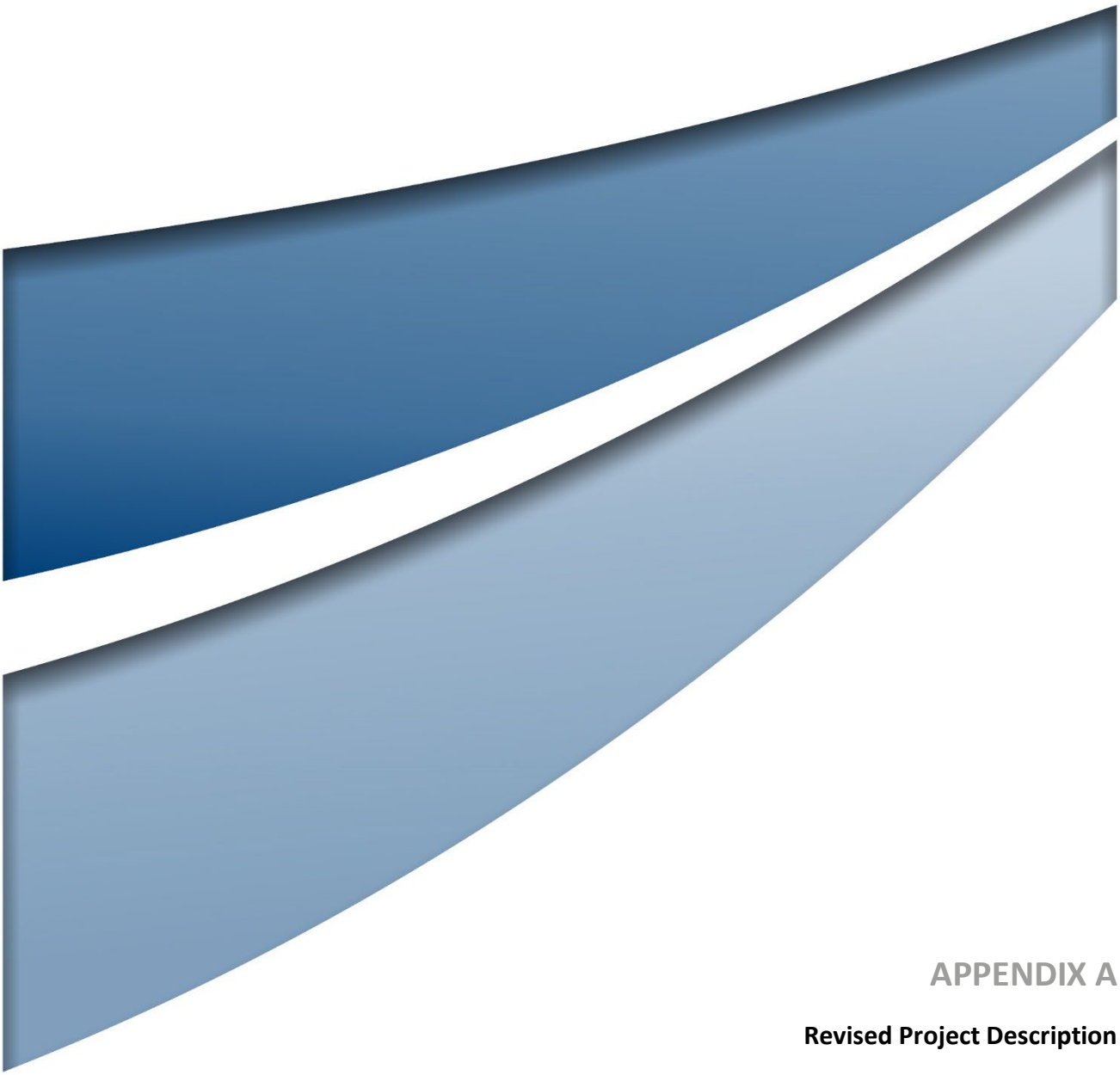


APPENDIX A

Revised Project Description

Appendix A – Revised Project Description

The following provides an updated Project Description for the Project, previously presented as Section 3 of the EIS.

1.1 A-CAES Technology Overview

Using only water and compressed air, A-CAES technology provides a long-duration grid-scale energy storage solution. The A-CAES technology uses energy from the grid when it is plentiful to compress air from the atmosphere and injects it into the underground cavern. The air remains in the cavern, sealed under pressure from the water reservoir above the cavern. The compressed air is then released from the cavern and generates electricity through an air turbine producing power at the time it is needed (refer to **Figure A1.1**).

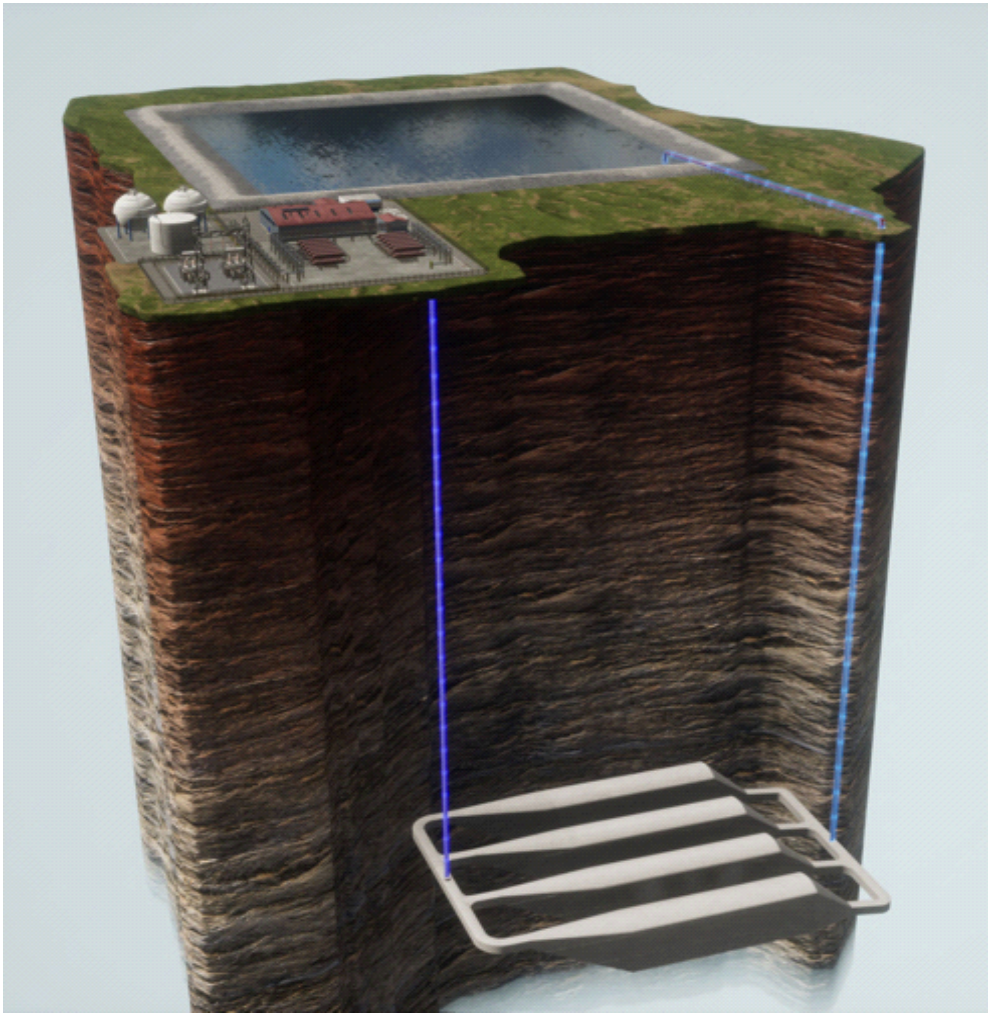
When the system is charging (charge cycle) electricity is drawn from the grid and used to drive the air compressors, converting the electrical energy to heat and air. The heat is stored separately at the surface within thermal storage tanks for later use during the discharge cycle. The compressed air is charged into the storage cavern and the water is displaced via a connecting shaft into the surface reservoir. This maintains a constant pressure of the air within the cavern.

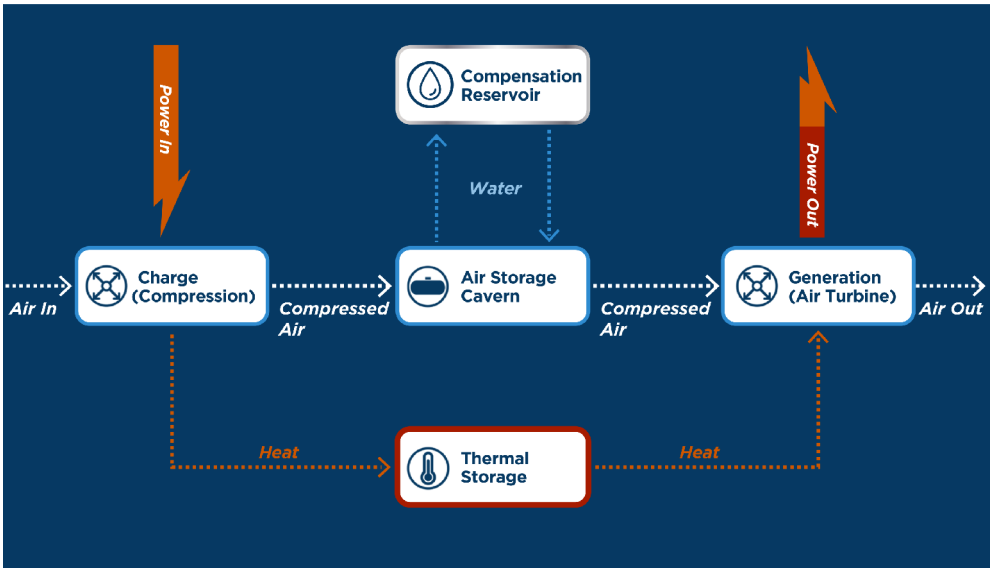
The air remains in the cavern, sealed under pressure from the water in the reservoir until electricity is required. When needed to generate electricity (discharge cycle) compressed air is discharged from the cavern, which allows the water to re-flood the cavern. The high-pressure air exiting the cavern is re-heated using the heat stored during the charge cycle, this air then used to drive the air expansion turbine generators, converting the energy back to electricity and transmitting it into the grid. The combined compressed air, underground cavern and water storage is designed to provide a long-term clean energy storage solution that does not use fossil fuels or hazardous materials to store energy.

In addition to the storage of electricity for use on the broader National Energy Market (NEM), the SCES Facility will maintain a reserve capacity of 250 MWh to provide back-up electricity generation to Broken Hill during times of planned and unplanned outages. This will replace the existing back-up diesel-powered combustion turbines which are approaching the end of their operational life.

The frequency of the charging and discharging cycles is dependent on the requirement of the grid. The SCES Facility can be charged daily and can remain charged for long durations before discharging; however, when charged for long durations additional maintenance plant is required such as electrical heaters which form part of the proposed plant. Outside of the charging and discharging cycles, the SCES Facility is maintained in standby mode. During standby mode the plant is maintained by various pumps, heaters and coolers.

Inspection, maintenance and repair will require plant standby for at short intervals (days) annually, with longer overhauls every 7 – 8 years (2 weeks). An extended plant shutdown, where the entire plant would be shut down and depressurised is anticipated between year 25 and 30 of operations.





Note: Not to Scale

FIGURE A1.1

A-CAES Technology Overview

Image Source: Hydrostar (2022)

1.2 Project Summary

A summary of the Project, listing details of the proposed development for which approval is sought, is summarised in **Table A1.1**.

Table A1.1 Project Summary

Key Element	Description
Life of the Project	50 years (operations)
Project Area	Approximately 310 ha (SCES Facility ~155 ha, transmission line corridor ~155 ha. The Project is located across 30 cadastral lots, refer to Schedule of Lands **Appendix 1**.
Disturbance Area	Approximately 58 ha (SCES Facility ~39 ha, transmission line corridor ~19 ha – including areas of temporary disturbance associated with access and laydown areas).
Project Area Access	SCES Facility – Silver Peak Road (existing Potosi Mine internal 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.
SCES Facility	SCES Surface Facility: • 2 x 100 MW Turbine/Generator/Compressor Trains. • Switchyard, Office, Warehouse and Guardhouse and other facilities associated with the operation of the SCES Facility. • Utilities storage (fuel/water). • Water Reservoir (~220 m x 302 m) ~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. Based on current design information, the pipeline is likely to sit approximately 400 mm above the ground and have a footing (likely concrete) to anchor at intervals along the 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.
Ancillary transmission connection works	Ancillary works within substation including creation of hardstand, installation of connection infrastructure and re-configuration works.

Key Element	Description
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.
Construction water use and supply	Construction of the proposed pipeline take-off will be prioritised in order to supply water for construction (under water supply agreement with Essential Water). Any potable water requirements will be supplied via water tanker and stored in the construction compound. First fill of Water Reservoir will be supplied via the proposed pipeline (under water supply agreement with Essential Water). Approximately 250-300 ML will be required over a 6-12-month timeframe.
Construction Timeframe	Approximately 36 months.
Construction hours	**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, drilling, compressors/generators, air tools, concrete pumps) – 24/7 • All other construction activities 7 days p/w (day time only) Limiting nighttime activities to critical activities only e.g., concrete pours
Construction Transport Route	Project components will be delivered via road from South Australia via the Barrier Highway.
Construction workforce	Up to 400 (during peak construction period – ~6 months).
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.
Operations workforce	Approximately 26.
Capital investment Value	$639 Million.

1.3 Project Area

The Project Area is approximately 310 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 also captures the Potosi Surface Operational Area located within Lot 7320 DP 1201053, refer to **Figure A1.2**. The Project will interact with the Perilya operations through the use of existing infrastructure, including the use of the existing mine access portals and surface processing facilities (rock crushing and concrete batching) however these are approved associated activities, no change to these processes is proposed and no disturbance is required.

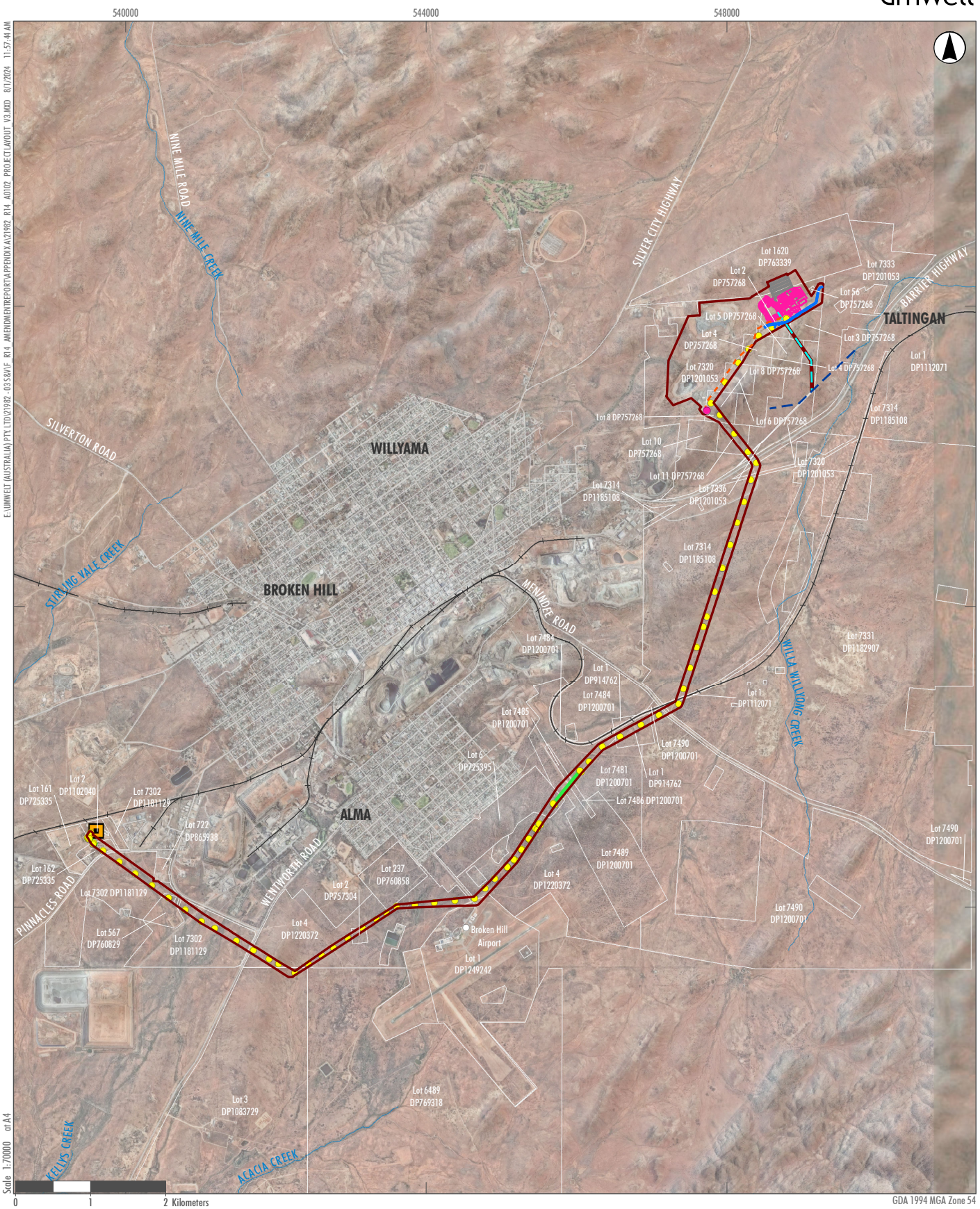
The Project Area will be subject to partial disturbance associated with the Project. A total disturbance area of approximately 58 ha is proposed, this captures all disturbance associated with the SCES Facility and the transmission, including:

- the SCES Facility, underground cavern, creek diversion, above ground pipeline and internal access upgrade works
- transmission line and all associated works:
    - access track along the transmission line (approximately 4 m wide)
    - underground line sections (approximately 15 m wide)
    - transmission line pole locations and areas required for pole erection and conductor installation
    - construction laydown and storage areas.

The proposed disturbance area is shown on **Figure 3.3**, **Figure 3.6**, **Figure 3.7** and **Figure 3.8**.

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 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 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, it is assumed 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.



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
- Site Access Point
- Access Road
- Property Boundaries
- Drainage Line
- Railway Line
- Road

FIGURE A1.2

Project Layout

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

1.4 Project Components

The Project includes two key components, the SCES Facility and the transmission line. These components are outlined in detail in the following sections.

1.4.1 SCES Facility

1.4.1.1 SCES Surface Facility

The SCES Surface Facility includes the following components:

- 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, parking and security fencing.

An indicative layout of the proposed surface facilities is provided in **Figure A1.2**, with a more detailed conceptual layout of the SCES Facility provided in **Figure A1.3**. The Project will be subject to further detailed design prior to construction with the potential for some further design refinements to the conceptual layout shown.

The surface infrastructure houses the energy storage drivetrains. Each drivetrain includes a series of compressors and an air-expansion turbine generator. The drivetrains are supported by a thermal management system made up of hot and cold thermal tanks, heat exchangers and fan coolers. The conceptual layout includes a range of noise control measures including acoustic hoods for the air compressor and turbine generators, a noise barrier on the southern side of the cooling water air cooled exchanger and multiple barriers around the transformers (ranging between 7 m and 10 m in height). These are shown on **Figure A1.4**. The layout will be subject to further detailed design prior to construction where there may be further refinements to both the layout and proposed noise control measures.

The surface infrastructure has been located on site with consideration of the existing topography and associated environmental and cultural constraints; however, requires co-location with the underground cavern. In order to operate efficiently, the surface facilities have been sited directly above the deepest level of the existing mining operations (approximately 600 m below surface) where the underground cavern will be constructed (refer to **Figure A1.4**).

The SCES Facility will also contain utilities such as fuel and water storage and include a switchyard to connect to the proposed transmission line.

The SCES Facility will be accessed from Silver Peak Road via the Barrier Highway. An internal access road will be constructed from Silver Peak Road to the SCES Facility via formalising an existing internal access track. This would include widening the existing track to approximately 10 m and forming a compacted gravel all weather access for construction and operational vehicles (refer to **Figure A1.3**). During construction, parking will be available within the temporary laydown areas. Suitable parking areas for operational staff will be provided within the SCES Facility compound.

The perimeter of the SCES Surface Facility will be enclosed by security fencing to restrict public access to the SCES Facility and the area immediately surrounding the associated infrastructure. Fencing will be subject to detailed design; however, will be designed in accordance with relevant Australian Standards.

Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Transmission Line Easement
- Tranmission Pole Location
- 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

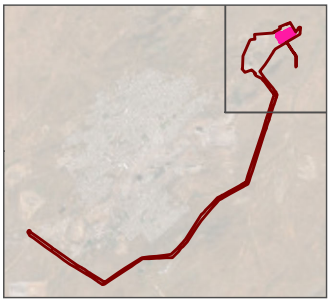
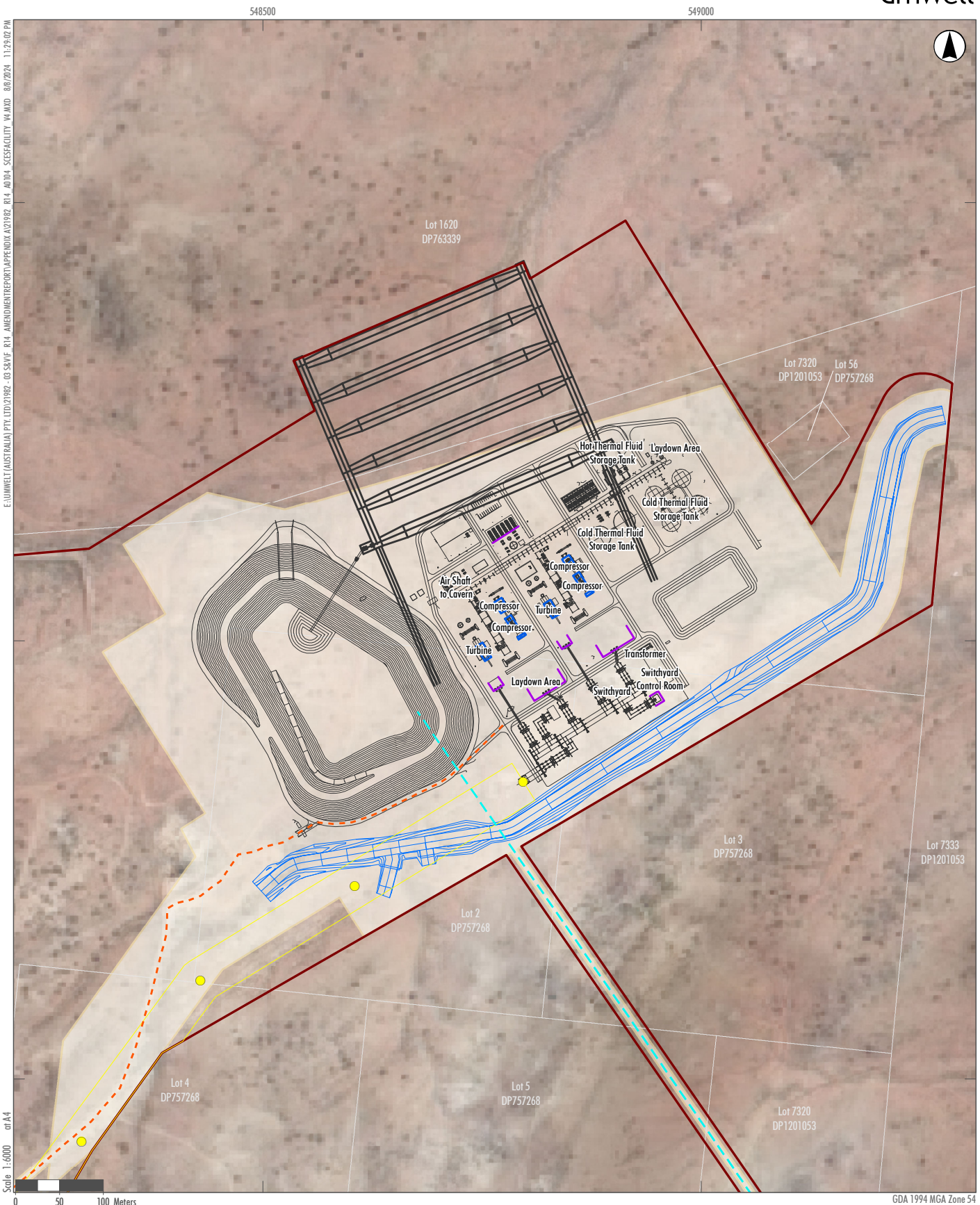


FIGURE A1.3

Project Layout
SCES Facility

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



Legend

- Project Area
- Silver City Energy Storage Facility
- Underground Cavern
- Transmission Line Easement
- Transmission Pole Location
- Disturbance Area
- Proposed Creek Diversion
- Proposed Above Ground Water Pipeline
- Access Road
- Property Boundaries
- Noise Barrier
- Turbine/Compressor Hood

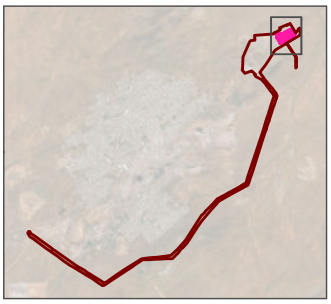


FIGURE A1.4

SCES Facility

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

Underground Cavern

The geotechnical conditions at the Potosi Mine are characterised by strong competent rocks. The dominant rock types are tightly packed and have a high metamorphic grade which provides low rock mass porosity and permeability. In summary, this means that the rock is very strong and has low water permeability; these conditions are favourable to the Project in supporting the proposed underground cavern.

There are currently two mine portals providing access to the underground workings, the Potosi Mine Portal (located within the Potosi Pit) and the Silver Peak Portal. These two portals provide access to the existing underground mining areas at the proposed cavern depth (approximately 600 mbgl). The existing portals and workings will be utilised to construct the cavern. Once construction is complete, access to the cavern would no longer be required and the ongoing use and/or rehabilitation of the portals would be undertaken by Perilya.

The current plan of the Potosi Mine indicates that Level 20/21 (approximately 600 mbgl) has several existing parallel tunnels and drives (refer to **Figure A1.5**). These existing workings will provide access to the cavern construction location with excavation works proposed to provide the cavern storage, with a total volume of approximately 275,000 m^3. The cavern will be constructed using conventional drill and blast mining methods similar to the methods currently used at the existing Potosi Mine to form a group of separate parallel excavated areas (known as drifts) approximately 9 m wide x 15 m high. Detailed design of the cavern will be subject to further review following detailed geotechnical investigations and engineering design (prior to construction).

Excavated rock will either be crushed underground and brought to the surface, or crushed on the surface at the Potosi Surface Operations. In order to commence construction of the water reservoir concurrently with the cavern existing stockpiled rock at the Potosi rock emplacement area will be utilised for construction. Excavated material will be stored at the surface either within the Potosi stockpile areas and/or within the proposed disturbance area and used to complete civil construction on site including the water reservoir with any excess material provided back to Perilya to replace the initial rock utilised during the initial construction phase for use in mine rehabilitation works. A total of approximately 300,000 m^3 of rock will be excavated.

Exploration activities undertaken by Perilya indicate the area does not contain minerals and any processing of minerals is unlikely to be required, however, should mineral quantities requiring processing be encountered, the material will be bought to the surface and processed by Perilya, under the provisions of DA 448/2004 (subject to modification). Any material not suitable for construction uses will be transported to the existing Potosi Mine overburden emplacement areas.

The cavern will be sealed from the remainder of the existing underground mine workings. Sealing the cavern will involve the installation of concrete bulkheads, sealed with pressure injected grout. Sealing the cavern protects the surrounding mining operations and also the operation of the SCES Facility providing a sealed system. These works will also provide for the opportunity for future expansion of the SCES storage capacity, if required. Any such proposed expansion would be subject to a separate approval process and be based on future energy demands.

Any fractures or cracks within the cavern encountered during construction will be sealed; however, given the low porosity and permeability characteristics of the rock, the application of a sealant to the interior of the cavern is not expected to be required. The underground cavern will be connected to the surface infrastructure via two shafts, one for the conveyance of air, the other for water from the surface to the cavern. The lower end of the water shaft will extend into a sump which will be constructed below the cavern floor to ensure that a water seal is maintained at all times during operation. The lower end of the air shaft will be located at the high point in the roof of the cavern.

The cavern is a closed system (using the pressure from the water reservoir) to provide sufficient pressure to operate the SCES Facility.

Note: Not to Scale

FIGURE A1.5
Underground Workings

Image Source: Energy Estate (2022)

Water Reservoir and Pipeline

A purpose-built above ground water reservoir will be constructed to provide hydrostatic pressure for the underground cavern and will be located adjacent to the SCES Facility. The proposed reservoir will have a footprint of approximately 220 m by 320 m with a maximum capacity of approximately 350 ML.

As discussed above, existing rock emplacement at Potosi and excavated material generated through the construction of the underground cavern will be utilised for the construction of the reservoir. Appropriate testing of excavated material will be undertaken to confirm its suitability for use in the construction of the reservoir with any unsuitable material taken to the Potosi mine site for emplacement.

The reservoir provides a constant head of water to maintain the air pressure in the cavern and refills the cavern when the compressed air is extracted and directed through the air turbines to generate electricity. The design of the reservoir is based on the following:

- maximum capacity of approximately 350 ML
- initial fill (approximately 250 – 300 ML) from Stephens Creek Reservoir (over an approximate 12-month period to minimise any potential impacts on other water users) and provided with make-up water from Stephens Creek Reservoir as required
- receive inflows from process condensate and direct rainfall on the reservoir surface (no external catchment drains to the reservoir)
- covered with floating shapes to reduce evaporative losses to approximately 90% of evaporation rates
- source of water for thermal fluid and cooling (sprays) and general washdown.

The Project includes an above ground water pipeline (refer to **Figure A1.3**). The proposed above ground pipeline will connect to the existing above ground section of the Stephens Creek Pipeline to the southeast of the proposed SCES Facility. Based on current design information, the pipeline is likely to sit approximately 400 mm above the ground and have a footing (likely concrete) to anchor at intervals along the pipeline. The pipeline will be constructed first and provide water supply for construction and the initial first fill of water to the reservoir and ongoing water supply as required. A-CAES NSW have an existing agreement with Essential Water providing water supply for both the construction and operations phase of the Project.

Creek Diversion

The SCES Facility will also require the diversion of an approximately 900 m long reach of the north easterly draining creek commencing at the south-western corner of the Project Area. It is proposed that this creek is diverted along the southern boundary of the SCES Facility as shown on **Figure A1.3**.

The proposed permanent creek diversion has been designed for the 1% annual exceedance probability (AEP) flooding event with consideration of design flows and velocities, bank slopes, bank stability, and soil conditions.

220 kV Transmission Line

The proposed 16 km 220 kV transmission line has been designed with sections of both overhead and underground line with the overhead line sections designed at a varying height. The design is the result of detailed site analysis to avoid adverse impacts to existing land uses, particularly the Broken Hill Airport. The transmission line will provide for connection of the SCES Facility to the existing Transgrid Kanandah Road substation located to the southwest of Broken Hill.

The transmission line layout is shown in **Figure A1.3, Figure A1.6, Figure A1.7** and **Figure A1.8**, the design includes the following:

- 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 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.

Transmission Connection Works

The transmission line will connect to the existing Transgrid Kanandah Road substation. The current design includes provision for both overhead or underground connection. The overhead and underground connection follow the same alignment, with the final design to be determined during the detailed design phase with Transgrid.

The overhead line option will connect to an existing pole within the substation switch yard before connecting to the switchyard. The underground option will follow the same alignment as the overhead option before connecting to the switchyard.

In order to facilitate the connection, ancillary works will be required within the substation compound. These works will include installation of connection infrastructure and associated hardstand, electrical re-configuration, connection, testing and commissioning works.

Legend

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

FIGURE A1.6

Project Layout
Transmission Line

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

Legend

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

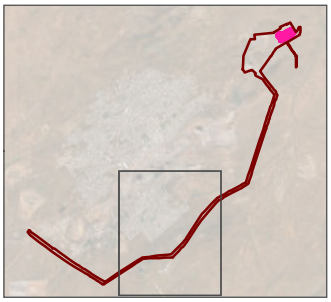


FIGURE A1.7

Project Layout
Transmission Line

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

Legend

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

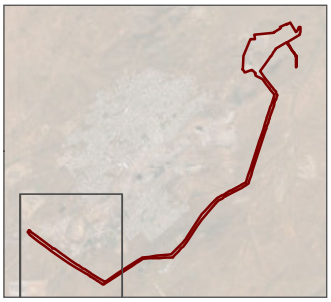


FIGURE A1.8

Project Layout
Transmission Line

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

1.5 Perilya Operational Modifications

Minor modifications to existing Perilya operational consents and management plans will be required to accommodate the Project. These changes are not part of the Project and are included here for information purposes only.

The relevant consents and management plans requiring modification are outlined in **Table A1.2**.

Table A1.2 Modifications to Perilya Operations

Operation	Relevant Consent/Management Plan	Modification required
Potosi Mine	DA 448/2004	Final land use plan to include the Project. Rehabilitation (timing and design) to reflect the changes due to the Project. Material processing and emplacement to reflect the changes due to the Project.
	Mining Operations Plan (MOP 801/06), which continues to apply until its expiry in 2026	Rehabilitation (timing and design) to reflect the changes due to the Project.
	Rehabilitation Management Plan (RMP 801/08) August 2022	Rehabilitation (timing and design) to reflect the changes due to the Project.
Flying Doctor	DA 336/2008	Revised surface operations design to reflect the changes due to the Project.

Perilya will be responsible for the changes required to the existing approvals and management plans for the Potosi and Flying Doctor mining operations and Broken Hill City Council will be the consent authority for the proposed modifications to DA 448/2004 and DA 336/2008. Although the Project will require the modifications to the existing Perilya approvals to facilitate the construction of the Project, this is a separate process, expected to be undertaken concurrently with the assessment of this Project. The proposed modifications do not form part of this Project.

1.6 Service and Utility Supply Arrangements

1.6.1 Water Supply

A-CAES NSW has entered into a water supply agreement with Essential Water to secure the water supply required for the construction of the Project and the initial fill and ongoing top up supply (if required) of the proposed the reservoir (250 – 300 ML over 12 months for first fill). This water supply is proposed to be provided via a connection to the existing Stephens Creek to Broken Hill Pipeline. This connection will be constructed early in the construction phase to provide the water supply required for the entire construction phase. Water usage associated with ongoing operations will be provided through recovery of water from the compression of air, groundwater inflows associated with Perilya Mining operations and/or continued supply via the proposed pipeline as provided by the water supply agreement.

Should supply from Stephens Creek Reservoir not be available, water may be sourced from the WaterNSW Murray River to Broken Hill Pipeline which is now the primary raw water source for Essential Water's Broken Hill potable water treatment plant. Essential Water has indicated that the required volume for construction and water for filling the Reservoir is expected to be available.

Potable water for the amenities use will be supplied to the site via the existing reverse osmosis water treatment plant at the Potosi Mine or trucked to site and stored in a water tanker.

1.6.2 Telecommunication

Telecommunications facilities providing for transmission of voice, data, image, graphic and video information will be installed on site.

1.6.3 Sewer and Waste

Appropriate onsite septic system or composting system will be installed to treat minor quantities of wastewater associated with operation of the Project, subject to securing the relevant local authorisations. Any wastewater from the amenities collected and removed from the site will be done so by a licensed waste contractor.

Other wastes will be classified and removed to an approved facility (landfill, recycling etc). An appropriate Waste Management Plan will be developed and implemented to manage waste associated with the construction and operation of the Project.

1.7 Construction Activities

1.7.1 Proposed Construction Activities

The proposed construction activities for each phase of the Project are outlined in **Table A1.3**.

Table A1.3 Project Phases and Associated Activities

Project Phase	Proposed Activities
Pre-construction Minor Works	Survey.
	Geotechnical investigative drilling and excavation of test pits and bore holes.
	Minor clearing of native vegetation.
	Establishment of temporary site office and laydown areas/storage compounds.
	Installation of environmental impact mitigation measures (e.g. erosion and sediment controls), temporary fencing and general enabling works.
	Heritage artefact surface and subsurface salvage, biodiversity pre-clearing surveys, inspections, specific habitat feature removal, and relocation.
	Establishment of proposed SCES and transmission line access roads and minor adjustments to services/utilities signage, etc.

Project Phase	Proposed Activities
Construction Works	Includes all physical works to construct all Project components, including, but not limited to, the construction and installation of the SCES Facility, underground cavern, water reservoir, above ground pipeline, creek diversion and transmission line and establishment or construction of any temporary facilities which were not already established as part of the pre-construction minor works.
Operation and Maintenance	Ongoing operation, monitoring (on-site and remote monitoring) and maintenance of all Project infrastructure and land within the SCES Facility boundary and the easement associated with the transmission line, during the operational lifespan of the Project.
	Replacement of major components as required, which may require the use of cranes and ancillary equipment.
Decommissioning	Includes all physical works required for the dismantling and transportation of Project infrastructure and rehabilitation of the Disturbance Area.

1.7.2 Temporary Ancillary Construction Works

Construction of the Project will require the installation of temporary construction facilities for both the SCES Facility and the transmission line, as outlined below.

SCES Facility:

- site compound including storage areas, offices, ablution facilities, internal access road and car parking
- laydown areas for storing plant and equipment, deliveries, and 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.

The proposed disturbance area captures both temporary and permanent disturbance associated with the Project, ancillary construction areas no longer required following completion of the construction phase will be appropriately rehabilitated.

1.7.3 Transport Routes and Traffic Movements

The SCES Facility will be accessed directly from Silver Peak Road (existing Potosi Mine access road) via the Barrier Highway. No intersection/road upgrade works are required at the Barrier Highway/Silver Peak Road intersection to accommodate traffic associated with the Project. The transmission Line will have multiple access points with main access provided from Kanandah Road/Pinnacles Road, Silver City Highway, Wentworth Road/Picton Street and Menindee Road. Appropriate temporary access points will be established to temporary construction access roads. The proposed disturbance area provides for a 4 m wide access road the full length of the transmission line, noting this may not be required at all locations and represents a worst-case scenario.

The transport of Project components and construction materials require both heavy vehicles and OSOM vehicles. The majority of materials and equipment will be delivered to the SCES Facility via Barrier Highway with offshore delivery of components expected to be received into Port Adelaide and then transported by heavy vehicle and/or OSOM vehicles to Broken Hill. No transport of construction materials via rail is proposed.

The source and location of construction materials will be confirmed during the detailed design phase. For the purposes of the assessment of the Project, the number of deliveries and possible routes have been assessed to cover all possible traffic-related aspects of the Project. General heavy vehicle transport could travel from any direction along the surrounding road network depending on origin of the deliveries, e.g., from the south (Wentworth-Mildura area), west (South Australia) and east (Wilcannia and beyond). As previously discussed, heavy vehicle transport from the north is unlikely.

There will be no traffic movements associated with excavated material from constructing the underground cavern, as all excavated material will be utilised on site.

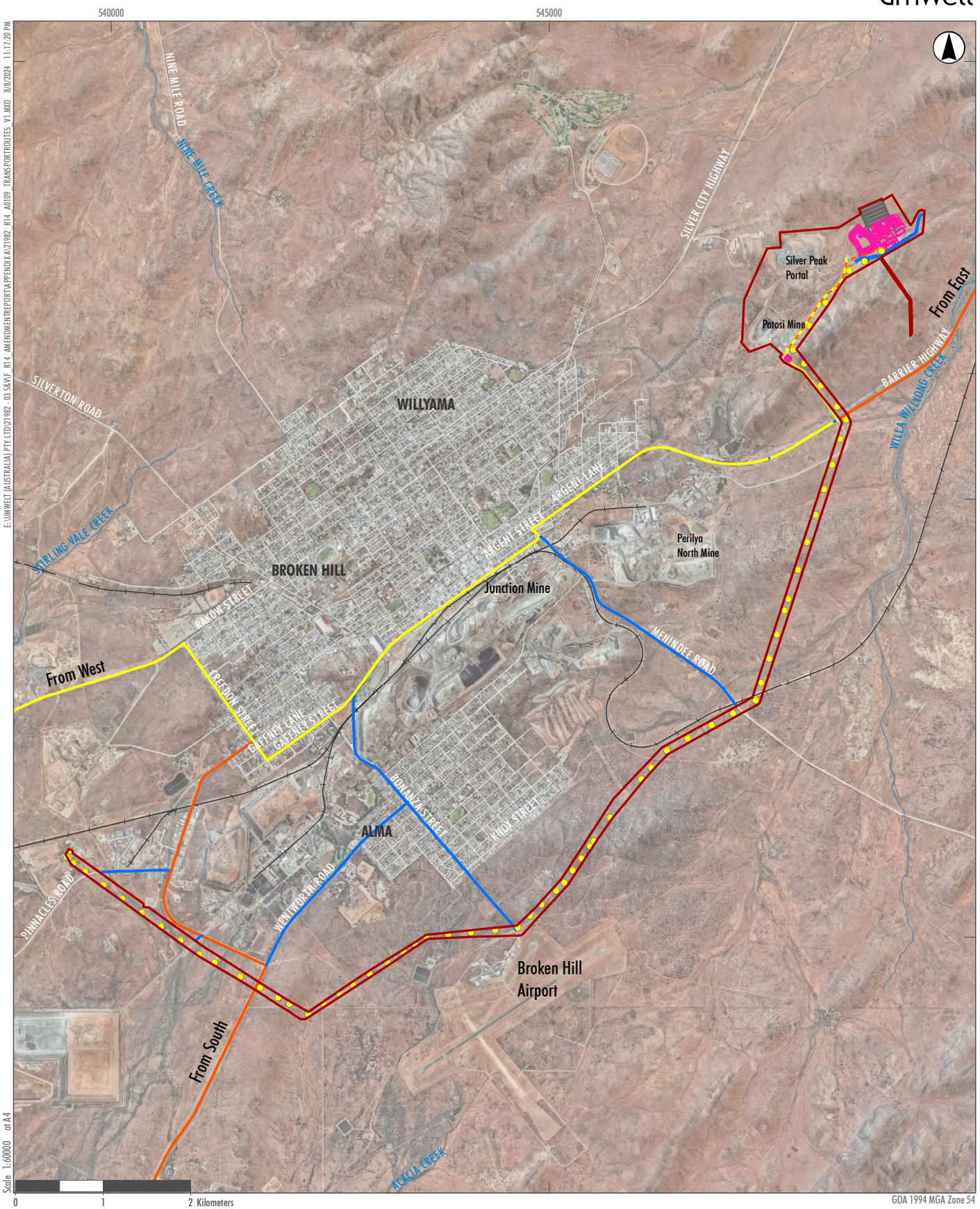
The following maximum traffic generation (associated with the peak construction period) is expected associated with the construction phase of the Project:

- Light Vehicles – 54 movements per day (20 per hour) associated with the SCES Facility, 30 movements per day (12 per hour) associated with the transmission line
- Shuttle Buses – 32 movements per day (18 per hour)
- Heavy Vehicles – 12 movements per day (2 movements per hour) associated with the SCES Facility, 32 per day (2 movements per hour) associated with the transmission line
- OSOM Movements – 2 movements per day (one delivery per day).

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 associated with the SCES Facility 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 are shown on **Figure A1.9**.



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 A1.9

Proposed Transport Routes through Broken Hill Urban Area

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

1.7.4 Construction Staging, Duration and Hours

A total construction period of approximately 36 months is expected, with a peak construction phase of 10 months. The indicative construction sequencing of the Project components is outlined in **Graph A1.1**.

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, drilling, compressors/generators, air tools, concrete pumps) – 24 hours, 7 days per week.
- All other construction activities 7 days per week (day time only).
- Limiting nighttime activities to critical activities only e.g., concrete pours.

1.7.5 Construction Workforce

It is estimated that on average approximately 400 full time equivalent (FTE) personnel will be on-site during peak construction activities. Construction personnel are expected to include a mix of local workers and specialist contractors likely from outside the region.

Graph A1.1 Indicative Construction Sequence

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Earthworks & Civil Works	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
Cavern and Shafts	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■							
Transmission Line Works						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■						
Over Size Over Mass Equipment	■				■		■		■	■		■	■	■	■	■		■	■	■	■	■	■			■			■	■	■					
Structural, Mechanical and Piping, Electrical and Instrumentation											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

1.8 Operation and Maintenance

The SCES Facility will operate 24-hours per day, seven days per week. It is estimated that approximately 36 (26 direct and 10 indirect FTE) technical and maintenance personnel will be required for ongoing operation. These personnel will carry out general management and operational/maintenance requirements.

In some cases, plant components may require replacement, which may require heavy machinery (e.g. cranes), these works would be managed using consistent controls with the initial construction work for the establishment of the Project.

Operation of the Project will be subject to a detailed Operation Environmental Management Plan (OEMP).

1.9 Decommissioning

The Project has an expected operating life of approximately 50 years and the agreement with Perilya provides for the continued operation for this timeframe. Following this the three main options apply:

- the SCES continues to operate (subject to continued land agreement, need and relevant approvals)
- the SCES is upgraded or replaced with newer technology (subject to continued land agreement and need)
- the SCES Facility is decommissioned, and associated infrastructure is removed in accordance with the OEMP and the development of a Decommissioning and Rehabilitation Strategy two years prior to closure of the SCES Facility.

Should decommissioning be required:

- Key stakeholders including Perilya and relevant landholders subject to transmission line easement would be consulted regarding the decommissioning and rehabilitation plan.
- All plant associated with the SCES Facility and transmission line infrastructure will be removed, the shafts sealed and the land rehabilitated. If reuse of the water reservoir is not proposed as part of the post closure land use, water remaining in the reservoir will be drained to the underground cavern and any remaining water will be allowed to evaporate.
- Erosion and sediment controls for the decommissioning phase will be implemented as per the construction phase of the Project with a Rehabilitation Management Plan (RMP) developed and implemented as part of the preparation of the Decommissioning and Rehabilitation Strategy.

It is anticipated that the decommissioning and rehabilitation phase, should the entire Project be decommissioned, would take 12 – 18 months to complete, with the Project Area being returned, as far as practicable, to a condition similar to that which existed prior to the commencement of construction.

Erosion and sediment controls for the decommissioning phase will be implemented as per the construction phase of the Project. A Rehabilitation Management Plan (RMP) will be developed prior to decommissioning to guide the rehabilitation of the site, including the rehabilitation of redundant watercourse crossings and stabilisation of disturbed areas.

A-CAES NSW has entered into long-term lease agreement with Perilya for the construction and operation of the SCES Facility. The terms of these agreements make express provision relating to decommissioning and rehabilitation obligations.

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