CENTRAL WEST PUMPED HYDRO PROJECT

SCOPING REPORT

AUSTRALIA

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We acknowledge Aboriginal elders past and present and all members of the Aboriginal community, the original custodians of the land on which the Central West Pumped Hydro Project resides.

EXECUTIVE SUMMARY

Description of the Project

ATCO Australia Pty Ltd (ATCO), supported by development partner Altura Group Pty Ltd (Altura), is proposing to develop the Central West Pumped Hydro project (the Project) on private land, located some 4km south of Yetholme, on Wiradjuri Country, Central West New South Wales, 21km southeast of Bathurst and 180km west of Sydney.

The Project is a nominal 325 Megawatts (MW), 8 hours storage (2,600MWh) pumped hydro storage development requiring the construction of a 3GL upper and lower reservoir storage system. The reservoirs have an elevation difference of 360m and are connected by a 1,400m penstock (pipeline) to a subsurface powerhouse. The Project will connect to an existing 330kV transmission line by a 6.8km (approx.) underground transmission cable. Water for the Project will be sourced from available water in the Fish River.

The primary role of the Project will be to store energy during periods of surplus electricity generation in the electricity network, and generate electricity during periods of high demand using the stored energy. Energy required in pumping mode will be drawn from the 330kV transmission network some 6.8km to the north of the Project, connected by a dedicated 330kV underground transmission cable.

The EIS will be prepared in 2021/2022, with submission expected in mid-2022. Subject to approval, it is proposed the three-year construction works will commence in 2023, with operation in 2026.

Strategic Context

The land immediately surrounding the Project is a mosaic of cleared to partially cleared areas on the gentler slopes and valleys, to well vegetated areas generally associated with steeper terrain. The locality of Yetholme is located approximately 4.5km north-east of the PSH facility, while the small locality of Locksley is located approximately 2.5km to the south-east.

The development footprint (i.e. potential disturbance area) will be in the order of 170 ha, with the permanent infrastructure occupying an area of approximately 85 ha. A Study Area of some 460 ha has been established surrounding these areas to enable potential micrositing of infrastructure to facilitate landowner considerations, feedback from stakeholder engagement, and minimising and avoiding environmental and heritage impacts through the design process.

Development of the Project is consistent with the State Government's climate change initiatives and facilitates and promotes energy and infrastructure strategies by further enabling the expansion of renewable energy generation by providing energy storage capacity to complement and firm variable (or intermittent) renewable energy generation, typically from wind and solar.

By the mid-2030s at the latest (AEMO, Generation information 2021), NSW will see the closure of at least four of the five coal-fired power stations which currently provide around three quarters of the state's energy supply. Intermittent renewable energy generation will in large part replace this lost generation. However, the variability of generation from renewable sources introduces new and emerging electricity system challenges. Power demand and supply must be balanced in real time to maintain a reliable and secure power system. Because renewable electricity generation and customer usage can both fluctuate rapidly, investment in complementary forms of short and long duration capacity, such as pumped hydro, is needed (NSW Electricity Infrastructure Roadmap, 2020).

The Project is also well placed to support the NSW's new Central West-Orana Renewable Energy Zone (CWO REZ); a key element in the NSW Government's Electricity Strategy. The CWO REZ, along with other REZs

around the State, are expected to unlock a significant pipeline of large-scale renewable energy and storage projects.

The Central West – Orana REZ is the first of the NSW REZs to proceed, proposed for development in the 2020-2027, with the State Government indicating that pumped hydro is needed to be developed in the time frame of 2021 to 2029 to support the REZs (NSW Roadmap, 2020).

Benefits

Development of pumped hydro like Central West Pumped Hydro will assist decarbonising the electricity grid by facilitating the development of renewable energy, contributing to lower emissions, and combating the impacts of anthropogenic climate change.

The Project will provide energy storage that will help to 'smooth-out' energy peaks and troughs created by variable energy (e.g. solar and wind).

The Project will facilitate the development of the Central West – Orana REZ by providing non-network services to the electricity network, helping to not only stabilise and improve security of the network, but also avoiding the need for costly stability upgrades to network infrastructure. The Project is estimated to deliver $100 million dollar in savings to the NSW energy consumers, through a reduced need for network augmentation.

The Project is expected to provide approximately 200 construction and 30 operational jobs, developing local skills and experience in the delivery of grid scale storage.

Statutory Framework

Under the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP), the Project would be as State Significant Development (SSD) as it is for the purpose of electricity generating works and has a capital cost greater than $30 million.

State Significant Developments are subject to environmental assessment under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and requires that a development application be accompanied by an Environmental Impact Statement (EIS).

This Scoping Report has been prepared to inform the preparation of Secretary's Environmental Assessment Requirements (SEARs) for an Environmental Impact Statement (EIS) for the proposal.

Stakeholder Engagement

Engagement in the early scoping phase of the Project has focused on specific stakeholders, particularly host and neighbouring landowners, the Yetholme community, Registered Aboriginal Parties, Bathurst Regional Council, Department of Planning and Environment, NSW Regional Economic Development, Local State Member, industry asset owners, and a range of interest groups and media.

A range of engagement techniques have so far been undertaken with various stakeholder groups, including community open days, group and individual meetings, phone and email, letters, information distribution lists, media, and a project specific website. ATCO have also opened an office in Bathurst, and engaged a Communication and Engagement Manager for the Project.

Information and feedback gained through the stakeholder engagement process has been, and will continue to be, used to further inform the Project design, and considered in the preparation of the EIS and supporting studies.

The community and stakeholders will have the opportunity to review the EIS and provide a submission. ATCO will continue to engage widely with government agencies, Bathurst Regional Council (including adjacent Oberon and Lithgow councils), key stakeholder groups and the community throughout the development of the Project.

Relevant Matters and Impacts of the Project

Key (or detailed) matters for the impact assessment of the proposal, identified on the basis that they are both most likely to occur and represent the greatest potential change to the existing environment, are as follows:

- Biodiversity
- Water
- Aboriginal heritage
- Traffic and access
- Noise and vibration

Other matters requiring assessment but considered less likely to result in significant impacts, either based on lower likelihood of occurrence, absence or few receptors, to be well understood, and/or well established and standard management measures. They include visual amenity, air quality, non-Aboriginal heritage, socio-economic, soils and spoil management, and hazards and risk (e.g. bushfire, contamination and waste management).

In developing the Project, the key focus would be avoidance and minimisation of impacts on the environment and local communities, where reasonable and feasible. The assessment would also identify mitigation and management measures to minimise these impacts both during construction and operation.

Contents

GLOSSARY

ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
AHIMS	Aboriginal Heritage Information Management System
AHMP	Aboriginal Heritage Management Plan
AIP	Aquifer Interference Policy
ANCOLD	Australian National Committee on Large Dams
AS	Australian Standard
ATCO	ATCO Australia
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
BFMC	Bush Fire Management Committee
BFRMP	Bush Fire Risk Management Plan
BRC	Bathurst Regional Council
CEMP	Construction Environmental Management Plan
DA	Development Application
CO_2	Carbon Dioxide
CoA	Commonwealth of Australia
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DPI	Department of Primary Industries
DPIE, now DPE	Department of Planning, Industry and Environment (now the Department of Planning and Environment)
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EP&A Act	Environmental Planning and Assessment Act 1979
EPC	Engineering Procurement Construct
FER	Functional Economic Region
FRWS	Fish River Water Source
FRWSS	Fish River Water Supply Scheme
GDE	Groundwater Dependent Ecosystem
GL	Gigalitre (i.e., 1,000 ML)
Ha	Hectares
HDPE	High-Density Polyethylene
HV	High Voltage

ISP	Integrated System Plan
kV	kilovolt
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LFB	Lachlan Fold Belt
MNES	Matters of National Environmental Significance
MDB	Murray Darling Basin
ML	Megalitre (i.e. one million litres)
MW	Megawatt
MWh	Megawatt hours
NEM	National Electricity Market
NGIS	National Groundwater Information System
NPI	Noise Policy for Industry
NRAR	Natural Resource Access Regulator
NSCAS	Network Support and Control Ancillary Services
OEH, now EES	Office of Environment and Heritage (now Environment, Energy and Science)
PCT	Plant Community Type
PSH	Pumped Storage Hydro
RAP	Registered Aboriginal Party
REDS	Regional Economic Development Strategies
REZ	Renewable Energy Zone
SAII	Serious and Irreversible Impacts
SEARs	Secretary Environmental Assessment Requirements
SEED	Sharing and Enabling Environmental Data in NSW
SPAL	Specific Purpose Access Licence
SRD SEPP	State Environmental Planning Policy (State and Regional Development)
SSD	State Significant Development
TEC	Threatened Ecological Community
µS/cm	micro-Siemens per centimetre
VRE	Variable Renewable Energy
WAL	Water Access Licence
WM Act	Water Management Act 2000
WSP	Water Sharing Plan

1. INTRODUCTION

1.1 Overview

ATCO Australia Pty Ltd (ATCO) propose to develop the Central West Pumped Hydro Project (the Project), a nominal 325MW pumped hydro project that is located in an area well suited for the efficient storage and deployment of potential energy.

The Project is located on Wiradjuri Country in the NSW Central Tablelands, at Yetholme NSW, approximately 21km south-east of Bathurst and 190km west of Sydney (Figure 1-1).

The Project's PSH facility is limited to two freehold land tenures, owned by two separate landowners, Lot 9 in Deposited Plan (DP)755805 and Lots 167, 168, 205 and 226 in DP755805 (Figure 1-2). The development footprint will be in the order of 170 ha, with the permanent infrastructure occupying an area of approximately 85 ha.

The key elements of the permanent Project infrastructure (Figure 1-3; Figure 1-4) comprise of:

a) "Turkey's nest" embankment dam forming an upper reservoir;

b) One or two embankment dams on a tributary forming a lower reservoir;

c) Penstock (or pipeline) connecting the upper and lower reservoirs;

d) Subsurface powerhouse enclosing two pump-turbine units;

e) Main private access road turning off a local Council road;

f) Water supply pipeline from the Fish River (route to be determined); and

g) Transmission connection infrastructure including an underground 330kV cable connecting to a nearby Transgrid 330kV overhead transmission line.

The primary role or objective of the Project will be to store energy during periods of surplus electricity generation and generate during periods of high demand using the stored energy, likely under a daily cycle regime.

By releasing water from the upper reservoir through the hydroelectric turbines, electricity is generated. The water is stored in the lower reservoir ready to be pumped, constituting a closed cycle. When surplus electricity is being produced by the electricity grid (such as when there is excess solar or wind), the water is pumped from the lower reservoir to the upper reservoir. By doing so, the Project will assist in 'evening out' the variable energy generation resulting from the increased penetration of wind and solar projects on the electricity grid.

The Project site is well suited for the efficient storage and deployment of potential energy, with the upper reservoir at a height difference of some 360m, with the steep terrain assisting to reduce the length of penstock to about 1,400m (Figure 1-4).

The Project will have the ability to provide sufficient energy to power over 153,000 homes, and anticipated to provide some 200 construction jobs and 30 operational jobs.

1.2 Proponent Details

The Project is being developed by ATCO, supported by development partner Altura Group Pty Ltd (Altura), under the entity of ATCO Australia Pumped Hydro Pty Ltd.

Established in Canada in 1947 and now a $22 billion global company, ATCO has a long history of partnering with communities and Indigenous groups, energising industries, and delivering customer focussed infrastructure solutions.

With 60 years' experience in Australia - having entered the market in 1961 - ATCO understands the Australian environment and is a trusted, long-term partner of many large and respected Australian companies.

Leveraging a 70+ year legacy of power generation, transmission and distribution networks operation and maintenance in Canada, ATCO has been providing gas-fired power generation in Australia for more than 20 years and is actively investigating investments across the entire energy value chain, including renewable generation, transmission, distribution, and storage infrastructure for the national electricity market.

Experienced in building, owning and operating pipeline infrastructure globally, ATCO has successfully managed the Western Australian natural gas distribution network since 2011, and will apply its global capability and know-how to expand into solutions across transmission, storage and processing. In mid-2020, ATCO was selected, as a partner to rebuild Puerto Rico's electricity system; with a plan to modernise and operate the system for the next 15 years.

ATCO has invested in alternative and renewable energy solutions for 30 years. ATCO will continue to respond to disruption in the energy sector through investing in a range of projects that utilise new technologies and business models to provide energy solutions for a low carbon future. Activities in this area include renewable generation, microgrids, storage and hydrogen.

ATCO is a global leader in providing modular solutions to the community; from regional mining developments through to urban infrastructure development and provides a diverse range of services and products throughout various markets in Australia.

Altura is an Australian project development company formed in 2016 to meet the growing need for experienced pumped hydro project development.

Proponent details for the Project are as follows:

Requirement	Details
Proponent	ATCO Australia Pumped Hydro Pty Ltd
Postal address	Level 12, 2 Mill Street, Perth, WA 6000
ABN	49 636 877 104
Nominated contact	Mark Endersby
Contact details	1300 258 872

1.3 Purpose of this Report

The purpose of this report is to support an application to the NSW Department of Planning, and Environment (DPE; formally the Department of Planning, Industry and Environment, DPIE) for Secretary's Environmental Assessment Requirements (SEARSs) under Section 5.16 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Central West Pumped Hydro Project (the Project).

Once issued, the SEARs will set out the matters to be addressed by ATCO in the Environmental Impact Statement (EIS) to be prepared and submitted for the Project under Part 4 of the EP&A Act.

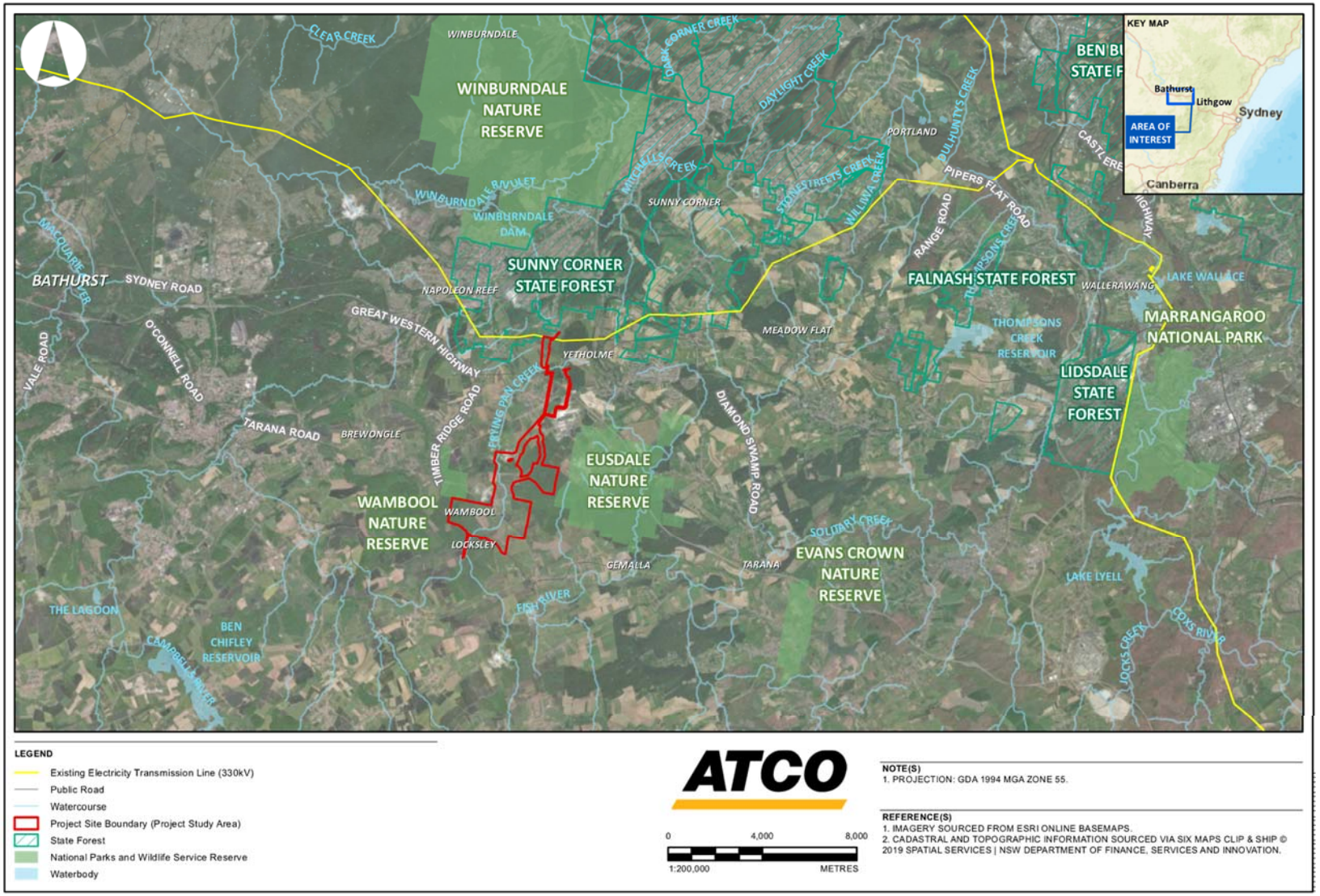


Figure 1-1: General Location

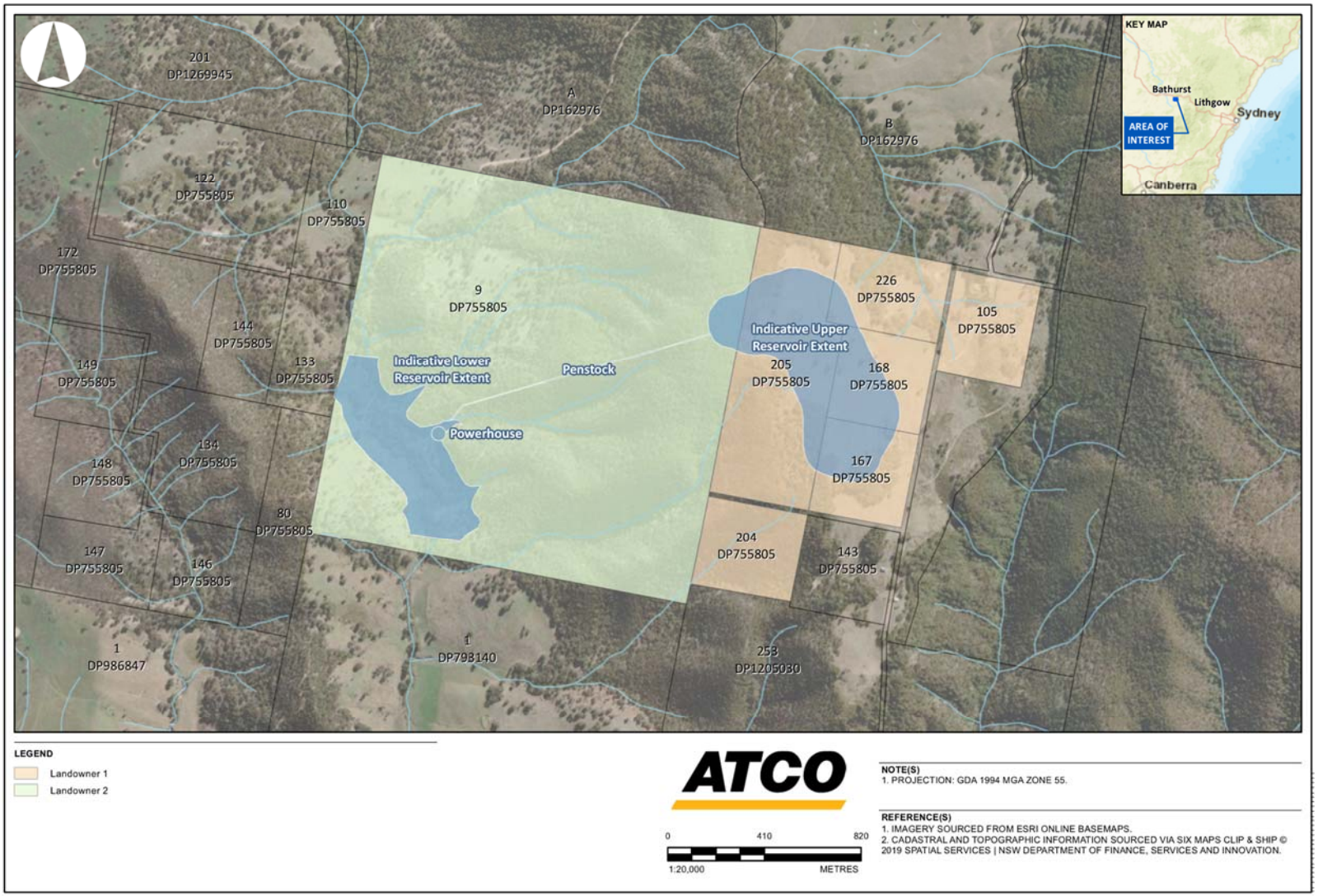


Figure 1-2: Cadastral and landowner information relating to the PSH facility area with secondary embankment.
Note: cadastral boundaries are subject to survey

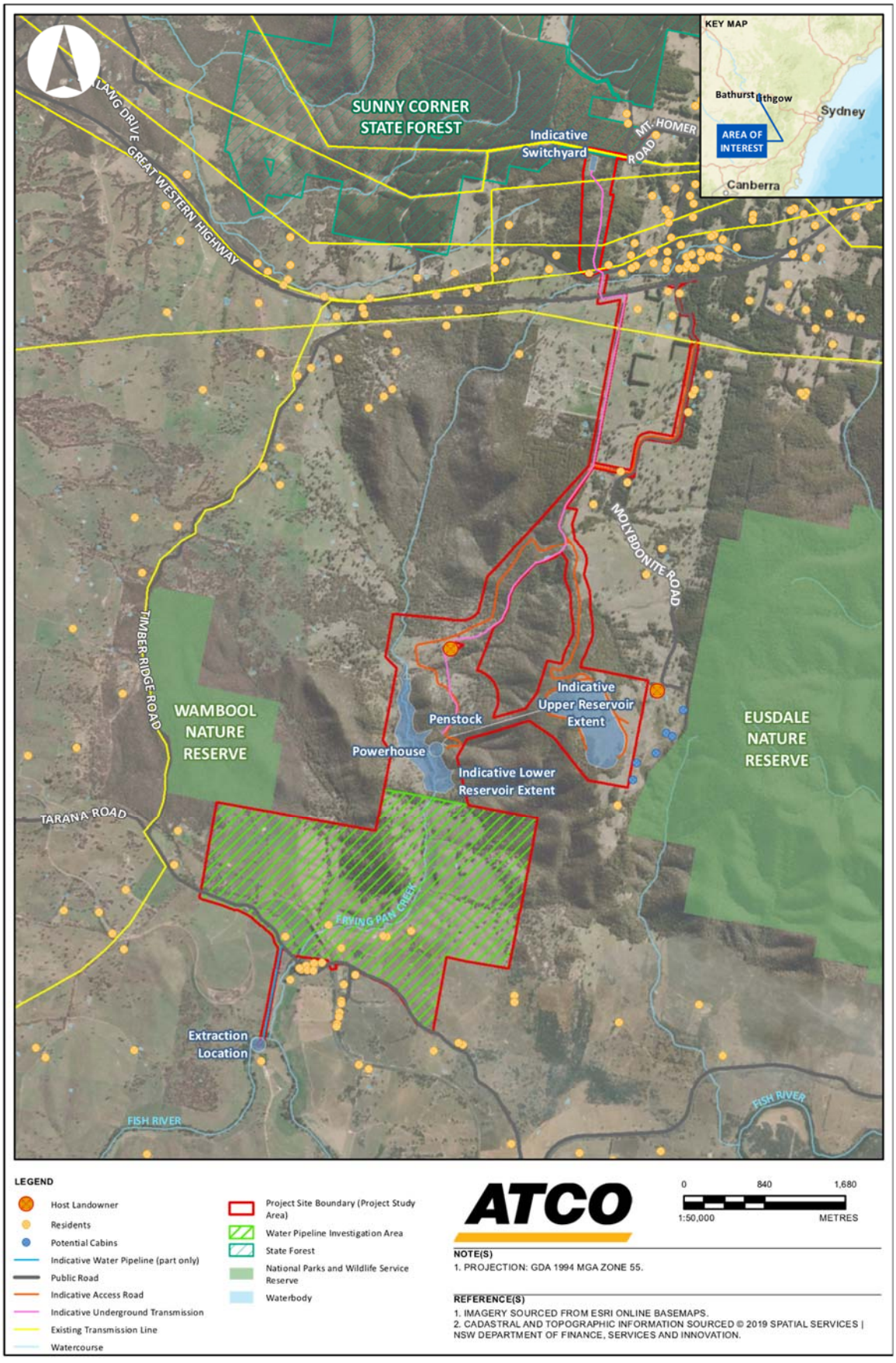


Figure 1-3: Indicative location and layout of the Pumped Storage Hydro Facility and associated linear infrastructure.

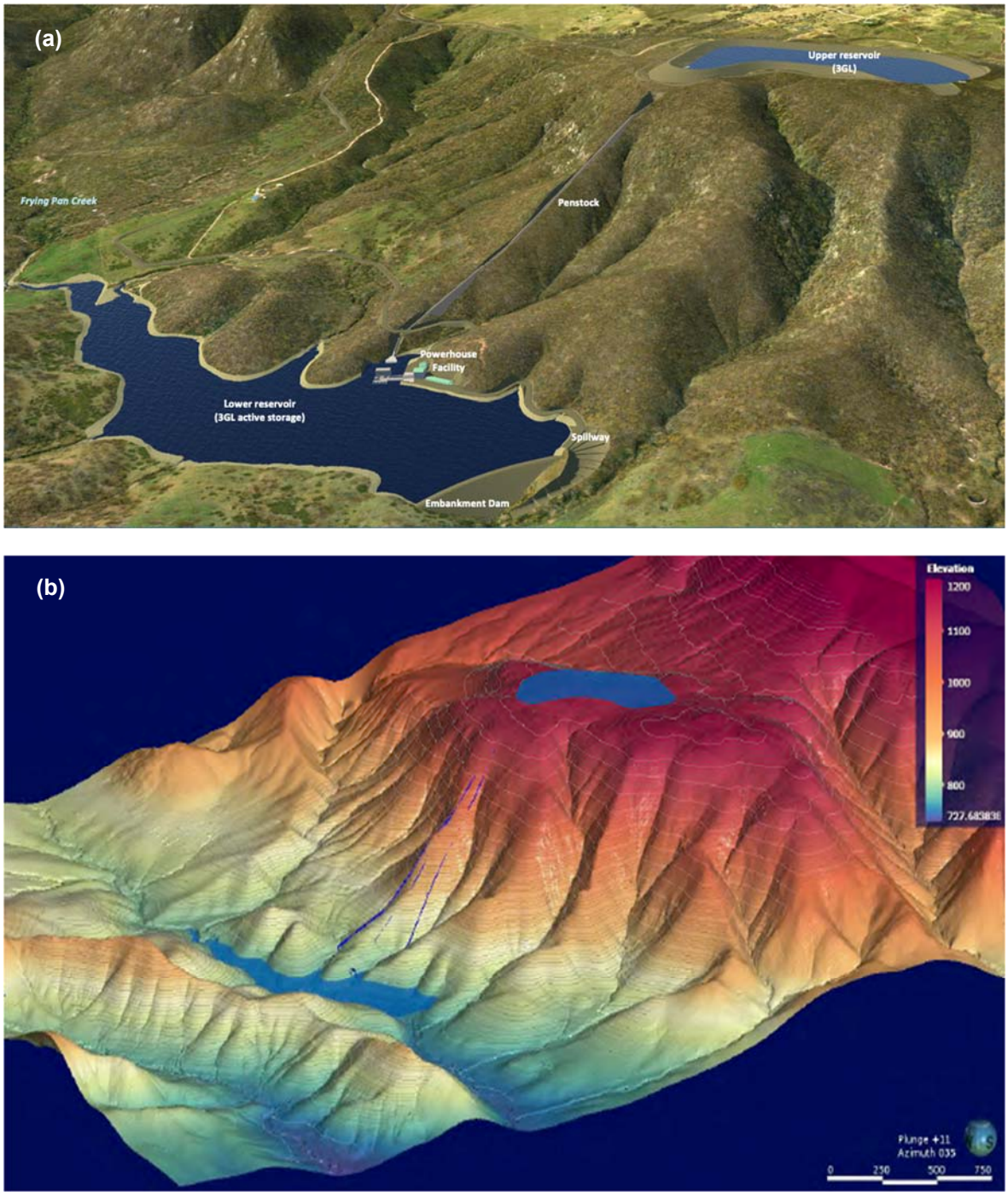


Figure 1-4: (a) Visualisation of the Pumped Storage Hydro Facility, and (b) showing the local relief.

1.4 Pumped Storage Hydro

Pumped Storage Hydro (PSH) utilises two bodies of water that are interconnected and located at different elevations. When energy is available, the PSH plant utilises electricity to pump water from the lower reservoir to the upper reservoir. When needed, energy is produced by releasing the water from the upper reservoir to flow back to the lower reservoir (Figure 1-5).

This energy transfer process has enormous benefits and 'firms' renewable energy sources such as wind and solar (often termed 'variable energy'), in turn supporting and enabling greater

penetrations of variable renewable generation. This capability is an essential complement in the low carbon transition occurring the National Electricity Network (NEM). Specifically, when surplus electricity is being produced when there is excess solar and/or wind, the water is pumped from the lower reservoir to the upper reservoir using electricity from the grid. When energy demand is high and/or wind and/or solar is not being produced as much, water from the upper reservoir in the PSH can be released to help provide the energy to meet the required demand. By doing so, the Project will assist in 'evening out' the variable energy generation creating stability, reliability and security in the electricity system (Figure 1-6).

As more electricity is needed to pump the water up-hill than is produced by releasing water down-hill, the facility is a net consumer of electricity and therefore relies on the difference in the cost of electricity consumption and revenue from electricity generation to be viable.

Pumped hydro is a proven and reliable technology that has operated worldwide for over 75 years. Globally there is around 181GW installed in over 40 countries. Australia currently has three operating PHS facilities, including Tumut 3 in NSW (600MW), Wivenhoe in QLD (500MW) and Shoalhaven in NSW (240MW) which have operated successfully since the 1970s.

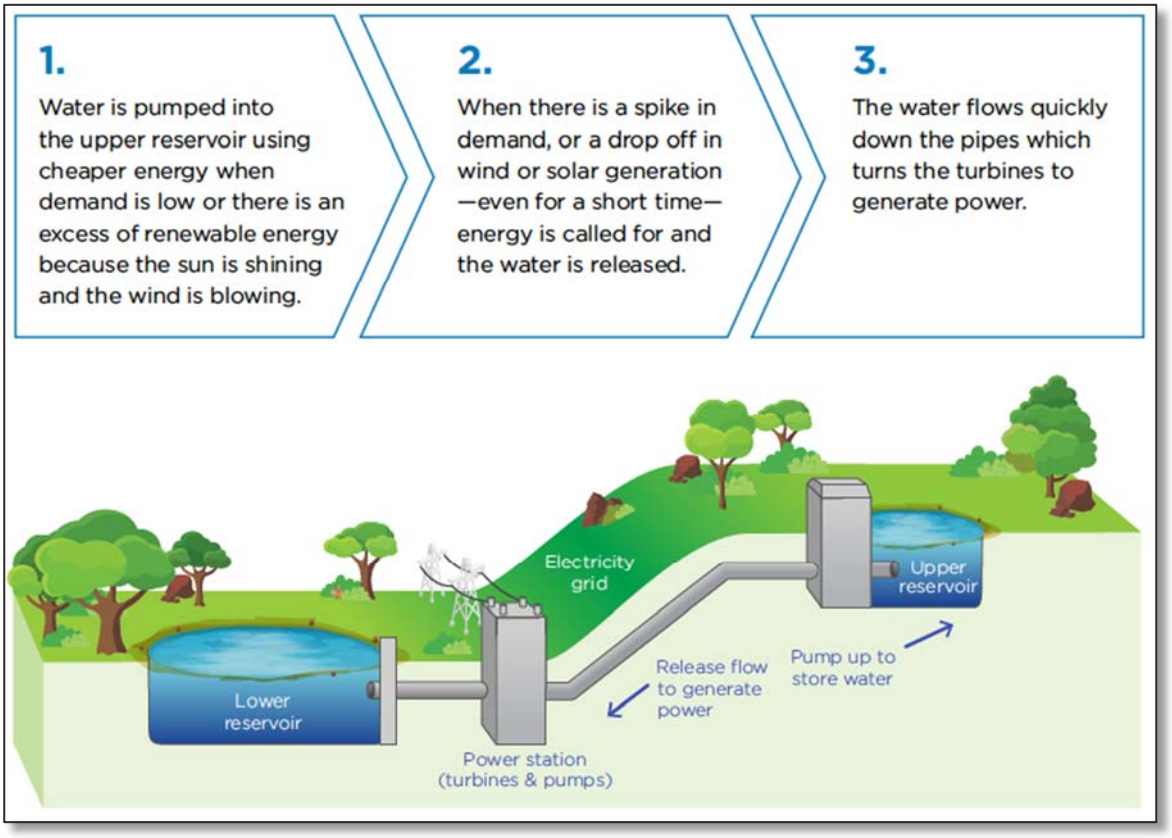


Figure 1-5: Schematic of a closed loop pumped storage hydro (Source: NSW DPIE, 2020 -Electricity Infrastructure Roadmap Overview).

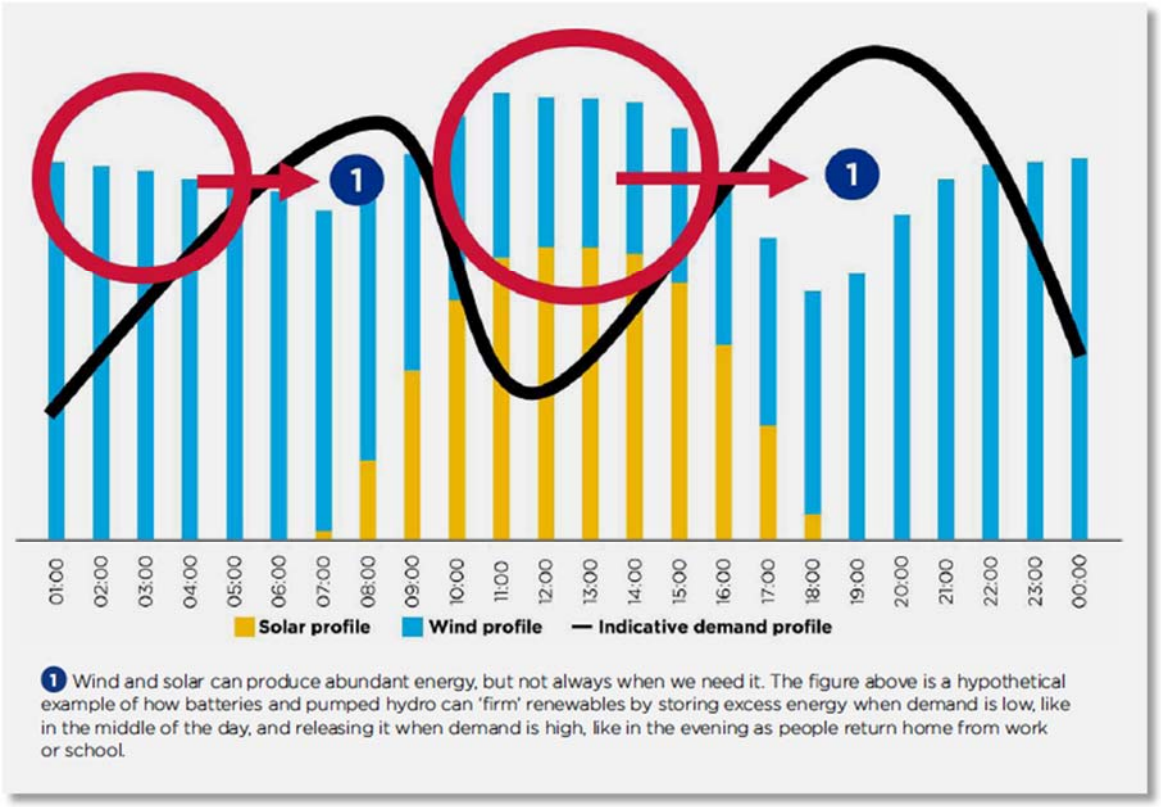


Figure 1-6: How energy storage, such as pumped storage hydro, facilitates the firming of renewables (Source: NSW DPIE, 2020 -Electricity Infrastructure Roadmap Overview).

2. STRATEGIC CONTEXT

2.1 Site and Surrounds

2.1.1 Regional Context

The Project is located in the Bathurst Local Government Area.

The locality of Yetholme is located approximately 4km north-east of the PSH facility, while the small locality of Locksley is located approximately 2.5km to the south-east. Other nearby population centres in the vicinity of the Project include Bathurst (population 35.020), some 21km northwest, and Lithgow (12,840) approximately 31km east, and Oberon (4,723), some 24km south.

In the surrounding locality of the Project area, land has been extensively cleared for cropping and grazing activities, a land use activity important in the region, especially toward the Fish River and west toward Bathurst. Large expanses of State Forest, including pine plantations, occur to the north of the Project (refer to Figure 1-1 and Figure 1-3).

2.1.2 Local Context

The land immediately surrounding the Project is a mosaic of cleared to partially cleared areas on the gentler slopes and valleys, to well vegetated areas generally associated with steeper terrain.

Two designated nature reserves are in the locality of the Project area, the Wambool Nature Reserve to the west, and the Eusdale Nature Reserve to the east. The Project is not located on such gazetted land, and is not expected to impact on the values of these areas. In contrast, the Project represents an opportunity to improve biodiversity connectivity between these conservation areas by the potential establishment of biodiversity offset stewardship sites with agreement with interested landowners.

There are ten non-host landowners located within 3km of the centre point of the Project (i.e. the centre of the penstock). Some of these landowners are in discussions with ATCO about the placement of linear infrastructure on their land. The closest non-host landowner is located about 400m from the upper reservoir, with the next closet being approximately 1.4km from the lower reservoir (Figure 2-1).

2.1.3 The Site

The Project is located at the end of an existing Council road, Molybdonite Road. This no-through road connects with the National highway route A32, the Great Western Highway.

The Project permanent infrastructure covers an area of approximately 85 ha. The development footprint (i.e. potential area of disturbance, including construction and permanent facilities) will be in the order of 170 ha. A Project Study Area (or Project Site Boundary) of some 460 ha has been established surrounding these areas to enable potential micrositing of infrastructure to facilitate landowner considerations, stakeholder engagement, and minimising and avoiding environmental and heritage impacts through the design process.

Linear infrastructure (access roads, underground transmission cable, and water supply pipeline) are located across several private landowners and several Crown land parcels, including road reserves. Directly affected landowners have been informed of the Project.

Linear infrastructure routes are subject to negotiations with landowners and will eventually be secured by agreement with landowners. As the negotiation process is ongoing with most landowners, and detailed studies such as heritage, environment and engineering have yet to be completed, linear infrastructure alignments may change.

Some of the linear infrastructure routes will also traverse several Government and private company assets including Council roads, Lithgow Gas Pipeline, Great Western Highway, the Main Western Rail Line, several Transgrid transmission lines, some local distribution powerlines and communication cables. Most of these asset owners have been informed of the Project.

The Project is predominantly located on land zoned RU1 Primary Production in the Bathurst Local Environmental Plan. A small length of the transmission cable and water supply pipeline will cross beneath the Great Western Highway and Western Rail Line respectively, which are zoned SP2 Infrastructure (Figure 2-2).

A review of historical aerial imagery indicates that other than the escarpment between the reservoirs, the Project area had been extensively cleared of native tree cover by 1964. By 1973, substantive clearing had occurred further north, including both north and south of the Great Western Highway. Since 1984, some of the cleared areas in the vicinity of the Project are showing signs of regrowth (Figure 2-3).

Today, the western property is predominantly uncleared on the eastern side, and partly cleared on the western side, where Frying Pan Creek (a fourth order stream) flows from north to south. In addition to cleared areas dating back pre-1960s, there is evidence of past exploration activities in this area as well. The steeper eastern side of the property has several vegetated gullies that contain minor tributaries that flow into Frying Pan Creek.

A large proportion of the eastern property where the upper reservoir will be located has been cleared or partially cleared for livestock grazing. Most of the cleared areas are on the central and eastern parts of the property

According to the Federal Government's Register of Native Title Claims, no Native Title is registered in the Project area.

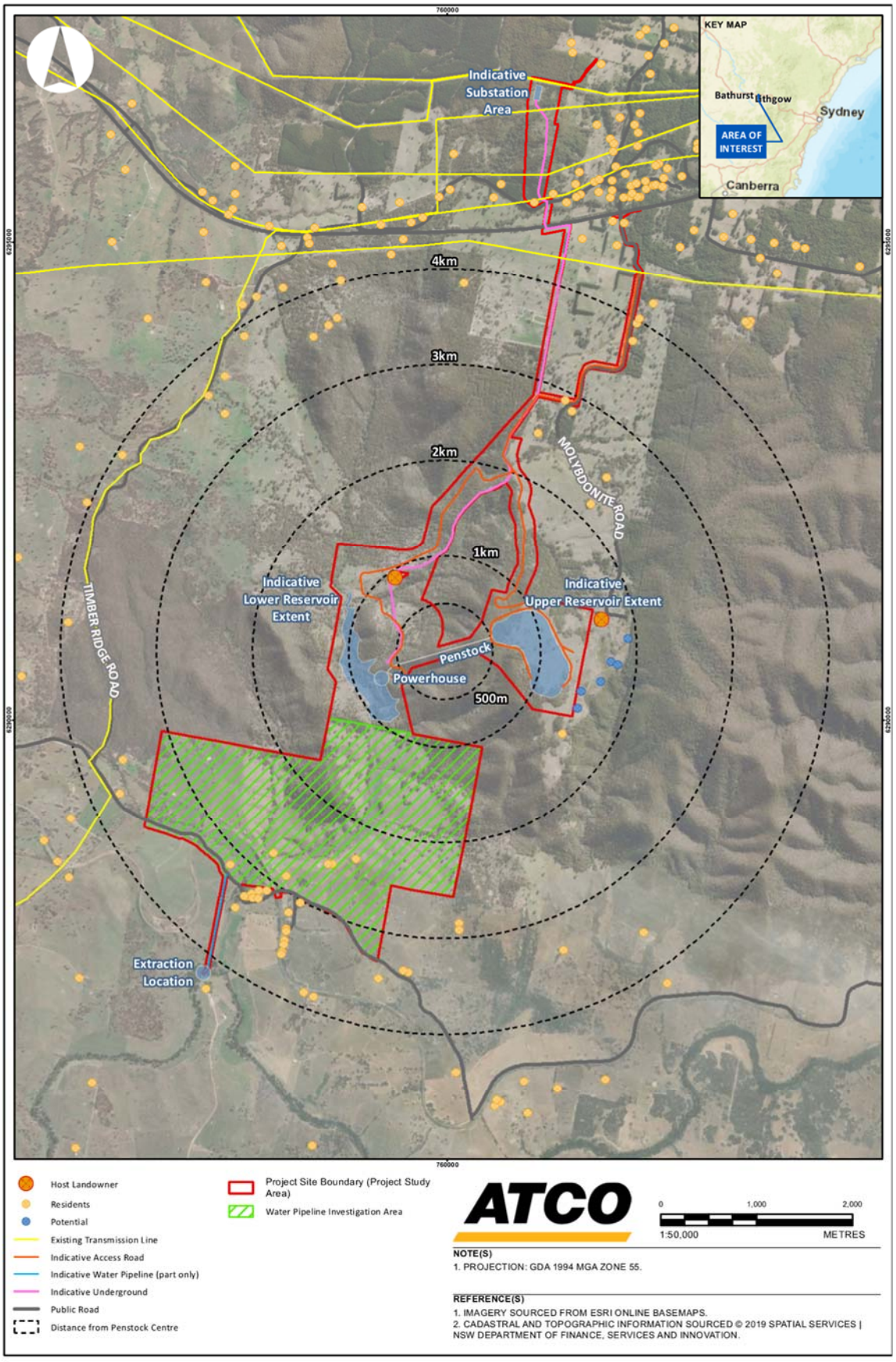


Figure 2-1: Near-neighbours to the Project with distances marked from the centre-point of the penstock.

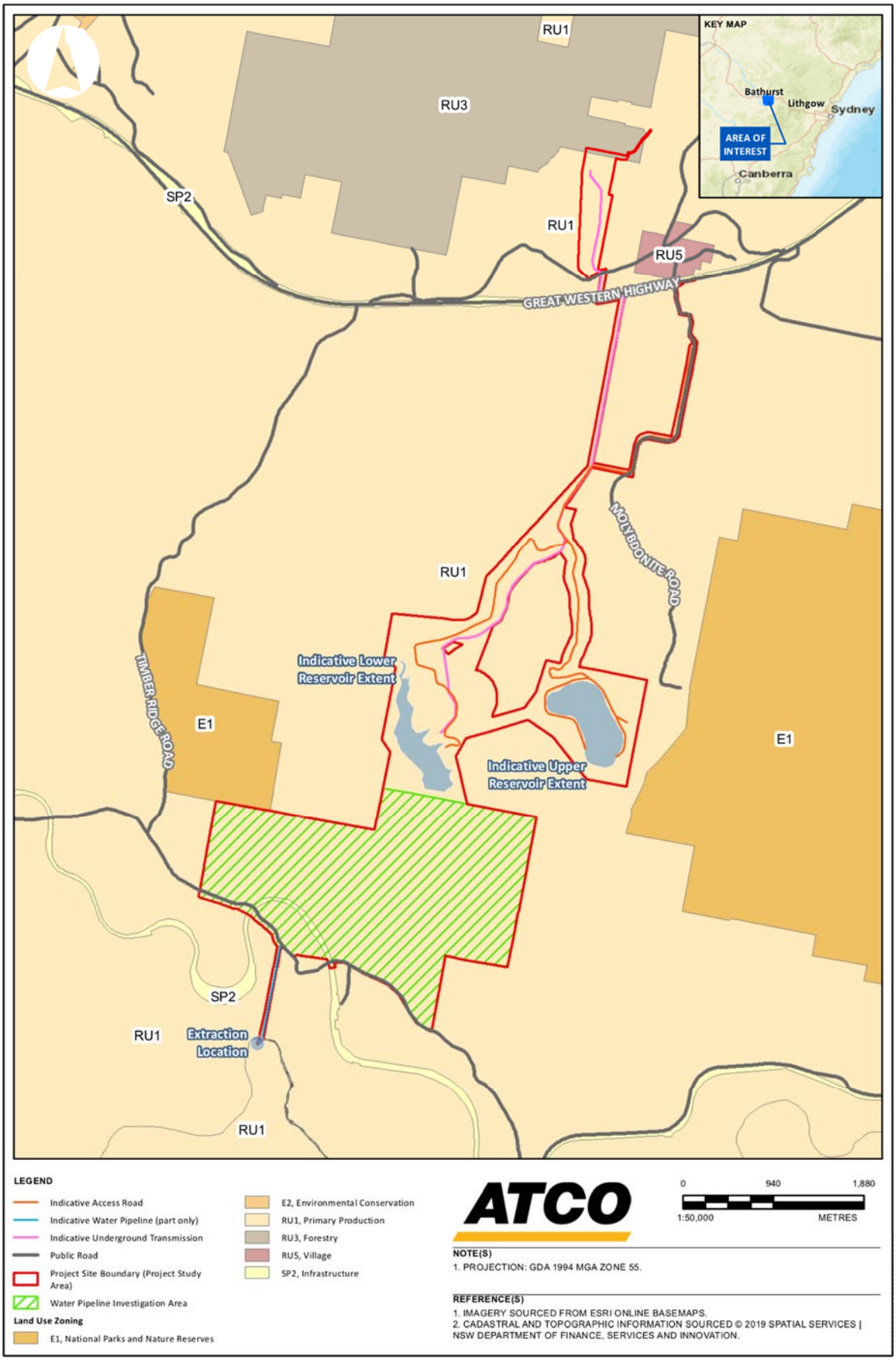


Figure 2-2: Land zoning associated with the Project.

Figure 2-3: Aerial image of the Project area and surrounds, (a) 18/5/1973 (Source: NSW Spatial Collaboration Portal) (b) 24/8/2019 (aerial image from Google Earth). The red circle represents the general location of the powerhouse.

2.1.4 Climate

Climate information is derived from the Bureau of Meteorology's Bathurst Agricultural Station (Site No. 063005). It has operated since 1908, and is located some 22 km north-west of the Project site.

Bathurst is in Australia's cool temperate climate zone which is defined as having mild to warm summers and cool to cold winters. Regular summer thunderstorms are common. The mean maximum and minimum temperatures are 28.2°C and 0.5°C in January and July respectively. Mean rainfall is highest in January (68.3mm) and lowest in May (41.3mm) (Figure 2-4). The average annual rainfall is 636.5mm across 74.2 days.

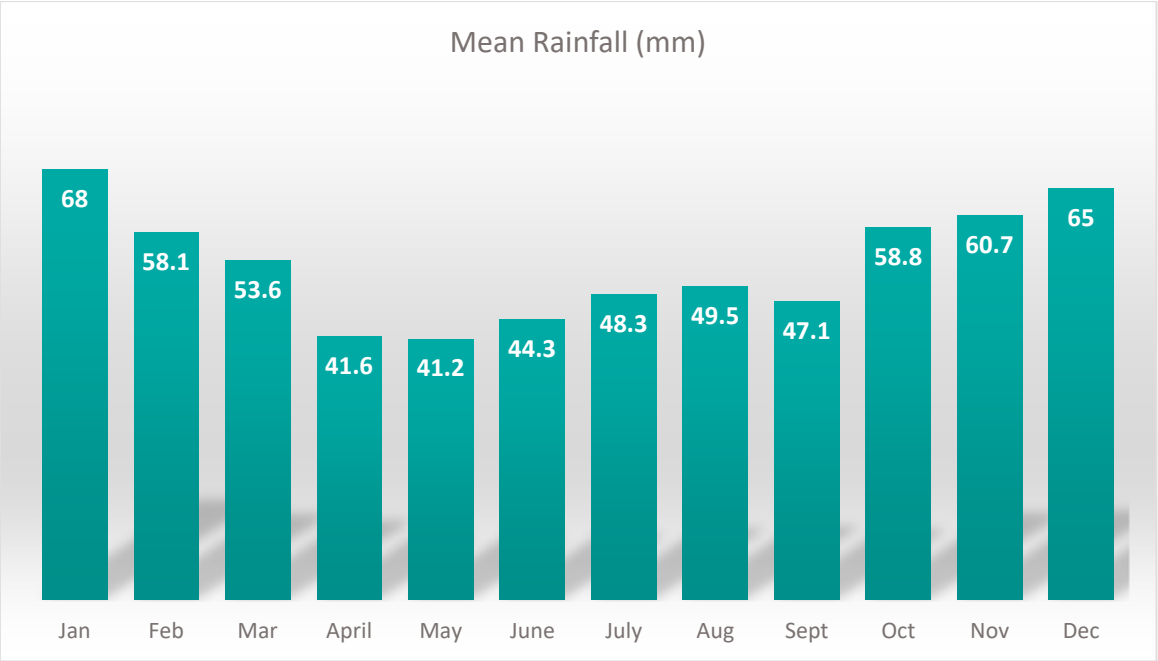


Figure 2-4: Average rainfall near the Project site, 1908 - 2021 (Source: Bureau of Meteorology).

2.1.5 Hydrological Setting

The Project is located within the Frying Pan Creek catchment, with the lower reservoir to be formed on part of Frying Pan Creek, a fourth order stream, and a tributary of the Fish River. The Fish River starts near the town of Oberon (NSW) and generally flows towards the northwest. The Fish River converges with Campbells River to become the headwaters of Macquarie River.

Frying Pan Creek is one of 38 sub-catchments in the Fish River. The catchment area of Frying Pan Creek is 43.2 km^2, and represents about 3.3 per cent of the total catchment area of Fish River, which has a catchment of 1,292 km^2.

2.2 State Policy Context

The Project is an energy storage project that aligns to the objectives of the State's electricity and infrastructure strategies and associated plans by firming variable renewable energy, being located in an area that would facilitate the growth of identified Renewable Energy Zones and helping the State respond to the challenge of climate change and meet emission targets.

2.2.1 NSW Electricity Strategy (2019)

The NSW Electricity Strategy is the NSW Government's plan for a reliable, affordable and sustainable electricity future that supports a growing economy.

The NSW Government recognised that the NSW electricity system must change, siting a number of pressures and changes occurring in the electricity network. Specifically, the Strategy notes the following:

- *Traditional generators are getting older and closing*. Four of the State's five remaining coal-fired generators are set to reach the end of their technical lives and close by 2035,

- *Firmed renewables are the cheapest type of reliable generation*. Wind and solar are the cheapest forms of new electricity generation. When paired with storage technology such as pumped hydro, they can reliably supply electricity when the sun is not shining and the wind is not blowing, and are the lowest cost option to replace power stations as they close.

The Project will support the strategy by delivering the substantial storage capacity within the local electricity grid, facilitate the development of additional renewable energy to offset the retirement of coal-fired power stations, and contribute to the security and reliability of the electricity network.

2.2.2 State Infrastructure Strategy 2018 – 2038 (February, 2018)

This 20-year Strategy sets out Infrastructure NSW's independent advice on the current state of NSW's infrastructure and the needs and priorities over the next 20 years. Building Momentum State Infrastructure Strategy 2018-2038 looks beyond the current projects and identifies policies and strategies needed to provide the infrastructure that meets the needs of a growing population and a growing economy.

The strategic objective for the energy sector is to *"Encourage private sector investment to deliver secure, reliable, affordable, low emissions energy supply".*

A key response is to encourage new energy infrastructure, including storage such as pumped hydro that will change energy productivity and demand profiles. Specifically, pumped hydro is recognised as having the capacity to act as an effective electrical energy storage technology by time-shifting surplus renewable energy supply into periods of lower output, and assist with providing firm dispatchable solutions for the intermittent supply characteristics of wind and solar.

The Project will support the strategy by:

- *delivering the substantial storage capacity within the local electricity grid which will assist in 'evening out' the variable energy generation resulting from the increased penetration of wind and solar projects on the electricity grid, and*
- *providing low cost non-network services to the local grid, contributing directly to the security and reliability of the electricity network.*

The Project will also support regional growth, particularly during the construction phase.

2.2.3 NSW Electricity Infrastructure Roadmap (November, 2020)

The Department of Planning, Industry and Environment's NSW Electricity Infrastructure Roadmap recognises that NSW has some of the best renewable energy resources in the world. As the global economy moves to reduce its carbon emissions in line with the Paris Agreement, NSW can attract huge investment in new, low carbon industries and can benefit from some of the lowest electricity prices in the Organisation for Economic Co-operation and Development (OECD). But to take advantage of these opportunities there needs to be substantial investment in modernising the electricity system, including by building transmission, generation, long duration storage and firming infrastructure (NSW DPIE, 2020).

The purpose of the NSW Electricity Infrastructure Roadmap is to deliver this infrastructure and secure NSW's future as an energy superpower. In this respect, the Roadmap is expected to attract $32 billion of timely and coordinated private sector investment by 2030 in large-scale generation, storage and transmission to maintain a reliable, secure, and affordable supply. It will support an expected 6,300 construction jobs and 2,800 ongoing jobs mostly in regional NSW in 2030 and an

estimated $1.5 billion in lease payments to landholders in regional NSW by 2042 and reduce NSW's carbon emissions by a total of 90 million tonnes of CO_2e ($MtCO_2e$) by 2030 (NSW DPIE, 2020).

A key driver in this roadmap is the recognition that the State needs to deliver this new infrastructure to replace four coal-fired power stations that are scheduled to close within the next 15 years, starting in 2023. These power stations currently provide around three quarters of the State's energy supply (refer to Figure 2-5).

Within the Roadmap, modernising the State's electricity system will be built on five foundational pillars:

1. Driving investment in regional NSW: supporting our regions as the State's economic and energy powerhouse.
2. Delivering energy storage infrastructure: supporting stable, long-term energy storage in NSW.
3. Delivering Renewable Energy Zones: coordinating regional transmission and renewable generation in the right places for local communities (refer to Section 2.2.5).
4. Keeping the grid secure and reliable: backing the system with gas, batteries or other reliable sources as needed.
5. Harnessing opportunities for industry: empowering new and revitalised industries with cheap, reliable and low emissions electricity.

In the NSW Government's Electricity Infrastructure Roadmap, pumped hydro is recognised as one of the most effective and reliable forms of long duration storage, and forms an integral part of the strategy.

The Project is seen as a vital part of this energy infrastructure modernisation, contributing to all five of the foundational pillars.

2.2.4 NSW Climate Change Policy Framework (2016)

The NSW Climate Change Policy Framework (OEH, 2016) represents the State's position on responding to climate change and relates directly to how energy is generated and consumed in NSW.

The Framework aims to maximise the economic, social and environmental wellbeing of NSW in the context of a changing climate and current and emerging international and national policy settings and actions to address climate change. Its aspirational long-term objectives are to achieve net-zero emissions by 2050 and make NSW more resilient to a changing climate.

Adjunct to this in September 2021, the NSW Government, through the state's Net Zero Plan, increased its ambition to reduce emissions on 2005 levels from 35% to 50% by 2030.

2.2.5 Renewable Energy Zones (REZ)

The NSW Government's Electricity Strategy[1] sets out a plan to deliver three Renewable Energy Zones (REZ) in the State's Central-West, New England and South-West regions. This builds on the

[1] https://energy.nsw.gov.au/government-and-regulation/electricity-strategy

NSW Transmission Infrastructure Strategy[2] and supports the implementation of the Australian Energy Market Operator's Integrated System Plan.

Specifically, a REZ involves the coordinated development of new grid infrastructure in energy rich areas, efficiently connecting multiple generators in the same location. REZs are the modern-day equivalent of a power station, combining generation, transmission, storage and system strength services to ensure a secure, affordable and reliable energy system.

The REZ are expected to unlock a significant pipeline of large-scale renewable energy and storage projects, while supporting up to $23 billion of private sector investment in our regions and up to 2,000 construction jobs each year.

The REZ will play a vital role in delivering affordable energy to help replace the State's existing power stations as they retire over the coming decades.

The zones are expected to deliver multiple benefits for NSW, including:

- improving electricity reliability by delivering significant amounts of new energy supply;
- increasing affordability by reducing wholesale electricity costs;
- supporting emissions reduction by delivering reductions in the electricity sector; and
- engaging communities by helping them to actively participate in the development of energy infrastructure in their region.

2.2.5.1 Central-West Orana Renewable Energy Zone

It is expected that a pilot REZ in the Central-West region would unlock up to 3,000 megawatts of new generation by the mid-2020s and be worth around $4.4 billion in private sector investment once fully developed. This is enough new generation capacity to power around 1.3 million homes. This REZ alone is expected to support 450 construction jobs in the local region.

The Central-West region is the planned location for the first pilot REZ because it benefits from significant existing investment and investor interest, with around 4,500 MW of projects either approved or in the planning system, relatively low build costs, and a strong mix of energy resources.

In June 2020, prior to ATCO acquiring the rights to the Project, development partner Altura lodged a Registration of Interest (ROI) to participate in the REZ.

Although the Project does not require transmission augmentation to be completed, it would play a critical role in providing system strength, firming and ancillary services which would help in implementation of the REZ and will be an important enabler for the input of variable renewable energy into the REZ. In fact, in July 2020, AEMO released a Notice of Consultation requesting submissions on non-network options for the Central-West Orana REZ Transmission Link project to improve the grid's hosting capacity of renewable energy, in turn avoiding costly upgrades to the transmission network. ATCO provided submissions to AEMO in October 2020 to indicate that the Project, a non-network option, could contribute toward grid stability (e.g. synchronous condenser operation) to enable the connection of variable renewable energy in the REZ and reduce costly upgrades to the transmission network. This is expected to realise a potential saving of $100M to the State. AEMO has expressed strong interest in the Project for facilitating the non-network options.

[2] https://energy.nsw.gov.au/renewables/clean-energy-initiatives/transmission-infrastructure-strategy

2.3 NSW Regional Policy Context

The Project provides an opportunity to contribute to the regional aspiration of expanding renewable energy generation, diversifying the regional economy and job creation.

2.3.1 A 20 Year Economic Vision for Regional NSW (2018)

In the State Government's 2018 publication *'A 20 Year Economic Vision for Regional NSW'*, renewable energy was recognised as an emerging 'engine industry' that will help drive regional NSW economies over the next 20 years.

The report recognises that NSW has excellent renewable energy resources, and strategic infrastructure projects such as regional energy zones (see Section 6.2.5 above) would capitalise on the State's significant energy resources. REZ would signal to the market new high-potential areas for renewable energy project development, to support a more secure, affordable and clean energy system for people and businesses in regional NSW.

Further, Bathurst is recognised as being in one of several of the State's growth centres where populations are rapidly increasing as people migrate to regional cities, attracted by their lifestyles and burgeoning employment industries.

The Project will contribute further to the expansion of renewable energy projects, and facilitate a diversified mix of industry in the region.

2.3.2 Central-West and Orana Regional Plan 2036 (June 2017)

The Department of Planning and Environment's Central West and Orana Regional Plan recognises that the region makes a major contribution to the State's economy, with the regional cities of Bathurst, Orange and Dubbo and other centres capitalise on their proximity to Sydney, Newcastle and Canberra. The region is also home to landmark solar, wind and bioenergy projects which distinguish the region as a leader in renewable energy development

Renewable energy generation is recognised to create a more sustainable energy future for the region, with the sectors growth promoting local jobs in smaller communities and development opportunities for associated industries. Specifically, Direction 9 seeks to increase renewable energy generation and recognises the importance of small-scale hydro and storage technologies.

The Project supports the Central West and Orana Regional Plan by continuing to facilitate renewable energy generation in the region, diversifying and supporting job growth and not being located on important agricultural land.

2.3.3 Regional Economic Development Strategy – Abercrombie, 2018-2022

In 2018, the NSW Government assisted local councils to develop Regional Economic Development Strategies (REDS) based on the concept of a Functional Economic Region (FER).

FERs are made up of one or more Local Government Areas in regional NSW that work together to create smaller economies with strong economic links.

The REDS provide a clear economic development strategy for the region. They guide government investment in economic development initiatives in regional NSW.

The Project would be expected to facilitate the strategy to achieve a number of its core strategies, including provide opportunities for attracting and retaining entrepreneurs and skilled professionals, optimise growth in the development of regional infrastructure, and capitalise on existing strengths in manufacturing.

2.4 Project Justification

2.4.1 Need

2.4.1.1 Closure of NSW Coal-Fired Power Stations

The recently released NSW Electricity Infrastructure Roadmap DPIE in November 2020 (the NSW Roadmap) sets the context for this Project and why it is important for the State of NSW.

Alongside the development of significant renewable energy projects such as wind and solar, within the next 15 years NSW will see the closure of at least four of the five coal fired power stations which currently provide around three quarters of the State's energy supply as shown in Figure 2-5. Intermittent renewable energy including solar and wind generation will in large part replace this lost generation.

However, the variability of generation from renewable sources introduces significant system challenges. Power demand and supply must be balanced in real time to maintain a reliable and secure power system. Because renewable electricity generation and customer usage can both fluctuate rapidly, investment in complementary forms of short and long duration capacity (i.e. batteries and pumped hydro) is needed.

AEMO has projected that NSW will need nearly 2.3 GW of energy storage to maintain system security and reliability in addition to Snowy 2.0.

Modelling[3] has confirmed the necessary replacement generation in NSW is likely to be a mixture of wind, solar, gas, and storage. Market modelling estimates[4] that $5.1 billion of long duration storage and between $22.4 billion to $33.6 billion of wind and solar investment will be required to meet the energy requirements of NSW and maintain a reliable supply.

The NSW Roadmap notes the urgency that faces the transition of the NSW electricity infrastructure to meet the changed patterns of generation and consumption, noting that "pumped hydro projects can make a substantial contribution to NSW's future electricity storage needs…, and it specifically states:

"Investment in large-scale storage and firming capacity will also be needed to balance the supply of variable renewable energy. This can include: Long duration storage of electricity is one type of firming, providing large amounts of reliable electricity on demand, by storing surplus of renewable electricity, and releasing it into the grid when demand exceeds supply. Currently, pumped hydro is the primary form of long duration storage; it is able to provide long injections of stored power (from hours to days)".

It is this need that the Project has been designed to fulfil. It provides long duration (8 hours storage) and is connected to the main transmission line serving the Central-West Orana REZ (described below).

[3] AEMO Integrated System Plan, 2020
[4] NSW Electricity Infrastructure Roadmap DPIE, November 2020.

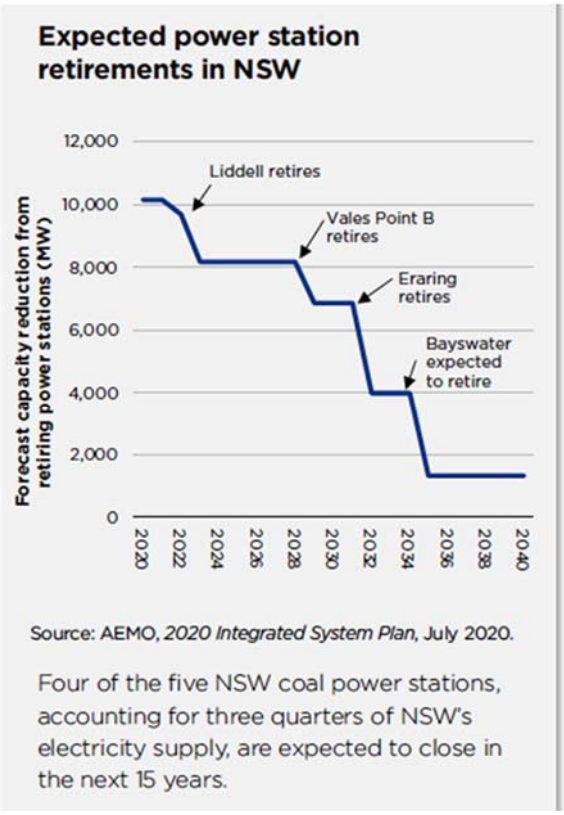


Figure 2-5: Summary timeline of NSW coal-fired power stations closure. Source: NSW Roadmap.

2.4.1.2 Central West Orana Renewable Energy Zone

The Central West-Orana Renewable Energy Zone (REZ) is highlighted in the NSW 2019 Government's Electricity Strategy for development as the first pilot REZ in NSW. The NSW Government has stated in the strategy that it will support the transmission upgrades for a pilot 3,000 MW REZ in the Central West REZ by the mid-2020s, and the Commonwealth Government has committed to financially support the infrastructure via the Grid Reliability Fund administered by Clean Energy Finance Corporation (CEFC) and the Australian Renewable Energy Agency (ARENA).

In July 2020, AEMO released a Notice of Consultation requesting submissions on non-network options for the Central-West Orana REZ Transmission Link project to improve the grid's hosting capacity of renewable energy, therefore avoiding costly upgrades to the transmission network. ATCO provided a submission in October 2020 to indicate that the Project, a non-network option, could reduce upgrades to the transmission network representing an estimated $100M cost saving to NSW taxpayer. The Project also will be available to support the development of the REZ by satisfying the system strength requirements for up to 3.25GW of renewable generation in the REZ through the provision of grid stability services.

2.4.1.3 Intra-day Energy Management – Moving Energy to When It is Needed

Pumped hydro energy storage becomes increasingly effective in grids with significant penetration of renewable energy technologies (particularly solar and wind), to balance times of low and high electricity supply from variable intermittent generators and to assist grid frequency control and voltage regulation.

The 2020 AEMO Integrated System Plan models the operation of the NEM with a high penetration of variable renewable energy (VRE) using pumped hydro to shift energy from solar hours to non-solar hours, noting the wind resource is distributed relatively evenly throughout the day. The AEMO

modelling shows a pumped hydro pumping operation is directly correlated to the production of utility solar, with pumped hydro generation combining with wind to provide the majority of late afternoon, evening and early morning demand (Figure 2-6).

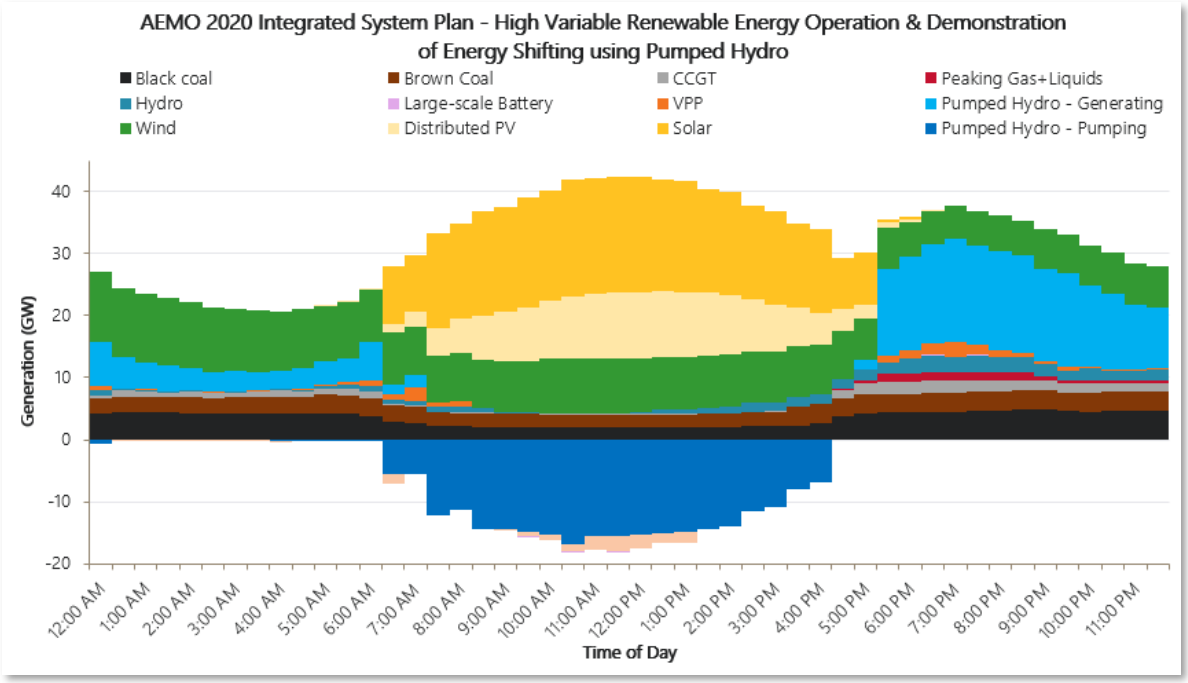


Figure 2-6: AEMO 2020 ISP – Intra Day Storage Operations with High VRE penetration

2.4.1.4 Emissions Reduction

At present, approximately 80 per cent of the electricity produced in NSW is sourced from coal. Coal fired power generation contributes to grid services such as inertia and frequency response ensuring a secure and stable power grid in NSW and the National Electricity Market (NEM).

However, coal fired power generation produces higher CO_2 emissions than other generation options and accounts for about 36 per cent of the state's total greenhouse gas (GHG) emissions. Together with fugitive emissions from mining coal, 48 per cent or nearly half of the state's total GHG emissions come from coal production and utilisation[5].

The NSW Government has announced an aspirational transitional objective of achieving net-zero emissions by 2050, including an interim cut of 35 per cent of emissions by 2030 from 2005 levels[6]. This was updated to a 50 per cent reduction by 2030 on 2005 levels in September 2021.[7] Development of pumped hydro projects like Central West Project will assist the decarbonising of the grid by facilitating the development of variable renewable energy.

2.4.2 Site Selection

ATCO have undertaken a complete multi-disciplinary search for the lowest cost, first to market pumped hydro prospects in NSW and concluded that the Project best meets these criteria.

[5] https://resourcesandgeoscience.nsw.gov.au/investors/coal-innovation-nsw/future-of-nsw-coal-fired-power-generation
[6] https://www.environment.nsw.gov.au/topics/climate-change/net-zero-plan https://resourcesandgeoscience.nsw.gov.au/investors/coal-innovation-nsw/future-of-nsw-coal-fired-power-generation
[7] https://www.nsw.gov.au/media-releases/nsw-set-to-halve-emissions-by-2030

The Project takes advantage of natural conditions and has been located to ensure the Project can be developed to minimise impacts to, the environment, known heritage, existing land use, and the community. It is well placed for transmission, infrastructure, renewable resources, electrical load, water supply, favourable geology, steep elevation difference, and is compatible to existing land use and land zoning.

The above approach ensures that the Project can be developed cost effectively and in an environmentally sensitive manner, providing an attractive energy storage solution to the NSW energy grid (refer also to Section 3.8).

2.4.3 Project Benefits

Development of pumped hydro like Central West Pumped Hydro will assist decarbonising the electricity grid by facilitating the development of renewable energy, contributing to lower emissions, and combating the impacts of anthropogenic climate change.

The Project will have the ability to provide sufficient energy to power over 153,000 homes, avoiding some 2,300,000 CO_2 equivalent tonnes per year.

Other significant Project benefits at local, regional and national levels include:

- improved infrastructure used by the local community (intersection and road upgrade, and communication benefits);
- approximately 200 construction, and 30 operational jobs, developing local skills and experience in the delivery of grid scale storage;
- The ATCO Communities Fund will support local community groups and not-for-profit organisations;
- Will facilitate the development of solar and wind generation, which will in large part replace the lost generation from the closure of 4 of 5 coal fired power stations in NSW over the next 15 years;
- Provide energy storage that will help to 'smooth-out' energy peaks and troughs created by variable energy (e.g. solar and wind);
- Provide synchronous capacity (inertia) required to support the deployment of wind and solar projects and the development of the Central West – Orana REZ; and
- Has been estimated to result in a $100M saving to the NSW energy consumer as it avoids costly network upgrades and interconnections, by the network service provider and renewable generators, through the provision of synchronous inertia.

3. PROJECT DESCRIPTION

3.1 Overview

The Project is a nominal 325MW pumped hydro facility with approximately 8 hours of storage capacity.

Key permanent Project infrastructure consists of:

a) "Turkey's nest" embankment dam forming an upper reservoir;

b) One or two rock-filled embankment dams (main or primary, and secondary) on Frying Pan Creek forming a lower reservoir;

c) Surface penstock, fully covered, or partly uncovered, with uncovered sections painted;

d) Intake/Outlet concrete structures at the upper and lower reservoirs;

e) Headrace tunnel;

f) Subsurface powerhouse enclosing two pump-turbine units;

g) Powerhouse administration building and associated infrastructure;

h) Communication infrastructure;

i) Water supply pipeline from the Fish River;

j) Approximately 6.8 km underground 330kV transmission cable connecting to the existing Transgrid overhead 330kV system;

k) Transmission connection infrastructure including a switchyard at the Project location, a new switchyard at the connection node; and

l) Ancillary development which including the construction of new access roads, intersection upgrade works associated with the Great Western Highway – Molybdonite Road, and spoil storage areas.

When generating, the Project will convey water from the upper reservoir through the intake structure to the short headrace tunnel under the escarpment and continue through the penstock before bifurcating into two smaller penstocks for each of the pump-turbine units which are enclosed in a subsurface powerhouse, and through the tailrace penstocks before discharging to the lower reservoir intake/outlet structure and into the lower reservoir (refer to Figure 1-4). When pumping, this operation sequence is reversed and water is pumped from the lower reservoir to the upper reservoir.

The elements of the Project are described in more detail in Section 3.2.

3.1.1 Scope Variability

The Scoping Report is based on the current Project definition which may vary during the subsequent design phases as more detailed site information becomes available. For technical and practical reasons, there may be a requirement to reconsider the main elements of the Project during the detailed design phase. Potential variations may include:

- Repositioning and refinement of PSH facility elements, including the design and final placement of the powerhouse, penstock, dams and associated infrastructure where justified on constructability, efficiency or cost, and balancing environmental, community and/or landowner impacts;

- Repositioning or relocating linear infrastructure (e.g. road access, water supply pipeline and transmission cable) and switchyard, where justified on constructability, efficiency or cost, and balancing environmental, heritage, community and/or landowner impacts;
- Total energy capacity due to improvements in technology and refinements in design;
- Total water requirements may be adjusted to cater for any changes in design;
- Confirmation of the water supply pipeline route between the Fish River and Project location, including whether the entire length is underground, or there are sections above ground. It is likely more than one option for the pipeline route will be assessed within the EIS;
- Confirmation of the transmission cable route location. It is likely more than one option for the cable route will be assessed within the EIS;
- Altered construction methods (such as spoil haulage, component delivery, penstock construction, dam construction methods) where justified based on minimisation of impact, construction duration and cost; and
- The size and final location of temporary construction facilities are subject the detailed design, and to confirmation by the selected construction contractor, based on preferred construction methodologies, optimisation of layouts, and further refinement of permanent infrastructure location and design.

It is desirable that flexibility is provided in the Project description to allow the final design and specifications for the Project to be determined based on selection of preferred technology and optimisation of layout to achieve the most economically, and environmentally and socially feasible development.

The assessment of the Project within the EIS would be based on the identified highest impact scenario of the Project including the use of the highest impact technology and infrastructure locations under consideration at the time of lodgement.

3.1.2 Project Development Sequence

The Project is proposed to be structured, and assessed accordingly, in the EIS in three discrete phases: Enabling Works (or Early Works), Construction, and Operations.

3.1.2.1 Enabling Works

Enabling Works, or Early Works, are specific elements typically within the broader construction phase that will be undertaken first to enable the execution of the broader Project construction activities. Enabling Works will likely include:

- the intersection upgrade works associated with the Great Western Highway and part upgrade of Molybdonite Road (if required);
- the access roads to the upper and lower reservoirs;
- fencing works; and
- establishment of temporary construction facilities associated with the above activities.

These works would be scheduled early in the broader construction phase and be undertaken once all approvals and consent conditions for the Enabling Works have been complied with.

3.1.2.2 Construction phase

The construction phase will include all other construction activities associated with the Project, including commissioning of the facility (refer to Section 3.4).

3.1.2.3 Operation phase

The operation phase will include the commercial commencement and ongoing operation of the facility.

3.2 Project Elements

3.2.1 Upper Reservoir

The upper reservoir will be located on reasonably flat topography and will be constructed as a turkey-nest embankment with material sourced from the excavation in the reservoir basin (Figure 3-1). The reservoir, with surface area of approximately 30 ha and operating range of approximately 15m, will be designed to store approximately 3 GL of water required for the operation of the Project.

The reservoir crest height will be approximately 2m above the maximum operating level to account for the required level of freeboard as determined by ANCOLD dam safety assessments. The upper reservoir does not have an external catchment but will also include a weir spillway that will discharge to an existing waterway, with appropriate rock fill erosion protection included in the design.

The reservoir floor and internal embankment slopes will be lined with an impervious bituminous geomembrane (or similar) lining system to minimise water losses through seepage (Figure 3-2).

3.2.2 Upper Reservoir Intake Structure

The upper reservoir will connect to the water conveyance system (i.e. penstock) with a concrete intake structure designed to convey water in and out of the water conveyance system in both the generating and pumping modes. In generating mode, the upper reservoir intake structure will gradually increase the water flow from the upper reservoir to the penstock.

The horizontal intake structure is designed to include an isolation gate structure and trash racks to prevent the entry of foreign objects into the water conveyance system which may otherwise damage the pump-turbine or its components.

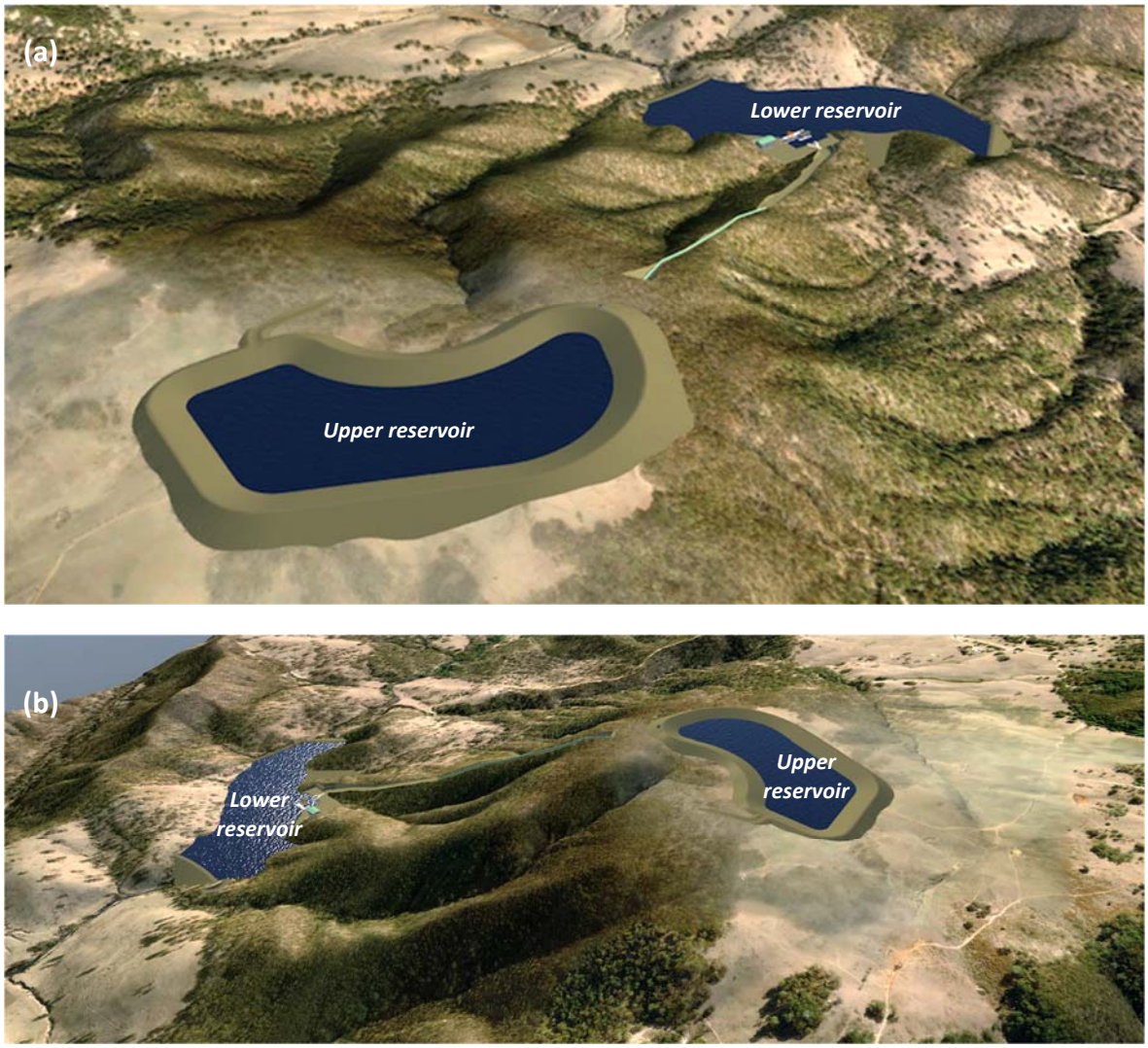


Figure 3-1: Upper reservoir visualisation (a) upper reservoir looking west to the lower reservoir, and (b) upper reservoir looking north (illustrative only).

Figure 3-2: An example of a bituminous geomembrane lining system being applied to a reservoir. Source: Coletanche.

3.2.3 Water Conveyance System

The water conveyance system consists of a surface penstock (steel pipeline) with an approximate 150m section of headrace tunnel directly beneath the escarpment at the upper reservoir (refer to Figure 3-1), and a steel penstock (refer to Figure 3-3 for an example). The penstock will be approximately 1,400m in length and approximately 5m in diameter and bifurcation into individual unit penstocks that enter the powerhouse.

It is expected that at least the lower section of the penstock (though possibly the entire length) will be covered with excavated material and/or concrete, removing the need for numerous expansion joints. The penstock is expected to be coated with a protective layer to minimise thermal expansion and avoid corrosion. If the penstock (in total or part) is to be uncovered, the final colouration will be selected to assist with blending with the surrounding environment.

Figure 3-3: Example of a surface penstock associated with the Shoalhaven Pumped Storage Hydro Project (NSW). Note: The Central West Project will have a single penstock, not two as shown in this example (Source: ARENA, from *PV Magazine*, September 2019).

3.2.4 Powerhouse

The powerhouse is a mass concrete structure, founded approximately 60m below the natural ground level with a surface area of approximately 30m wide and 50m in length, located in what will become the lower reservoir. The powerhouse will enclose two reversible Francis pump-turbine units, and all associated/ancillary equipment required for the operation of the power plant.

Surface infrastructure associated with the powerhouse will include an assembly bay, electrical buildings, administration building (including control rooms, offices, and amenities), workshops, gantry crane enclosure, parking, and laydowns/pads for maintenance requirements (Figure 3-4).

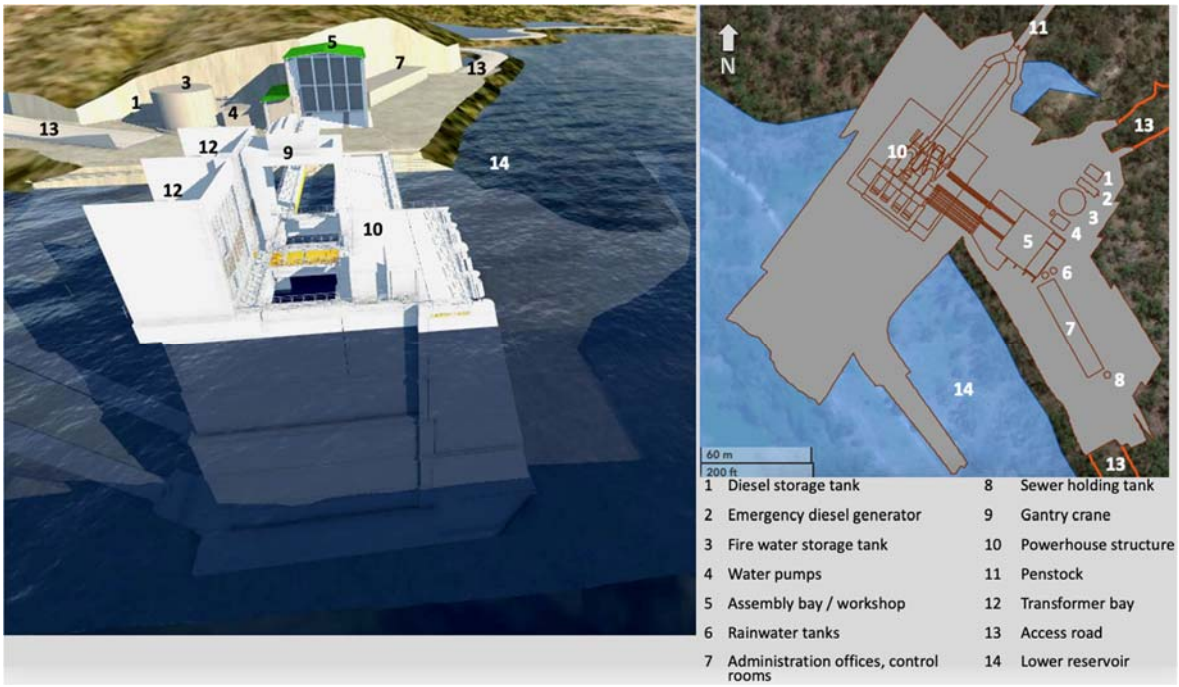


Figure 3-4: Indicative visualisation of the sub-surface powerhouse, (a) with the lower reservoir at maximum operating level, and (b) general arrangement of facilities (excavation footprint shown in grey).

3.2.5 Lower Reservoir

The lower reservoir will be located within Frying Pan Creek, with a rock fill embankment dam termed the Primary or Main Dam (Figure 3-5). The main dam (sometimes referred to as embankment) will have a total length of approximately 270m with a maximum height of approximately 30m and a base width of approximately 100m. The surface area of the lower reservoir is approximately 30ha and will have an operating range of about 19m.

The dam crest (top) elevation will be of sufficient height required to satisfy freeboard requirements as well as contain the total active volume of storage required to meet the generating requirements. The active volume of the lower reservoir (i.e. 3 GL) is equivalent to the upper reservoir to de-risk any potential of overtopping the storages.

The primary dam will also include a spillway structure to manage floodwater safely and in a controlled manner. The size and position of the spillway and downstream energy dissipation/erosion protection structures, are subject to further hydrology and dam designs including ANCOLD assessment.

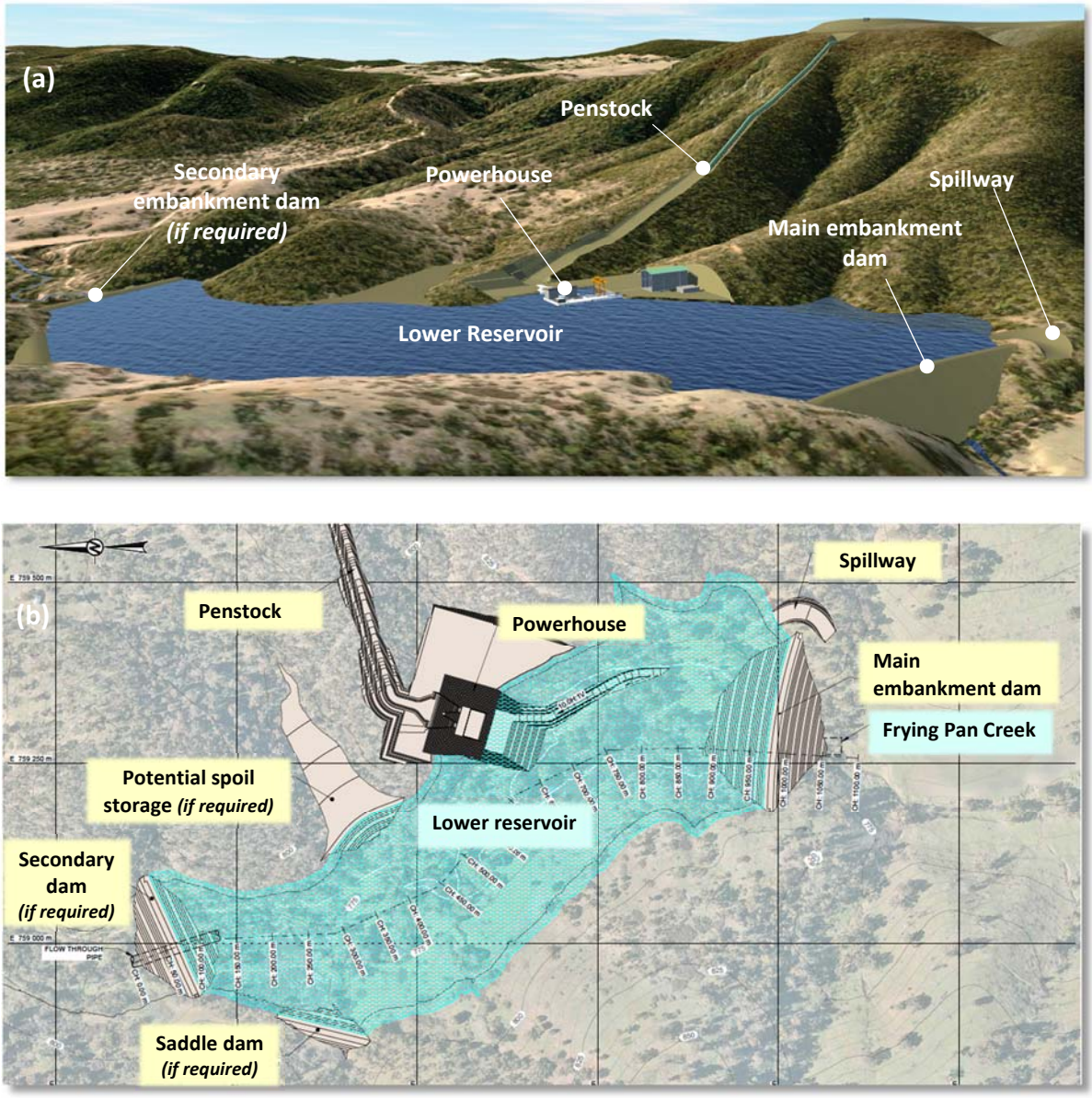


Figure 3-5: Lower reservoir area (a) visualisation, and (b) plan view. Concept only.

As part of the detailed engineering phase, consideration will be given to the construction of a smaller dam approximately 1,000m upstream of the main dam, termed the secondary dam. Associated with this dam (if required) would be a saddle dam, designed to contain the inundation area. These dams may be constructed to facilitate the construction of the main dam and tailrace excavations associated with the powerhouse (refer to Figure 1-3; Figure 3-5 and Figure 3-6).

The secondary dam, if required, would be in the order of 15m high with a base width between 50-100m depending on the slope stability requirements. It would be left permanently in place to further assist in the management of water flow through the reservoir.

The secondary dam would also include a spillway structure to manage floodwater safely and in a controlled manner. The sizing and positioning of the spillway would be subject to further hydrology and dam designs including ANCOLD assessment.

A lining system on the lower reservoir floor is not expected to be required based on preliminary geotechnical studies, however if this assumption changes an impermeable liner similar to the upper reservoir will be constructed.

Subject to soil stability investigations, erosion protection (such as rock armouring) may be applied to sections of the reservoir sides. A fence will be installed on the external perimeter of the reservoir.

3.2.5.1 Flow of Frying Pan Creek through the lower reservoir

The operating philosophy of the lower reservoir anticipates releases from the reservoir downstream into Frying Pan Creek will be matched with inflows into the lower reservoir. This is termed a 'transparent release' (Figure 3-6).

Water would pass through a bottom outlet(s) on the main dam, and the secondary dam (if built). Energy dissipation structures would be used to pass flows safely downstream into Frying Pan Creek, and beyond into the Fish River.

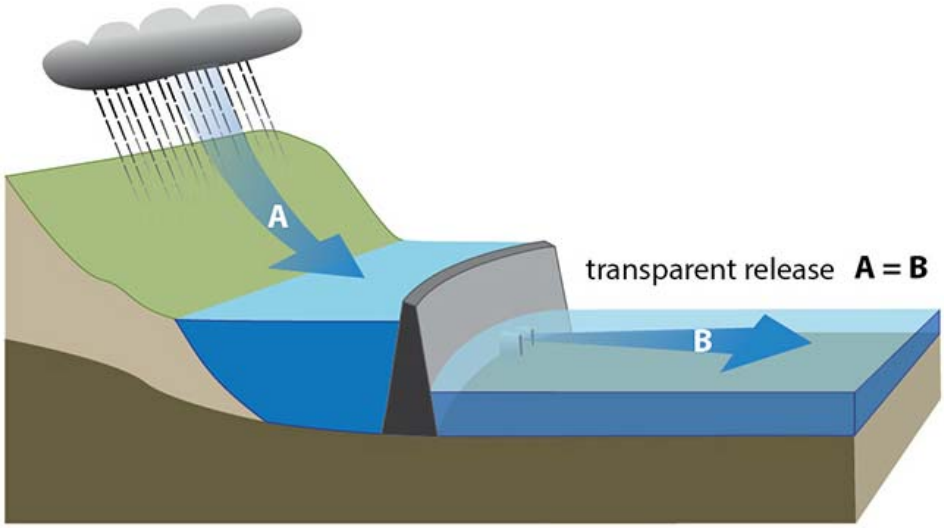


Figure 3-6: Concept of transparent flows through the lower reservoir. Source. NSW Department of Planning and Environment.

3.2.6 Water Supply Pipeline

As described in Section 3.7, it is proposed to pump a potential water allocation from the Fish River to the lower or upper reservoirs via a permanent underground water supply pipeline, which may have a holding tank and one or more pumping stations along its length.

The permanent water pipeline would be expected to be in the order of 350 - 500mm in diameter and likely made of high-density polyethylene (HDPE). The pipeline would be underground, though sections may be above ground if ground conditions warrant. Road and rail crossings would be likely trenched and under-bored respectively.

It is proposed to install a pump adjacent to the extraction point with power provided via a co-located electrical cable with the buried water supply pipeline (refer to Figure 1-3). The final proposal will be subject to ongoing assessment and detailed design.

The water supply pipeline route will be subject to ongoing negotiations with landowners, further assessment of environmental and heritage constraints, and detailed design. The preferred pipeline option(s) will be presented and assessed as part of the EIS.

3.2.7 Main Access Road

A total of approximately 8km of new, private access road will be constructed to provide construction and permanent access to the lower reservoir and upper reservoir sites. The final alignment of the access roads will be subject to landowner agreement, environment and heritage constraints, and design requirements.

The main access road involves utilising the first 750m of the existing Molybdonite Road, which intersects the Great Western Highway (refer to Figure 2-1; Figure 3-7). As part of the Project's Enabling Works (refer to Section 3.4), this intersection would be upgraded to provide safe access to and from Molybdonite Road. Approximately 750m along Molybdonite Road from the intersection, the Project access road is proposed to leave the Council road and enter private land.

Figure 3-7: Turn-off to Molybdonite Road from the Great Western Highway. Source: Google Earth Street View.

The access road, a dual lane sealed road, would then run parallel to Molybdonite Road for about 1.7km before heading toward the Project area. If the Project was to utilise Molybdonite Road for this entire length, substantial widening and vegetation clearing would be required (Figure 3-8). The reason for departing 'early' from Molybdonite Road to the adjacent farmland was based on several factors:

- local community and Council feedback that the large native trees along the road verge have high aesthetic and conservation value;
- opportunity for the Project to further avoid impacts to Threatened Ecological Communities, and large hollow-bearing trees that are likely to house a variety of arboreal mammals and hollow roosting /nesting birds;
- improve public safety by removing heavy vehicle and construction traffic from a long section of the road;
- avoid potential Aboriginal cultural heritage, and;
- the landowner of concern is agreeable for the Project to acquire a small part of their land to enable road development.

Subject to agreement with Council and consultation with landowners, it is proposed to upgrade and seal Molybdonite Road to at least the access road intersection to meet construction access requirements and minimise noise and dust disturbance to nearby residences.

Figure 3-8: Clearing of native vegetation along Molybdonite Road (main picture) will be avoided by diverting the Project access road onto adjacent farmland (insert).

3.2.8 Transmission Infrastructure

The Project will connect into the TransGrid 330kV transmission network approximately 6.8km north of the Project location (refer to Figure 1-3). The connection will likely include:

- a new switchyard at the existing Mt Piper-Wellington overhead 330kV line;
- approximately 6.8 km of 330kV underground transmission cable; and
- a switchyard adjacent to the powerhouse.

The underground cable route predominantly traverses private land (refer to Figure 1-3).

The transmission cable alignment would be directionally drilled beneath the Great Western Highway. Subject to the final route selected, site constraints and the methodology adopted by the construction contractor, the cable could cross upper Frying Pan Creek by a number of methods, including directional drilled, extended across a cable bridge, or trenching and reinstatement.

The switchyard and transmission cable routes will be subject to ongoing negotiations with landowners, further assessment of environment and heritage constraints, and detailed design.

3.2.9 Ancillary Components

For the operation of the facility, various permanent Project components will also be required, including:

- a surface operation compound adjacent to the powerhouse, including administration building (including control rooms, offices and amenities), electrical buildings, backup diesel generator, electrical and mechanical workshops, and gantry crane enclosure;
- fire water tank and associated pumps and pipework (if required);
- parking facilities adjacent to the Powerhouse ground floor platform, and the upper reservoir; and
- security fencing around the perimeter of the upper reservoir and parts of the lower reservoir, switchyard, powerhouse surface facilities, and switchyard adjacent to the existing Transgrid 330kv line. Security gates would be placed on the entrance to the private access road to the facility.

3.3 Operation

The Project would operate in response to energy demands and market conditions, but would likely operate daily, cycling (release and pump) within a 24-hour period.

The Project will be designed for remote operation capability, though have the capacity to be manned. The Project is expected to support up to 30 full time equivalent positions, including operational, maintenance and various support roles.

The powerhouse and reservoirs will be security fenced, with road access across private property secured by a locked gate. Although the Project is located on private property, information and warning signs will be located at appropriate locations to inform people of changing water conditions within the reservoirs (noting it is not accessible to the general public as it is located on private land).

Parking, including unloading zones, will be provided at the powerhouse facility.

The minimum operational life of the Project will be 50 years, though this is expected to be extended several decades by routine maintenance cycles.

3.4 Construction

It is anticipated that the construction works will commence in 2023, with commercial operation in 2026.

Construction of the Project is expected to take 42 months. In order to achieve these timeframes, some construction work will be undertaken on a 24 hour per day, seven days per week basis.

It is expected that construction will occur in two main phases, being:

1. Enabling Works
2. Balance of Construction Works

During the first six months, the following key Enabling Works are proposed to occur:

- Upgrade of the Molybdonite Road - Great Western Highway intersection;
- Upgrade, sealing and realignment (if required) a short section of Molybdonite Road;

- Establishment of internal access roads to enable safe and efficient access to construction staging areas at the upper and lower reservoir areas;
- Fencing and temporary security works; and
- Establishment of temporary construction infrastructure.

From 2023/2024 to 2026 the following key Construction Works will occur:

- Topsoil and vegetation removal and storage;
- Establishment of erosion and sediment controls;
- Establishment of temporary roads, workshops, stores, offices, amenities, parking areas and laydown;
- Establishment of crushing and batching plants (if required);
- Excavation and construction of the upper reservoir;
- Excavation for the powerhouse and lower reservoir;
- Separation of Frying Pan Creek from construction areas;
- Construction of the secondary dam (if required) on the lower reservoir;
- Construction of the main dam on the lower reservoir;
- Construction of the water conveyance system and headrace tunnel;
- Construction of the powerhouse and related buildings, and installation of hydro and electro-mechanical equipment;
- Construction of the water supply pipeline;
- Construction of the switchyards and installation of the transmission cable;
- Placement of excess material (if required); and
- Commencement of the initial fill of the upper or lower reservoir from the water supply pipeline.

From 2026 until the project operation the following commissioning activities will progressively occur:

- Demobilisation of the construction site;
- Rehabilitation of remaining disturbed areas; and
- Commissioning of the power station.

The Project will be developed in a manner which allows for standard construction techniques to be implemented, however it should be noted that the final construction methods will be subject to detailed design undertaken by the construction contractor.

3.4.1 Spoil Management

The construction of the upper reservoir is expected to generate minimal spoil as the design considers achieving a cut and fill balance between the excavation and fill quantities. Nevertheless, there will likely be a volume of soil strength material that will require storage.

The excavation of the powerhouse will likely generate excess rock material to that used in the construction of the embankment dam and erosion works.

Generally, small volumes of spoil material will also be required for levelling of construction and laydown areas across the Project area, and the construction and maintenance of the access tracks.

The unsuitable excavation spoil will be placed in proposed spoil storage areas. Conceptually, the spoil storage areas have been identified as a valley area adjacent to the powerhouse and/or storage below the operational water depth of the lower reservoir (clean rock only), and to the eastern side of the upper reservoir. Final locations will be confirmed based on construction requirements, volumes to be stored, environment, heritage and landowner considerations.

3.4.2 Surface Infrastructure

The surface infrastructure, including electrical buildings, administration building (including control rooms, offices, and amenities), workshops and laydowns will be constructed by conventional means. It is expected that most surface buildings will be prefabricated and delivered on-site ready for installation and fit-out of internal amenities.

3.4.3 Temporary Construction Infrastructure

A number of temporary infrastructure and construction facilities are expected to be required during construction including:

- Office and amenities area;
- Temporary access roads;
- Temporary power, water, wastewater and communication infrastructure;
- Temporary workshops, washdowns and fuel storage;
- Laydown and general storage areas;
- Concrete batching plant (if required);
- Screening and crushing plant (if required);
- Material stockpiles;
- Magazine;
- Stormwater, groundwater (if required) and erosion controls; and
- Topsoil and vegetation stockpiles.

Where practicable, temporary construction infrastructure will be sited on previously disturbed areas, though some clearance of undisturbed vegetation is likely to be unavoidable. Indicative construction facility layouts for the upper and lower reservoir areas are shown in Figure 3-9.

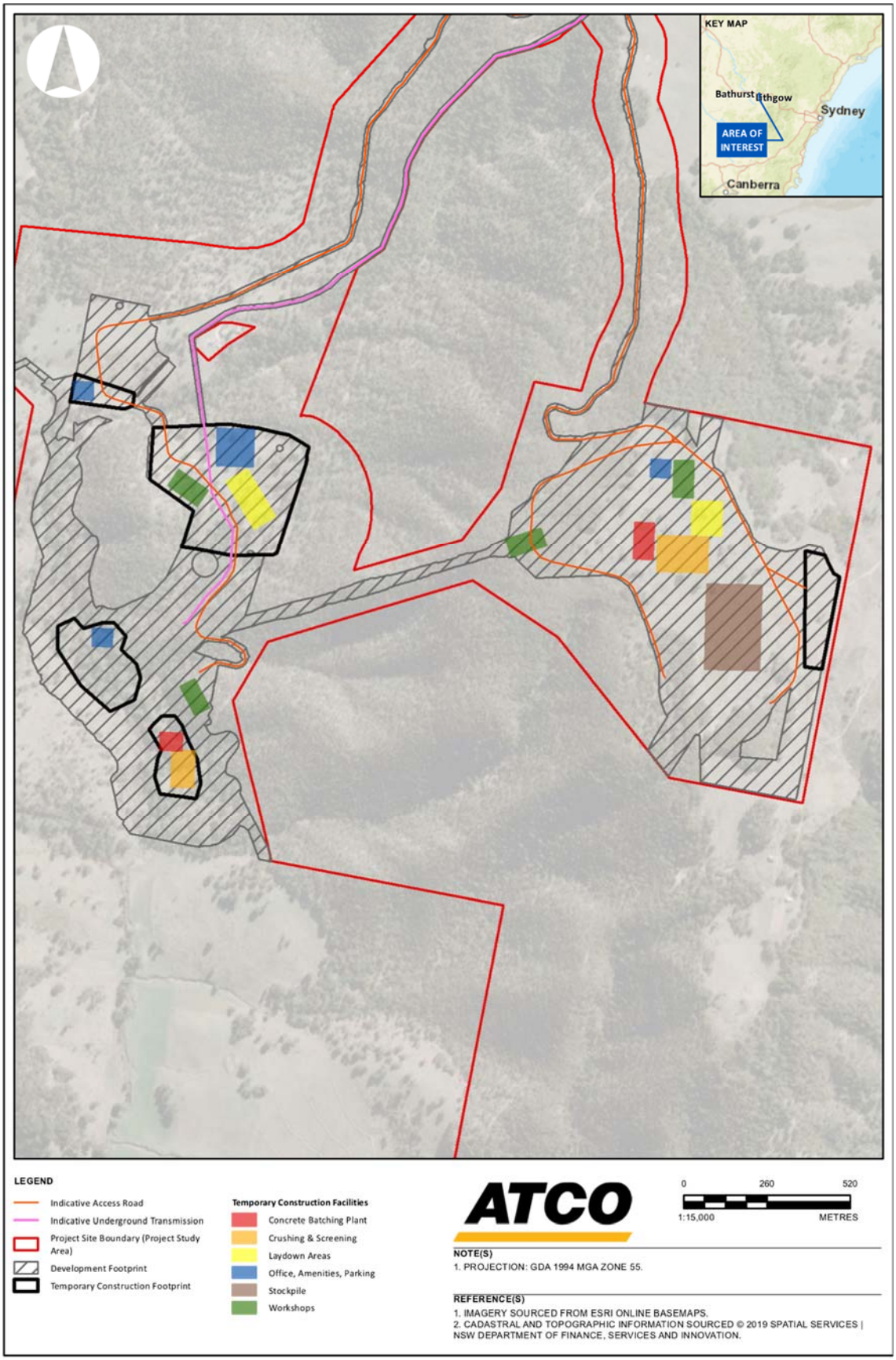


Figure 3-9: Indicative construction facilities in the upper reservoir and lower reservoir areas.

3.5 Workforce

Workforce during the construction period is expected to be equivalent to approximately 200 on site jobs. The Project will have access to the skilled workforces from Bathurst, Lithgow and Oberon regions.

Accommodation is expected to utilise existing facilities in the surrounding towns.

It is expected that buses will be used to transport the majority of employees to site to minimise traffic on local roads especially Molybdonite Road. It will also avoid the necessity for large areas for temporary car parking, minimising disturbance.

The final workforce numbers and sources, together with accommodation and transport requirements, will be subject to consultation with the construction contractor. It is anticipated the workforce would be sourced locally to the extent possible.

3.6 Decommissioning

At the completion of the Project's operational life (expected to be greater than 50 years), a detailed decommissioning plan will be developed which would consider reuse, recycling, disposal and potential preservation options (e.g. for tourism or water storage purposes). The final objectives at that time would need to consider relevant legislative requirements, plus the requirements of several stakeholders, including regulators, landowners, Council and the community.

3.7 Water Supply

3.7.1 Water Requirements

The upper and lower reservoirs have been designed with an operational capacity of 3GL, providing 8 hours energy storage for the operations of the plant at the nominal capacity of 325MW.

The estimated volumetric water requirements for the Project are:

- a one-off initial fill of 3.3 GL (this includes about 0.3GL of non-operational water which represents the volume below the powerhouse intake level),
- an annual construction temporary take of approximately 200 ML per year, for the estimated three-year construction period, and,
- an ongoing annual top up requirement of approximately 400 ML per year to compensate for losses, such as due to evaporation and potential seepage.

3.7.2 Water Supply – Initial Fill and Construction

Several potential water supply options for the Project were considered including surrounding reservoirs, near-by mine dewatering water, Frying Pan Creek, Fish River, and the fractured rock aquifer (i.e. local groundwater).

A review of the options resulted in the Fish River being the preferred main water supply due to several factors including: the source being close to the Project and in the same legislative Water Source and potential volume available.

A water supply pipeline from the Fish River to the Project area could deliver the 3.3 GL initial fill and this fill volume can be staged to take water during higher flow events. Taking water in this manner

is anticipated to minimise the impacts of the water take on the environment and downstream users, including water access licence holders and water for Bathurst town supply (see below).

The Fish River starts above the town of Oberon (NSW) and generally flows towards the northwest, before heading west. The upper Fish River is impounded by the Oberon Dam, then flows through the western tablelands before convergence with Campbells River to become the headwaters of Macquarie River. It has a catchment area of 1,292 km^2.

The Fish River contributes water to the Bathurst town water supply via the Macquarie River. According to Bathurst Regional Council (BRC), the Fish River catchment often has good flows over the winter and is the preferred water source for the water treatment plant. However, when the flow in the Fish River is low or when it has no flow, BRC releases water from its Ben Chifley Dam into the Campbells River from where it flows down the Macquarie River for extraction at the Bathurst water treatment plant (BRC, 2008).

The preferred water supply option will be subject to detailed studies and engagement with a range of stakeholders, including but not limited to NRAR, WaterNSW, and the State Government. ATCO will also continue engagement with the Bathurst Regional Council and the local community throughout the process.

The pathway for licensing the water entitlement is proposed to be via a Specific Purpose Access Licence (SPAL) with works on both the Fish River and Frying Pan Creek. Amendments to the *NSW Water Management (General) Regulation 2018* will provide a pathway for proponents of pumped hydro schemes to apply for a SPAL for the initial fill and construction water volumes.

The SPAL licence would need to consider the implications to the NSW commitments to the Murray Darling Basin Ministerial Council Cap on surface water diversions (the Cap) and future Water Resource Plans for the various catchments. However, the impact on the Cap is expected to be minor particularly as this is a once off water requirement.

3.7.3 Water Supply – Operations

The operational efficiency of the scheme inherently induces water losses either via evaporation or leakage. These operational losses are currently estimated to total 400 ML per year. Addressing water losses on an annual basis is an operational requirement for the Project, ensuring security of supply to the scheme and maintaining a base level of storage

There are two mechanisms to be investigated to meet the projected annual top-up water demands. These are:

(a) Water trading market

Water trading is expected to present the main opportunity to facilitate the annual top up volumes required.

Options for trading entitlement from unregulated river access licences has been identified within the Fish River Water Source.

The Fish River Water Source has 49 water access licences, with 18,080.5 ML of entitlements (excluding harvestable rights), with 15,876 ML/y (87.8%) for a major utility access licence. The major utility water licence 15,876 ML/y for is held by WaterNSW for the operation of the Fish River Water Supply Scheme (FRWSS).

(b) Harvestable rights

Once operational, the Project will include two established reservoirs which may collect and retain minor volumes of rainfall onto the surface of the reservoirs. The Project will be designed to minimise rainfall runoff entering the Project area. The design of operational dam storages will be presented in the EIS, providing a realistic estimate of the expected rainfall onto the surface of the reservoirs, which is expected to be very minor in volume.

3.8 Project Alternatives Considered

The NSW Government supports sensible, private development of new pumped hydro infrastructure in the State. Through the Central West Pumped Hydro Project, ATCO is responding to the Government's call for the private sector to "share the load of our future energy needs."[8]

ATCO identified the Project site as a suitable location for a pumped hydro facility and has undertaken a complete multi-disciplinary search for the lowest cost, first to market pumped hydro prospects in NSW and concluded that the Central West Project best meets these criteria. The Project is in close proximity to: existing transmission, infrastructure, renewable resources, load, water supply, favourable geology, sharp elevation difference, compatible land use and regional benefits. It is also well placed for avoiding the need for transmission system augmentation, connecting into one of the strongest points in the NSW transmission network.

Further, the Project site itself has an inherently reduced environmental and social footprint on the local area, as the Project:

- is designed to allow flows in Frying Pan Creek to pass through the lower reservoir;
- is located in an area predominantly affected by past clearing activities;
- is not located on prime agricultural land;
- is located on freehold land, and is not located on any conservation reserves;
- is located on zoned rural land that permits the development of renewable energy;
- is located on a tributary that is classified as having very poor freshwater fish community status;
- is close to existing transmission line and road infrastructure therefore reducing easement clearing and minimises landowner interactions;
- includes the adoption of low impact infrastructure due to the proximity to the connection point, specifically an underground 330kV transmission cable as opposed to an overhead 330kV line with its accompanying lattice towers and 60m wide easement;
- includes a penstock (pipeline between the reservoirs) that will either be partly or entirely covered, or painted, to blended with the surrounds; and
- is distant to most near neighbours.

Alternatives to the current pumped hydro and linear infrastructure alignments at the site were considered as part of the early concept deign phases. The current alignments have considered multiple variables to optimise the location, including consideration to landowner requirements, reducing impact to known locations of threatened vegetation communities and potential threatened species habitat, avoidance of known heritage, reducing visual amenity, recognising potential underlying geology and optimising hydraulic efficiency.

[8] hhttps://www.energy.nsw.gov.au/sites/default/files/2018-12/NSW%20Pumped%20Hydro%20Roadmap.pdf

3.8.1 Do Nothing Approach

Not proceeding with the Project would forgo the benefits of the development, resulting in:

- The loss of a source of renewable energy that would assist the Australian and NSW Governments reach their emissions targets;
- The loss of cleaner energy and reduced greenhouse gas emission by supporting the growth in variable energy (i.e. solar and wind);
- The loss of additional electricity generation and storage, and supply into the grid;
- The loss of additional electricity grid stability, reliability and security; and
- Loss of social and economic benefit through the provision of direct and indirect employment.

The 'do nothing' option may avoid any potential impact; however, the likelihood of significant negative impacts is low compared to the benefit of the proposed Project in contributing to overall ecologically sustainable development by contributing to the progressive decarbonising of the electricity grid, contributing to lower emissions, and combating the impacts of climate change.

4. STATUTORY CONTEXT

4.1 NSW Legislation

4.1.1 Power to Grant Consent - Environmental Planning & Assessment Act 1979

The *Environmental Planning and Assessment Act 1979 (*EP&A Act) is the principle environmental planning legislation in NSW and establishes the development assessment process. The EP&A Act provides for the making of Environmental Planning Instruments (EPIs) including Local Environmental Plans (LEPs) and State Environmental Planning Policies (SEPPs), which set out requirements for particular localities and/or particular types of development. The applicable EPIs and the *Environmental Planning and Assessment Regulations 2000* (EP&A Regulation) determine the relevant planning approval pathway and the associated environmental assessment requirements for particular development activities.

The environmental assessment pathway under the EP&A Act is generally dependent on the location, purpose and proponent (private or NSW public authority). The scale of the development, including level of impact and/or capital investment value, will further refine the assessment process. Development can be exempt (does not require any approval or assessment) or can require various forms of approvals and assessment under Part 4 or Part 5 of the EP&A Act.

Part 4 applies to development that is permissible with development consent. Depending on the location, size and capital costs the consent authority for a development subject to Part 4 can be the local Council (generally referred to as local development) or the Independent Planning Commission or Minister for Planning for State Significant Development.

4.1.1.1 State Significant Development

The SEPP (State and Regional Development) 2011 (SRD SEPP) (clause 20, Schedule 1) declares proposals to be State Significant Development if:

- the development is for the purpose of electricity generating works (using any energy source, including hydro), and has
- a capital cost of greater than $30 million.

Consequently, the Project would be as State Significant Development (SSD) as it is for the purpose of electricity generating works and has a capital cost greater than $30 million.

State Significant Development are assessed in accordance with Division 4.1 of Part 4 of the EP&A Act where Section 78A(8A) of the EP&A Act requires that a development application for SSD is to be accompanied by an Environmental Impact Statement (EIS) in the form prescribed by the EP&A Regulations and addressing the Secretary's Environmental Assessment Requirements (SEARs).

The Minister for Planning, their delegate, or the Independent Planning Commission (depending on the circumstances) is the consent authority for SSD.

A summary of the typical assessment pathway for State Significant Development (SSD), including the Scoping Process, is summarised in Figure 4-1. The Project is currently in the Early Consultation and early Prepare EIS stages of the planning process.

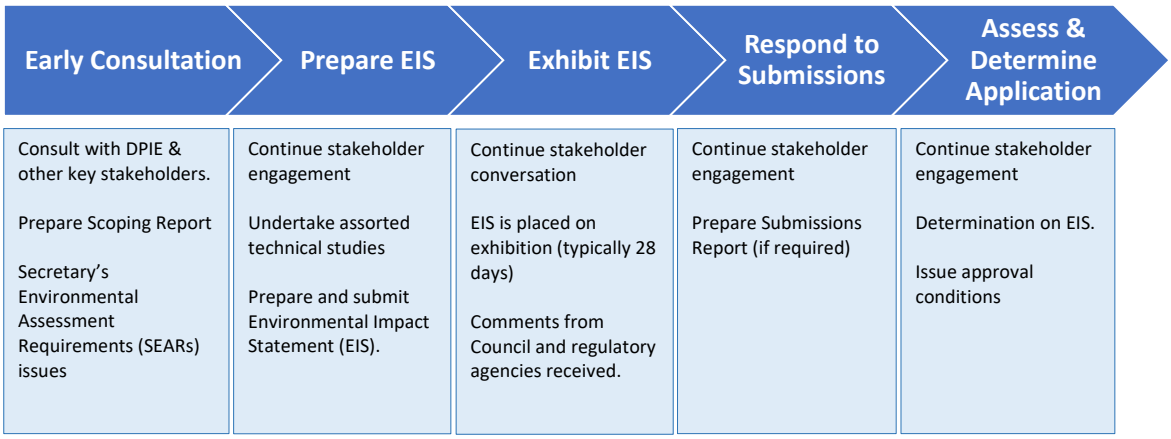


Figure 4-1: Summary of the State Significant Development (SSD) process including the Scoping Process, which is the first stage in the SSD process.

4.2 Commonwealth Legislation

4.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Commonwealth legislation relating to the environment. Under Part 3 of the EPBC Act, approval from the Minister for the Environment from the Department of Agriculture, Water and the Environment (DAWE) is required for a controlled action being an action that:

- Has, will have, or is likely to have a significant impact on a matter of national environmental significance;
- Is undertaken on Commonwealth land and has, will have, or is likely to have a significant impact on the environment;
- Is undertaken outside Commonwealth land and has, will have or is likely to have a significant impact on the environment of Commonwealth land; or
- Is undertaken by the Commonwealth and has, will have or is likely to have a significant impact on the environment.

A significant impact under the EPBC Act is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

Matters of national environmental significance (MNES) include:

- World heritage properties;
- National heritage places;
- Wetlands of international importance;
- Nationally threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park;
- Nuclear actions (including uranium mining); and

- A water resource, in relation to coal seam gas development and large coal mining development.

It is generally the responsibility of the proponent of a proposed action to determine whether the action has the potential to impact upon a MNES and constitute the need for a referral to the Commonwealth for determination. An action that is referred for consideration by the Australian Minister for the Environment cannot be undertaken until the outcome of the referral process is completed.

The EPBC Act Protected Matters Search Tool was used to search an area of 10km radius around the approximate centre point of the Project. The search results are provided in Appendix B and summarised in Table 4-1.

Table 4-1: EPBC Search Tool results for an area of 10km radius around the approximate centre point of the Project

EPBC Act Protected Matters Search Tool	Search Result	Other Matters Protected by the EPBC Act	Search Result
World Heritage Properties	None	Commonwealth Land	5
National Heritage Places	None	Commonwealth Heritage Places	None
Wetlands of International Importance	4	Listed Marine Species	19
Great Barrier Reef Marine Park	None	Whales and Other Cetaceans	None
Commonwealth Marine Area	None	Critical Habitats	None
Listed Threatened Ecological Communities	2	Commonwealth Reserves Terrestrial	None
Listed Threatened Species	43	Commonwealth Reserves Marine	None
Listed Migratory Species	12	State and Territory Reserves	3
Invasive Species	31	Nationally Important Wetlands	None

At this time, there is insufficient information to confirm whether or not a significant impact is likely to result from the Project. When the Project design is further developed, and the environmental assessment adequately progressed, an EPBC Act referral for the Project will be submitted. In the event that a significant impact is considered likely on MNES, an accredited assessment process will be sought under section 87(4) of the EPBC Act where the Commonwealth accredits the assessment process under Division 5.2 of the EP&A Act.

The EIS would assess the potential for impacts on MNES regardless of whether or not the Project is deemed a controlled action.

4.3 Environmental Planning Instruments

4.3.1 Permissibility - Bathurst Regional Local Environmental Plan 2014

The Project is situated within the Bathurst Regional Council (BRC) Local Government Area. As SSD, the Project will not require additional development consent from BRC under Part 4 of the EP&A Act. However, it is noted that BRC is an important stakeholder for the Project, and as such, consultation with BRC has already commenced to enable effective consultation regarding local issues associated with the development (refer to Section 5, Table 5-2).

The Project is situated in a Rural Zone (RU1 Primary Production) under the Bathurst Regional Local Environmental Plan 2014 (Bathurst LEP) (refer to Figure 2-2).

Under Clause 34 of the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), development for the purposes of electricity generating works (which is defined to include both generating and storing electricity) is permitted with consent on any land in a prescribed rural zone, including RU1 Primary Production. Accordingly, the development and operation of a pumped hydro project is permissible on the land in question.

Some local provisions apply in the LEP, specifically Drinking Water Catchment (Bathurst), Bushfire Prone Land, Local Contribution Plans and Lot Size (see below). These matters will be considered in the EIS for the Project.

The Project site will be leased from the two landowners hosting the Project. Since the leases will extend for a term greater than five years, the development would typically be deemed a 'subdivision' of land pursuant to Section 4B(1) of the EP&A Act. Further, it is noted that the Bathurst LEP stipulates that land subdivisions in this area is set at a minimum of 100 ha, though exemptions apply for 'subdivision' where a dwelling is not located on the land.

As the Project does not represent an actual subdivision of the land which creates a new allotment and deposited plan, and a formal request for subdivision certificate may not be required, as per other projects in similar situations. This will be confirmed by further discussions with Council and DPE, with relevant information being presented in the EIS.

4.4 Other Approvals Required

Other approvals and permits that may be required for the Project are listed in Table 4-2. Potentially, further approvals may be required subject to site specific conditions and the final design.

Table 4-2: NSW planning legislation that will likely apply to the Project

Legislation	Purpose	Applicability
Environmental Planning and Assessment Act 1979	A number of 'secondary consents' associated with standards of construction are required under the EP&A Act.	Construction and occupation certificates are required with detailed design post approval of the Project in addition to a number of management plans for construction and operation.
Biodiversity Conservation Act 2016	Regulates and protects biodiversity, threatened species and ecological communities in NSW.	Potential impacts to biodiversity must be assessed and mitigated by the Project with the preparation of a Biodiversity Development Assessment Report (BDAR) in accordance with the Biodiversity Assessment Method (BAM) (OEH 2017). Where it is not possible to mitigate impacts, biodiversity offsets will be required.
Crown Lands Act 1983 ***Crown Land Management Act 2016***	Regulates the management of Crown Land and land tenure in NSW	The Project will interact with Crown land via easements and potential road alignments, and therefore consent from the Minister will be sought.
Forestry Act 1916	Authorisation is required from the Minister to occupy	The Project may have a switchyard and part of the transmission line on land managed by Forestry Corporation of NSW. Appropriate permits or

Legislation	Purpose	Applicability
	Crown land associated with forestry.	easements will be required to be sought to enable Crown land access and occupation.
Dam Safety Act 1978	Sets safety standards for reserves in NSW.	The Central West dams will be declared dams under the Dam Safety Act as they will be >15m high. As part of the development of Central West, assessments must be undertaken to calculate the societal and individual risk rating for the declared dams, and to determine their consequence category. The owners/operators of declared dams have compliance obligations under the Dams Safety Act, including record keeping requirements.
Fisheries Management Act 1994	Protects aquatic habitats, threatened species of fish and marine vegetation and aquatic ecological communities in NSW; regulates works in waterways and the need to consider and retain fish passage	The Project will interfere with Frying Pan Creek, and therefore assessments will be undertaken to determine if barrier works require the implementation of a fish passage.
Heritage Act 1977	Protects State and local heritage items	Assessments of potential heritage items or relics will be undertaken in accordance with appropriate guidelines, such as Assessing heritage significance (the Heritage Office 2001) and Assessing Significance for Historical Archaeological Sites and 'Relics' (Heritage Branch 2009).
National Parks and Wildlife Act 1974	Regulates management and access to national parks in NSW and, amongst other things, protects Aboriginal heritage areas and native species.	Assessment of potential impacts to Aboriginal cultural heritage will be required for the Project in order to meet requirements under the EP&A Act and NPW Act. This will involve preparation of an Aboriginal Cultural Heritage Assessment (ACHA) including Aboriginal community consultation and field investigation of the study area. Consultation will be required with the relevant Registered Aboriginal Parties (RAPs), and must be undertaken in accordance with the established process set out in Aboriginal Cultural Heritage Consultation Requirements for Proponents (OEH, 2010). Depending on the outcomes of the consultation and field investigation, a Cultural Heritage Management Plan (CHMP) may also be required.
Protection of the Environment Operations Act 1997	Regulates pollution of the environment and requires Environmental Protection Licences (EPL) for certain activities. For an SSD, approval to be consistent with the conditions of consent.	EPL's will be required for Electricity Generation, and Crushing, Grinding or separating, and, potentially, for non-scheduled activities for the purpose of regulating water pollution.

Legislation	Purpose	Applicability
Roads Act, 1993	Regulates activities affecting public roads. For an SSD, approval to be consistent with the conditions of consent.	Permits will be required for carrying out activities in, on and over public roads, specifically Council Roads (Molybdonite Road upgrades, road intersection, transmission line crossings) and the Great Western Highway (intersection and transmission line crossing).
Water Management Act 2000	Regulates water access in NSW, including aquifer interference.	A Special Purpose Access Licence (SPAL) will be sought to secure an allocation of water for the initial fill and construction water. For Operations, water trading is the most likely pathway with the application of a Water Access Licence. As part of the assessment of impacts to water supplies, particular attention will be paid to requirements of the Water Sharing Plan (WSP), particularly Section 57. Whilst SSD are exempt from s89 (water use approval) and s90 (works approval) of the WM Act, DPE (Water) have indicated they would use the above requirements of the WSP to assess the significance of impacts. Further, impacts will be assessed with consideration to the high ecological value aquatic ecosystem (HEVAE) criteria of Fish River and Frying Pan Creek (NSW Department of Industry, 2018). A groundwater aquifer interference permit may be required, subject to the findings of the groundwater assessment as part of the EIS.
National Electricity (NSW) Law 1997	Before a generator can connect to the national electricity grid, a formal notification and application process must be followed.	Central West will need to register with AEMO as an Intending Participant and seek a Registration for Generator prior to connection to the NEM.
National Electricity (NSW) Law No 20a	To connect to the electricity grid, a formal grid Connection Enquiry followed by an Offer to Connect from Transgrid is required.	Central West will connect to the 330kV transmission line, and a formal connection process will be required to be followed.
Conveyancing Act 1919 ***Crown Lands Act 1989*** ***Forestry Act 2012***	Easements located on freehold land and State land to be lodged with the NSW Lands Registry Services.	Easements will be required for the establishment of linear infrastructure, including transmission line, access roads, and possibly the switchyard.
Pipeline Act 1967	Controls pipeline construction, operation and licensing in NSW.	If a water supply pipeline is required to pump water from the Fish River, a water pipeline licence will be required.

4.5 Pre-Conditions to Exercising the Power to Grant Consent

A number of conditions must be satisfied before the consent authority may grant consent for the Project. These are summarised in Table 4-3, and is subject to the final design which will be presented in the EIS.

Table 4-3: Summary of pre-conditions to exercising the power of the consent authority to grant consent

Statutory Reference	Pre-Condition
Consideration under the Act and Regulations	
Environmental Planning and Assessment Act 1979 s4.3	It must be ascertained that the development is not prohibited under the Environmental Planning Instrument
Environmental Planning and Assessment Regulation 2000, s49.1	Consent from the owner of the land is required for a development application to be made
Environmental Planning and Assessment Regulation 2000, s94A	The consent authority is to consider in relation to the fire safety and erection of temporary structures: a) Whether the fire prevention and structural capacity will be appropriate to the proposed use; and b) Whether the ground or other surface on which the structure is be erected will be sufficiently firm and level to sustain the structure while in use.
Consideration under EPIs	
Bathurst Regional Local Environmental Plan 2014 s7.5	Essential Services: Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required— a) the supply of water, b) the supply of electricity, c) the disposal and management of sewage, d) stormwater drainage or on-site conservation, e) suitable vehicular access.
Bathurst Regional Local Environmental Plan 2014 s7.14(4)	Drinking Water Catchments: Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that— a) the development is designed, sited and will be managed to avoid any significant adverse impact on water quality and flows, or b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or c) if that impact cannot be minimised—the development will be managed to mitigate that impact.
Consideration under other Legislation	
Water Management Act 2000 s91AA	Consultation with Dams Safety NSW in relation to approvals for dams and flood retarding basins: Without limiting any other provision of this Part, the Minister must, before granting a water management work approval to which this section applies or before amending any such approval—

Statutory Reference	Pre-Condition
	a) refer the application for the approval or amendment to Dams Safety NSW, and b) take into consideration any matters that are raised by Dams Safety NSW in relation to the application within 28 days (or such other period as is agreed between the Minister and Dams Safety NSW) after the application is referred to Dams Safety NSW.

4.6 Mandatory Matters for Consideration

A number of conditions must be considered by the consent authority in deciding whether to grant consent for the Project. These are summarised in Table 4-4, and is subject to the final design which will be presented in the EIS.

Table 4-4: Summary of mandatory matters the consent authority must consider prior to granting consent

Statutory Reference	Mandatory Consideration
Consideration under the Act and Regulations	
Environmental Planning and Assessment Act 1979, s1.3	• to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, • to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment, • to promote the orderly and economic use and development of land, • to promote the delivery and maintenance of affordable housing, • to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats, • to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage), • to promote good design and amenity of the built environment, • to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants, • to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State, • to provide increased opportunity for community participation in environmental planning and assessment.
Environmental Planning and Assessment Act 1979, s4.15	• The likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality. • The suitability of the site for the development. • Any submissions made in accordance with the EP&A Act or the EP&A Regulation.

Statutory Reference	Mandatory Consideration
	• The public interest. • Relevant environmental planning instruments: - SEPP 44 - SEPP 55 - Bathurst Regional Local Environmental Plan 2014
Consideration under EPIs	
SEPP 44	This policy aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent, free-living population over their present range and reverse the current trend of koala population decline, a) by requiring the preparation of plans of management before development consent can be granted in relation to areas of core koala habitat; and b) by encouraging the identification of areas of core koala habitat; and c) by encouraging the inclusion of areas of core koala habitat in environment protection zones.
SEPP 55 c7(1)	A consent authority must consider whether the land is contaminated and be satisfied that, if the land is contaminated, the land is suitable in its contaminated state (or will be suitable after remediation) for the purpose of the Project.
Bathurst Regional Local Environmental Plan s7.14(3)	Drinking Water Catchments: In deciding whether to grant a development application for development on land to which this clause applies, the consent authority must consider the following— a) whether or not the development is likely to have any adverse impact on the quality and quantity of water entering the drinking water storage, having regard to the following— i) the distance between the development and any waterway that feeds into the drinking water storage, ii) the on-site use, storage and disposal of any chemicals on the land, iii) the treatment, storage and disposal of waste water and solid waste generated or used by the development, b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development
Consideration under other Legislation	
Biodiversity Conservation Act 2016, s7.14	The Minister for Planning, when determining in accordance with the EP&A Act any such application, is to take into consideration under that Act the likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values
Biodiversity Conservation Act 2016, s7.16	If the Minister for Planning is of the opinion that proposed State significant development or State significant infrastructure that is the subject of an application to which this Division applies is likely to have serious and irreversible impacts on biodiversity values, the Minister— • is required to take those impacts into consideration, and is required to determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is to be granted.

Statutory Reference	Mandatory Consideration
Environment Protection and Biodiversity Conservation Act 1999, s136.1 and s136.2	In deciding whether or not to approve the taking of an action, and what conditions to attach to an approval, the Minister must consider the following, so far as they are not inconsistent with any other requirement of this Subdivision: • matters relevant to any matter protected by a provision of Part 3 that the Minister has decided is a controlling provision for the action; • economic and social matters. In considering those matters, the Minister must take into account: • the principles of ecologically sustainable development; • the assessment report (if any) relating to the action. Additionally, the minister must take into account, where applicable: • The finalised environmental impact statement; • The recommendation report relating to the action; • A commissioner's report if an inquiry was held relating to the action; • Any other information the Minister has on the relevant impacts of the action
Environment Protection and Biodiversity Conservation Act 1999, s139.2	If the Minister is considering whether to approve, for the purposes of a subsection of section 18 or section 18A, the taking of an action; and the action has or will have, or is likely to have, a significant impact on a particular listed threatened species or a particular listed threatened ecological community; the Minister must, in deciding whether to so approve the taking of the action, have regard to any approved conservation advice for the species or community.
Water Management Act 2000, s96	In considering whether or not to grant an approval, the Minister must take into account— a) such matters as are prescribed by the regulations, and b) such other matters as the Minister considers to be relevant.
Water Management (General) Regulation 2018, s28	For the purposes of section 96(a) of the Act, the matters to be taken into consideration by the Minister in considering whether or not to grant an aquifer interference approval include whether the amount of water taken in the course of carrying out the aquifer interference activity to which the approval relates will exceed the total extraction limit for the aquifer set out in any relevant management plan.

5. ENGAGEMENT

5.1 Background

Stakeholder engagement is critical to Project development, planning approvals and ultimately achieving a social licence to operate. Stakeholder engagement as utilised by ATCO is an all-encompassing term and includes Government, regulators, community, Aboriginal parties, interest groups, landowners, and the general public.

ATCO's stakeholder engagement considers and is integrated into key activities throughout the development phase of the Project, specifically landowner agreements, scoping and planning approvals, engineering, connection enquiry and contract development.

The over-riding objective for ATCO during its stakeholder engagement is to provide appropriate and accurate information with openness and transparency, and specifically to undertake to:

- provide stakeholders with honest, clear, consistent and timely information regarding the Project;
- identify and proactively communicate the potential benefits and impacts of the Project to stakeholders;
- gather stakeholder opinions and expectations of the Project in order to effectively address any concerns; and
- approach all consultation activities in a transparent, focused, inclusive, responsive and timely manner.

5.1.1 COVID-19 Implications

The engagement strategy for the Project has been modified to cater for the requirements imposed by Governments (i.e. border closures; minimising group sizes; travel restrictions) and individual stakeholder requirements.

Several meetings which would have been typically undertaken in person, have been conducted by video conferencing or phone. Face-to-face meetings have been limited in number, and those undertaken have involved few people whilst maintaining social distancing and attention to hygiene standards.

5.2 Key Stakeholders

Key stakeholders for the Project that are expected to have an interest in or be affected by the Project have been identified and categorised into core groups (Table 5-1). The geographical extent of community interest in the Project is expected to be highest at the local (<5km) and regional level (5-100km), with the engagement strategy reflecting this.

Consultation has occurred with all stakeholder groups and further engagement will continue throughout the project development and beyond (refer to Table 5-2). Methods used and feedback from these stakeholder categories are provided in Sections 5.3 and Section 5.5 respectively. Of note, the opening of an ATCO office in Bathurst and appointment of a local Communications and Engagement Manager has facilitated the engagement with the all stakeholder groups.

Table 5-1: Summary of key stakeholder engagement undertaken during the scoping phase

Stakeholder Group	Members	Engagement Methods
Local Communities	Residents of Yetholme and surrounding villages including Tarana, Wambool, Locksley, Meadow Flat, and Sunny Corner.	Community Open Days, including letter box drop informing residences of the event; Project information distribution lists (by subscription); ATCO Project specific web site with Q&A. See also Media below.
Host Landholders	Landholders with Project infrastructure on their property	One-on-one meetings; letters; phone calls; email
Near Neighbours	Landowners adjacent to the Project	Community open days; some by one-on-one meetings; letter drops
Aboriginal Representatives	Registered Aboriginal Parties	Meetings; field surveys and report review
Councils	Bathurst Regional Council (BRC), Oberon Council*; Lithgow City Council*.	Meetings and presentations; email updates; sponsorship of Business Month event – Bathurst BizLunch; * phone calls only at this stage*
Interest Groups	Yetholme & District Progress Association; Historic society; Bathurst Community Climate Change (Action) Network	Variable contact, but has included meetings; one-on one discussions with representatives
Businesses	Various - including equipment suppliers, plant hire, contractors, accommodation.	Restricted at this stage to discussions and responding to queries raised about job and goods & service provision opportunities.
Government Agencies	Relevant water, environment, planning, energy and community departments	Meetings and presentations; phone calls; email
Government Corporations / Entities	TransGrid, WaterNSW, Forestry Corporation NSW	Meetings and presentations; phone calls; email
Asset Owners with interactions with linear infrastructure	BRC, TransportNSW, Transgrid, APA Group, Essential Energy, Communication entities (e.g. Telstra, Optus)	Variable, but includes meetings and presentations; phone calls; email; on-line responses
Political	State and federal members of parliament representing the local area and ministers of relevant Government departments.	Meetings and presentations; phone calls; email; briefings.
Media	Local media outlets including local community and news print media, local commercial and community radio, television with local news services.	Interviews; media releases; articles; advertisements for community open days and Communities Fund.

5.3 Engagement to Date

Engagement in the scoping phase of the Project has focused on specific stakeholders (Table 5-2), with engagement focused on providing information about ATCO, Altura and the Project, seeking feedback on matters of concern, and establishing sound relationships to facilitate ongoing engagement through the EIS development, and the construction and operation phases.

Table 5-2: Summary of key stakeholder engagement undertaken during the scoping phase

Stakeholder / Stakeholder Group	Engagement Overview
Local community	Two community information open days have been held in Yetholme, and one in Bathurst, to introduce the Project and Project team to the local Bathurst, Yetholme and surrounding community. Interviews have occurred on radio and presentations about the Project have been aired on local TV news channels. Updates about survey activities have been provided to potentially affected local residents via letter drops. Regular Project updates have been provided via email to community members who have subscribed to the newsletter, as well as to local council, state and federal government stakeholders and government department personnel. ATCO is seeking to share benefits with the local community through such aspects as improving local infrastructure and providing community funding to non-for-profit community organisations.
Landowners associated with the Project	Landowners directly associated with the Project have entered land agreements for the Project. Engagement with these landowners is ongoing via face-to-face meetings, email, and phone calls.
Landowners associated with linear infrastructure	All landowners that have potential for linear infrastructure to be located on their land (including the water supply pipeline, transmission cable, and access road) have had face-to-face meetings with ATCO. Discussions with all landowners are ongoing, with particular attention on confirming routes and working-though matters important for the individual landowners. Ongoing and regular contact has been made with all these landowners in this early stage of the Project.
Surrounding Landowners	Several landowners adjacent to, or near to, the Project have been contacted to inform them of the Project, and to provide the opportunity for them to discuss matters which are importance to them. Engagement has been variable, but has included face-to-face meetings, email, letter drops, and phone, and will be ongoing through the Project.
Registered Aboriginal Parties	Five RAPs have expressed an interest in the Project and consultation has (and is) occurring in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010). A virtual meeting (due to Covid) was held in July to introduce the Project and ATCO, and discuss the methodology for the Aboriginal Cultural Heritage Assessment, which has now been agreed with the RAPs. Aboriginal cultural heritage surveys have been undertaken with various RAP representatives. ATCO see this process as the first step in an ongoing relationship and seek to create a collaborative environment to generate enduring shared benefits.
Bathurst Regional Council	Information in relation to the Project has been presented by face-to-face meetings, video links and email. Council have provided in principle support for the

Stakeholder / Stakeholder Group	Engagement Overview
	Project, and have raised several matters which the Project should include in either engagement with specific stakeholders and community, and in the development of the Project. These include potential impacts to Bathurst town water supply, supplementary water supply options, vegetation clearing, traffic management and Aboriginal heritage. Council have expressed interest in sealing part of Molybdonite Road (at the cost of the Project) and have not expressed opposition to the Project's access road occurring in parallel with part of Molybdonite Road (refer also to Table 5-3). Council have been extremely helpful in sharing Project development insights in the region, providing assistance and connecting the Project team to other stakeholders.
Oberon and Lithgow Councils	Contact to introduce the local Communications and Engagement Manager and the ATCO Communities Fund, was made in September 2021. Meetings are scheduled to formally brief to the Oberon and Lithgow Councils about the Project in April/May 2022.
Yetholme & District Progress Association	A presentation to the Yetholme Progress Association has been provided, with information about the Project to be disseminated within the Association. The Association will receive periodic updates over the development phase of the Project.
Bathurst Community Climate Change (Action) Network	One-on-one discussion with Network representative. Meetings proposed for mid-2022.
Bathurst Historic Society	Initial contact has been made as part of the historic heritage assessment.
Business	Phone conversation with the Bathurst Business Chamber about the Project and future opportunities. Local business representatives attended the Community Information sessions. Assorted discussions and responding to queries raised about job and goods & service provision opportunities from local businesses. As the Project approaches the pre-construction phase, ATCO will commence a formal expression of interest process, and ultimately link-in the selected EPC Contractor to those businesses.
DPE – Planning and Assessments DPE – Water DPE - Energy DPE – BCD NSW Fisheries NSW Heritage	An initial introductory meeting by video-link was provided to DPE including Planning & Assessments, Water and Energy, to introduce the Project. Ongoing updates on the Project have been provided by meetings, email, and phone to the Department representatives. Collective meetings involving two or more of the departments have occurred from time to time. Meetings have been conducted with various Government departments and agencies (listed here) linked to the EIS process, to inform them about the Project and seek clarification on technical matters. Contact mechanisms have been variable, ranging from virtual meetings, email and phone updates and site visits. A Referral pre-submission meeting has occurred with the Commonwealth's Department of Arts, Water and the Environment (DAWE).

Stakeholder / Stakeholder Group	Engagement Overview
DAWE	Consultation will continue through the Project development phase with all the above agencies, and likely expand to include the EPA, NSW Fire and Rescue, NSW State Emergency Service (SES), NSW Police and others during the development of various construction plans.
Local Media (Local and Regional Community)	The Project been approached by local media outlets to provide information and interviews about the Central West Project. Water supply and potential affects downstream were initially a key focus of the ABC Central West Radio interview and the Stereo 2BS radio interview. The ATCO Communities Fund received both local press and radio coverage in the Western Advocate and Stereo 2BS. ABC Central West Radio are regularly request interviews about the progress of the Project. Local Media outlets receive regular project briefings and media releases on the progress of the Project.
Crown Lands	Crown land has been contacted to inform them of the Project, and the potential requirements of forming easements and road corridors across Crown land.
TransportNSW	Introductory information has been provided, including conceptual details of intersection and crossing requirements. TransportNSW has provided crossing and intersection requirements such that they can be considered in the early planning stages of the Project.
Forestry Corporation of NSW	Representatives of the Forestry corporation have been provided information about the Project, and in particular about the potential siting of a switchyard on State land managed by them for forestry production. Discussions are ongoing to determine, if required, the relevant instruments to establish easements and or forestry permits for Project infrastructure.
TransGrid	TransGrid has been informed of the Project, including the Project's intent to connect into the 330kV Mt Piper-Wellington transmission line. Indicative connection locations along this line have been discussed.
WaterNSW	Introductory meeting was held with WaterNSW to inform them of the Project.
AEMO	AEMO have been informed about the Project, and ATCO have submitted an application on the provision of non-network services.
Asset Owners with linear infrastructure interactions	Most asset owners describe din Table 5-2 above have been contacted, although some have been via Dial-Before-You Dig services (i.e. telecommunication services). With the pipeline option being more defined at the time of preparing this document, the Transport Asset Holding Entity of NSW (TAHE) will be approached to discuss crossing requirements.
State Member	The State Member for the Bathurst area, Hon Paul Toole, NSW Deputy Premier, has been briefed about the Project, and receives regular Project updates.

Stakeholder / Stakeholder Group	Engagement Overview
Federal Member	The Federal Member for the Bathurst area, Hon Andrew Gee has been briefed about the Project, and receives regular Project updates.
NSW Ministers	A number of State Ministers and their advisers, some now former Ministers, have been briefed of the Project, with periodic updates provided from time to time. These have included the former Minister of Water, Minister of Energy and Minister of Planning.
Media	The Project has received national coverage within the Australian Financial Review, Renew Economy and the Energy Insiders podcast.

5.3.1 Other Activities

A community open day was held in Yetholme in April 2021. A second open day was held in both Yetholme and Bathurst in February 2022. These events allowed people from the local and Bathurst community to drop in and ask questions about the Project and view posters, maps, information brochures and a video about the Project (Figure 5-1). Information flyers were delivered to local residents in the localities of Yetholme, Walang, Napoleon Reef, Wambool, Locksley, O'Connell and Gemalla, with advertisements published in the local paper. Various stakeholders were also informed of the open day via direct email, including representatives from Bathurst Regional Council, RAPs, both State and Federal local members, and various agencies including the Department of Regional Development, NSW and Regional Development Australia.

ATCO has also established a website about the Central West Project where people can contact the company directly if they have any queries and access an extensive list of Q&As. The link to the web site is:

https://www.atco.com/en-au/projects/central-west-pumped-hydro-project.html

In July 2021, ATCO employed a local Communication and Engagement Manager based in the new ATCO office in Bathurst, which opened in October 2021. This position is designed to provide a focal point for local community and stakeholder engagement, providing a 'familiar face' for the community to readily contact about the Project and matters they may wish to discuss. The person appointed to this position has extensive experience in stakeholder and communications management, and has worked in the energy industry for 15 years.

Figure 5-1: (a) Community Open Day set-up at the Yetholme Community Hall in April 2021, and (b) Community Open Day at the Yetholme Community Hall in February, 2022.

Figure 5-2: ATCO's new office in Keppel Street, Bathurst.

5.4 Ongoing Engagement and Timing

Engagement with different stakeholder groups will occur throughout the Project development phase and beyond. The timing and frequency will be dependent on a number of factors, including but not limited to:

- feedback from stakeholders on their preferred contact frequency and how they prefer to be contacted;
- whether the stakeholder is directly involved in environmental and heritage assessments;
- whether engagement of the stakeholder is required by legislation; and
- the type of issues that get raised by stakeholders, and the subsequent engagement activities that might occur thereafter.

Following on from the submission of the Scoping Report, ATCO will continue to engage with the current stakeholder contacts. Specifically, in relation to the preparation of the EIS, the following engagement will occur as a minimum:

- Further communications with local landowners associated about the Project and potential linear infrastructure routes, including Molybdonite Road, and activities and progress associated with the EIS;
- Ongoing engagement with the Registered Aboriginal Parties involved with the Aboriginal Cultural Heritage Assessment for the Project;

- Providing community open days (i.e. public information sessions) to share information about the Project and seek feedback;
- Engagement with various State Government departments about findings from environmental surveys and/or technical queries that will facilitate the preparation of the EIS;
- Further engagement with the Federal DAWE about the Project and the assessment findings as they relate to MNES, and the proposed submission of a Referral under the EPBC Act;
- Article(s) in media informing the broader community about the Project;
- Provision of periodic newsletters and information to interested parties via email distribution lists and the web site; and
- Updates about the Project on the ATCO website to inform the public about the progress of the Project, and ability for them to provide feedback or seek further information.

Information and feedback gained through the stakeholder engagement process has been and will continue to be used to inform the Project design, and be considered in the preparation of the EIS and supporting studies. It will also help to shape the ongoing engagement process, and assist ATCO to implement more targeted shared benefits with the local community.

Formal public consultation will occur when the EIS is exhibited via the DPE website. This is expected to occur in mid-2022. Information about the EIS and other Project updates will be shared at this time through community open day(s), the Project's web site, information updates to assorted stakeholders (e.g. newsletters, meetings, notifications).

5.5 Identified stakeholder issues

A range of issues have been raised by stakeholders in various forums. Several of these matters have been used to date to inform the design and layout of the Project, the location of Project linear infrastructure, water supply, and shared value opportunities, including upgrades to local infrastructure. Key issues are summarised in Table 5-3.

As ATCO continues to receive feedback about the Project, it will consider these in the Project development phase during the EIS.

Table 5-3. Summary of key matters raised by stakeholders.

Matter	Stakeholder Interest	Consideration and Project Modifications
Jobs	The number of jobs expected to be generated by the Project during construction and operations.	ATCO will provide requirements in the construction contract for the Principle Contractor to employ local people as far as practicable, and utilise local sub-contractors where available.
Community Benefits	How the Project could benefit the local community were raised in the community open day, and at landowner discussions.	ATCO has commenced a Community Investment funding program, to provide certain categories of non-for-profit organisations an opportunity to apply for funding of projects. Upgrades to Molybdonite Road and the intersection of the highway and this road will improve local road safety (see below).

Matter	Stakeholder Interest	Consideration and Project Modifications
Project location	Community members have queried the location of the Project, and why it is located where it is. Some have suggested it may be better suited in other areas from a water supply perspective.	The Project is located near a very strong part of the electricity network, is in close proximity to growing load centres of Bathurst, Orange and Parkes, is close to abundant intermittent renewables in the region, and is considered to form a vital element in the development of the State Government's nearby Central West Orana REZ. The site is also considered to be hydrologically efficient, is in a geological area suitable for such a development, and is considered to have a pathway to a water supply (see below). Justification and consideration of alternatives will be presented in the EIS, and communicated to stakeholders.
Project's contribution to a renewable energy future.	Several participants at the community open day expressed positive comments about the Project, in particular the contribution to a renewable energy future and fight on climate change	ATCO will continue to inform its various stakeholders, including the local community, the strong benefits of the Project.
Water supply and security (regionally).	Concerns raised that the Bathurst area was recently in drought, and the Project is using valuable water resources.	Several potential water sources for the Project have been investigated. An assessment focused on technical review and feasibility, and engaging with stakeholders, including the Bathurst Council, regulatory agency and local stakeholders. The Project determined Fish River was the most suitable water supply option, with water potentially available, and a regulatory pathway available in an otherwise complex Water Sharing Plan area. The EIS will include detailed hydrological impact assessment to investigate the risks and methods to mitigate these. ATCO will continue communicate with the local community, downstream landowners, local Councils and regulators on this issue.
Water supply, security and quality (Local)	Potential impacts to the quantity and quality of water downstream of the Project has been raised both in terms of water supply for existing users, and water to the downstream aquatic environment in Frying Pan Creek.	Construction activities will be separated from Frying Pan Creek to avoid pollution occurring downstream. The EIS will provide details on the types of controls to be implemented to protect the water flow and quality of the creek. Concern from some downstream water users that the original concept of sourcing initial fill water from Frying Pan Creek has resulted in a change in the approach to sourcing water. This has resulted in the Project looking at alternative sources, in particular from water in the Fish River (refer to Section 3.7). Water flows in Frying Pan Creek will be maintained during operations, as the lower reservoir will be designed to

Matter	Stakeholder Interest	Consideration and Project Modifications
		allow creek flows entering the reservoir to 'flow through' the dam downstream into Frying Pan Creek (refer to Section 3.7). Conversations with potentially affected landowners and other stakeholders will continue throughout the development of the Project.
Biodiversity – road corridor	Modifications along Molybdonite Road (e.g. removal of mature trees) is known to be a matter of interest with Bathurst Regional Council, the broader community, and some residents living along this road.	The Project access road into the site has been modified to reduce the length of Molybdonite Road used, therefore minimising direct impacts on important residual native vegetation, some of which form remnants of a Threatened Ecological Community. Engagement with Council, neighbours along this road and Yetholme & District Progress Association on this matter has been positive, and ATCO will continue to provide updates and seek feedback regarding this specific infrastructure.
Biodiversity – Frying Pan Creek	Loss of biodiversity in Frying Pan Creek and potential hazards to aquatic fauna during operations.	A section of Frying Pan Creek will be inundated by the creation of the lower reservoir embankment. To reduce downstream effects of the dam, the lower reservoir will be designed to allow creek flows entering the reservoir be released downstream of the dam into Frying Pan Creek (refer to Section 3.2.5.1). Discussions with downstream landowners on Frying Pan Creek have included the potential for assistance in habitat restoration of the riparian zone. The EIS will assess the significance of the impoundment on the biodiversity values of the creek, including potential fish movement.
Biodiversity – general loss of vegetation and species impacts (such as the Bathurst Copper Butterfly)	Several landowners stated that the local community value the Frying Pan Creek valley and surrounds is valued for its natural beauty and biodiversity.	The Project will result in about 180ha of disturbance with much of this on land previously impacted by past landuses. Nevertheless, there are areas of higher quality native vegetation that have important biodiversity values. The Project has been sited to minimise vegetation impacts as far as practicable, and designed to avoid and minimise impacts to specific areas of important vegetation, including Threatened Ecological Communities. The adoption of certain technical aspects of the Project, including an underground transmission cable and re-aligning sections of access road, have resulted in the avoidance of substantial vegetation clearing. ATCO is liaising with private landowners for the potential to develop biodiversity stewardship sites, shelter belts

Matter	Stakeholder Interest	Consideration and Project Modifications
		and remediation of sections of Frying Pan Creek to lead to improving and securing land for biodiversity and catchment benefits to the local and regional area. Potential ecological impacts from the Project will be assessed in the EIS, with avoidance, minimisation and offset options described.
Traffic - construction	Increased traffic during construction along Molybdonite Road has been raised as a concern for local residents and Council.	Project access roads have been modified to reduce the length of Molybdonite Road used, with most of the Project's access road now to be located on private land. This will improve safety by reducing potential interactions between construction traffic and public road users along a rural road. Feedback on this approach has been positive, both by Council and the local community. Potential upgrades to the turn-off from the Great Western Highway onto Molybdonite Road will be considered during the EIS and discussed with TransportNSW. A traffic impact assessment focusing on the construction stage of the Project would be included in the EIS.
Traffic – dust during construction	Some residents along Molybdonite Road have raised the generation of additional dust from the use of the unsealed Molybdonite Road during construction.	Construction and operational traffic is proposed to use a purpose-built road utilising private land. The access road will be dual land and ATCO will now seal the access road adjacent to Molybdonite Road to avoid the generation of dust and associated impacts to adjoining landowners. The Project will also investigate upgrading the sealing of the section of Molybdonite Road between the Highway turnoff and the Project's access road turnoff. This will be subject to Council approval.
Groundwater - springs	Some local landholders have queried whether the upper reservoir may impact springs around Yetholme and the Project area.	A groundwater assessment (including on Groundwater Dependent Ecosystems) will be undertaken as part of the EIS, including the potential to affect any local springs.
Visual – upper reservoir	Some neighbours have raised concern about the upper reservoir's effect on their vistas.	It is expected the outer walls of the upper reservoir will either be revegetated and/or screened in part by the use of strategic plantings (if agreed with the landowners). The wall height of the upper reservoir has been lowered (albeit increasing the area slightly), thus reducing the visual prominence to a degree. ATCO will develop some individual visualisations for these landowners to further facilitate discussions and potential methods to help reduce this specific local impact.

Matter	Stakeholder Interest	Consideration and Project Modifications
		A visual assessment of the Project will be presented as part of the EIS.
Visual – transmission line	Some landowners have raised concerns about the visual effect of the proposed overhead transmission line as viewed from their property.	The Project has proposed to modify the original overhead transmission line to an underground transmission cable. This will largely avoid the visual impacts associated with the overhead original overhead option. Note, the original transmission line route has been modified to try to minimise the visual impacts. Discussions with landowners (some involved in the eventual creation of an easement) will continue in an attempt to consider their views in the placement of the transmission cable.
Visual – scenic character	Elements of the Project (particularly the penstock) may be visible from remote localities or from neighbouring lands, resulting in impacts to visual amenity.	The Project is not anticipated to have a significant impact to the local visual landscape as it is located some kilometres from potential public access points. To reduce the penstock being a distant, but visual element of the Project, the design has now considered to cover all or part of the penstock. Uncovered portions of the penstock will be now be painted in a colour to assist with blending it to the surrounds. The visual attributes of the Project will be assessed and reported in the EIS.
Greenhouse emissions reduction and energy transition.	Several stakeholders are supportive of the Project by the direct benefit it would play in facilitating renewable energy transition, and reduced carbon emissions.	The Project is being developed to meet the need for energy storage in the NEM, and the commercial/economic, environmental and society opportunities this provides. Although not developing the Project may avoid any potential impact, the likelihood of significant negative impacts is expected to be low compared to the benefit of the proposed Project in contributing to overall ecologically sustainable development, by contributing to the progressive decarbonising of the electricity grid, contributing to lower emissions, and combating the impacts of climate change.
Noise and vibration	Noise and or vibration impacts during the construction phase.	A noise impact assessment would be provided in the EIS to confirm anticipated noise impacts to near neighbours during construction. Project mitigation measures would be developed to achieve noise management levels. Discussions with some nearest Project neighbours have commenced to investigate concerns and potential mitigation measures.
Fire	The potential for bushfires to present a hazard to	Emergency management plans, in consultation with relevant emergency services, will be developed for the

Matter	Stakeholder Interest	Consideration and Project Modifications
	construction or operational staff.	Project. These plans will consider bushfires and how personnel will respond to such events.
Engagement	Extend timing of community engagement (i.e. Drop-In Sessions) to cater for those unable to attend during normal work hours	Information Sessions are planned to occur a number of times during the Project development phase. These sessions have extended open hours, are held on weekends and repeated the following week to allow people multiple opportunities to attend. ATCO has also established a local office in Bathurst to further aid people's ability to access material and ask questions about the Project.

6. PROPOSED ASSESSMENT OF IMPACTS

6.1 Overview

In accordance with the Scoping Report Guidelines (DPIE 2021a) and Cumulative Impact Assessment Guidelines (DPIE, 2021b), a preliminary environmental assessment has been undertaken to identify the matters that will require further assessment in the EIS and the level of assessment that should be carried out for each matter. The following factors have been considered in the identification of matters needing further assessment for the Project as specified in the Scoping Report Guidelines (DPIE 2021a):

- the scale and nature of the likely impact of the project and the sensitivity of the receiving environment;
- whether the project is likely to generate cumulative impacts with other relevant future projects in the area;
- the ability to avoid, minimise and/or offset the impacts of the project, to the extent known at the scoping stage; and
- the complexity of the technical assessment of the project in regards to such factors as data requirements for assessment, method for predicting the impacts, investigations required to identify the specific mitigation measures, and the ability to deal with uncertainties.

The following sections present the identified matters requiring further assessment and the proposed approach to the respective assessments.

Matters have been categorised as per the categories identified in the Scoping Report Guidelines (DPIE 2021a). A scoping summary table in accordance with the Scoping Report Guideline is included in Appendix A.

The level of assessment identified for each aspect are classified as either Detailed or Standard. Detailed aspects identified on the basis that they are both most likely to occur and represent the greatest potential change to the existing environment and require project specific mitigation. Standard aspects require assessment but are considered less likely to result in significant impacts, either based on lower likelihood of occurrence, absence or few receptors, to be well understood, and are managed by standard management measures. They are listed below and summarised in Table 6-1:

- Detailed:
  - Biodiversity
  - Water
  - Aboriginal Heritage
  - Noise and vibration
  - Traffic and transport
- Standard:
  - Air quality
  - Non-Aboriginal heritage
  - Soils and spoil management
  - Socio-economic

- Hazards and risk

There are no known significant Projects in the area of influence of the Project that would warrant the need for a cumulative impact assessment as per the DPIE (2021) Cumulative Impact Assessment Guideline. However, the assessment of potential impacts to (i) Aboriginal heritage, (ii) threatened species and ecological communities, (iii) hydrology and water supply, and (iv) socio-economic assessment, will consider cumulative impacts derived from the regional area. The requirement for additional cumulative assessments will be considered as part of the EIS.

Table 6-1: Overview of the Key (Detailed) and Standard Matters identified for the Project.

Detailed (Key) Aspects

Matter	Impact Summary	Assessment and Mitigation
Biodiversity	The Project will result in the loss of native vegetation and fauna habitat, including habitat of some potential threatened species and two threatened ecological communities. Permanent changes will occur to the existing lotic aquatic environment due to impoundment inundation.	A biodiversity assessment would be undertaken as part of the EIS to assess potential impacts associated with the Project including the preparation of a Biodiversity Development Assessment Report (BDAR). Targeted surveys for relevant threatened species will be undertaken in accordance with relevant guidelines to determine likely presence on site. The BDAR will include assessments of serious and irreversible impacts (SAII), to meet the requirements of the Commonwealth Department of Agriculture, Water and Environment (DAWE) and NSW Department of Planning and Environment (DPE). The preparation of an aquatic ecological assessment report to adequately assess the Project will include assessments in accordance with Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull, 2013) to address requirements under the FM Act. A determination on fish passage requirements will be undertaken. The Project design has applied the hierarchy of control to avoid and minimise disturbance. A number of opportunities have been identified in the early stage of the Project to promote and improve ecological outcomes. Biodiversity offsets will be sought for impacts that are unavoidable, with a focus on seeking stewardship sites adjacent to the Project where the opportunity presents itself.
Water	The Project has the potential to affect a number of landowner's downstream with regard to surface and/or groundwater extraction along Frying Pan Creek or the Fish River, which may occur during and/or after construction of the PSH.	Hydrological and hydrogeological assessments will be undertaken to assess the potential impacts from impounding Frying Pan Creek, both upstream and downstream. A groundwater model will be developed to assess potential impacts of the pumped hydro scheme on the receiving environment, including Groundwater Dependent Ecosystems (GDEs).

Matter	Impact Summary	Assessment and Mitigation
	Potential impacts to Water Access Licence (WAL) holders further downstream in Fish River and including on Bathurst town water supply, are expected to be minimal, but will require further investigation. Potential changes to hydrogeology environment immediately downstream of the dam may influence alluvial aquifers if present. Major flood events in Frying Pan Creek may affect construction activities within the creek area.	Potential changes to water flow and water quality, particularly during construction, will be consider downstream water users and ecological function, and potential mitigation measures that could be applied. Potential impacts to downstream WAL users and the Bathurst town water supply, together with values associated with the high value criteria for Fish River, will be assessed. At least two seasonal water quality monitoring events will be undertaken for the modelling and impact assessment required for submission of the EIS. Specifically, the baseline water quality program will consider the level of aquatic ecosystem protection required in waterways upstream and downstream of the Project site. Dam break assessment will provide the EIS with information on the extent of potential flooding in the event of a dam failure. Being declared dams, details of safety measures to avoid such catastrophic events will be provided.
Aboriginal Heritage	One Aboriginal heritage object has been recorded in the Project area. Construction activities may disturb currently unrecorded Aboriginal heritage.	Assessment of potential impacts to Aboriginal cultural heritage will be required for the Project in order to meet requirements under the EP&A Act and NPW Act. This will involve preparation of an Aboriginal Cultural Heritage Assessment (ACHA) Report including Aboriginal community consultation and field investigation of the study area. Consultation will be undertaken with the relevant Registered Aboriginal Parties (RAPs), and will be undertaken in accordance with the established process set out in Aboriginal Cultural Heritage Consultation Requirements for Proponents (OEH, 2010).
Noise and Vibration	Construction activities (including traffic and blasting) may affect the amenity of limited near-neighbours.	A noise impact assessment will be provided in the EIS to confirm anticipated noise impacts to near neighbours during construction and operation, including local road use and water pumping from the Fish River. Standard and potentially Project specific mitigation measures would be developed to achieve noise management levels.
Traffic and Transport	Construction traffic on local rural roads is expected to represent a noticeable increase in vehicle movements which may result in a deterioration of the running surface. and affect normal safety conditions of other road users.	A traffic impact assessment focusing on the construction stage of the Project would be included in the EIS. Road upgrades along Molybdonite Road, particularly the turn-off to the Project access road, would be included on the traffic assessment within the EIS and discussed with Council and local residents. Potential changes to the turn-off from the Great Western Highway onto Molybdonite Road will be

Matter	Impact Summary	Assessment and Mitigation
		considered during the EIS and discussed with TransportNSW.

Standard Aspects

Matter	Impact Summary	Assessment and Mitigation
Visual	Construction and permanent Project facilities expected to occur within the view shed of limited neighbours. Permanent facility (penstock, and possibly the dam wall) may be noticed from distant public roads, and limited residences. The transmission cable and water supply pipeline are expected to be temporary visual elements during construction, with minimal visual impacts thereafter.	The EIS would include an assessment of visual impacts during construction and operation, including a description of existing landscape character and potential visual receivers, and identification of measures to be used to minimise visual impacts. The relatively remote location and position in the landscape of the Project elements will mean that there is limited visual impacts to most residents and the broader community. The use of an underground transmission cable, as opposed to an overhead 330kV transmission line on lattice towers, is considered the single largest measure to minimise the visual nature of the Project. Further, the covering, or use of sympathetic colours on the penstock will be expected to reduce one of the key visual elements to the Project.
Air Quality	During construction, dust generation from traffic movements and open areas may affect local vegetation and residences along unsealed local roads leading to the Project site. Dust plumes could potentially be visually evident from near neighbours. Air quality impacts as a result of operations are expected to be minimal. The operation of the Project contributes to the decarbonisation of the State generation fleet, therefore the Project should be viewed as having a positive greenhouse gas outcome through allowing displacement of more carbon intensive dispatchable energy.	The EIS would include an assessment of potential air quality impacts during construction and operation. It is expected that standard dust control measures employed during construction through a site-specific air quality management plan (including blast management plan) should be sufficient to avoid air quality impacts to the nearby sensitive receivers, and the local area more broadly.
Non-Aboriginal Heritage	No recorded historic sites are listed in the Project area or immediate surrounds, though some old exploration activities (digging and potential benching along Frying Pan Creek) have been noted. There is potential that non-Aboriginal heritage, if it occurs	Background research will be undertaken including a literature review, historic database searches and consultation with stakeholders, including the local historical society. As part of the Aboriginal heritage survey, any non-Aboriginal sites will be searched, with results provided in the EIS.

Matter	Impact Summary	Assessment and Mitigation
	within the Project area, could be impacted by construction activities.	
Soils & Spoil Management	The placement of excavated rock material may have the potential to release contaminants to the surrounding environment, either as a result of long-term weathering, or chemical reactions (i.e. acid drainage). Although the geology of the area suggests this impact is unlikely, additional investigations will be undertaken. Exposure of soils (often of steep slopes) from vegetation clearing and material movement, may cause erosion during construction and rehabilitation, with potential for impacts to waterways and surrounding areas.	Soil assessment will be undertaken in accordance with various guidelines including the Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000). Rock types in the Project will be characterised and tested for potential future contamination issues, such as potential for acid generation. Excavated material will be reused in the construction of the Project to, in part, minimise the need for spoil areas. Geological analysis will be presented in the EIS, together with spoil storage location(s), design, stability and rehabilitation objectives.
Socio-economic	The Project is expected to have a positive impact on the local economy through the generation of employment (particularly during construction) and the resultant expenditure in local towns and will improve local road infrastructure used by the Yetholme community. Some pressure on local accommodation may occur from time to time during the construction phase, though it is recognised that Bathurst has several hundred rooms available in assorted hotel, motel and other short to medium term accommodation (e.g. Airbnb)	Social and economic impact assessments will be undertaken in conjunction with stakeholder engagement, to assess the potential impacts (positive and negative) of the construction and operation of the Project on local communities. It is anticipated that the social assessment will be desktop based and guided by the assessment methodology by the NSW Government Social Impact Assessment Guideline (October 2020).

Matter	Impact Summary	Assessment and Mitigation
Hazards and Risks	The Project occurs in designated bushfire prone land. Access / egress may be restricted during bushfire events.	The potential bushfire hazard of the Project will be investigated further in a Bushfire Risk Assessment in the EIS, prepared in accordance with the relevant guidelines and standards. As part of the required management plans for the construction and operation of the Project, Emergency Management Plans will be developed in consultation with local emergency services, and include bushfire events.
	Dams have the potential to cause impacts downstream in the event of failure.	Dam design, construction and operation will follow NSW dam safety regulations and guidelines, and an ANCOLD risk assessment. A dam break assessment will be presented in the EIS.
	No known contamination is registered within the Project area. Contamination from construction may occur from accidental spills.	Contamination will be assessed during soil surveys. Any contamination found would be managed in accordance with relevant guidelines. Results of this analysis will be presented in the EIS.
	Potential impacts could occur if inappropriate waste disposal during construction was to occur.	The EIS would identify potential waste streams associated with construction and operation of the Project and would include standard management practices compliant with the *Waste Avoidance and Resource Recovery Act 2001* and other relevant guidelines and good practice.

6.2 Detailed Aspects

6.2.1 Biodiversity

6.2.1.1 Existing Environment

A large proportion of the Project site has been previously disturbed to various degrees by past activities, particularly in around the upper and lower reservoirs and powerhouse location, and substantial sections of the linear infrastructure (refer also to Section 1). Relatively undisturbed vegetation occurs along the penstock route.

A background review of publicly available information was undertaken to prepare a list of threatened species, populations and communities as well as important habitat for migratory species with a likelihood of occurrence in the study area and surrounds.

Searches were also undertaken to identify if any Areas of Outstanding Biodiversity Value were present and Groundwater Dependent Ecosystems (GDEs).

The following database searches were performed:

- NSW BioNet - the website for the Atlas of NSW Wildlife and OEH Threatened Species Profile Database;
- OEH BioNet Vegetation Classification System database;

- Commonwealth Department of Agriculture, Water and the Environment EPBC Protected Matters Search Tool;
- The Biodiversity Assessment Method (BAM) calculator predicted species function;
- NSW Department of Primary Industries freshwater threatened species distribution maps (DPI, 2016);
- Key fish habitat maps (DPI 2007);
- The Bureau of Meteorology's Atlas of Groundwater Dependent Ecosystems (GDE);
- Department of Environment and Energy directory of important wetlands;
- Atlas of Living Australia; and
- DPIE (now DPE) Register of Declared Areas of Outstanding Biodiversity Value.

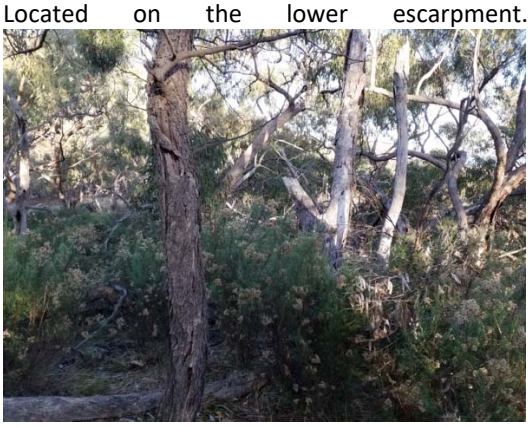
(a) Vegetation

A preliminary site assessment of the Plant Community Types (PCTs) and their condition that exist across the PSH area, including parts of the indicative linear infrastructure corridors has determined nine PCT's occur across the site (Table 6-2; Figure 6-1). The PCT types, and the extent and condition of them, will be further assessed during the EIS.

Table 6-2: Plant Community Types (PCT) mapped across the Project area with example photographs (Source: NGH).

BC Act = *Biodiversity Conservation Act 2016*; EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999.*

PCT	Conservation Status		Condition	Description
	BC Act	EPBC Act		
85 – River Oak Forest and woodland wetland	Not listed	Not listed	Moderate	Located adjacent Fish River, Frying Pan Creek and lower order streams associated with the water supply pipeline. 
277 - Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW	Endangered	Critically Endangered (potential)	Low to High	PCT 277 was located on the mid to lower escarpment.

PCT	Conservation Status		Condition	Description
	BC Act	EPBC Act		
South Western Slopes Bioregion				
280 – Red Stringybark – Blakely's Red Gum +/- Long-leaved Box shrub/grass hill woodland	Critically Endangered	Critically Endangered	High	Located on the lower escarpment. 
351 – Brittle Gum – Broad-leaved Peppermint – Red Stringybark open forest	Endangered	Not listed	Moderate - High	Located predominantly on the upper reaches of the escarpment impacted by the upper reservoir with some areas impacted by the pipeline and pumphouse of the lower reservoir. 
731 - Broad-leaved Peppermint - Red Stringybark grassy	Not listed	Not listed	High	Located on the upper reaches of the escarpment adjacent the access road to the lower reservoir and to the south of the upper reservoir study area.

PCT	Conservation Status		Condition	Description
	BC Act	EPBC Act		
open forest on undulating hills, South Eastern Highlands Bioregion				 Above. PCT 731 grassy understorey and Brittle Gum, Inland Scribbly Gum and Broad-leaved Peppermint Below. PCT 731 derived shrubland of Sifton Bush *Cassinia sifton* and scattered eucalypt paddock trees 
732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the	Not listed	Not listed	Moderate and High	Located from Yetholme Drive in the north of the study area to the higher reaches of the escarpment adjacent Molybdonite Road. Some smaller patches are located adjacent a 3rd order stream gully feeding into Frying Pan Creek

PCT	Conservation Status		Condition	Description
	BC Act	EPBC Act		
South Eastern Highlands Bioregion				
963 – Narrow-leaved Peppermint – Mountain Gum – Brown Barrel moist open forest	Endangered	Endangered	Moderate - High	Located in the north of the study area south of Mount Homer Road, and in the south east impacted by the upper reservoir. A large patch is also located to the west of Frying Pan Creek interspersed with exempt land / blackberry. 
1102 – Ribbon Gum – tea tree – River Tussock riparian scrub	Endangered	Not listed	Moderate	Located adjacent Frying Pan Creek on both sides. 

PCT	Conservation Status		Condition	Description
	BC Act	EPBC Act		
1197 – Snow Gum – Mountain Gum tussock grass-herb forest	Critically Endangered	Not listed	High	Located in the north of the study area north of Broken Bridge Road and adjacent Molybdonite Road 
Exotic dominated pasture	n.a.	n.a.	n.a.	Grassy paddocks dominated by exotic species were recorded largely on the upper plateau, with smaller areas present scattered over the lower reservoir area. Based on the current preliminary assessment these areas are not considered native vegetation, however further detailed analysis may be required to determine whether any areas support areas of derived native grasslands. 

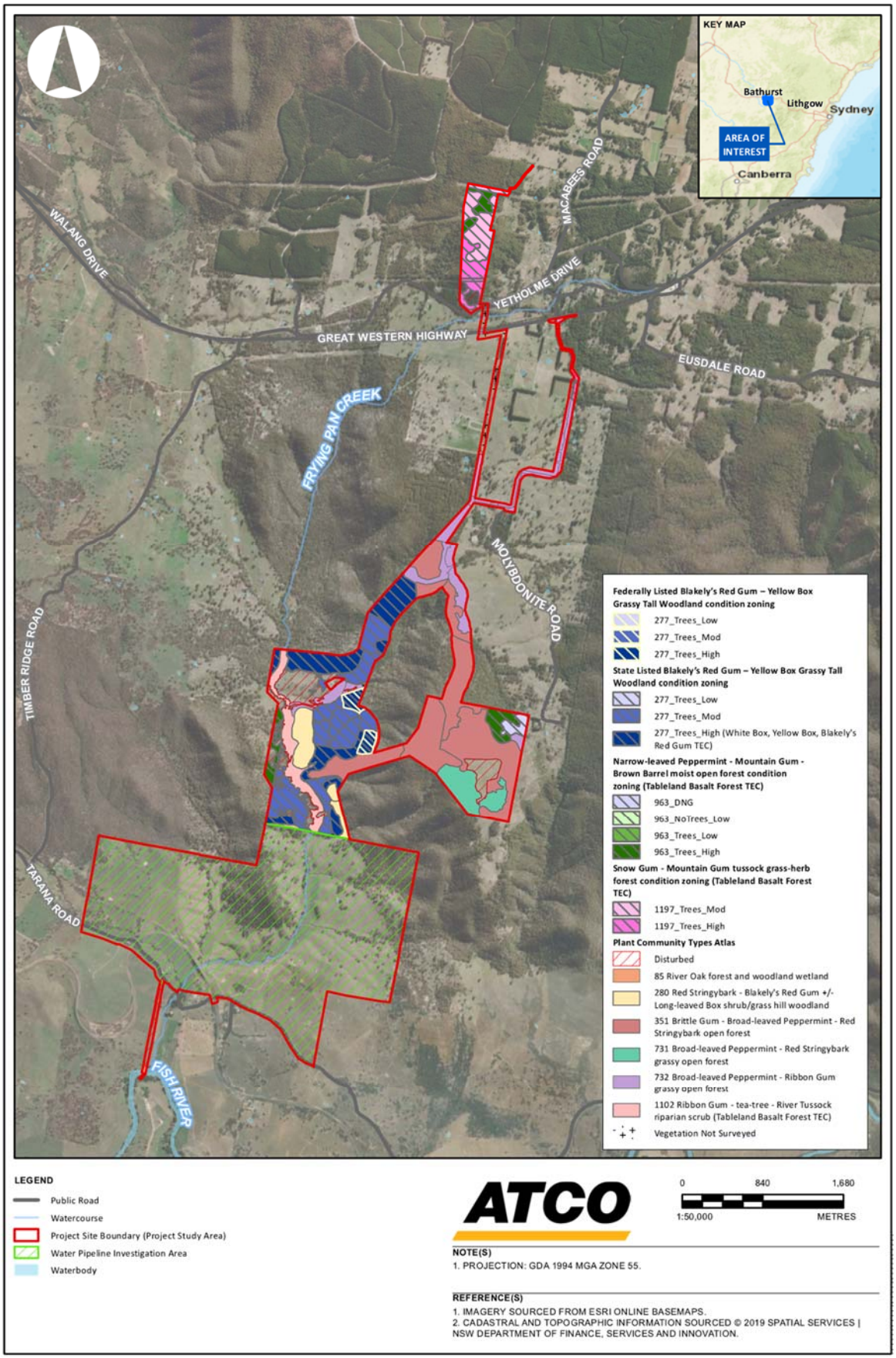


Figure 6-1: Plant Community Types (PCT) mapped across the Project study area. Source, NGH.

A preliminary vegetation assessment reveals there are two Threatened Ecological Community (TECs) that occurs within the Project area, specifically:

- White Box-Yellow Box-Blakely's Gum (Box Gum Woodland), and
- Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions (Tableland Basalt Forest).

Both are listed in the NSW BC Act; the Box Gum is also listed in the Commonwealth EPBC Act.

The extend of both TEC's across the Project area have been mapped (Figure 6-1; Figure 6-2). Preliminary designs for Project infrastructure have considered the TECs, with substantial changes been made to avoid some areas, and minimise impacts to others. Examples include adjusting the locations and/or alignments of the upper reservoir, access road and intersections, and transmission cable.

It is expected further reductions in impact areas will be achieved through the design process, with the extent of disturbance being fully described and assessed in the EIS.

Box Gum Woodland, considered to meet the requirements for listing under the BC Act was found to occur along the parts of the upper Frying Pan Creek valley and surrounding low hills. The TEC was also recorded in patches along hills to the immediate north, along parts of the proposed access road as described (Table 6-1; Figure 6-1 and Figure 6-2).

The majority of the PCT types that comprise the Box Gum Woodland vegetation present is considered unlikely to meet the requirements for listing under the BC Act. This is due to the largely degraded and weed infested understorey. This will be further assessed as part of additional vegetation mapping to occur during the EIS.

Two areas were mapped that meet the requirements for EPBC Act listing (Figure 6-2) where native understorey species were considered likely to comprise > 50% of the total perennial cover, over a > 0.1 ha patch, which would meet the requirement for a 'predominantly native understorey' (Commonwealth of Australia 2006). Permanent and temporary infrastructure locations have been designed to avoid these areas.

Tablelands Basalt Forest considered to meet the requirements for listing under the BC Act was found to occur along the Frying Pan Creek riparian zone, in the location of the lower reservoir, as well as the surrounding low hills and sections of the feeder tributaries. The TEC was also found to occur along sections of Molybdonite Road and hills to the north of the Great Western Highway in the vicinity of the proposed switchyard (Figure 6-2).

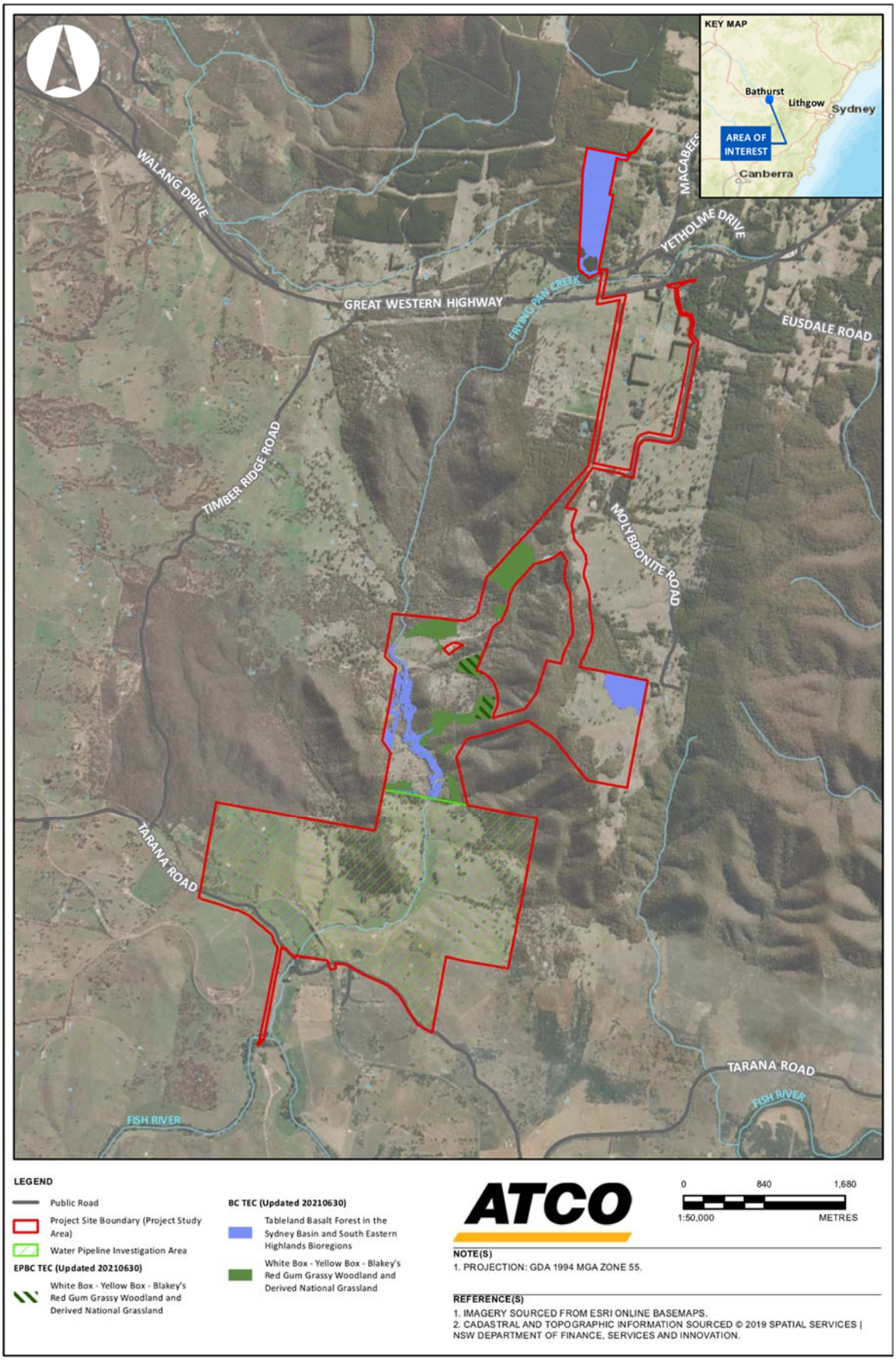


Figure 6-2: Preliminary mapping of the two Threatened Ecological Communities across the Project area (source NGH).

(b) Threatened Species

Threatened Species which have the potential to occur within the study area were determined from searches across the following databases.

- EPBC PMST Potential Threatened Species: The EPBC Protected Matters Search Tool lists federally listed threatened species which may occur in the area, or species whose preferred habitat may or likely occurs in the area. The search returned 35 potential threatened species, including 6 mammals, 10 birds 2 reptiles, 4 frogs, 2 fish, 1 invertebrate, and 10 plants (refer to Section 4.2.1);
- BAM Calculator Predicted Species: The NSW's Government's Biodiversity Assessment Method (BAM) Calculator is used to predict potentially occurring threatened species based on the mapped PCTs identified above. The BAM calculator predicted 38 potential threatened species including, 8 mammals, 12 birds, 2 reptiles, 3 amphibian, 1 invertebrate and 12 plant species.

Based on knowledge of the species' preferred habitats and known distributions, contrasted against the habitat in the study area and verified sightings of species in the area, 33 threatened species have the potential to occur in the Study Area, including 23 fauna and 10 flora species (Table 6-3).

Targeted species surveys for these species, together with general fauna and habitat assessment surveys, will be undertaken during the EIS.

Table 6-3: Terrestrial threatened species that may occur in the Project area based on the Plant Community Types (PCTs) mapped across the Study Area.

BC Act = *Biodiversity Conservation Act 2016*; EPBC Act = *Environment Protection and Biodiversity Conservation Act 1999.*

Threatened Species	Conservation Status	
	BC Act	EPBC Act
Mammal		
Eastern Pygmy-possum *Cercartetus nanus*	Vulnerable	-
Squirrel Glider *Petaurus norfoicensis*	Vulnerable	-
Greater Glider *Petauroides volans*	-	Vulnerable
Koala *Phascolarctos cinereus*	Vulnerable	Endangered
Brush-tailed Phascogale *Phascogale tapoatafa*	Vulnerable	-
Large-eared Pied Bat *Challnolobus dwyerl*	Vulnerable	Vulnerable
Large Bent-winged Bat *Miniopterus orianae oceanenisis*	Vulnerable	-
Grey-headed Flying Fox *Pteropus poliocephalus*	Vulnerable	Vulnerable
Bird		
Gang-Gang Cockatoo *Callocephalon fimbriatum*	Vulnerable	Endangered
Glossy Black cockatoo *Calyptorhynchus lathami*	Vulnerable	-
Powerful Owl *Ninox strenua*	Vulnerable	-
Barking Owl *Ninox connivens*	Vulnerable	-
Masked Owl *Tyto novaehollandiae*	Vulnerable	-

Threatened Species	Conservation Status	
	BC Act	EPBC Act
Bush Stone-curlew *Burhinus grallarius*	Endangered	-
Little Eagle *Hieraaetus morphnoides*	Vulnerable	-
Square-tailed Kite *Lophoictinia isura*	Vulnerable	-
White-bellied Sea Eagle *Haliaeetus leucogaster*	Vulnerable	-
Superb Parrot *Polytelis swainsonii*	Vulnerable	Vulnerable
Reptile		
Pink-tailed Worm Lizard *Aprasia parapulchella*	Vulnerable	Vulnerable
Broad-headed Snake *Hoplocephalus bungaroides*	Endangered	Vulnerable
Amphibian		
Booroolong Frog *Litoria booroolongensis*	Endangered	Endangered
Yellow-spotted Tree Frog *Litoria castanea*	Critically Endangered	Critically Endangered
Invertebrate		
Bathurst (Purple) Copper Butterfly *Paralucia spinifera*	Endangered	Vulnerable
Flora		
Ausfeld's Wattle Acacia *ausfeldii*	Vulnerable	-
Acacia meiantha	Endangered	Endangered
Hoary Sunray *Leucochrysum albicans var. tricolor*	-	Endangered
Small Purple-pea *Swainsona recta*	Endangered	Endangered
Silky Swainson-pea *Swainsona sericea*	Vulnerable	-
Veronica *blakelyi*	Vulnerable	-
Robertson's Peppermint *Eucalyptus robertsonii subsp. hemisphaerica*	Vulnerable	Vulnerable
Granite Ziera *Zieria obcordata,*	Endangered	Endangered
Capertee Stringybark *Eucalyptus cannonii*	Vulnerable	-
Silver-leafed Gum *Eucalyptus pulverulenta*	Vulnerable	Vulnerable

(c) Migratory Species

The EPBC Protected Matters Search Tool lists 12 listed migratory species that may occur within 10km of the Project area, including 1 migratory marine bird, 5 migratory terrestrial species, and 6 migratory wetlands species. Of those species, no species were predicted to occur in the Project area).

(d) Aquatic species and communities

Frying Pan Creek flow is variable, drying during extended dry periods (landowner pers. com). Preliminary assessments indicate the riparian vegetation is comprised of a heavily disturbed Tablelands Basalt Forest, with variable native understory (Table 6-1; Figure 6-1).

Frying Pan Creek is classified as a 'Key Fish Habitat' in the Bathurst Regional Council LGA, however the creek in the vicinity of the Project is classified as 'very poor' in terms of freshwater fish community status by the Department of Primary Industries (DPI). The status grades to 'poor' in the lower reaches of the creek (outside the Project area), including the receiving waterbody, Fish River.

Frying Pan Creek is classified as 'Low Instream Value' on DPE's High Ecological Value Aquatic Ecosystem (HEVAE) framework. The HEVAE framework identifies and defines a range of instream values and their importance for freshwater river reaches in NSW. These values help prioritise areas for focused water management to benefit all water users including the environment.

Figure 6-3: Flow event in Frying Pan Creek within the Project area, June 2020. Note heavily modified understory. Source Altura.

(e) Fish

Introduced Trout - Fish River has likely been affected by introduced trout, which were introduced in 1918 as recorded in the Tarana newspaper at the time "*A consignment of twelve tins of trout has been received from The Fisheries Branch by Mr. A.E. Thurling and liberated in the Fish River and Solitary Creek*" (Bathgate, 2013).

Fish River today is now recognised as an important recreational water way. Baumgartner *et. al* (2008) indicate that both Brown and Rainbow Trout populations in the Fish River are self-sustaining, with natural recruitment occurring most years. Nevertheless, there are 21 trout stocking locations within the Fish River Catchment. Of the nine release locations along Fish River downstream of Oberon Dam, DPI freshwater fish stocking records the average annual release numbers for Brown and Rainbow Trout since 2009 are 14,909 and 14,732 per year respectively. The total release number of brown and rainbow trout for the same period for the reach has been 164,000 and 162,050 fish respectively.

(f) Threatened Species

Three threatened fish species have been listed as having potential to occur in the Project area, including:

- Spotted Purple Gudgeon (*Mogurnda adspersa*) listed as endangered under the FM Act.
- Murray Cod (*Maccullochella peelii*) listed as vulnerable under the EPBC Act.
- Macquarie Perch (*Macquaria australasica*) listed as Endangered under the EPBC Act.

Detailed aquatic assessments will be undertaken as part of the EIS to determine the presence of these and other aquatic species.

(g) Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are natural environments which are dependent on the access to groundwater on a constant or intermittent basis to sustain aquatic and terrestrial ecosystems such as vegetation, springs, wetlands and rivers (DPIE, 2020).

A search of the using the Australian Government's Bureau of Meteorology, Groundwater Dependent Ecosystems Atlas (GDE Atlas) (BOM 2018) within the Project area and surroundings are listed below and presented in Figure 6-4. There are three types of GDE listed in the Atlas and these include:

- High potential aquatic GDEs associated with the Frying Pan creek (within the lower reservoir) and associated with the Stony creek (approximately 600 m to the east of the upper reservoir).
- Moderate potential terrestrial GDEs associated with the Frying Pan creek (within the lower reservoir) and dispersed across the Project area.
- Low potential terrestrial GDEs covering most of the Project area and surroundings.

The high potential aquatic GDEs within the investigation area are thin elongated features restricted to the channels of the local creeks including Frying Pan Creek in the Project area

The Terrestrial GDEs include terrestrial vegetation which depends on groundwater on a seasonal, episodic or permanent basis. These types of ecosystems can exist wherever the water table is within the root zone of the plants, either permanently or episodically.

The upper reservoir may interact with some areas of low to moderate potential terrestrial GDEs, while the lower reservoir may interact with high potential aquatic GDEs and low to moderate potential terrestrial GDEs. These GDEs (which are based on regional mapping) will be verified by field mapping and potential impacts assessed during the EIS.

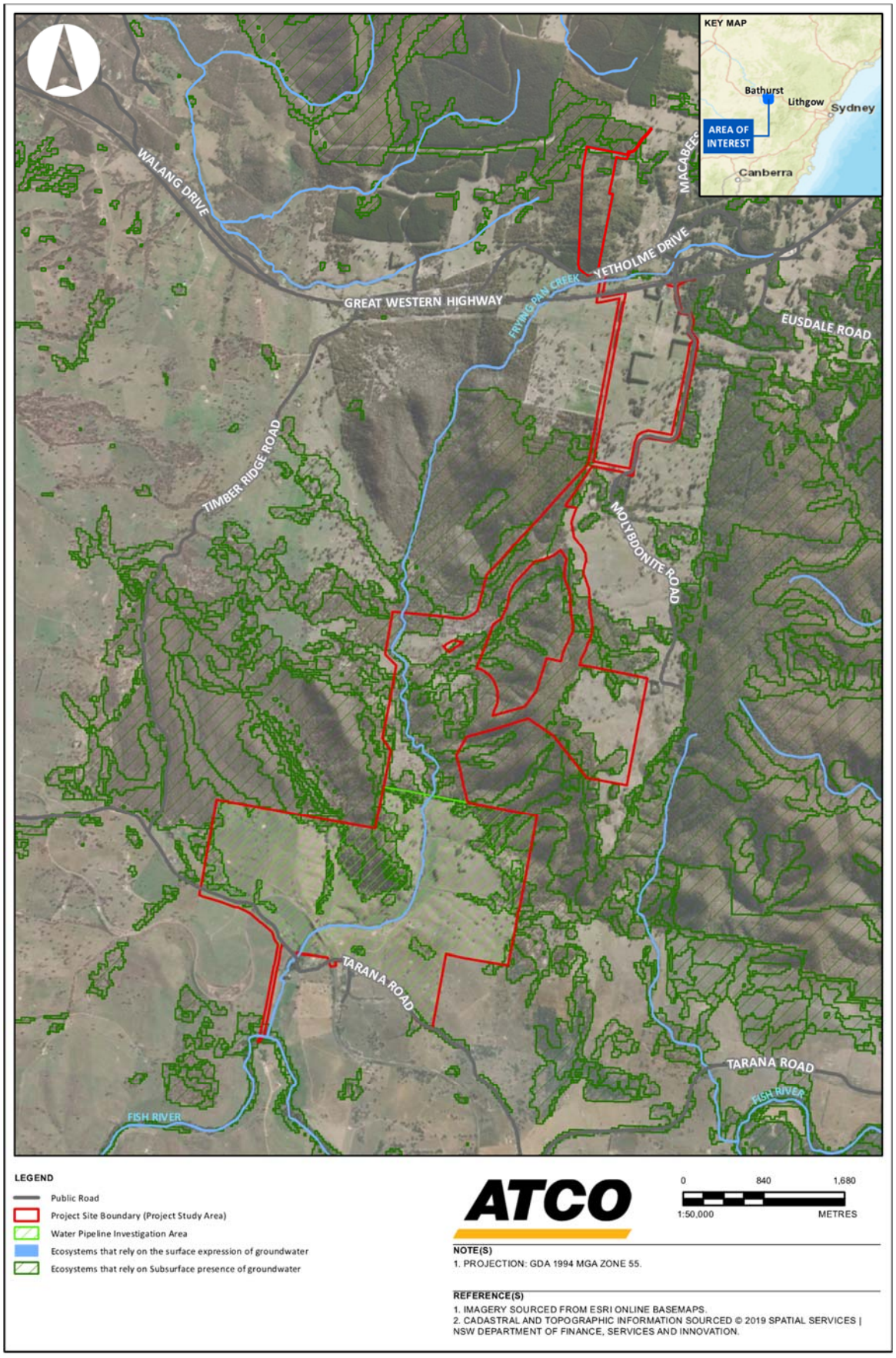


Figure 6-4: Groundwater Dependent Ecosystems (GDEs) potentially occurring in the Project area and surrounds (Source: Golder).

(h) Areas of Outstanding Biodiversity Value

No Declared Areas of Outstanding Biodiversity Value occur in the Project area or immediate surrounds.

(i) Invasive Species

The Protected Matters Search Tool lists 31 invasive species that may occur within 10km of the Project area, including 11 mammals, 10 bird and 10 plant species (refer to Appendix B).

The preliminary ecological investigations recorded five introduced mammal species (cattle, goat, rabbit, pig and fox) and one priority weed species, Serrated Tussock *Nassella trichotoma.*

(j) Avoidance, minimising and offsetting disturbance

As described in Section 3.8, the specific location of the Project's permanent infrastructure, was not only guided by local technical and engineering requirements to enable efficient energy generation, but also environmental, heritage, landowner, and community considerations. This approach was extended to linear infrastructure and indicative locations of temporary construction facilities. The application of this approach has continuously applied the avoid and minimise disturbance hierarchy. This will continue with the design provided in the EIS, with particular focus on linear infrastructure and the placement of temporary construction facilities. Where disturbance cannot be avoided, biodiversity offsets requirements will be determined, with a preference to establish biodiversity stewardship sites in close proximity to the Project area where practicable.

6.2.1.2 Issues for Consideration

The main potential impacts to biodiversity include:

- Vegetation clearing and habitat disturbance within the Project area, including areas associated with the permanent PSH infrastructure and temporary construction facilities;
- Vegetation clearing and disturbance associated with linear infrastructure establishment;
- Inundation of approximately 1,500m of Frying Pan Creek associated with the lower reservoir (including the dam) potentially affecting aquatic processes, including upstream/downstream movement;
- Creation of a fluctuating lentic environment (i.e. reservoir) within Frying Pan Creek potentially affecting aquatic processes;
- Temporary modification of downstream flows in Frying Pan Creek during construction, potentially affecting aquatic processes;
- Erosion and sedimentation could result in adverse impacts within the reservoir and downstream in Frying Pan Creek;
- Changes to hydrogeological conditions may affect groundwater dependent ecosystems;
- Increase road traffic may lead to increased mortality and injury to fauna; and
- Noise and light associated with construction may disturb fauna species in the vicinity of works areas.
- The operation of the reservoir has the potential to impact GDEs through a change in groundwater levels and a change in groundwater quality.

- With the construction and operation of the reservoir, an increase in the overlying pressure on any shallow aquifer may cause the shallow groundwater to rise and potentially discharge to surface, impacting local vegetation, impairing the function of stream, and affecting downstream users.

Several opportunities to avoid, minimise and even improve biodiversity impacts from the Project include:

- Maintaining hydrological connectivity within Frying Pan Creek by allowing most of the creek flows to 'pass through' the lower reservoir;
- Continually apply the avoid and minimise vegetation disturbance hierarchy in the design process for the placement of permanent and temporary infrastructure, including linear infrastructure;
- Incorporation of an underground 330kV transmission cable, as opposed to overhead transmission line;
- Maximise the reuse of excavated material to minimise the area of any spoil areas required;
- Establishment of substantive biodiversity corridors between existing stands of native vegetation and nature reserves by the establishment of biodiversity stewardship sites;
- Establishing improved riparian habitat along Frying Pan Creek in conjunction with downstream landowners, and;
- Supplementing key habitat features in rehabilitated areas and providing nesting and resting sites for a range of arboreal mammals, bats and bird species.

6.2.1.3 Method of Assessment

A biodiversity assessment would be undertaken as part of the EIS to assess potential impacts associated with the Project.

Specifically, the preparation of a Biodiversity Development Assessment Report (BDAR) in accordance with the Biodiversity Assessment Method (BAM) (OEH 2017) including a further review of background documents and databases containing information relevant to the study area and its surrounds, and detailed seasonal field investigations to provide accurate detail on the ecological values present within the Project area. Particular attention will be given to potential impacts to listed threatened species and threatened ecological communities.

The preparation of an aquatic ecological assessment report to adequately assess the Project will include assessments in accordance with Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull, 2013) to address requirements under the FM Act. A determination on fish passage requirements will be undertaken.

Various general and specific species guidelines will be used to guide methods to target surveys for threatened species likely to occur in the Project area, including:

- Surveying Threatened Plants and Their Habitats (DPIE 2020)
- Survey guidelines for Australia's threatened mammals (CoA 2011)
- Survey guidelines for Australia's threatened frogs (CoA 2010)
- EPBC Act referral guidelines for the vulnerable Koala (CoA 2014)
- Survey guidelines for Australia's threatened birds (CoA 2017)

- Survey guidelines for Australia's threatened bats (CoA 2010)
- Survey guidelines for Australia's threatened fish (CoA 2010)

The BDAR will be compiled in accordance with Section 6 of the BAM, including assessments of Serious and Irreversible Impacts (SAII), to meet the requirements of the Commonwealth Department of Agriculture, Water and Environment (DAWE) and NSW Department of Planning and Environment (DPE).

The biodiversity assessment findings undertaken as part of the EIS will be used to further inform the Project design, including avoiding, minimising and remediating impacts. Biodiversity offsets will be used to achieve net gains where impacts are unavoidable. Where feasible, stewardship sites will be established to secure offset obligations for the Project.

6.2.2 Water

6.2.2.1 Existing Environment

(a) Frying Pan Creek

Frying Pan Creek is a relatively short tributary (approx. 12km) of the Fish River, with its headwaters near the township of Yetholme. It is classified as a fourth order stream, with several minor tributaries forming part of the catchment. Numerous farm dams occur on first and second order streams within the Frying Pan Creek Catchment (NSW SEED).

Approximately half of the Frying Pan Creek's catchment is comprised of cleared to partially cleared areas; the other half is comprised of native and exotic vegetated areas showing various degrees of disturbance (refer to Figure 1-3).

Frying Pan Creek forms one of 38 sub-catchments in the Fish River. The catchment area of Frying Pan Creek is 43.2 km^2, and represents about 3.3 per cent of the total catchment area of Fish River, which has a catchment of 1,292km^2. The Fish River, which is impounded by the Oberon Dam, converges with Campbells River (itself impounded by the Ben Chifley Dam) to become the headwaters of Macquarie River.

Together with the Ben Chifley Dam on the Campbells River, Fish River contributes water to the Bathurst town water supply via the Macquarie River. According to BRC, the Fish River catchment often has good flows over the winter and is the preferred water source for the water treatment plant. However, when the flow in the Fish River is insufficient or has no flow, BRC releases water from its Ben Chifley Dam into the Campbells River from where it flows down the Macquarie River for abstraction at the water treatment plant (Bathurst Regional Council, 2008).

(b) Water Quality

Preliminary baseline water quality monitoring of Frying Pan Creek upstream and downstream of the Project area indicate that the water is fresh (< 200 µS/cm), neutral to slightly acidic pH (6.7 – 7.1) with low turbidity (< 20 NTU), and is similar to the water quality in the Fish River.

More detailed surface water quality analysis within Frying Pan Creek and Fish River will be undertaken during the EIS, with water quality samples being collected across at least one wet and dry seasonal period for a range of indicators, including major anions and cations, metals and metalloids, non-metallic organics, nutrients, and an assortment of organic chemicals.

(c) Water Supply

Water Supply pathways for the Project are described in Section 3.7.

The Project is located in the Water Sharing Plan (WSP) for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012. Within the WSP, the Project is located in one of the 30 sub-catchments the WSP applies to, specifically the Fish River Water Source, and is also located downstream of the Fish River Water Supply Scheme (FRWSS) operated by WaterNSW.

The Fish River Catchment has 43 unregulated water access licences (WAL's), including 22 upstream and 19 downstream of the confluence with Frying Pan Creek respectively. The extraction volume against the licences equates to 591 and 1,469.5 ML/year respectively. There are two surface WALs downstream of the Project on Frying Pan Creek with extraction limits of 38 and 54 ML/year. Collectively, the total unregulated surface water extraction allowance on the Fish River is 2,159.5 ML/year (Table 6-4).

The EIS will assess potential impacts of the Project on water access licences downstream of the Project, together with potential impacts to Bathurst's town water supply. Of note, the Project will be designed to allow water flowing upstream of the Project to pass through the reservoir, and continue downstream in Frying Pan Creek to Fish River.

Table 6-4: Water extraction volumes from Frying Pan Creek and the Fish River. Excludes WaterNSW volumes captured by Oberon and Rydal Dams.

Catchment	Number of WALs	Extraction Volumes - Total Share Component (ML/year)
Frying Pan Creek	2	92
Fish River, at Frying Pan Creek confluence (excluding Frying Pan Creek)	22	591
Fish River, downstream of Frying Pan Creek confluence, to confluence with Campbells River	19	1,469.5
Fish River, at Campbells River convergence point	43	2,152.5

(d) Flooding

The Project area is not identified on the Flood Planning Maps of the Bathurst Regional Council LEP 2014.

The potential for flooding impacts downstream of the dam will be assessed as part of the hydrological investigation for the dam. Dam safety elements will also be presented in the EIS, particularly results from the dam break assessment (refer to Section 6.3.6.2).

(e) Groundwater

The Project is located within the Lachlan Fold Belt (LFB) Sustainable Diversion Limit resource unit within the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011.

The LFB is the most extensive of the groundwater systems and ranges from the Great Dividing Range through to the western rangelands around Cobar. It provides stock and domestic

groundwater supplies. Groundwater is stored and moves through fractures, joints, bedding plains, faults and cavities within the rock mass (DPIE, 2019).

The local flow system is a fractured rock groundwater aquifer contained within the surrounding terrain. The fractured rock itself is likely to have very low primary porosity with groundwater flow occurring within secondary porosity features such as fractures or along contact boundaries between different rock lithologies. The hydraulic conductivity and groundwater storage within these secondary porosity features is typically very low, making it potentially an ideal surrounding rock for water impoundment.

Recharge areas to the fractured rock and upper reaches of the valley alluvial aquifers are generally considered to be via rainfall on the upper slopes, ridgelines and hilltops of the landscapes where the rock sub-crops or outcrops. Fractured rock aquifers may discharge groundwater into channels largely in the lower parts of the landscape which may support GDEs. Channels in upper parts of the landscape usually transmit surface water run-off only.

Groundwater development across the LFB is relatively limited, particularly as surface water has historically been available for water users (DPIE, 2019).

A review of the NGIS and WaterNSW groundwater bore public databases reveals there are no bores within 3km of the Project area, with a few bores within 4 – 5km of the Project. Within 15km of the Project area, the databases reveal 356 and 231 registered bores respectively.

Generally, bores to the north are located in fractured and folded sedimentary rocks (fractured areas to the north of the Project), whereas bores to the south and west are located in granites (termed 'Centre' in this report). Several bores are located in alluvium, generally associated with Fish River (Figure 6-5).

Bores are generally relatively shallow in the areas mentioned above, ranging on average from 26 to 56m in depth, as is typically consistent with the broader LFB.

Most bores have low yields, in the order of 1 – 2 L/s (Figure 6-6), with water quality in terms of salinity considered fresh (< 1,000 μS/cm), with a several bores having slightly brackish water. This is suggestive of a groundwater system that responds readily to rainfall, with water penetrating and travelling through rock fractures and faults (Golder, pers. com.).

Initial investigations suggest that groundwater will not be significant in the Project area, and not a water source likely available to the Project due to the type of aquifer system present and low yields.

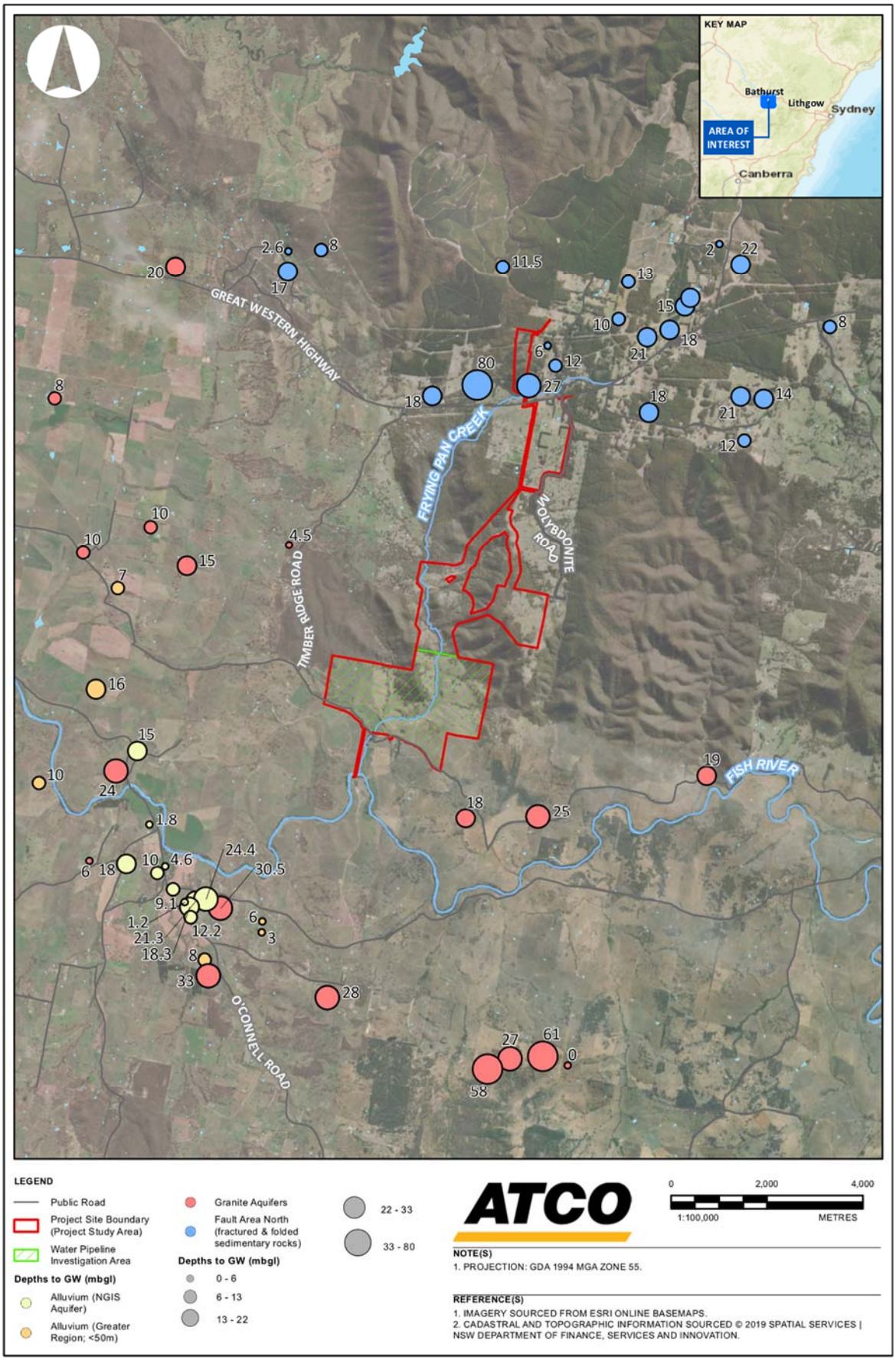


Figure 6-5: Location and depth of bores within 10km (approx.) of the Project area relative to the main geology.

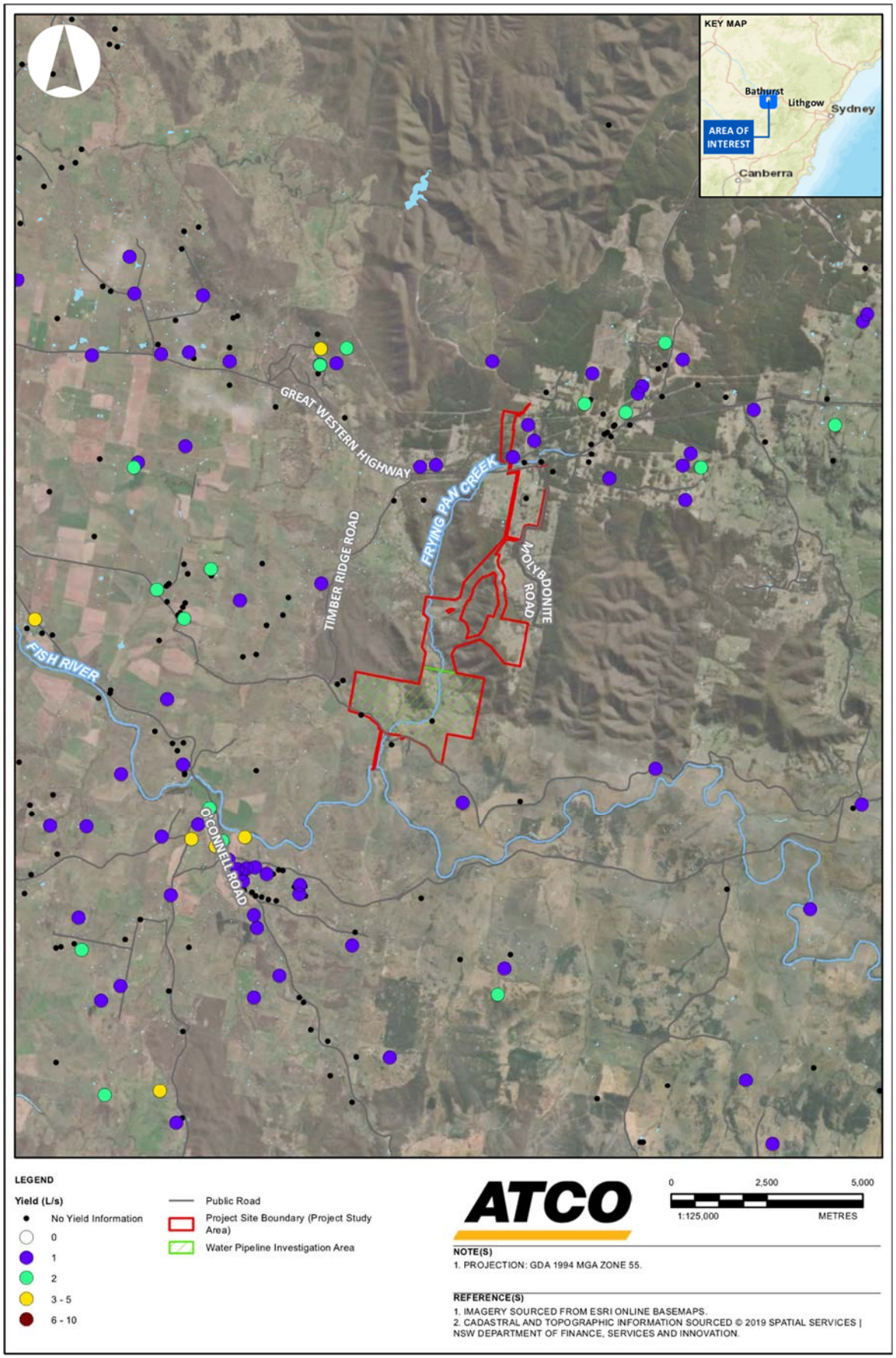


Figure 6-6: Yield data from groundwater bores within 10km (approx.) of the Project area. Data from WaterNSW database, supplied by Golder.

6.2.2.2 *Issues for Consideration*

(a) Surface Water and Flooding

The main potential impacts to surface water include:

- Temporary modification of downstream flows in Frying Pan Creek during construction, potentially affecting downstream water availability to existing water access licences and ecosystem values;
- Reservoir water fluctuation could affect water quality by mobilizing sediment;
- Erosion and sedimentation during construction could result in adverse downstream impacts;
- Waste water from construction activities or spills causing pollution to local waterways if not managed appropriately; and
- Potential for construction areas in the lower reservoir area to be affected by flood events in Frying Pan Creek.

(b) Groundwater

The main potential impacts to ground water include:

- Potential changes to shallow alluvial aquifer flows due to the construction of the dam wall may affect downstream flows;
- Changes to hydrogeological conditions may affect groundwater dependent ecosystems; and
- Potential dewatering (if required) during construction may impact water quality of waterways and result in localised drawdowns.

6.2.2.3 *Method of Assessment*

(a) Surface Water and Flooding

As there is limited water quality information associated with Frying Pan Creek, continue the water quality field survey to ascertain water quality conditions for at least two seasons (wet and dry). Water quality data collected will be reviewed against the ANZECC/ARMANZ (2000) Guidelines for Fresh and Marine Water Quality and also assessed against the environmental values (e.g. aquatic environment, human consumption, livestock consumption).

Based on the establishment of a flow meter and rain gauge within the Frying Pan Creek catchment, an existing preliminary water balance model will be further developed to provide an assessment of the potential surface runoff and groundwater inflows that will contribute to on-site supply and demand during construction. The water balance model inputs will be updated according design options to inform on the following:

- Fill times
- Operational releases
- Inundation statistics
- Water supply requirements (where applicable)
- Climate change impacts
- Assess design storm events of 20per cent, 10 per cent, 5per cent and 1per cent AEP's

The scope of the surface water impact assessment comprises the following:

- Identify potential changes to the existing surface water hydrology and flood mapping as a result of the Project;
- Assess potential effects of the Project on downstream water quality;
- Assess nutrient inflows into the lower reservoir and the potential for algal blooms and water quality changes;
- Recommend mitigation measures for managing potential impacts to surface water resources from Project construction and operation;
- Identification of evaluation hydrology impacts for construction and operation, comprising of:
    - Water resources including releases to the downstream environment and users
    - Flood hydrology
    - Develop feasible mitigation measures;
- Evaluation of fluvial geomorphology impacts for operational releases comprising of flow levels and stream bed profile. A qualitative assessment of stream channel and fluvial geomorphology will be investigated;
- Recommend environmental flow requirements based on broad flow objectives (e.g. river health, biodiversity); and
- Identification of evaluation potential surface / stormwater water quality impacts during Project construction and operation.

Based upon the information obtained from the assessment methodology, a Surface Water Quality and Hydrology Assessment Report will be prepared and included as part of the EIS.

(b) Groundwater

A groundwater assessment will be undertaken to assess the potential impact to the groundwater from the Project. Groundwater bores established as part of a geotechnical investigation will be monitored for water levels and periodic water quality (minimum of two seasons) to adequately describe and characterise the groundwater system.

A description of the environmental values of groundwater will be developed as an outcome of the baseline and seasonal monitoring program. Environmental values will consider groundwater and wetlands that may be affected by the Project. The Project is situated in the Macquarie-Bogan River catchment in an uncontrolled streams area. The NSW water quality and river flow objectives indicate that the subsequent environmental values may include consideration of protection of aquatic ecosystems, visual amenity, recreation, livestock, irrigation water supply, homestead water supply and drinking water. Water quality objectives, indicators, and trigger values will be identified for each environmental value to makes sure the values and resources can be protected. Details will be provided to demonstrate how these objectives will be met by the Project during the construction, operation, decommissioning and post-closure. The ANZECC/ARMCANZ (2000) guidelines for fresh and marine water quality will be used for guidance.

A simple local-scale numerical groundwater model will be developed which will describe the inputs, movements, exchanges and outputs of groundwater and surface water that may be affected by the Project. The groundwater model will use the Australian Groundwater Modelling Guidelines (Barnett et al., 2012) for guidance on model build, parameterisation, calibration and execution.

The groundwater modelling and impact assessment will be reported in a technical report within the EIS and *inter alia* include:

- A summary of the predictive simulations. This will include information on the time required for maximum drawdown/mounding to occur, and when drawdown/mounding equilibrium will occur. The time required for water level recovery rates will also be provided for the life of the Project and during post-closure;
- A description of how the modelling undertaken meets the Australian Groundwater Modelling Guidelines (AGMG) including a description of the model confidence and uncertainty;
- Details and results of modelling of the drawdown/mounding as a result of water storage activities to determine the spatial and temporal extent of impacts, and
- An assessment of the likely drawdown/mounding at key GDEs and ecosystems within the Project site.

The Project will also address the NSW Aquifer Interference Policy (AIP) which sets out the minimal impact considerations that are essentially a series of threshold levels for groundwater level drawdown and quality changes. The study will directly address the potential for the Project to impact upon these thresholds.

6.2.3 Aboriginal Cultural Heritage

6.2.3.1 Existing Environment

According to Tindale's 1974 map of tribal boundaries (from Tuovinen and Benton, 2011), the current Project area would be within the boundaries of Wiradjuri country, as defined by the limits of the Wiradjuri language group.

An initial duty of care investigation as part of preliminary geotechnical investigations revealed one Aboriginal object; an isolated flake adjacent to the penstock area

A search of the Aboriginal Heritage Information Management System (AHIMS) of the Project area was conducted in May 2021. The search area covered the Project area and a buffer of approximately 1km. A total of 22 Aboriginal objects and cultural heritage sites were found in the surrounding region, one site was found within the Subject Area (i.e. the isolated flake mentioned above), and two sites were identified close to Molybdonite Road, but outside the Project area. The most common Aboriginal sites are summarised in Table 6-5.

A search of the Australian Heritage Database and NSW heritage database was also undertaken and no Aboriginal sites within these databases were identified.

Table 6-5: Aboriginal site types in the surrounding area of the Project (Source, Niche, 2021)

Site Feature	Total	Frequency (%)
Artefacts	14	63
Modified Tree (carved or scarred)	3	14
Combined Aboriginal ceremony & dreaming and Artefacts	3	14
Combined Potential Archaeological Deposits and Artefacts	2	9

It is recognised that the AHIMS database identifies only officially recorded Aboriginal sites and therefore does not necessarily represent a complete recording of Aboriginal sites within the area.

6.2.3.2 *Issues for Consideration*

Although only one registered AHIMS sites was identified within the Project area, the largely undeveloped landscape associated with parts of the penstock and linear infrastructure does suggest there is potential for previously unidentified archaeological material. Further, the lower reservoir, although disturbed by past activities, may still have the potential to contain Aboriginal artefacts given it is a landscape feature expected to be utilised by Aboriginal people.

6.2.3.3 *Method of Assessment*

Preparation of an Aboriginal Cultural Heritage Assessment (ACHA) would be conducted in accordance with the:

- Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011)
- Aboriginal Cultural Heritage Consultation Requirements for Proponents (Part 6 National Parks and Wildlife Act, 1974) (DECCW 2010a)
- Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010b)
- Ask First; A Guide to Respecting Indigenous Heritage Places and Values (Australian Heritage Commission 2002)
- Guide to completing the AHIMS Site Recording Form (OEH 2012a).
- Australia ICOMOS Charter for Places of Cultural Significance, The Burra Charter, 2013 (Burra Charter).

Consultation

Aboriginal people that express an interest in being involved with the Project then become registered and are referred to as Registered Aboriginal Parties (RAPs).

ATCO is keen to meaningfully engage the Aboriginal community. Consultation will be undertaken in accordance with the consultation guidelines in the following stages:

Stage 1: Write to both agencies and Aboriginal representative groups who have been identified as stakeholders for the Study Area. An advertisement in a local newspaper is also required with a minimum of 14 days to be given for registration of interests. During this stage a record of the names of the RAPs would be provided to Biodiversity and Conservation Division (BCD) and the Bathurst Local Aboriginal Land Council.

Stage 2: Consultation Meeting #1 would be held to meet the RAPs and Project team, discuss communication protocols, present the Project information as well as a draft assessment methodology for discussion.

Stage 3: Gathering information about Aboriginal cultural heritage (from RAPs). This stage initiated upfront with Stage 2 so that it may guide the archaeological survey, which will be undertaken with the RAPs.

As part of this Stage, Niche (the company engaged to facilitate the Aboriginal heritage activities) would begin compiling a comprehensive Aboriginal Cultural Heritage Assessment (ACHA), which would initially inform the existing environments and constraints of the Project and subsequently inform the development. A terrain model

for the Study Area will be developed, which together with the registered sites database (AHIMS), will provide a basis to target areas for the field survey.

Stage 4: A draft ACHA report would be prepared that satisfies the Secretaries Environment Assessment Requirements (SEARs) and the requirements of relevant policies and guidelines noted above. The draft report would be sent to the RAPs for comment.

Consultation meeting #2 with the RAPs would occur at this time to discuss the draft. After the required time, the ACHA report would be finalised for incorporation into the EIS.

Depending on the outcomes of the consultation and field investigations, a Cultural Heritage Manage Plan (CHMP) would be prepared in consultation with the RAPs.

6.2.4 Noise and Vibration

6.2.4.1 Existing Environment

The land immediately surrounding the Project is a mosaic of cleared to partially cleared areas on the gentler slopes and valleys, to well vegetated areas generally associated with steeper terrain (refer to Figure 1-3 and Figure 1-4).

Further afield from the Project area, land has been extensively cleared for livestock grazing, a landuse activity important in the region, especially toward the Fish River and west toward Bathurst (refer Figure 1-1).

The locality of Yetholme is located approximately 4.5km north-east of the Project, while the small locality of Locksley is located approximately 2.5km to the south-east.

There are ten non-host landowners located within 3km of the centre point of the Project (i.e. the centre of the penstock). The nearest neighbours to the Project components are approximately 400m and 500m from the upper reservoir embankment, representing a non-host and host landowner respectively. From the dam on the lower reservoirs, the nearest residences are some 1,450m to the north and south, being host and non-host landowners respectively (refer to Figure 2-1).

6.2.4.2 Issues for consideration

The ambient noise environment in the majority of the Project area and immediate surrounds is characterised by a rural environment. Consequently, the sensitive receivers (i.e. residents) surrounding the Project, have the potential to be exposed to noise and vibration associated with the Project.

In addition to general construction noise, the following specific activities have the potential to generate adverse noise and/or vibration impacts to nearby residents during construction:

- Excavation of the powerhouse and upper reservoir, which may involve techniques including blasting and heavy machinery use;
- Rock and material excavation and placement for the reservoir walls;
- Concrete batching and rock crushing / screening;
- Vehicle movements required for the construction phase could lead to traffic noise impacts to residents along Molybdonite Road; and

- Pump/generator on the Fish River and booster pumps along the pipeline (if required) to pump water from the Fish River to the Project area during construction.

As the major operational components of the Project would be housed underground, and are distant from sensitive receivers, there is limited potential for operational noise impacts. The exemption may be the pump/generator that is proposed to be used periodically to pump water from the Fish River to the Project.

6.2.4.3 Method of Assessment

Background noise monitoring to confirm background noise levels and potentially noise affected sensitive receivers would be undertaken in accordance with the methodology outlined in the NSW Noise Policy for Industry (NPI) (EPA, 2017).

The operational noise criteria for assessing the Project will be established in accordance with the NPI.

Construction noise criteria will be established in accordance with the NSW Interim Construction Noise Guideline (ICNG) (DECC, 2009). Ground vibration criteria will be considered in accordance with Assessing Vibration: A technical guideline (DEC, 2006).

A site-specific noise model would be developed to assess the potential for noise impacts from the proposed construction activities. To allow for potential night time construction, predicted peak noise impacts shall also be assessed to consider sleep disturbance potential at nearest receivers. Noise levels during typical, favourable and adverse meteorological conditions would be assessed.

The construction noise assessment will also consider the noise impact from traffic generated on public roads by the Project, particularly Molybdonite Road. These impacts will be considered in accordance with the NSW Road Noise Policy.

As the majority of operational noise generating equipment will be located underground, operational noise impacts are likely to be relatively minor. An assessment of potential operational noise impacts (including pump/generator located on the Fish River) would be carried out through predictive noise modelling.

Potential vibration impacts will be considered in terms of human comfort and potential building damage criteria in accordance with Assessing Vibration: A technical guideline (DEC, 2006).

Based on the findings of the noise assessment, and discussions with the nearest residences, mitigation measures would be recommended and outlined in a Noise and Vibration Assessment Report to be include as part of the EIS.

6.2.5 Traffic and Transport

6.2.5.1 Existing Environment

The main access to the Project is directly from the existing Molybdonite Road which intersects the Great Western Highway (refer to Figure 1-3). Molybdonite Road is a 'no-through' one to two-laned rural road (Figure 6-7) which is unsealed, except for a short length from the intersection with the Great Western Highway. Several private residences located on rural properties are located along its length, and it is one access road to the Eusdale Nature Reserve.

Figure 6-7: Views along Molybdonite Road.

6.2.5.2 Issues for consideration

A total of approximately 8km of new, private road is proposed to be constructed to provide construction and permanent access to the lower reservoir and upper reservoir sites (refer to Figure 1-3). The final alignment of the private access roads will be subject to landowner agreement, environment and heritage constraints and design requirements

Road upgrades for a short section (~ 800m) may be required to Molybdonite Road, which may include widening, straightening and improvements to drainage. These will be discussed with the local Council and affected residences along the road.

Subject to confirmation of the private access road, a new turn-off from Molybdonite Road would be required, together with an intersection upgrade to the Molybdonite Road – Great Western Highway.

The proposed Project access road would remove construction traffic from over 1.7km (to the lower reservoir) and a further 2.6km (to the upper reservoir) from the length of Molybdonite Road, with resulting benefits to reducing road traffic, reducing amenity issues to a number of residents, and substantial native vegetation clearing associated from road widening.

The Project would introduce additional traffic to local roads (particularly the short length of Molybdonite Road exposed to construction traffic), including the need for some oversize and overmass vehicle movements for the delivery of equipment.

No material change to traffic would arise from the operation of the Project, except during periodic maintenance cycles approximately every 5 to 10 years.

Potential for increased road noise will be assessed as part of the broader noise and vibration assessment detailed in Section 6.2.4.

6.2.5.3 Method of Assessment

A traffic and transport impact assessment will be conducted to assess the impact of the proposed construction works on traffic and road design (including intersection upgrades), in accordance with appropriate guidelines including:

- Austroads, 2010. Guide to Road Design, Part 3: Geometric Design

- Austroads, 2009. Guide to Road Design, Part 4: Intersections and Crossings – General
- Austroads, 2010. Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections
- ARRB Group, 2009. Unsealed Roads Manual, Guidelines to Good Practice 3rd Edition
- Department of Transport and Main Roads (2017). Guide to Traffic Impact Assessment, September, 2017
- RTA Guide to Traffic Generating Developments.

This traffic and transport impact assessment will include:

- Assessment of existing conditions including traffic volumes, intersection configuration and existing levels of service;
- Estimate of traffic generated by construction; and
- Identification of measures to mitigate the impacts of the proposed construction stages, including the potential to reduce traffic volumes; and
- Although it is expected standard controls will be used to minimise potential impacts, the issue of construction traffic has been raised by local residents as a matter of concern, and therefore will warrant focused engagement.

A Traffic and Transport Route Impact Assessment report will be included as part of the EIS.

6.3 Standard Aspects

6.3.1 Visual

6.3.1.1 Existing Environment

The Project is located on relatively remote private land, is distant from towns and hamlets and public roads, and in part, is located within a vegetated valley that provides an element of screening to the Project (refer to Figure 1-1 and Figure 1-4).

In the vicinity of the Great Western Highway, particularly to the north, several existing overhead 132kV transmission lines on poles and towers, together with a 330kV transmission line on towers cross the landscape (refer to Figure 1-3).

Several hills, spurs, stands of trees and existing stands of trees forming agricultural windbreaks and road-side vegetation result in interrupted views across the landscape. A number of residences in proximity to the Project would have views to the upper reservoir, particularly the closest non-host residence.

A number of higher vantage points to the north, and within the nearby nature reserves, and parts of the southern sections of Molybdonite Road, do provide vistas across the broader landscape.

According to the NPWS, the near-by Wambool Nature Reserve is infrequently used for walking with visitor groups generally between 1-5 individuals, who use the existing management trail network. NPWS state that given the low use of the reserve for walking it is neither practical nor desirable to construct and maintain walking tracks within the reserve. Further, camping is not permitted in the reserve which is likely to limit visitor numbers (NPWS, 2007). Similarly, the Eusdale Nature Reserve has low recreational use, likely attributable that the reserve has no public roads or visitor facilities (NPWS, 2012).

6.3.1.2 *Issue for Consideration*

(a) Pumped Storage Hydro

Elements of the upper reservoir and penstock may be observable from certain locations from Wambool and Eusdale Nature Reserves, with distant glimpses of the penstock from Tarana Road. These views would substantially be diminished if the penstock is either partially or fully covered, or painted to colours to assist in camouflaging.

Some residents immediately to the south, and near the upper reservoir may have views to the Project from their place of residence or on driveways to their property. For example, the nearest resident to the Project would see construction areas and parts of the upper reservoir wall as they drive along their driveway to their residence. These residents are important stakeholders in the broader community engagement for the Project.

(b) Transmission Cable

The proposed underground transmission cable will largely avoid the otherwise more substantial visual elements of an overhead line strung on either poles or lattice towers, together with the vegetation clearing associated with a wide easement.

(c) Access Roads

Road upgrades parallel to Molybdonite Road, and the proposed development of an access road will create or contribute further to existing visual impacts.

(d) Water Supply Pipeline

A water supply pipeline route will be established and assessed during the EIS, and will be subject to landowner agreements. The pipeline is proposed to be buried though in some parts may be located aboveground due to localised ground conditions. The pipeline is not expected to form a visual element post construction.

6.3.1.3 *Method of Assessment*

The EIS would include an assessment of visual impacts during construction and operation, including a description of existing landscape character and potential visual receivers, and identification of measures to be used to minimise visual impacts.

Guidelines used to facilitate the visual assessment will include:

- Landscape Institute and IEMA (2013). Guidelines for Landscape and Visual Impact Assessment (GLVIA3), and
- Centre for Urban Design (2020). Guideline for landscape and visual impact assessment.

Specific tasks for assessment will include:

- Desktop assessment to identify view sheds and potentially affected sensitive viewpoints, and;
- Analysis of visual impacts from any potentially affected sensitive receptors.
- Outline standard mitigation measures to avoid or reduce impacts to sensitive receivers.

Digital engineering drawings which will fulfill the requirement of artist impressions and perspective drawings together with photographs from selected view-points will be used to assist in understanding the visual elements of the Project.

The assessment will inform a Visual Impact Assessment section to be included in the EIS

6.3.2 Air Quality

6.3.2.1 Existing Environment

The Project is located in a rural setting where existing sources of pollution are limited. Local sources would likely include dust from agriculture activities and exhaust emissions from vehicles travelling along the Great Western Highway, and occasionally along Molybdonite Road. Smoke from home heating and occasional bushfires may also temporarily affect local air quality.

6.3.2.2 Issues for Consideration

The Project has the potential to generate temporary air quality impacts to local sensitive receivers (including a few residences and native vegetation) during construction due to such activities as:

- Clearing, excavation and material removal works, including blasting;
- Vehicle movements over unsealed roads, including the transport of earthen material (including spoil) on trucks;
- Spoil and material stockpiles;
- Concrete batching and crushing/screening, and;
- Use of diesel generators and equipment during construction.

Air quality impacts as a result of operations are expected to be minimal, with the periodic start-up to confirm operational readiness, and expected rare use of, a back-up generator, and temporary use of diesel generator for water pumping.

(a) Greenhouse Emissions

The operation of the Project contributes to the decarbonisation of the State electricity generation fleet, together with the NEM more broadly, through promoting the further development of variable renewable energy, and providing energy storage and dispatchable energy. As such, the Project should be viewed as having a positive greenhouse gas outcome through allowing displacement of more carbon intensive energy generation (e.g. coal).

6.3.2.3 Method of Assessment

The method of assessment to be included in the EIS will be to:

- Identify key sources of emissions, particularly during construction, and
- Outline standard mitigation measures to avoid or reduce impacts to sensitive receivers.

It is not anticipated that baseline air quality monitoring, air emission modelling or greenhouse emissions assessment would be required.

It is expected that standard dust control measures employed during construction through a site-specific air quality management plan (including blast management plan) should be sufficient to

avoid air quality impacts to the nearby sensitive receivers, and the local area more broadly. Such measures would likely include, but not limited to:

- Dust suppression by use the use of water on roads and suitable product stockpiles;
- Minimise disturbance and progressive rehabilitation;
- Sealing of the Project access road adjacent to Molybdonite Road;
- Crushing and screening activities to have suitable dust suppression measures (e.g. minimise product drop from conveyors, conveyor sprays, etc);
- Consideration of prevailing winds in the design and positioning of facilities and stockpiles;
- Minimise travel distances between key facilities;
- armoring (i.e. a thin layer of high-quality pavement material placed on the pavement surface);
- vehicle speed limits; and
- Blasting design to minimise impacts and to consider prevailing winds and nearest neighbours.

6.3.3 Non-Aboriginal Heritage

6.3.3.1 Existing Environment

(a) The Project area

There are no European heritage sites within the Project area that are recorded on heritage registers, including the Bathurst Regional Council LEP and NSW State Heritage Inventory.

Within the lower reservoir area is a disused and dilapidated hut. A review of historic aerial photographs indicates this hut was at least in place since 1964. The history and potential historic significance of the hut will be investigated during the EIS.

There is evidence of relatively small excavations and test pits, and cleared areas in the lower reservoir/powerhouse and penstock areas., with soil samples taken to confirm potential for contamination. These will be investigated during the EIS.

(b) Surrounding area

The area surrounding the Project has been cleared for agriculture purposes for over 100 years, especially the land along the Fish River valley, which was opened up as the Bathurst Plains in 1815 (Pearson, 1984).

Historic mining surrounding the Project area include the Endeavour 9 Prospect located about 1km south-west of the lower reservoir and associated with copper which operated circa 1888, and according to Bathgate (2013) closed around 1913. Also, around 1914, the Mount Tennyson Molybdonite Mine located some 1km south east of the upper reservoir which mined molybdonite and minor amounts of copper and gold pre-1918 (Department of Mines, 1970; mindata search, September 28, 2020). A number of other molybdonite mines operated in the area around 1918, providing ore to a nearby smelter near Mt Tennyson (Bathgate, 2013).

The area has had a long history with gold. In fact, the first reported discovery of gold in Australia took place in 1823 when Mr. James McBrien, a Government Surveyor, found flakes of gold in the Fish River near Locksley while surveying for a road along the river (Bathurst District Historical

Society, 2013). Mining and prospecting activity associated with gold has also been recorded in and around the lower reaches of Frying Pan Creek (or Dirty Swamp Creek or Badgers Brush Creek as it was known then) and adjacent to the Fish River, particularly in the 1870s and 1890s, with dredging of the Fish River occurring at around 1898 by The Fish River Gold Dredging Company (Bathgate, 2013).

Further south of the Project, Clifton house and former servant's accommodation is registered on the Bathurst Regional Council's heritage list. This site is some 2.2km south of the lower reservoir, adjacent to Tarana Road.

6.3.3.2 Issues for Consideration

There is potential that non-Aboriginal heritage, if it occurs within the Project area, could be impacted by construction activities, either through direct clearing activities or inundation as a result of the lower reservoir and surge basin.

6.3.3.3 Method of Assessment

A literature review will be undertaken, including database searches and consultation with the local historical society and landowners. As part of the Aboriginal heritage survey, any non-aboriginal sites will be searched, including the known old hut and identified diggings, with a historic heritage results being included in the EIS.

6.3.4 Soils and Spoil Management

6.3.4.1 Existing Environment

(a) Geology

The Project area lies in the Central Eastern NSW within the Eastern Lachlan Fold Belt.

The geological evolution of this region is complex and can best be summarised in terms of major depositional sequences and magmatic events in their tectonic context spanning from the Middle Ordovician to Late Carboniferous Ages 459-298 million years old (M.a). Younger cover rocks have all been largely stripped from the area because of an extensive period of erosion in more recent geological time exposing these older rocks.

Preliminary geotechnical investigation have indicated the following geologies in relation to the key infrastructure (Figure 6-8):

- **Upper reservoir:** located on a flat-topped ridge and underlain by Granite and the Crudine group (volcaniclastic rocks[9]). Residual soils between 0.9 – 3.5m thick are expected;
- **Penstock:** shallow rock comprising the Crudine group and Granite are expected, with some localised patches of colluvial[10] materials;
- **Powerhouse:** excavation of the powerhouse is expected to occur within the Cabonne and Crudine groups. The powerhouse also would intersect a non-seismic fault zone; and

[9] body of rock that is composed of fragments of volcanically derived rocks or minerals that were then transported some distance from their place of origin
[10] Colluvium (also colluvial material or colluvial soil) is a general name for loose, unconsolidated sediments that have been deposited at the base of hillslopes by either rainwash, sheetwash, slow continuous downslope creep, or a variable combination of these processes

- **Lower reservoir:** this feature is expected to occur across all 3 rock types; Granite, Cabonne[11] and Crudine groups. Alluvial materials up to some 8m are anticipated in sections of Frying Pan Creek, with localised colluvial material on adjacent slopes.

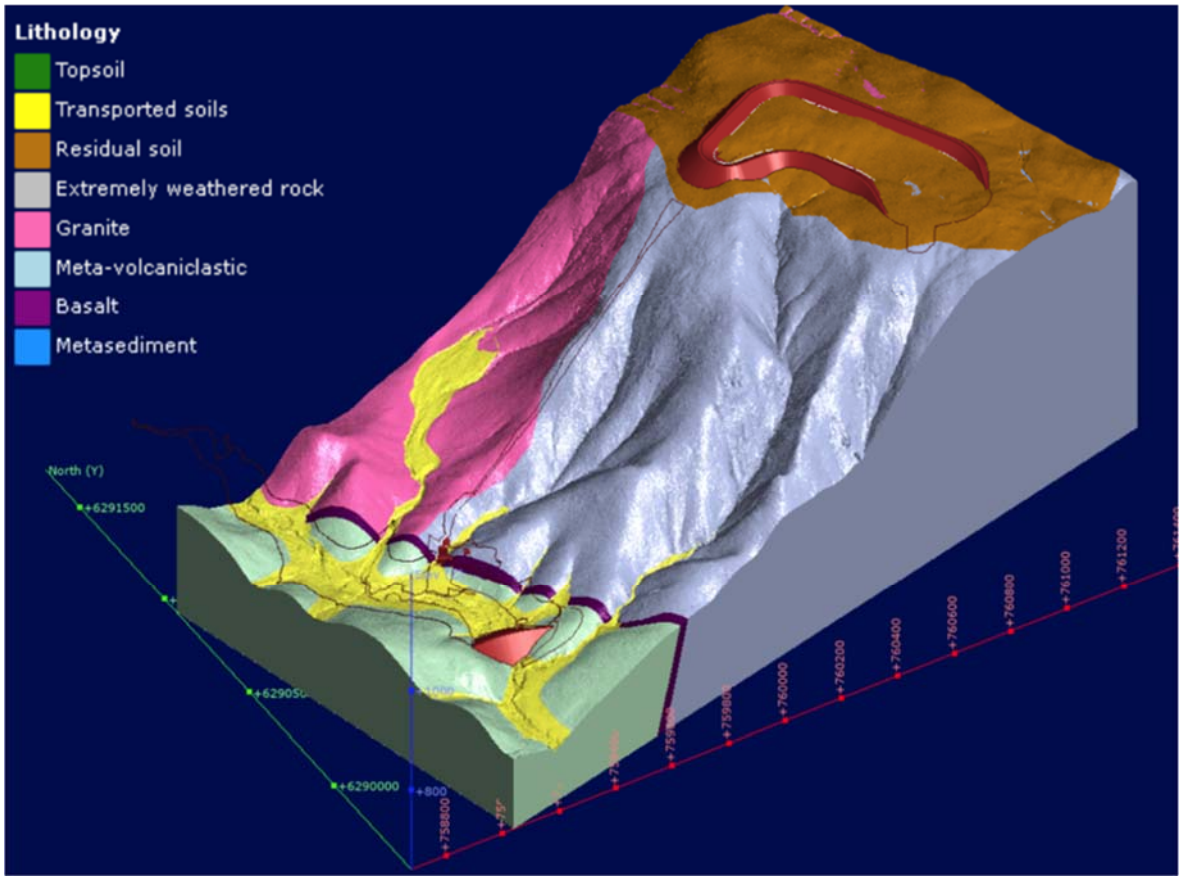


Figure 6-8: Model of underlying geology in relation to the Pumped Storage Hydro facility (Source: Golder).

(b) Soil types

The majority of soils within the Project area are classified as Tenosols and Rudosols. To the north, Sodosols become more prevalent, whereas to the south, Chromosols are dominant. These soils types are described briefly below.

Tenosols have a weakly developed soil profile which is typically very sandy and without obvious horizons. Tenosols form from highly siliceous (i.e. quartz-rich and low in clay) parent material and where rainfall is typically low and erratic.

Generally, tenosols have a very low agricultural potential with very low chemical fertility, poor structure and low water-holding capacity. Tenosols are mainly used for grazing of native pastures rather than cropping

Rudosols are a widespread and diverse group of soils that have negligible pedologic organisation. They are usually young soils in the sense that soil forming factors have had little time to pedologically modify parent rocks or sediments. Most have few commercial land uses because of their properties or occurrence in arid regions, or both.

[11] A volcanic rock that shows evidence of having been subjected to metamorphism

Sodosols occur to the north of the PSH facility. These soils have a strong texture contrast between the A horizons and sodic B horizons that are not strongly acid. Generally, sodosols have very low agricultural potential with high sodicity leading to high erodibility, poor structure and low permeability. These soils have low to moderate chemical fertility and can be associated with soil salinity.

Chromosols to the south as one enters the Fish River valley. These soils have a strong texture contrast between A horizons and B horizons. The latter are not strongly acid and are not sodic. These soils have moderate agricultural potential with moderate chemical fertility and water-holding capacity and are the most widespread soil used for agriculture in Australia

(c) Acid Sulfate Soils

There are no acid sulfate soils known or expected to occur within or surrounding the Project area (NSW SEED).

(d) Naturally Occurring Asbestos

The Project area and surrounds does not have geological units with naturally occurring asbestos potential (NSW Trade and Investment Naturally Occurring Asbestos Maps).

6.3.4.2 Issues for Consideration

(a) Spoil Management

An understanding of the local geology is essential to the final design, construction techniques, and material management for the Project.

As described in Section 3.4.1 under Spoil Management, much of the material excavated from the upper reservoir, headrace tunnel, powerhouse and platform and tailrace will be utilised in the construction of reservoir retaining walls, access track construction, erosion protection, and laydown areas and the like.

Appropriate assessment and management of surplus material will be important to minimising impacts to, surrounding waterways, visual amenity, and landowners.

(b) Soils

The construction of the Project will involve ground clearing and excavation activities that will expose soils to potential erosion and resultant sediment transport. Sediment transport into waterways and deposition downstream have the potential to cause substantial deterioration of water quality and impacts to aquatic environments.

6.3.4.3 Method of Assessment

(a) Spoil Management

Rock material encountered during geotechnical program will be characterised and tested for potential future contamination issues, such as potential for acid generation. Geotechnical drilling results will also be used to estimate volumes of rock material, suitability for reuse and potential quantities for long term storage and management.

Any unsuitable spoil, likely to be primarily soil strength material, will be placed in proposed spoil disposal areas. These areas will be developed according to good practice spoil management standards, utilising guidance such as:

- Minerals Council of Australia (1998) Mine Rehabilitation Handbook
- Australian Government (2016) Mine Rehabilitation. Leading Practice Sustainable Development Program for the Mining Industry.

Results of the geotechnical analysis will be presented in the EIS, together with spoil storage locations, details on design, and rehabilitation objectives.

(b) Soils

Soil material encountered during a field soil assessment survey will be characterised for their physical and chemical properties to assess their potential for contamination and soil erosion.

Results of this analysis will be presented in the EIS, together with management practices to minimise potential impacts to waterways from soil erosion and sediment transport. A site-specific Sediment and Erosion Control Plan would be a requirement stipulated in the EIS.

Standard management measures presented would follow good practice, including those outlined in:

- Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000);
- Managing Urban Stormwater: Soils and Construction. Volume 1 (Landcom, 2004) (the 'Blue Book'); and
- Managing Urban Stormwater. Soils and Construction. Volume 2 (2C. Unsealed Roads; 2E. Mines and Quarries) (DECC, 2008).

6.3.5 Socio-economic

6.3.5.1 Existing Environment

The Project is located in the Bathurst Local Government Area, in the locality of Yetholme.

The Project itself is located approximately 4km southwest of the small township of Yetholme, and approximately 21km southeast of Bathurst. The locality of Locksley is approximately 3km SSW of the PSH facility. Further afield, the towns of Lithgow, and Oberon are within 31 and 24km, together with a number of smaller villages, including O'Connell and Tarana. From the 2016 Census (ABS, 2016), the general population statistics of Yetholme, Bathurst, Lithgow and Oberon are summarised in Table 6-6.

Table 6-6: Population statistics from the 2016 census.

Attribute / Town	Yetholme	Bathurst	Lithgow	Oberon
Population	243	35,020	12,818	3,256
Gender	54.8% male; 45.2% female	49.6% male; 50.4% female	50.5% male; 49.5% female	49.9% male; 50.1% female
Aboriginal and/or Torres Strait Islander People	11	2,045	793	110
Median Age	42	35	44	45

Attribute / Town	Yetholme	Bathurst	Lithgow	Oberon
Main occupation (for people > 15yrs old)	Managers	Professionals	Technical & trade workers	Machinery operators & drivers
Main industry	Primary education; Other social assistance services; gardening	Higher Education; Hospitals	Coal mining	Log sawmilling
Full time employment (%)	60.3	57.7	53.8	57.9
Unemployment (%)	4.3	6.3	8.6	7.4
Median weekly income ($)	741	646	495	581

6.3.5.2 Issues for Consideration

The potential for social impacts of the Project are predominantly limited to construction. The following potential impacts are anticipated:

- An influx of people associated with the construction workforce will be residing within the local and broader towns for the duration of the construction period. Although, it is recognised that Bathurst and surrounding areas have a significant range and number of accommodation options in assorted hotel, motel, caravan park, guesthouses, cottages, self-contained apartments, and other short to medium term accommodation (e.g. Airbnb).
- Stimulation in the local economy of nearby towns by the provision of accommodation, food, services and materials during construction.
- Stimulation of employment directly and indirectly within the region.

Benefits of the operations of the Project include are detailed in Section 2.4.3.

6.3.5.3 Method of Assessment

A desktop socio-economic impact assessment will be undertaken in conjunction with community consultation to assess the impacts (positive and negative) of the construction and operation of the Project on local communities.

It is anticipated that the social assessment, which will be integrated with the stakeholder engagement program, will be desktop based and guided by the assessment methodology by the NSW Government Social Impact Assessment Guideline (October 2020).

The socio-economic assessment will be included as part of the EIS.

6.3.6 Hazard and Risks

6.3.6.1 Bushfire

(a) Existing Environment

The Project is located within the Chifley Bush Fire Management Committee (BFMC) area and controlled under the associated Bush Fire Risk Management Plan (BFRMP). The Chifley BFMC area

is located in the Central West of NSW and includes the local government areas (LGA) of Bathurst Regional Council and Oberon Council.

The BFRMP (2015) states that the prevailing weather conditions associated with the bush fire season in the Bathurst Regional Council LGA of the Chifley BFMC area are associated with the westerly wind patterns experienced during the months of November, December and January. The majority of serious bush fire events occur from this period until the cooler temperatures of autumn are experienced. Extended periods of lower than normal rainfall can extend the bush fire season with serious fires late in the season under very dry summer conditions.

The Chifley BFMC area has, on average, 63 bush fires per year, and up to two of these may be considered major fires.

According to the NSW Rural Fire Service, the Project is located in a designated bushfire prone area.

(b) Issues for Consideration

The potential for bushfire risk in the Project area is largely related to the construction of the Project. The construction phase of the Project has the potential to result in unplanned fires, creating risk to the Project's site workforce and members of the public.

Key considerations include:

The Project is surrounded by a mosaic of cleared grazing land and native vegetation with limited public road access into and out of, the Project area. The location, therefore, will require careful bushfire management response and planning:

- Potential sources of ignition, most likely from hotworks (e.g. welding equipment);
- Ensuring adequate construction standards and asset protection zones.

The implementation and management of bushfire protection measures will continue to be required for the operation phase of the Project.

(c) Method of Assessment

The potential bushfire hazard of the Project will be investigated further in a Bushfire Risk Assessment in the EIS, prepared in accordance with the relevant guidelines and standards.

It is noted that as part of the required management plans for the construction and operation of the Project, Emergency Management Plans will be developed in consultation with local emergency services, and include bushfire events.

6.3.6.2 Dam Safety

(a) Existing Environment

The proposed location of the embankment dams is upstream of agricultural land a few residences in the vicinity of Frying Pan Creek. There is also some public infrastructure, including a rail line/bridge and Council Road.

(b) Issues for Consideration

Dam safety is critical to protect life, property and the environment from potential dam failure. Sudden and catastrophic releases of water caused by dam failure can cause loss of life and damage to properties and the surrounds. Dam failure can occur due to inadequate dam design, causing overtopping or dam failure.

The design, construction and operation of the embankment dams and associated spillways will need to comply to strict Dam Safety regulatory requirements.

(c) Method of Assessment

The EIS will present the findings from the dam break assessments undertaken to defined standards, in particular to ANCOLD (2003) Guidelines on Risk Assessment and Dam Safety NSW regulations and guidelines.

The outcome of these assessments will identify risks and determine potential impacts to public safety, the built environment and the environment, with mitigation through good dam design and dam management.

6.3.6.3 Contamination

(a) Existing Environment

A search of the Contaminated Land: Record of Notices database for the Bathurst Regional Council area revealed 9 notices relating to three sites; two in Bathurst (Gas Works and Police Station) and one in Yetholme (Timber Treatment Plant). The nearest registered site at Yetholme which recorded elevated levels of Copper, Chromium and Arsenic, is over 5km north-east from the Project, and within a different sub-catchment.

A search of the EPA notified contaminated sites revealed 12 sites for Bathurst and one at Yetholme. This search identified several properties that are currently, formerly or not regulated under the *Contaminated Land Management Act 1997*. None of these sites are located within 5km of the Project site.

Part of the Wambool Nature Reserve located west of the Project, which was gazetted a reserve in 1987, had previously been notified Rubbish Depot (Wambool Tip). The tip was managed by Evans Shire Council as a waste depot from 1978 and later as a transfer station until its closure in August 1992 (NPWS, 2007). These land uses are part of a separate sub-catchment to the Project location, forming a confluence into Frying Pan Creek downstream of the Project.

(b) Issues for Consideration

The Project area has had land use practices that may have the potential for localised legacy contamination to be present, namely old mining areas and past agricultural use. These will be investigated as part of the EIS.

Construction activities themselves have the potential to result in contamination to soils and water as a result of possible spills and leaks. Standard measures would be implemented to manage any contamination encountered and to minimise the likelihood of spills or leaks during both construction and operation phases.

(c) Method of Assessment

Contamination will be assessed during the EIS including desktop assessment of historic aerial photos. Any contamination found would be managed in accordance with relevant guidelines, including:

- Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014)
- Consultant reporting on contaminated land. Contaminated Land Guidelines (NSW EPA, 2020).

Results of this analysis will be presented in the EIS. If contamination is found, the EIS will provide measures for managing such soils during construction, and if necessary, operation and decommissioning.

6.3.6.4 Waste

(a) Issues for Consideration

Construction of the Project will generate waste materials including construction materials, cementitious waste and domestic wastes. If waste is not managed appropriately, there is potential that the Project could result in adverse impacts to the local environment. Such impacts could include environmental pollution caused by release of waste to soils and waterways, impacts to amenity, and risks to health and safety of employees and the public.

Significant volumes of waste materials are not expected to be generated during operation of the Project, beyond occasional minor waste streams associated with periodic maintenance activities.

Waste streams generated during construction and operation that cannot be repurposed, reused or recycled, would be disposed of at appropriately licensed landfill facilities. It is anticipated that sewerage will be appropriately collected and then disposed to the Bathurst sewerage treatment plant. No waste disposal is proposed to occur on site.

Chemical and fuel storage areas will be stored and managed in accordance with Australian Standards and MSDS.

(b) Method of Assessment

The EIS would identify potential waste streams associated with construction and operation of the Project and would include standard management practices compliant with the *Waste Avoidance and Resource Recovery Act 2001* and other relevant guidelines.

7. SUMMARY AND CONCLUSION

ATCO, supported by Altura, is developing the Central West Pumped Storage Project (325MW, 8 hours storage, 2,600MWh) approximately 21km southeast of Bathurst, near Yetholme, Central West NSW.

The NSW Government supports sensible, private development of new pumped hydro infrastructure in the State. Through the Central West Pumped Hydro Project, ATCO is responding to the Government's call for the private sector to "share the load of our future energy needs." Early engagement with the NSW Government has acknowledged the importance of the Central West Pumped Hydro Project.

This document provides a description of the Project has been prepared in support of an application for the SEARs for the Project. It provides information on the existing environment and heritage and considers the potential for environmental and heritage impacts. It also outlines the stakeholder engagement undertaken to date, as well as engagement planned during the EIS. Once the SEARs have been issued, ATCO will prepare an EIS to address the SEARs. The EIS will be placed on public exhibition in accordance with the EP&A Act, with links made available on the ATCO website, and hard copies made available at the ATCO office in Bathurst.

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APPENDIX A. SCOPING SUMMARY TABLE

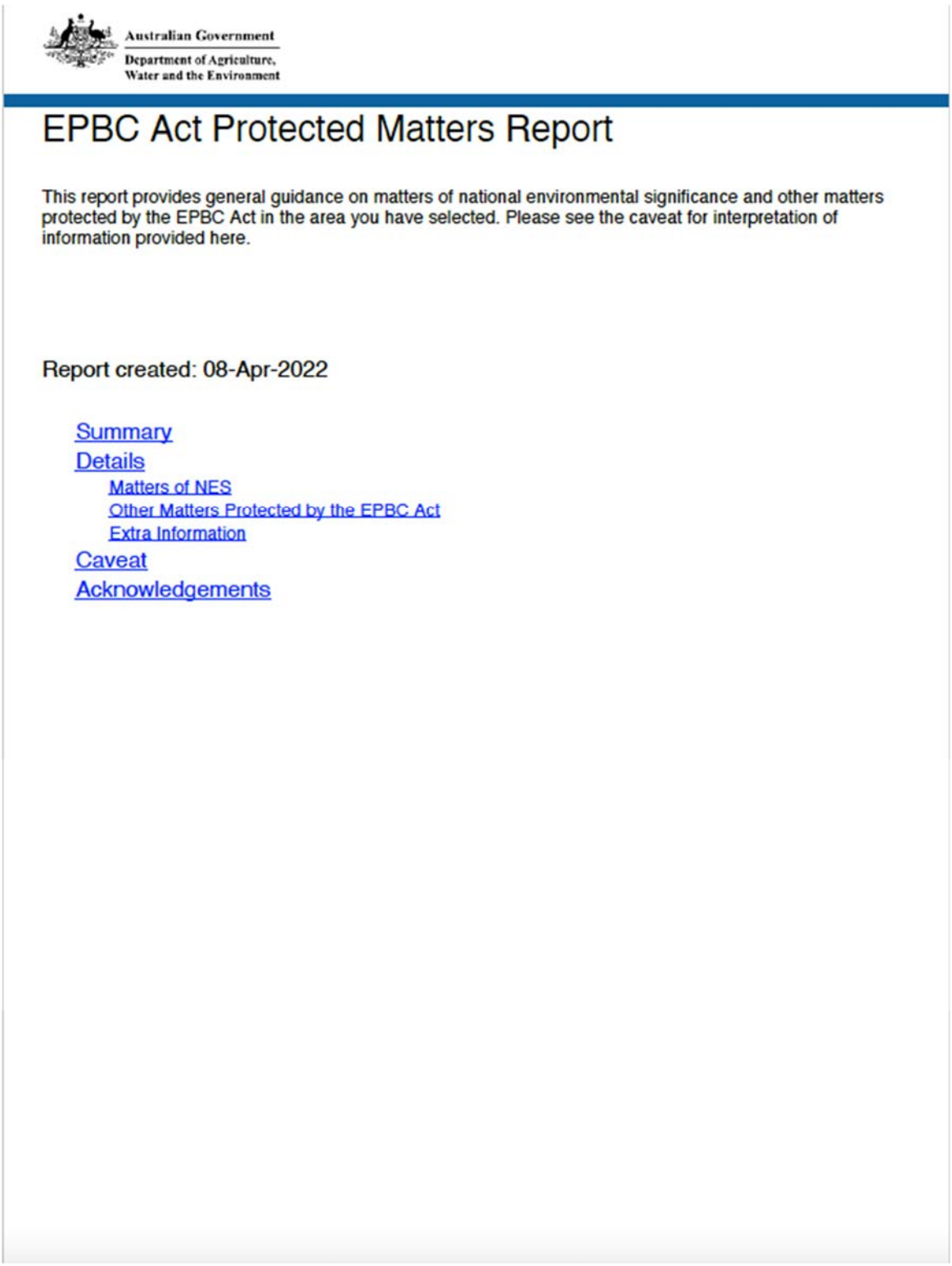
Level of Assessment	Group	Matter	Cumulative Impact Assessment	Engagement	Relevant Policies & Guidelines	Scoping Report Reference
Detailed	Heritage	Aboriginal	Yes Regional assessment of potential impacts	Specific	Guide to investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011) Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010) Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)	Section 6.2.3
	Biodiversity	Terrestrial and Aquatic flora and fauna	Yes For potential impacts to threatened species and threatened ecological communities	General	Biodiversity Assessment Method (DPIE, 2020) Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013) Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various) Policy and Guidelines for Fish Habitat Conservation and Management (Fairfull, 2013) Why do fish need to cross the road? Fish passage requirements for waterway crossings (NSW Fisheries, 2003)	Section 6.2.1
	Water	Hydrology (including flooding; water quality; water availability)	Yes For potential impacts to hydrology and water supply	Specific	Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water Sources 2012 Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004)	Section 6.2.2

Level of Assessment	Group	Matter	Cumulative Impact Assessment	Engagement	Relevant Policies & Guidelines	Scoping Report Reference
		Hydrogeology			Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000) Using the ANZECC Guidelines and Water Quality Objectives in NSW (Department of Environment and Conservation, 2006) Guidelines for instream works on waterfront land (DPI, 2012) Guidelines for riparian corridors on waterfront land (DPI, 2012) Guidelines for watercourse crossings on waterfront land (DPI, 2012) NSW Aquifer Interference Policy Groundwater Modelling Guidelines (Barnett et al., 2012)	
	Amenity	Noise and Vibration	No	Specific	NSW Interim Construction Noise Guideline (ICNG) (DECC 2009) NSW Noise Policy for Industry (EPA 2017) NSW Road Noise Policy (DECCW 2011) Assessing Vibration: A Technical Guideline (DECC 2006)	Section 6.2.4
	Access	Traffic	No	Specific	Guide to Traffic Management – Part 3 Traffic Studies and Analysis (Austroads, 2013)	Section 6.2.5
Standard	Heritage	Historic	No	General	Historical Archaeology Code of Practice (Heritage Council 2006)	Section 6.3.3
	Air	Particulate matter	No	General	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016) (Approved Methods)	Section 6.3.2

Level of Assessment	Group	Matter	Cumulative Impact Assessment	Engagement	Relevant Policies & Guidelines	Scoping Report Reference
		Atmospheric Emissions (including GHG)			National Environment Protection (Ambient Air Quality) Measure 1998 (Air NEPM) National Environment Protection (National Pollutant Inventory) Measure 1998 (NPI) Australian Government's Department of Energy's National Pollutant Inventory Guide Australia's National Greenhouse and Energy Reporting guidance (NGER, 2020) International GHG quantification guidance (ISO14064:2006)	
	Amenity	Visual	No	Specific	Landscape Institute and IEMA (2013). Guidelines for Landscape and Visual Impact Assessment (GLVIA3) Centre for Urban Design (2020). Guideline for landscape and visual impact assessment	Section 6.3.1
	Land	Soil (including spoil)	No	General	Soil and Landscape Issues in Environmental Impact Assessment (DLWC, 2000) Consultant reporting on contaminated land. Contaminated Land Guidelines (NSW EPA, 2020). Mine Rehabilitation Handbook. Minerals Council of Australia (1998) Mine Rehabilitation. Leading Practice Sustainable Development Program for the Mining Industry. Australian Government (2016)	Section 6.3.4
	Economic Social	Socio-economic (Community)	Yes	Specific	Social Impact Assessment Guideline for State Significant Projects 2021 (DPIE 2021)	Section 6.3.5

Level of Assessment	Group	Matter	Cumulative Impact Assessment	Engagement	Relevant Policies & Guidelines	Scoping Report Reference
	Hazard and Risk	Bushfire	No	General	Bathurst Regional LEP 2014.	Section 6.3.6
		Dam Safety (includes flooding)	No	Specific	ANCOLD Guidelines Dam Safety Act and Regulations	Section 6.3.6
		Contamination	No	General	Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014) Consultant reporting on contaminated land. Contaminated Land Guidelines (NSW EPA, 2020).	Section 6.3.6
		Waste	No	General	*Waste Avoidance and Resource Recovery Act 2001*	Section 6.3.6

APPENDIX B. EPBC SEARCH TOOL RESULTS



Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-Apr-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	43
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	5
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	3
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	800 - 900km upstream from Ramsar site	In feature area
Riverland	800 - 900km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	900 - 1000km upstream from Ramsar site	In feature area
The macquarie marshes	300 - 400km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria booroolongensis Booroolong Frog [1844]	Endangered	Species or species habitat known to occur within area	In feature area
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
INSECT			
Paralucia spinifera Bathurst Copper Butterfly, Purple Copper Butterfly, Bathurst Copper, Bathurst Copper Wing, Bathurst-Lithgow Copper, Purple Copper [26335]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Eucalyptus pulverulenta Silver-leaved Mountain Gum, Silver-leaved Gum [21537]	Vulnerable	Species or species habitat known to occur within area	In feature area
Eucalyptus robertsonii subsp. hemisphaerica Robertson's Peppermint [56223]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Lepidium aschersonii Spiny Pepper-cress [10976]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat likely to occur within area	In feature area
Leucochrysum albicans subsp. tricolor Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area	In feature area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In feature area
Swainsona recta Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580]	Endangered	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Zieria obcordata Granite Zieria [3240]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tympanocryptis pinguicolla Grassland Earless Dragon [66727]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Commonwealth Trading Bank of Australia		
Commonwealth Land - Commonwealth Trading Bank of Australia [12386]	NSW	In buffer area only
Commonwealth Land - Commonwealth Trading Bank of Australia [12385]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [12388]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Corporation [12370]	NSW	In buffer area only
Defence		
Defence - AIRTC BATHURST [10099]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Eusdale	Nature Reserve	NSW	In buffer area only
Wambool	Nature Reserve	NSW	In buffer area only
Winburndale	Nature Reserve	NSW	In buffer area only

EPBC Act Referrals	[Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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