are an important component of their aesthetic values.

The revised assessed scientific values for the identified sites located during survey have been determined on the basis of the sites' rarity, representativeness, and archaeological potential. **Table 6.6** provides a summary of the archaeological significance and potential impact for recorded sites of high-moderate and low/moderate significance (excluding the 49 low significance sites). Seven sites were assessed as having moderate-high scientific significance, these sites contain high density artefact scatters, intact deposit and unusual features such as grindstone fragments or stone arrangements. No sites were assessed as high significance during the revised assessment.

Table 6.6 Archaeological Significance Assessment (excluding low significance objects)

Scientific Significance	Number of Sites	Name of sites (AHIMS number)
Low-Moderate	6	BH AFT 8 (#23-5-0173), BH AFT/HTH 15 (#23-5-0179), BH AFT/HTH 16 (#23-5-0180), BH AFT 25 (#23-4-0700), BH AFT 29 (#23-4-0702), BH AFT/HTH 51 (#23-5-0187)
Moderate	4	BH AFT 22 (#23-4-0698), BH HTH 27 (#31-1-0724), BH AFT 14 (#23-4-0178); BH AFT/HTH 19 (#23-5-0168)
Moderate-High	7	BH AFT/HTH 10 (#23-5-0174), BH HTH 26 (#31-1-0723), FD08 (#23-5-0141), BH AFT 46 (#23-5-0192), BH1-48 (#23-5-0063), South airports regency area isolated artefacts (#23-4- 0682), BH AFT 20 (#23-4-0697)

In total 34 Aboriginal archaeological sites would be impacted by the Project (reduced from 47 associated with the impact assessment presented in the EIS). The impacts outlined in the EIS were based on total impact within the Project Area, the assessment has now been updated to define the impacts of the Project associated with the amended disturbance. The 34 sites include 24 with low significance, 4 with low-moderate significance, 3 with moderate significance and 3 with moderate-high significance). The sites with moderate-high significance are located along the transmission alignment and subject to partial impact. 15 of the sites are located wholly within the disturbance area resulting in total loss of value. The remaining 19 sites extend beyond the proposed disturbance area and will only be partially impacted. For the sites within the transmission line easement, as much of the easement will be undisturbed, there will only be partial impacts to many of these sites. These impacts will be primarily related to pole construction and access tracks which will only impact discrete areas. Impacts to the sites located outside of the proposed disturbance area will be avoided.

Construction related disturbance will be contained within the proposed disturbance area, with the potential for further impact avoidance to be reviewed as part of the detailed design process, providing further avoidance of Aboriginal Heritage, as far as practicable.

6.2.4 Management and Mitigation Measures

The following mitigation and management measures have been developed based on the findings of the ACHA and the consultation process with the RAPs and are consistent with the mitigation and management measures presented in the EIS. The mitigation and management measures focus in particular on areas of high archaeological sensitivity and existing sites with predicted moderate-high or greater scientific value and include:

- Preparation of an Aboriginal Cultural Heritage Management Plan (CHMP) in consultation with the RAPs and relevant government agencies, incorporating the following mitigation and management strategies and staged salvage recommendations.
- Avoiding and conserving known sites wherever practicable:
    - Known sites outside of the proposed disturbance area will be avoided and where necessary demarcated with temporary fencing or flagging during construction.
    - Transport routes around the proposed disturbance area will be planned and managed to avoid impacting existing sites or areas of high archaeological sensitivity.
    - Relevant construction personnel will be provided with maps of site boundaries to guide avoidance activities.
    - All construction and SCES Facility workers involved in works with potential to interact with or impact on heritage values will undergo a cultural heritage induction facilitated by the Wilyakali Aboriginal corporation to communicate the importance of protecting cultural heritage, and the legal, ethical, social and practical issues involved.
- During the detailed design phase – reviewing opportunities for further impact avoidance where practicable (e.g., siting the locations of power poles to avoid existing sites and areas of high archaeological sensitivity).
- Where disturbance is unavoidable, implement a program of staged archaeological salvage.

- An unexpected finds protocol will be established and included in the CEMP and OEMP.
- In the event that Ancestral remains, or suspected Ancestral remains, are encountered during any of the proposed construction activities or salvage actions, all work must stop and the procedures outlined in the Salvage Methodology be implemented.

Further detail relating to the proposed mitigation and management measures is provided in **Appendix C**.

A staged salvage program will be undertaken prior to construction in line with the proposed CHMP. Avoidance of impacts will be prioritised during detailed design and areas requiring staged salvage will be confirmed in consultation with the RAPs with consideration of the methodology outlined in **Appendix F**.

6.3 Noise and Vibration

A Noise and Vibration Impact Assessment addendum report (NVIA Addendum) has been prepared to assess the noise and vibration in relation to the Amended Project. The EIS NVIA and the Addendum NVIA were prepared in accordance with the following guidelines:

- *Interim Construction Noise Guideline* (ICNG), NSW Department of Environment and Climate Change (DECC), 2009.
- *Noise Policy for Industry* (NPfI), Environment Protection Authority (EPA), 2017.
- *NSW Road Noise Policy* (RNP), Department of Environment, Climate Change and Water (DECCW), 2011.
- *Assessing Vibration: A Technical Guideline (the vibration guideline)*, Department of Environment and Conservation (DEC), 2006.
- Australian and New Zealand Environment Conservation Council (ANZECC) – *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*.

The Addendum NVIA is attached to this report as **Appendix H**, with a summary of the assessment results outlined in the following sections.

6.3.1 Construction Noise

6.3.1.1 Construction Noise Criteria

The NSW Environment Protection Authority (EPA) recognises that construction activities could potentially generate higher noise levels than those of an industrial operation. The Interim Construction Noise Guideline (ICNG) provides noise management criteria for construction activities. The criteria are intended to guide the need for, and the selection of, feasible and reasonable work practices to minimise construction noise impacts.

The ICNG notes that a residential receiver is 'noise affected' if the $L_{Aeq,15minute}$ construction noise level exceeds the rating background noise level by more than 10 dB during recommended standard hours. A residential receiver is 'highly noise affected' if the $L_{Aeq,15minute}$ construction noise level exceeds 75 dB(A).

During periods outside recommended standard hours, a residential area is 'noise affected' if the $L_{Aeq,15minute}$ construction noise level exceeds the rating background noise level by more than 5 dB(A).

It is noted that this level is consistent with the NPfI minimum noise criteria for operational noise. Given construction noise is temporary, this level is considered to be relatively restrictive.

A graphical representation of standard and outside standard hours (out-of-hours work (OOHW) periods) and the determination of residential receiver Noise Management Levels (NML) for each period is shown in **Figure 6.4**.

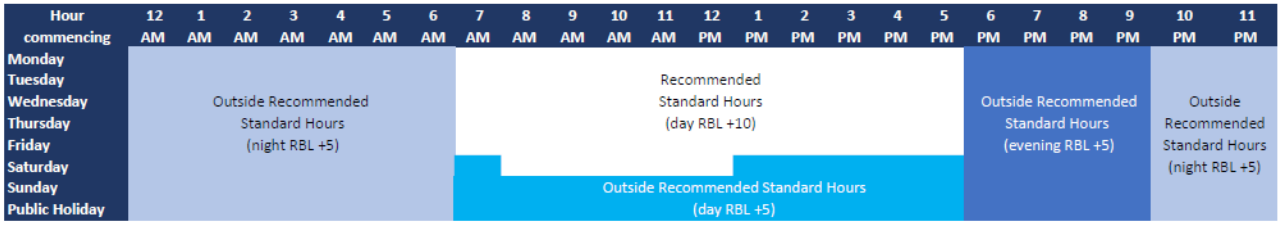


Figure 6.4 ICNG Recommended Standard Hours and Outside Recommended Standard Hours (and NML determination)

Additionally, the ICNG states the following with respect to the potential for sleep disturbance:

> *Where construction works are planned to extend over more than two consecutive nights, and a quantitative assessment method is used, the analysis should cover the maximum noise level, and the extent and the number of times that the maximum noise level exceeds the RBL. Some guidance indicating the potential for sleep disturbance is in the NSW Environmental Criteria for Road Traffic Noise (EPA 1999).*

The potential for both sleep disturbance and awakenings has been considered using a contemporary approach as nominated in the NPfI. The NPfI approach to assessing maximum noise level events for industrial noise sources at residential locations, includes a screening level test based on Project night-time noise levels exceeding:

- 52 dB(A) L_{Amax}, or
- the prevailing ambient RBL noise level by more than 15 dB, whichever is greater.

For the purposes of this assessment, the 52 dB(A) L_{Amax} parameter has been adopted to assess the potential for sleep disturbance from construction noise during the night-time period in all NCAs.

6.3.1.2 Construction Noise Modelling

Consistent with the original NVIA (Umwelt, 2023), construction noise level predictions were undertaken using the CONCAWE noise prediction algorithms. The noise models were developed using 3-Dimensional terrain data.

Construction noise levels have been predicted under the screening default worst-case noise-enhancing meteorological conditions (D-class with 3 m/s windspeed or F-class with 2 m/s windspeed). These meteorological conditions represent worst-case enhancing conditions for both standard and outside standard hour construction activities.

Construction for the Project is planned to occur over a 36-month period and will involve a range of activities along the transmission line, water pipeline and SCES facility. Some of these activities will occur simultaneously through the progression of the construction program.

A-CAES NSW provided details of the construction activities and aspects, periods of operation (i.e. day, evening, or night) and equipment numbers and types that are expected to be used for each aspect. A detailed summary of the construction activities, periods of operation and combined sound power levels for each aspect are provided in the Addendum NVIA, refer to **Appendix H**. Based on this information, five (5) construction scenarios were assessed as part of the revised assessment. The scenarios cover all of the construction aspects and address the worst-case periods of the construction program when multiple activities are occurring simultaneously.

The activities include approved rock crushing and concrete batching at the Perilya stockpile, which will be undertaken associated with the proposed construction activities. Given these activities are already approved as part of Perilya operations, the inclusion of these activities into the modelled scenarios is considered a conservative approach.

6.3.1.3 Construction Noise Modelling Results

Construction-related noise levels have been assessed at nearby sensitive receivers surrounding the project area. This included the evaluation of construction scenarios that represent the various construction activities required for the project.

Standard Construction Hours

Consistent with the findings outlined in the EIS, without the application of noise mitigation measures, the noise levels from all construction activities during standard construction hours were predicted to be greater than the applicable noise management levels at a number of sensitive receivers. The majority of these receivers are predicted to be impacted by the construction of the transmission line rather than the SCES Facility. Given the transient nature of the transmission line works, construction works will not occur in any one location for a long period of time and so potential noise impacts at any one receiver are anticipated to be short in duration.

The predicted exceedances are consistent with the EIS NIA, except in proximity to the SCES Facility. The number of exceedances in proximity to the SCES Facility has reduced and degree of exceedance has also reduced, by approximately 8 dB(A). This is attributed to the comprehensive construction activity and equipment information provided by A-CAES NSW, enabling detailed noise modelling.

No receivers were predicted to be highly noise affected.

The noise modelling results and analysis for unmitigated noise levels during standard construction hours indicate that reasonable and feasible noise mitigation measures are required to minimise the potential impacts on the communities surrounding the Project. Again, this is consistent with the findings of the EIS.

Out of Hours Construction Work

In regard to proposed OOHW for the SCES Facility, it was demonstrated that with the specific noise control measures in place, the OOHW construction noise levels are predicted to comply with the out of hours noise management levels at all non-involved sensitive receivers. As noted above, once it is operational, the SCES Facility will operate 24/7. The OOHW evening and night construction noise criteria are consistent with the operational noise criteria. That is, any work undertaken during the evening and night-time periods during construction must meet the same criteria as operations undertaken in the evening and night. In effect, the proposed changes to construction hours do not result in any greater noise impacts than those proposed for operations in these periods and A-CAES NSW has committed to manage construction noise to meet these criteria.

Whilst no exceedances are predicted for the OOHW, for best practice, it is recommended that noise verification program is carried at the commencement of the various OOHW activities/aspects and additional management and mitigation measures are proposed to address this recommendation in **Section 6.3.3**.

Other Construction Activities

Road traffic noise during the construction phase of the Project is predicted to comply with the relative increase criterion of 2 dB(A) and/or be under the RNP noise limits. Furthermore, the Project-related construction traffic noise levels, are lower than that predicted in the EIS NVIA due to the reduction in predicted construction traffic movements.

Potential impacts and findings from construction blasting and vibration, cumulative noise and decommissioning, and operational traffic, sleep disturbance and emergency equipment are consistent with the original NVIA.

6.3.2 Operational Noise

The operational noise criteria is unchanged from that discussed in the EIS, with the project noise trigger level (PNTL) for the Project for residential receivers are shown in **Table 6.7**. The PNTLs for the non-residential receivers are shown in **Table 6.8**.

Table 6.7 Project Noise Trigger Levels – Residential Receivers – LAeq(15min), dB(A)

NCA	Period [1]	Project Noise Trigger Level
NCA 1 - An area in vicinity of the SCES Facility and representing the rural areas located within 200 m of the Barrier Highway.	Day	46
	Evening	35
	Night	35
NCA 2 - An area surrounding the SCES Facility and representing the rural areas near the eastern extent of the Project.	Day	40
	Evening	35
	Night	35

Notes: 1 Day period is 7:00 am – 6:00 pm Monday-Saturday and 8.00 am-6.00 pm Sunday and Public Holidays, evening period is 6:00 pm – 10:00 pm and night period is 10:00 pm to commencement of day period.

Table 6.8 Project Noise Trigger Levels For Non-Residential Receivers – LAeq(15min), dB(A)

Receiver	Period	Project Noise Trigger Level[1]
Holiday Accommodation – R10	Day	58
	Evening	48
	Night	43
Active recreation area – R16	When in use	53
Commercial – R11, R12, R13, R14 & R15	When in use	63

Note: 1 PNTL is only applicable when the receiver is in use.

The proposed amendments to the conceptual SCES Facility layout are restricted to minor changes to the location of noise emitting equipment. There are no other proposed changes that required consideration in the NVIA Addendum (i.e. equipment type, number and noise levels, vehicle movements, hours of operation and expected equipment operational cycles will remain the same).

The location of the main noise generating equipment is relatively unchanged. The separation distance between the nearest receivers and the air compressors and air turbines has not changed. The transformers and switchyard have moved further to the south; however, the separation distance is relatively unchanged. The air-cooled exchanger has moved to the west, approximately 200 m further away from the nearest receivers.

Additional noise modelling was undertaken to determine potential noise impacts associated with the amended SCES Facility conceptual layout. The noise model incorporated updated 3-dimensional digital ground contours for the site and applied the same noise control measures applied to the original conceptual layout.

Based on the worst-case meteorological condition originally modelled (F-class with up to 0.5 m/s windspeed), predicted noise levels were determined to remain within 1 dB(A) of previous results as presented in the EIS at the nearest residential receiver locations. Further, the noise levels were predicted to comply with the day, evening and night-time PNTLs and the cumulative noise criteria at all non-involved sensitive receivers.

The risk of unacceptable noise emissions from the operation of SCES Facility based on the amended conceptual layout has been assessed and shown that the noise levels are predicted to comply with the applicable PNTLs. Additionally, A-CAES NSW has committed to achieving the PNTLs at all non-involved sensitive receivers.

6.3.3 Noise Management and Mitigation

The noise and vibration mitigation measures to be implemented during construction of the Project are identified in Section 8 of the NVIA (Umwelt, 2003) and are incorporated into **Appendix C**.

As an outcome of the updated noise assessment, an additional commitment is also proposed to undertake a noise verification program at the commencement of the various OOHW activities/aspects, this commitment has been added to the revised consolidated management and mitigation measures, refer to **Appendix C**.

6.4 Air Quality

An Air Quality and Greenhouse Gas Impact Assessment (AQGHGIA) was prepared by Airen to address the SEARs (Appendix 10 of the EIS). The AQGHGIA has been revised since exhibition of the EIS to include air quality modelling based on the detailed construction planning, to further evaluate the potential air quality impacts and confirm the required management and mitigation measures.

No changes have been made to the greenhouse gas (GHG) assessment and the proposed management and mitigation measures relating to GHG outlined in the EIS are unchanged.

6.4.1 Air Quality Criteria

The EPA has developed assessment criteria for a range of air quality indicators including particulate matter. These criteria are unchanged from the EIS and are outlined in the "*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*" (Approved Methods) (EPA, 2022). This criteria are outlined in **Table 6.9** and apply to existing and potentially sensitive receptors, where the Approved Methods defines a sensitive receptor as including "*a location where people are likely to work or reside; this may include a dwelling, school, hospital, office or public recreational area"*.

Table 6.9 EPA Air Quality Assessment Criteria

Air Quality Indicator	Averaging Time	Criterion
Particulate matter (PM_{10})	24-hour	50 µg/m^3
	Annual	25 µg/m^3
Particulate matter ($PM_{2.5}$)	24-hour	25 µg/m^3
	Annual	8 µg/m^3
Particulate matter (TSP)	Annual	90 µg/m^3
Deposited dust	Annual (maximum increase)	2 g/m^2/month
	Annual (maximum total)	4 g/m^2/month

6.4.2 Air Quality Modelling

The CALPUFF model was selected to use in the air quality modelling for the Project. This model is listed in the Approved Methods and has been used to predict ground-level particulate matter concentrations and deposition levels due to the proposed construction activities. Air quality concentrations and dust deposition levels have been modelled and the results at sensitive receptors have then been compared to the relevant air quality assessment criteria.

6.4.3 Assessment Results

Consistent with the findings in the EIS, the updated AQGHGIA found that the Project would not cause adverse construction or operational impacts with respect to dust concentrations or deposition levels, based on a risk assessment that determined a "Low" air quality risk.

Based on the air dispersion modelling results the Project would not cause adverse construction impacts with respect to dust concentrations or deposition levels, which predicted compliance with the relevant assessment criteria at all sensitive receptors. The modelling, undertaken conservatively with limited assumed mitigation measures, also showed that off-site dust concentrations and deposition levels would be well below the relevant EPA assessment criteria. Further detail and contour plots showing the spatial distribution of the model results are provided in the AQGHGIA, refer to **Appendix I**.

6.4.4 Air Quality Management and Mitigation

The Project has been determined to represent, at most, a "Low" air quality risk. This outcome as presented in the EIS, has been confirmed through detailed modelling undertaken as part of the updated AQGHGIA.

The air quality management measures, commensurate with the determined level of impact risk, have been identified as follows:

- Trafficable areas shall be clearly defined by guideposts or other suitable barriers to prevent unnecessary vehicle movement onto other areas.
- Water carts, high pressure water hoses and other approved methods shall be employed as required to dampen work areas and exposed soils, to prevent the emission of excessive dust from the site.
- A wheel washing / shaking facility shall be constructed at the access point to the site if appropriate.
- Trucks transporting material from the site shall be covered immediately after loading to prevent wind-blown dust emissions and spillages. The covering must be maintained until immediately before unloading the trucks.
- The tailgates of all trucks leaving the premises will be securely fixed prior to loading or immediately after unloading to prevent loss of materials.
- All access roads shall be surfaced in selected materials to minimise generating dust, mudstone, claystone, and shale stone shall not be used.
- Stockpile materials and exposed soils will be covered or dampened, where practicable, and mitigation devices will be installed to reduce the transfer of spoil and dust.
- Contractors will maintain all construction equipment to ensure exhaust emissions comply with the relevant Regulations issued under the relevant legislation.
- Cleared vegetation, demolition materials and other waste materials shall not be burnt on the site.
- The area of disturbed land will be minimised as far as practicable.
- Visual monitoring will be adopted to identify excessive dust generation.

The Consolidated Management and Mitigation Measures have been updated to reflect these management and mitigation measures, refer to **Appendix C**.

6.5 Traffic

Detailed construction scheduling undertaken by A-CAES NSW has resulted in a reduction in the expected traffic generation associated with the Project. The revised construction working hours have also changed the timeframe associated with the traffic movements. The Traffic Impact Assessment (TIA) has been revised to reflect this change, the results are summarised in the following sections and the revised TIA is provided as **Appendix J**.

6.5.1 Traffic Generation

Based on the detailed construction planning undertaken by A-CAES NSW the expected traffic generation associated with the Project is much less than discussed in the EIS and has been revised as follows:

- Consistent with the original assessment - up to a maximum of 424 staff in total, inclusive of transmission line works – maximum (peak) movements arriving at start of shift and departing at end of shift, although transmission line works shifts would not coincide with SCES site works shifts. The assessment assumes 90% of the workforce will be sourced from outside the region and will utilise the workers accommodation facility, the assessment has been revised based on this to account for staff using private vehicles (24 light vehicle trips per day) as well as A-CAES NSW providing a shuttle service (36 bus movements per day).
- Up to 44 non-OSOM heavy vehicles (12 heavy vehicle trips for the SCES facility works and 32 heavy vehicle trips for the transmission line works) per day spread out across a working day. The original assessment contemplated 34 vehicle trips per day. The additional movements are associated with detailed construction planning indicating additional vehicle movements associated with the transmission line.
- Up to two OSOM vehicle trips per day (one single load per day) outside of background peak traffic periods. The original assessment contemplated up to 24 OSOM vehicle trips per day.

Traffic generation used in the TIA adopts the highest use case scenario for each of the heavy vehicle and light vehicle (construction staff) trip generation to provide a conservative (high) figure. The highest use case scenario traffic generation also assumes that peak heavy vehicle generation coincides with peak construction staff numbers.

6.5.2 Assessment of Traffic Impacts

6.5.2.1 Road Network

As outlined in the EIS, the existing intersection operations along the proposed transport routes were all observed to have significant spare capacity with minimal queuing or congestion. A capacity analysis of the intersections found that all are currently operating at level of service (LoS) A with very low average delays per vehicle travelling through the intersection.

Once the Project's traffic generation is added to the current traffic flows, the TIA found that all relevant intersections will remain at LoS A with average delays of less than 10 secs per vehicle. This demonstrates that operating conditions along the proposed transport routes' road network would only change marginally from existing conditions, as a result of the Project.

The addition of heavy vehicles and construction staff traffic during peak construction periods associated with the Project is able to be readily absorbed by the relevant road network and intersections. The significant reduction in light vehicles and OSOM vehicle traffic (in comparison with the original TIA) has decreased the predicted insignificant traffic impacts identified in the original TIA. Minor increases to heavy (non-OSOM) vehicles have resulted in no change to the traffic impacts identified in the TIA, the minor increase of heavy (non-OSOM) vehicles does not exceed the total overall OSOM and non-OSOM movements previously anticipated in the original TIA.

Access locations along the transmission alignment have also been reviewed and all potential locations have significant spare capacity with relatively low traffic volumes and relatively wide roads / streets for access.

In conjunction with the relatively minor traffic generation at these works' locations (maximum (during peak construction period of some 30 light vehicles and 32 heavy vehicles daily), the TIA found that road safety and access will not be adversely affected to any significant degree because they are to be located where suitable sight distances exist and, where relevant, will be suitably setback from level crossings to provide adequate storage / stacking space for the largest vehicle using the access.

6.5.2.2 SCES Facility Access

The TIA found that the existing highway intersection with Silver Peak Road, as well as Silver Peak Road itself, will be suitable to allow all relevant construction vehicles (including OSOM vehicles) to safely exit and enter the public road network (Barrier Highway) whilst minimising disruption to traffic and maintaining road safety. Again, the significant reduction in light vehicle, standard heavy vehicle and OSOM vehicle traffic (in comparison with the EIS TIA) means that the existing Barrier Highway intersection with Silver Peak Road is predicted to operate efficiently and safely. Available sight distance along the Barrier Highway at the Silver Peak Road junction is in excess of 500 m in both directions, which is satisfactory for the 110 km/h speed limit along the highway.

During construction, the TIA found that the increased traffic generation and in particular, the higher turning movements to/from the highway at Silver Peak Road would not warrant any significant intersection upgrade treatments.

6.5.2.3 Cumulative Traffic Impacts

The construction phase of the Project has the potential to result in cumulative impacts including those associated with traffic and transport. Interactions with the existing Perilya mining operations represent a key potential cumulative impact consideration for the Project. It is noted that the Perilya operations are existing and so traffic movements associated with these operations have already been considered in the transport assessment as part of existing traffic.

Other current mining operations including the operational Perilya North Mine and Junction Mine, as well as current operations at the Silverton Wind Farm, Broken Hill Solar Plant, Broken Hill Airport (particularly for transmission line construction), Outback Astronomy and Broken Hill Battery Energy Storage System have been included in the transport assessment as part of existing traffic conditions, as per the Perilya mining operations. The TIA found that these operations are not anticipated to change traffic movements to any significant extent.

Potential cumulative impacts may result from proposed (under assessment) projects such as the Broken Hill Cobalt Blue Project, the Blue Bush Project and Hawsons Iron Ore Project dependent on their timing, it has also been reported that these projects have been significantly scaled back, however detail is not currently available. Assuming the worst-case scenario that all three projects are in the construction phase at the same time and that all trips travel along the same routes, the cumulative daily traffic movements could increase by approximately 970 light vehicle trips and 170 heavy vehicle trips in addition to the Project's traffic generation. This would significantly increase traffic throughput along the Broken Hill urban area road network. However, because of the significant spare capacity available, the TIA found that it is anticipated that only up to approximately 50% of road network capacity would be utilised in the worst case.

6.5.3 Mitigation and Management Measures

Consistent with the EIS, A-CAES NSW has committed to the development and implementation of a CEMP which will include a detailed Construction Traffic Management Plan (CTMP). The CTMP will address the management and mitigation of potential traffic related impacts.

The management of potential traffic impacts during the construction phase will include:

- Engaging a licensed and experienced transport contractor with experience in transporting OSOM component loads.
- Securing all relevant transport permits and approvals prior to commencement of construction.
- Developing and implementing a comprehensive CTMP in consultation with Broken Hill City Council and the relevant road authorities.

The CTMP will detail appropriate construction traffic controls and management measures including the following (refer also to the CTMP Framework as drafted in Appendix 11):

- Details of transport routes and traffic types to be used for Project related component and material delivery.
- Details of the measures that would be implemented to minimise traffic safety issues and disruption to local users of the transport route(s) during construction or decommissioning works, including, but not limited to, the following:
    - temporary traffic controls, including detours and signage
    - notifying the local community about Project-related traffic impacts
    - minimising potential for conflict with school buses, stock movements and rail services
    - implement measures to minimise development-related traffic on the public road network outside of standard construction hours
    - implement measures to minimise dirt tracked onto the sealed public road network from Project-related traffic
    - providing that loaded vehicles entering or leaving the site have their loads covered or contained
    - providing sufficient parking on-site for all Project-related traffic

- responding to any emergency repair or maintenance requirements during construction and/or decommissioning
- a traffic management system for managing OSOM vehicles
- complying with the traffic conditions in the Development Consent.

- Include a Drivers' Code of Conduct.
- Include a 'carpool' initiative and provide shuttle bus services for construction staff from the Broken Hill urban area to minimise the impact of vehicle movements.

To address cumulative transport-related impacts, during the detailed design phase, the construction timeframe will be finalised with consideration of any overlapping timeframes and potential transport impacts resulting from other projects. Should the other projects overlap with the construction phase of the Project, mitigation measures that would be considered to address cumulative transport impacts include:

- scheduling of construction activities and deliveries for each project so that any overlap is suitably managed in order to minimise road transport movements along shared transport routes
- consultation with project developers / construction companies to seek to minimise impacts
- engagement in any region-wide traffic management in conjunction with relevant road authorities, e.g. Council and TfNSW
- targeted dilapidation and reinstatement programs
- collective community consultation programs.

For management of potential impacts during the operations phase, the key measure would be the ongoing maintenance of the internal on-site road access network.

For the decommissioning phase, an updated CTMP would be developed during the preparation of a Project Decommissioning Management Plan (two years prior to closure) to address decommissioning phase traffic impacts.

6.6 Surface Water

As discussed in **Table 6.1**, the only aspect of the Amended Project relating to water that required assessment was flooding. An addendum to the original Surface Water Impact Assessment (SWIA) has been prepared by Torrent Consulting to revise the flooding impact assessment to accommodate the amended Project design including the revised creek diversion design and the addition of Probable Maximum Flood (PMF) estimates. The addendum report is attached as **Appendix K**, with the results summarised in the following sections.

6.6.1 Flooding Assessment

Flood modelling of the Project Area was completed using a two-dimensional (2D) TUFLOW flood model. The model provides estimates of flood levels, depth, velocities and flood hazard for each of the modelled design events. The hydraulic model was run for both existing and climate change conditions. Climate change modelling was undertaken using the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood-producing rainfall events due to climate change.

A flood investigation was undertaken for a range of design flood magnitude events including the 5%, 1%, 0.5% and 0.2% AEP (Annual Exceedance Probability) and Probable Maximum Flood (PMF). AEP is a measure of the likelihood a flood level or flow will be equalled or exceeded in any given year.

The 5%, 1%, 0.5%, 0.2% AEP and PMF events were assessed considering flood depth, velocity and hazard levels for the existing case (without the Project) and proposed case (with the Amended Project). Modelling has shown the entire Project Area to be of relatively low flood risk.

For all of the events up to the 0.2% AEP magnitude, with the Project there are minor changes to existing flood conditions. Within the proposed disturbance area there are minor changes to the flow distribution arising from the modified topography and on-site changes in the overland flow paths from the natural gully lines. In the receiving northern and southern channels downstream there are small reductions in peak flood level. This is attributable to the proposed minor surface water capture (e.g. reservoir freeboard, localised depressions) resulting in small reductions in peak flow. The corresponding changes in peak flood velocity also show minor changes, with typically small reductions to peak velocity in line with the flow reduction.

Changes in peak flood level and velocity are more extensive for the PMF event associated with the higher peak flows. On the northern channel alignment there are again only minor changes in peak flood condition associated with the on-site water capture and subsequent minor reduction in peak flow. Irrespective of these minor flow reductions, the Project does not provide any significant encroachment into the northern channel inundation extents and accordingly the Project has negligible impact on this flow environment.

The areas impacted on the southern channel are predominantly related to the proposed diversion channel and associated change in flow distribution. The impacts are most significant where the diversion rejoins the natural channel alignment. The discharge at the diversion channel outlet concentrates flow in a more northerly alignment compared to the existing flow distribution. This provides for increase in peak water level and flow velocity along the northern part of the flow path alignment and corresponding reduction along the southern part downstream of the existing dam. The magnitude of the peak flood level and velocity change dissipates further downstream, with flow conditions back similar to the existing flow distribution at the confluence of the northern channel. Minor increases in water level (<0.1 m) and velocity (<0.25 m/s) extend towards the downstream model boundary, with these not being significant at the PMF level. It is noted that these impacts would reduce further once the local catchment flows combine with the Willa Willyong Creek flows.

The modelled maximum impacts to water level and velocities in the northern and southern channel are provided in **Table 6.10** for the modelled design flood events. The bracketed velocity value is the corresponding existing conditions velocity at the same location to appreciate the relative change and increased scour potential.

Table 6.10 Proposed Case Changes in Peak Water Level and Velocity

Event	Northern Channel		Southern Channel	
	Maximum Change in Water Level (m)	Maximum Increase in Velocity (m/s)	Maximum Change in Water Level (m)	Maximum Change in Velocity (m/s)
5% AEP	-0.08	-0.15 (0.5)	0.01	0.2 (0.5)
1% AEP	-0.08	-0.10 (0.8)	0.03	0.3 (0.6)
0.5% AEP	-0.05	-0.08 (0.9)	0.04	0.4 (0.6)
0.2% AEP	-0.02	-0.05 (1.0)	0.05	0.4 (0.7)
PMF	-0.02	-0.04 (1.8)	0.16	1.4 (1.2)

The nature and extent of flooding within the Project Area provides for relatively low flood risk to both infrastructure and risk to life. The minimal change to existing flood conditions as a result of the Project does not warrant consideration of specific flood management measures to address potential impact on property risk and risk to life, and additionally, there are no buildings or structures along the drainage lines in the vicinity of and downstream of the Project Area.

The results of the flooding assessment are generally consistent with the EIS findings with the updated results indicating that in general less than 160 mm localised increase in water levels and less than 1.5 m/s increase in velocities are predicted as a result of the Project at the PMF level, with relative impacts considerably reducing for the lower order flood events. These impacts are considered to be minor and are also localised adjacent to the Project Area and within the channel, and additionally, there are no buildings or structures along the drainage lines in the vicinity of and downstream of the Project Area. As such, mitigation measures are not considered necessary, however stream stability monitoring is proposed.

The detailed design of the diversion channel and outlet transition is expected to appropriately consider scour risks and incorporate appropriate design measures (e.g. bed/bank rock protection, energy dissipation).

Through the implementation of appropriate surface water management measures as part of the CEMP, and constructing the surface facilities above the flood planning level and constructing the stream diversion to accommodate the 1% AEP peak flow storm event, it is considered that the Project is unlikely to have any material residual impacts on flooding or stream stability.

6.7 Visual

The revised layout results in minor changes to potentially visible infrastructure within the SCES Facility. Therefore, the visual analysis and photomontages have been amended to reflect this change (refer to **Section 6.7.1**).

In addition, a detailed lighting impact assessment has been prepared to assess the potential lighting impacts associated with the SCES Facility, particularly the potential lighting impacts on the operation of the Outback Astronomy to address the concerns raised by the owners of the Outback Astronomy in their submission on the Project (refer to **Section 6.7.2**).

6.7.1 Visual Assessment

The detailed visual impact assessment for the Project was outlined in Section 6.12 of the EIS. As outlined in the EIS, given the scale of the proposed infrastructure and expanse of the Project Area, parts of the Project (primarily the transmission line) will be visible, however, through siting and Project design the visual impact has been reduced as far as practicable. Overall, the Project is assessed as having low visual impacts.

The Project was not predicted to impact on the existing visual character, which, in the areas where the Project will occur, is dominated by existing mining/industrial land uses. Due to surrounding topography and distance, views of the proposed SCES Facility from sensitive receivers are restricted and therefore no material visual impacts were predicted associated with the SCES Facility.

No change to the proposed transmission line infrastructure is proposed so the review of the visual assessment has focused on the amended SCES Facility layout. As discussed above, the amended design of the SCES Facility has a reduced height compared to the conceptual design presented in the EIS.

6.7.1.1 Assessment Methodology

Consistent with the EIS, the following representative assessment locations were selected based on being representative or having the highest potential for visual impact relevant to the SCES Facility. The relevant visual assessment locations (viewpoints 1, 2 and 3) are shown on **Figure 6.5** and described below. Note viewpoints 4, 5 and 6 relate to the proposed transmission line and have therefore not been further considered in this updated assessment.

Viewpoint 1 – Line of Lode Lookout – the Line of Lode is the mineral deposit that runs through the centre of Broken Hill, the appearance of this area is characterised by extensive mining operations and associated infrastructure. The Line of Lode lookout is located on top of a large overburden emplacement area, created by historic mining activities, located in the centre of Broken Hill City. The Line of Lode is the centre of the historic mining precinct of Broken Hill. This viewpoint represents potential views of the Project (both the SCES Facility and the Transmission Line) from a scenic/significant vista, this location is also a heritage listed item. The Line of Lode Lookout is orientated towards the Broken Hill City Centre (away from the Proposed Transmission Line) and is located approximately 6 km from the proposed SCES Facility.

Viewpoint 2 – Barrier Highway directly east of the proposed SCES Facility – representing views of the facility from the closest residential receivers, the Outback Astronomy (star-gazing business) and the closest public vantage point (being the Barrier Highway).

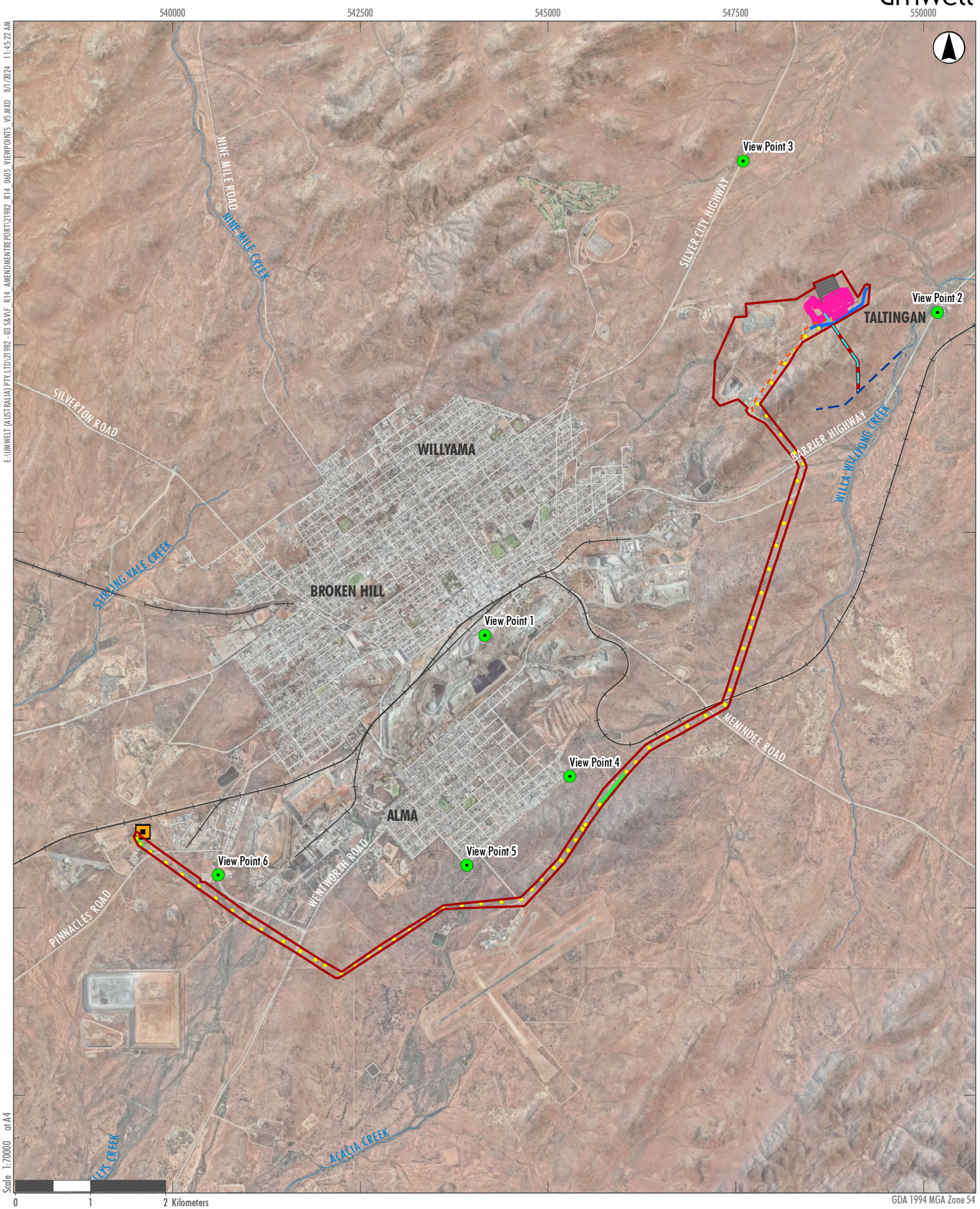
Viewpoint 3 – Silver City Highway directly west of the proposed SCES Facility – representing views of the SCES Facility from public vantage points (Silver City Highway) and residential/commercial properties to the west.

6.7.1.2 Radial Analysis

For each viewpoint location radial analyses were developed using 3D topographic information and the electronic Project layout to identify what can theoretically be seen from each vantage point. The radial analysis illustrates what is visible from a height of 1.7 m at that location (i.e. from approximate eye height). It should be noted that the radial analyses are based on topography only and do not include vegetation and existing built infrastructure that may screen the viewshed, so are considered conservative and to inform the identification of potential viewpoints and further detailed assessment.

6.7.1.3 Photomontages

Photomontages were completed for selected viewpoint locations consistent with the methodology used in the EIS. The photomontages presented in the EIS provided a 'before and after' project scenarios to illustrate the existing landscape and provide a comparison landscape including the Project infrastructure. For the purposes of this assessment the photo frame includes the indicative location (with white box outline shown on the photo) of the infrastructure given its limited visibility. For the purposes of this revised assessment the photomontage has been updated to show 'before' being the layout as proposed in the EIS and the amended layout, for comparison.



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Transmission Pole Location
- Proposed Transmission Line (Underground Section)
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Access Road
- Drainage Line
- Railway Line
- Road
- Viewpoint

FIGURE 6.5

View Points

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

6.7.1.4 Visual Assessment Results

Based on the results of the original visual assessment including radial analysis, fieldwork and 3D modelling, views of the proposed SCES Facility will be limited, these results remain the same for the Amended Project. Due to the intervening topography, views of the proposed SCES Facility from both public and private vantage points will be limited. As noted in the EIS, the extent of visibility of the proposed SCES Facility during both construction and operation will be similar, with limited views available, however, some larger machinery including cranes may be required during construction which may be visible.

An assessment of the representative viewpoints relevant to the proposed SCES Facility and amended layout is provided below.

Viewpoint 1 – Line of Lode Lookout

The Line of Lode Lookout is orientated to the north of Broken Hill and provides views over the north, west and east of Broken Hill (refer to **Figure 6.6**). Views to the northeast where the proposed SCES Facility is located (approximately 6 km from the lookout) are restricted by intervening topography and the proposed infrastructure (as amended) is not expected to be visible from this location.

Viewpoint 2 – Barrier Highway directly east of the proposed SCES Facility

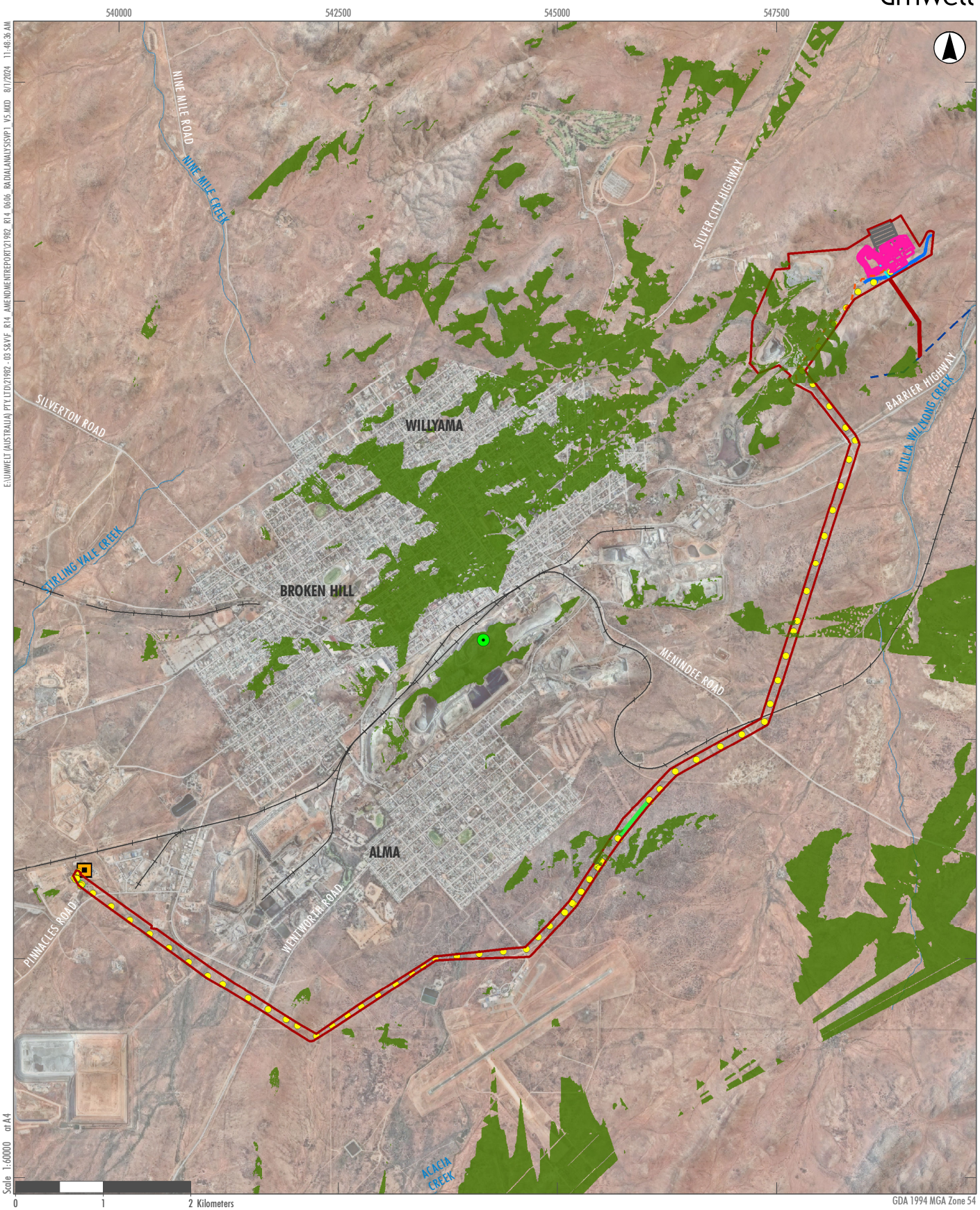
The radial analysis (refer to **Figure 6.7**) indicates that based on analysis of topography alone, the proposed SCES Facility will be visible from Viewpoint 2 which is representative of the views from the closest public viewpoint (the Barrier Highway) and the closest residential viewpoints being (R1) the closest dwelling and (R2) the Outback Astronomy.

The photomontage (refer to **Figure 6.8**) demonstrates that consistent with the layout presented in the EIS, the existing topography, vegetation and distance are predicted to obscure the SCES Facility from view. Given the limited views of the SCES Facility the potential visual impact from viewpoint 2 is considered low.

Viewpoint 3 – Silver City Highway directly west of the proposed SCES Facility

The radial analysis (refer to **Figure 6.9**) indicates the proposed SCES Facility is not predicted to be visible from Viewpoint 3 which is representative of the views from potential public viewpoint (the Silver City Highway) and residential and commercial properties located to the west of the proposed SCES Facility.

The photomontage (refer to **Figure 6.10**) demonstrates that the existing topography and distance will obscure the infrastructure from view, consistent with the findings presented in the EIS. Some aspects of the SCES Facility may be visible from locations along the Silver City Highway, however, these views would be predominately from moving vehicles and predominately obscured by the landscape. Due to the decreased height of the proposed infrastructure, the extent of these potential views are reduced from those associated with the EIS layout.



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Transmission Pole Location
- Proposed Transmission Line (Underground Section)
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Access Road
- Drainage Line
- Railway Line
- Road
- Viewpoint
- Visible Area from Viewpoint

FIGURE 6.6

Radial Analysis
View Point 1

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Tranmission Pole Location
- Proposed Transmission Line (Underground Section)
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Access Road
- Drainage Line
- Railway Line
- Road
- Viewpoint
- Visible Area from Viewpoint

FIGURE 6.7

Radial Analysis View Point 2

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

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EXISTING



AS PRESENTED IN THE EIS



AMENDED PROJECT



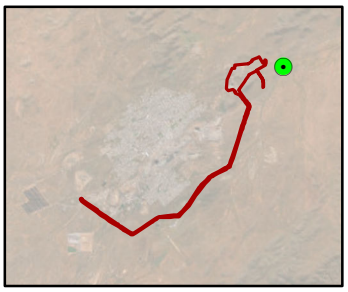


FIGURE 6.8

Photomontage
View Point 2

Image Source: Visual Subconsultant (2023)



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Transmission Pole Location
- Proposed Transmission Line (Underground Section)
- Transgrid Substation
- Proposed Creek Diversion
- Existing Stephens Creek Reservoir Water Pipeline (above ground section)
- Proposed Above Ground Water Pipeline
- Access Road
- Drainage Line
- Railway Line
- Road
- Viewpoint
- Visible Area from Viewpoint

FIGURE 6.9

Radial Analysis
View Point 3

Image Source: ESRI Basemap (2022); Nearmap (2022) Data source: DFSI (2023)

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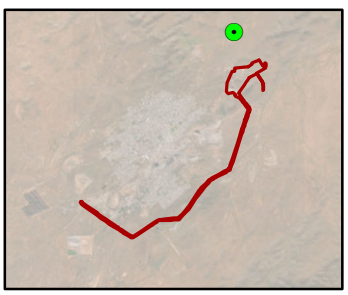


FIGURE 6.10

Photomontage
View Point 3

Image Source: Visual Subconsultant (2023)

6.7.1.5 Visual Assessment Summary

Consistent with the visual assessment presented in the EIS, overall, the Project is assessed as having low visual impact and is not predicted to impact on the existing visual character, which, in the areas where the Project will occur, is dominated by existing mining/industrial land uses. Due to surrounding topography and distance, views of the proposed SCES Facility from sensitive receivers are restricted and therefore no material visual impacts are predicted associated with the SCES Facility.

6.7.1.6 Visual Mitigation and Management

Project design has sought to address potential impacts though the siting of the proposed SCES Facility and the route of the proposed transmission line, including reducing the potential for visual impacts. To assist with further minimising the potential visual impacts associated with the Project, the following management controls and further detailed design will be implemented:

- Temporary disturbance required during construction will be rehabilitated as soon as practicable following the completion of construction.

6.7.2 Lighting Impact Assessment

A detailed lighting design has been prepared for the SCES Facility and a Lighting Impact Assessment has also been prepared by Pendoley Environmental – Artificial Light Assessment Services, refer to **Appendix L**. This detailed assessment has been undertaken by A-CAES NSW to address the concerns raised by the Outback Astronomy business which is located on the highway to the east of the facility and the east of Broken Hill.

As outlined in the EIS, minimal lighting is required for the operation of the SCES Facility with no lighting proposed at height. Through the modelling undertaken to inform the Lighting Impact Assessment the following additional mitigation measures have been committed to for the Project to further minimise the potential lighting impacts:

- Only 3 security lights at the perimeter of the SCES facility will be active at all times.
- All other lighting will utilise smart sensors to only activate lighting when required for use.
- Colour temperature of lighting reduced where practicable.

The scope of the Lighting Impact Assessment included:

- Benchmark Artificial Light at Night (ALAN) Survey:
    - To establish current artificial light levels at relevant locations. This included a light survey from north and south positions of the Outback Astronomy to establish current lighting levels and benchmark for assessment.
- Artificial light modelling of proposed lighting design:
    - light monitoring results were utilised to model the contribution of the SCES Facility to the local sky glow and light overspill relative to the other industrial light sources in the area to address cumulative contributions

- model output is used to predict a target overhead sky quality at selected locations
- determination any recommendations on further mitigation measures.

A summary of the key findings of the lighting assessment is included in the following sections.

6.7.2.1 Artificial Light Survey

The artificial light survey took place over four nights on the new moon between 7 and 11 March 2024. Surveys must be conducted on moonless nights for accurate artificial light benchmarks and to allow for future comparison against darkest conditions. The survey captured all-sky imagery from two locations to the north and south of the Outback Astronomy.

The artificial light data captured was processed to determine the “zenith”, “whole-of-sky”, and “horizon” sky brightness levels. Zenith is the mean value of sky glow directly overhead and within the 0 – 30° inner band (i.e. looking up). The whole-of-sky (WOS) is the mean value of sky glow in the entire image, and horizon is the mean value of sky glow within the 60–90° outer band.

To give the measured light levels some meaning relevant to the visibility of the night sky, they have been compared to the bortle scale. The bortle scale splits light levels into nine different bands, known as Bortle classes, which are used as a guide for how much light pollution is impacting on the night sky based on the visibility and brightness of stars to humans, refer to **Figure 6.11**. A lower Bortle class number means better night sky viewing conditions (i.e. less light pollution and better visibility of stars), whereas a higher Bortle class indicates worse viewing conditions).

Based on the recorded zenith brightness values, the current sky brightness at the Outback Astronomy survey locations fall within Bortle Class 4. This implies an existing reduction in visibility of details in the Milky Way and is equivalent to a rural/suburban transition quality night sky. Further, the only existing light source identified during the benchmark survey was the town of Broken Hill which is visible as a large light dome on the south-west horizon, and extending over an approximate bearing of 210 – 260° refer to **Figure 6.12**.

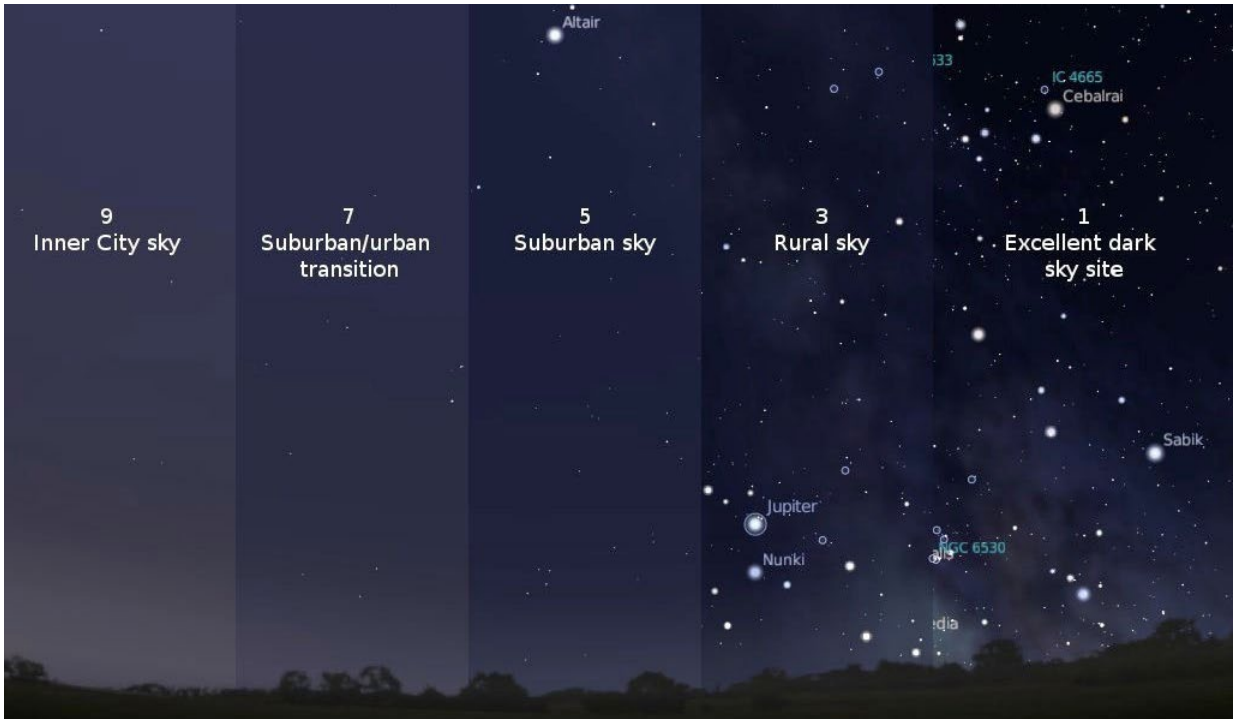


Figure 6.11 Bortle Scale Showing the Changes in Night Sky Quality Between Bortle Classes

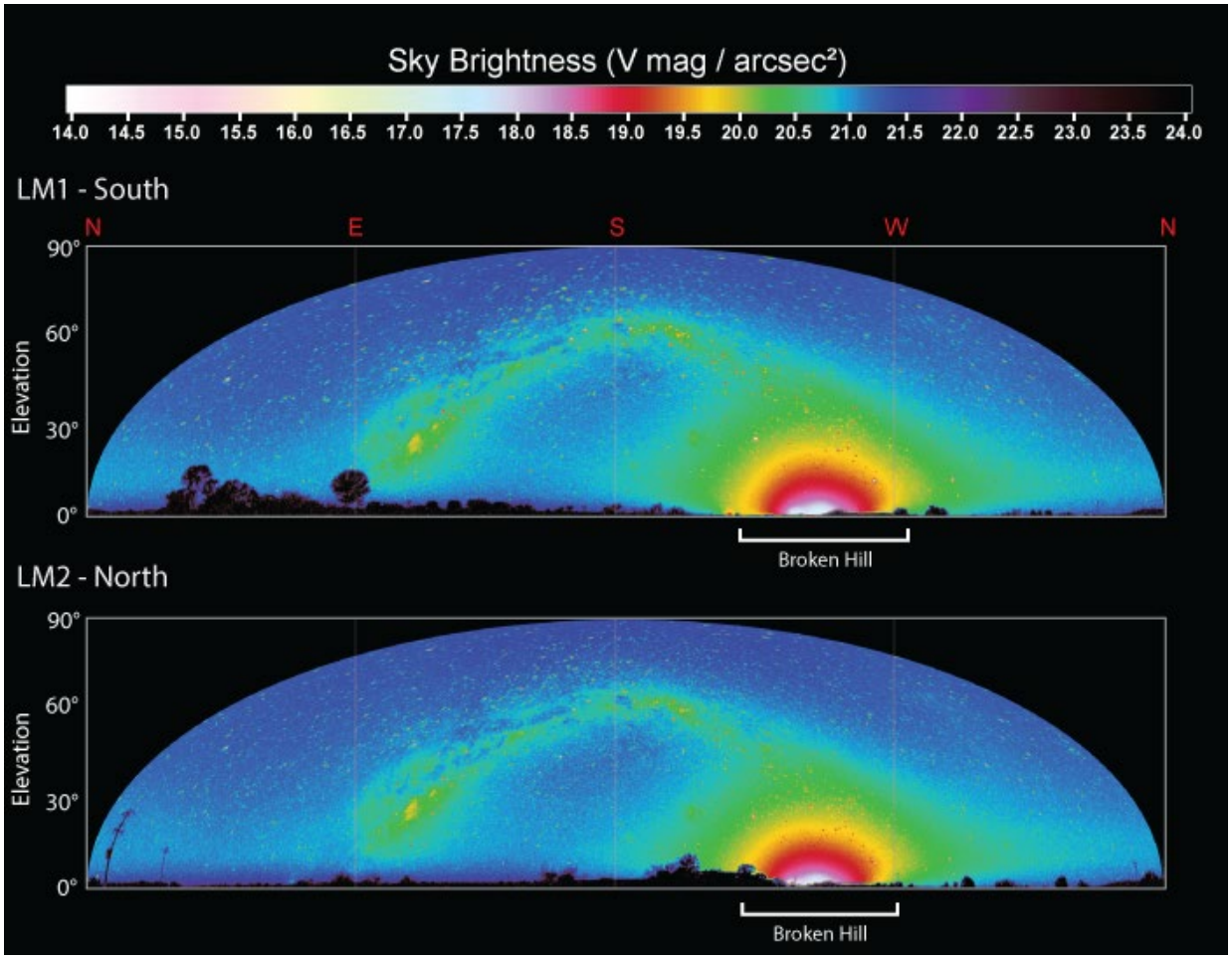


Figure 6.12 All-Sky Benchmark Imagery Captured from each Monitoring Location

6.7.2.2 Modelling Results

Modelling was completed for each location for two scenarios which were based on the lighting inventory before and after mitigation:

- Scenario 1 – Base case lighting without mitigation, all lighting is active throughout the night
- Scenario 2 – Proposed design - normal lighting conditions, with mitigation measures applied.

The monitoring and modelling data was combined to predict the cumulative lighting environment.

For the unmitigated scenario (without proposed refined lighting design and mitigation), the SCES Facility appears as a bright source of sky glow on the westerly horizon, comparable in brightness and extent to the town of Broken Hill, given that it while being substantially closer. For the proposed scenario (with the proposed refined lighting design and mitigation) the SCES Facility is visible as a small source of sky glow on the westerly horizon, substantially dimmer in brightness and extent when compared to the town of Broken Hill, refer to **Figure 6.13**.

The assessment found that for both monitoring locations and scenarios there was no significant change in zenith brightness (that is the overhead sky) and therefore no change in Bortle classification, due to SCES Facility lighting, with the impacts substantially reduced with the proposed mitigation in place.

Overall, the Lighting Assessment found that the risk of impact on the sensitive receptor (Outback Astronomy) is considered low with the proposed mitigation measures applied.

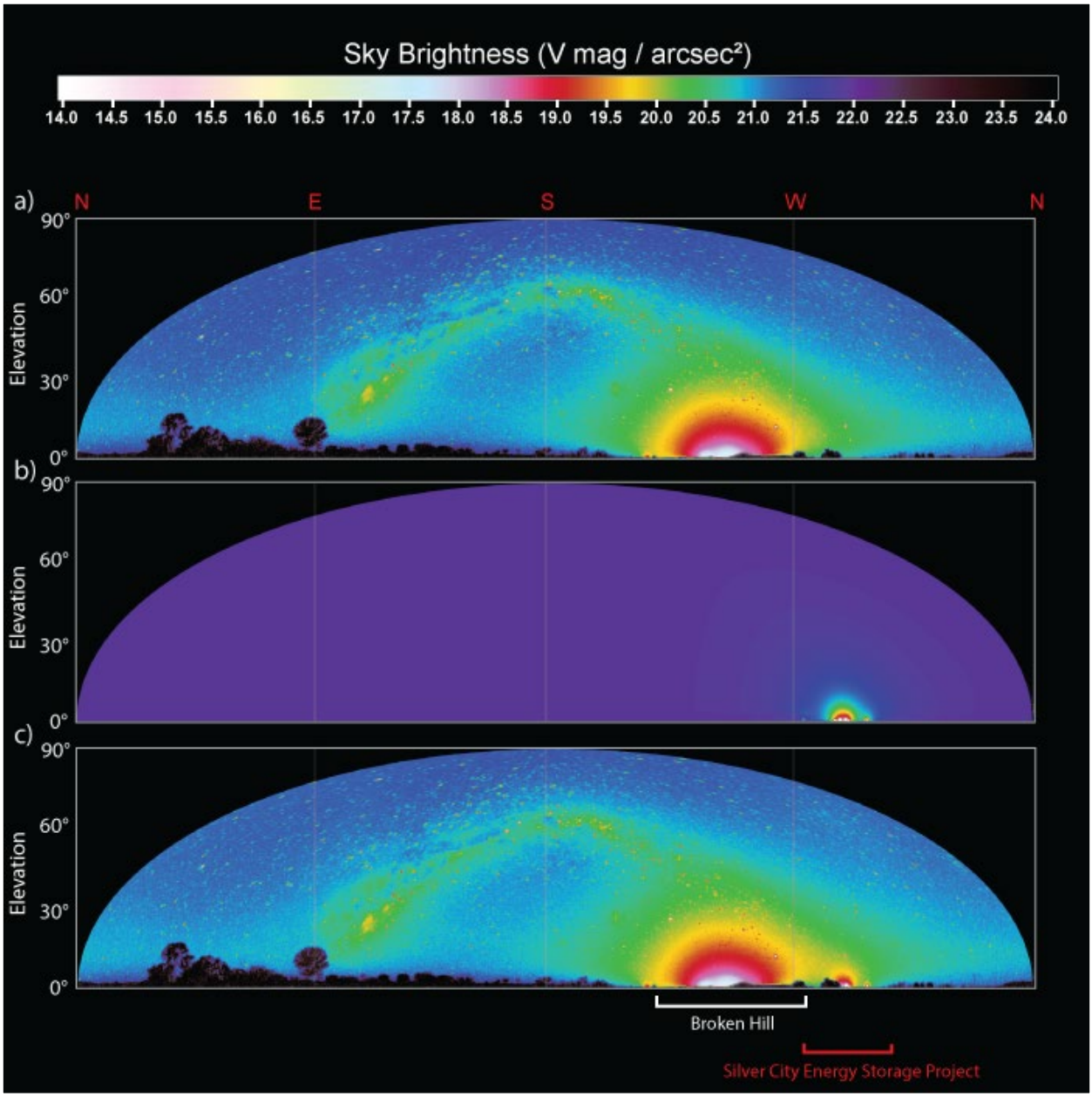


Figure 6.13 Proposed Lighting Scenario Example

Note: a. Benchmark all-sky processed image recorded during the light survey; b. Modelled brightness based on light design; c. Benchmark monitoring image + modelled brightness.

6.7.2.3 Lighting Management and Mitigation Measures

To ensure that the impact from artificial light emissions is minimised, A-CAES NSW have committed to the implementation of additional mitigation measures as an outcome of the assessment including:

- Reduce colour temperature to as low as possible where practicable (aim for ≤ 2,700 CCT).
- Implement smart controls on lighting to ensure only lighting in use will be active.
- Aim lights facing inwards towards the plant where practicable.

- Any mobile or temporary lighting required during the construction phase will be managed to reduce any potential offsite impacts. Management will include restricted lighting only within areas requiring lighting, use of directional lighting away from the adjoining residential and use of shielding including physical shielding and use of any vegetation and topography (if possible). The CEMP will include the development and implementation of appropriate procedures associated with the placement of mobile lighting to reduce for potential associated impacts.

Further measures will also be considered during detailed design including:

- Use the minimum number and intensity of lights required to operate safely.
- Utilise true Amber LEDS where practicable, such as non-task areas, walkways/pathways, and office/admin sites.
- All windows/doors on administration and office buildings to have opaque (block-out) blinds/curtains/shutters fitted.
- Building window blinds should be shut during hours between sunset and sunrise.

A-CAES NSW will also undertake post construction monitoring to confirm the results of the modelling.

7.0 Justification of the Amended Project

This Amendment Report has been prepared to provide an assessment of the Amended Project including the proposed amended SCES conceptual layout (and amended disturbance area) and proposed change to construction working hours. This section provides an updated assessment of the justification of the Project, taking into consideration the associated environmental and social impacts and the suitability of the site, to assist the consent authority to determine whether or not the Project is in the public interest.

The overall justification for the Project, as outlined in Section 7 of the EIS, remains unchanged. The Project fits within the current strategic direction of the NSW and Australian government's approaches to energy generation, being the transition to renewables and ensuring the reliability of the grid. The low emission dispatchable electricity from the Project will assist with improving the stability and reliability of the electrical grid within the Broken Hill Region, whilst replacing the existing diesel-fired turbine electricity back up system and reducing greenhouse gas emissions.

A-CAES NSW has proceeded with the Project as a direct response to electricity reliability supply issues in Broken Hill and as the preferred option identified by Transgrid through the RIT-T process. The proposed co-location of the SCES Facility within the Potosi Mine site was selected due to favourable geological conditions, utilisation of existing mining areas, existing mine infrastructure for access and ability to suitably manage environmental and social impacts. Specifically in relation to the proposed amendment, 24 hour operation is common with mining activities and is a familiar occurrence within and surrounding Broken Hill. The Project will also provide a diversified post-mining land use for the Potosi Mine site.

The key issues associated with the Project were subject to comprehensive specialist assessment to identify the potential impacts of the Project on the existing environment and community in preparing the EIS. Additional consideration of the issues raised in the submissions and as a result of the proposed amendments required environmental assessment and that has been undertaken in this assessment that has demonstrated that the predicted impacts with the proposed amendments are substantially similar to those outlined in the EIS.

Consistent with the justification presented in the EIS, the potential environmental, cultural and social impacts associated with the Project can be appropriately managed through the implementation of appropriate management, mitigation and monitoring measures. A consolidated list of the revised management and mitigation measures is provided in **Appendix C**.

Specifically in relation to potential noise impacts associated with the proposed construction hours, once operational, the SCES Facility will operate 24 hours per day, 7 days per week. For the proposed construction activities during the evening and night, the construction noise criteria are consistent with the operational noise criteria. That is, any work undertaken during the evening and night-time periods during construction must meet the same criteria at operations undertaken in the evening and night. In effect, the proposed changes to construction hours do not result in any greater noise impacts than those proposed for operations in these periods and A-CAES NSW has committed to manage construction noise to meet these criteria.

The amended construction hours are proposed following detailed construction scheduling and are required to meet the construction timeframe presented in the EIS and committed to under contract with Transgrid and the LTESA with ARENA. This timeframe is required to deliver on the energy security timeframes needs for Broken Hill. Detailed construction scheduling has been undertaken to determine the construction scenarios required and detailed assessment indicates the Amended Project will comply with relevant criteria. Following standard construction hours, as outlined in the EIS is not a viable option for the Project and will add an additional 12 months to the 36-month construction timeframe affecting the energy security supply timeline and also impacting the economic viability of the Project.

As outlined in Section 7.3 of the EIS, the Project has been assessed against the principles of ESD as required by the EP&A Act and EP&A Regulation. The assessment has indicated that while the Project, like any large-scale development, has associated environmental and social impacts, these impacts can be effectively managed, mitigated and offset and the development will result in social and economic benefit to Broken Hill. The assessment therefore concludes that the Project is consistent with the principles of ESD. The Project will provide long-term, strategic benefits to Broken Hill and the State of NSW, including:

- using innovative technology to provide a long-duration grid-scale energy storage solution that aligns with the State of NSW's transition to a renewable energy-based system reducing greenhouse gas emissions and the impacts of climate change
- contributing to maintaining reliability and security of the electricity network assisting with meeting current load demand
- supporting provision of the firming required to meet the rising contribution of renewables in the transitioning energy mix
- providing enhanced energy security for Broken Hill whilst providing low emission energy replacement for the existing diesel-fired turbines which are approaching the end of their operational life.

The Project will also provide direct financial benefits to the regional and local community, including:

- infrastructure investment of approximately $638 million
- increasing the real economic output of Broken Hill by a cumulative total of $3.5 billion (with a net present value of $728 million, using a 7% real discount rate) and NSW as a whole by a cumulative total of $1.7 billion (with a net present value of $601 million, using a 7% real discount rate)
- increasing the real income of Broken Hill by a cumulative total of $642 million (with a net present value of $192 million, using a 7% real discount rate) and NSW as a whole by a cumulative total of $1.0 billion (with a net present value of $662 million, using a 7% real discount rate)
- generation of 780 FTE construction phase job years (over three years) with an average of 260 FTE workers per year and peak of 400 FTE workers
- generation of approximately 36 enduring jobs (26 direct and 10 indirect) during the operation and maintenance phase
- providing ongoing financial assistance through the Community Benefit Agreement to ensure direct benefit from the Project to the local community, including local schools, training or education as well as grants or support for local community, environmental and/or sporting groups.

Through the implementation of appropriate best practice management, the potential environmental and social impacts associated with the Project can be appropriately avoided or managed. The Project has generally received strong support from the stakeholders that participated in the engagement process, with the proposed management and mitigation measures addressing the identified community concerns and social impacts. Given the identified need for the Project, the net benefit and commitment from A-CAES NSW to appropriately manage the potential environmental impacts associated with the Project, it is considered the Project would result in a net benefit to Broken Hill, the Far West Region and the broader NSW community.

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