

Lake Lyell Pumped Hydro Energy Storage Project

Concept Design webinar

13 December 2023



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LIGHT THE WAY

Acknowledgment of Country

EnergyAustralia acknowledges that the proposed site for the Lake Lyell Pumped Hydro Project is on the traditional lands of the Wiradjuri Peoples. We recognise their continued connection to Country and culture, and we pay our respects to Elders past and present.



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Public acknowledgement and disclaimer: This project is proudly funded by the NSW Government's Pumped Hydro Recoverable Grants Program. The views expressed herein are not necessarily the views of the NSW Government. The NSW Government does not accept responsibility for any information or advice contained herein.

Agenda

Time	Topic	Lead
7.00pm	Welcome Agenda and housekeeping	Sarah Stent Community Engagement Lead, Nation Partners
7.05pm	About the project and why it's needed Presenting the concept designs	Michael de Vink Project Director, Lake Lyell Pumped Hydro, EnergyAustralia
7.20pm	Exploring the concept design in detail	Andrew Wilson Group Technical Director, Acciona McConnell Dowell (ADM)
7.40pm	Environmental and site assessments	Alex Frolich Associate Environmental Scientist, EMM
7.50pm	Questions and answers	All

Housekeeping

- This session is being recorded and will be available on the project website – www.lakelyellpumpedhydro.com.au
- Please put your questions in the Q&A box.
- Please ask questions respectfully – this is a public forum.

Our presenters



Sarah Stent
Community Engagement Lead, Nation Partners



Michael de Vink
Project Director, Lake Lyell Pumped Hydro, EnergyAustralia



Andrew Wilson
Group Technical Director, Acciona McConnell Dowell (ADM)



Alex Frolich
Associate Environmental Scientist, EMM

About the project and why it's needed

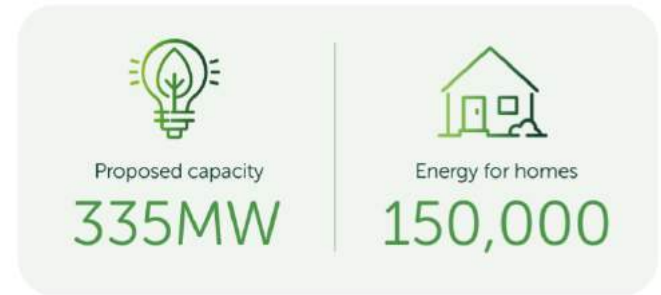
Mike de Vink

Project Director - Lake Lyell Pumped Hydro Project

EnergyAustralia

About the Lake Lyell Pumped Hydro Project

- Would use land owned by EnergyAustralia and existing energy and water infrastructure.
- Lake Lyell will be used as a lower reservoir and a new 4.6 gigalitre upper reservoir will be built behind the southern ridge of Mount Walker.
- Will generate 335 MW of electricity for 8 hours at a time.
- Expected to operate for up to 80 years.
- Lake Lyell maintained as an energy asset and public recreational space for decades to come.



Why it's needed?

- New South Wales is undergoing an energy transformation. New renewable energy sources will help meet Australia's climate change goal of net zero emissions by 2050.
- Major investments in new energy projects to provide a reliable, affordable energy supply for the state.
- Project is crucial to the transition away from coal and towards renewables.
- For a successful transition, we need a range of energy storage solutions.
- Hydropower is one of the oldest forms of energy storage and is proven technology.



Who developed the concept design?

- Concept design developed by Lake Lyell PHES Early Contractor Involvement (ECI) team.
- ECI brings together:
 - EnergyAustralia (client)
 - Acciona McConnell Dowell Joint Venture (AMDJV) (construction and engineering)
 - Mott McDonald (design)
- Track record of collaborating on similar projects.
- Sharing construction knowledge will contribute to improved design 'buildability' and cost/time estimates.
- Ensures all parties also in receipt of stakeholder feedback as project progresses through planning and approvals.

Engineering design update

Concept design is not final. Can be modified to address environmental impacts identified during environmental assessment process and community feedback.

- The project is economically and technically feasible.
- Concept follows successful approaches used by other pumped hydro projects.
- Maintains 335MW, 8-hour duration generation output.
- Design emphasises EnergyAustralia's commitment to mitigating impacts through site-sensitive design. Feedback has played a significant role:
 - Relocation of the upper reservoir.
 - Locating most infrastructure underground.
 - Use of natural topography to screen visible infrastructure features, e.g. intake.
 - Design solutions to avoid impacts to aquatic species.
 - No new transmission lines on private property.
 - Lake Lyell maintained and operated as an energy asset and **public recreational space** for decades to come.

The Concept Design



Drone view. Artist impression only. Subject to change.



View from Rydal. Artist impression only. Subject to change.



Rydal

Mt Walker

Lithgow

Access Road

Upper Reservoir

Bowenfels

Bathurst

Inlet / Outlet

Upper Reservoir Wall

Rock Stockpile

Site Compound

Tunnel Portal

Diversion

Infill

Permanent Bridge

330kV Line

Switchyard

South Bowenfels

Lake Lyell

Sydney

Katoomba



Switchyard

Upper Reservoir

View from Recreation Centre. Artist impression only. Subject to change.

Exploring the concept design in detail

Andrew Wilson

Group Technical Director

AMD



Upper Reservoir

Tunnel Portal

Temporary Bridge

Inlet / Outlet

Site Compound

Diversion

Permanent Bridge

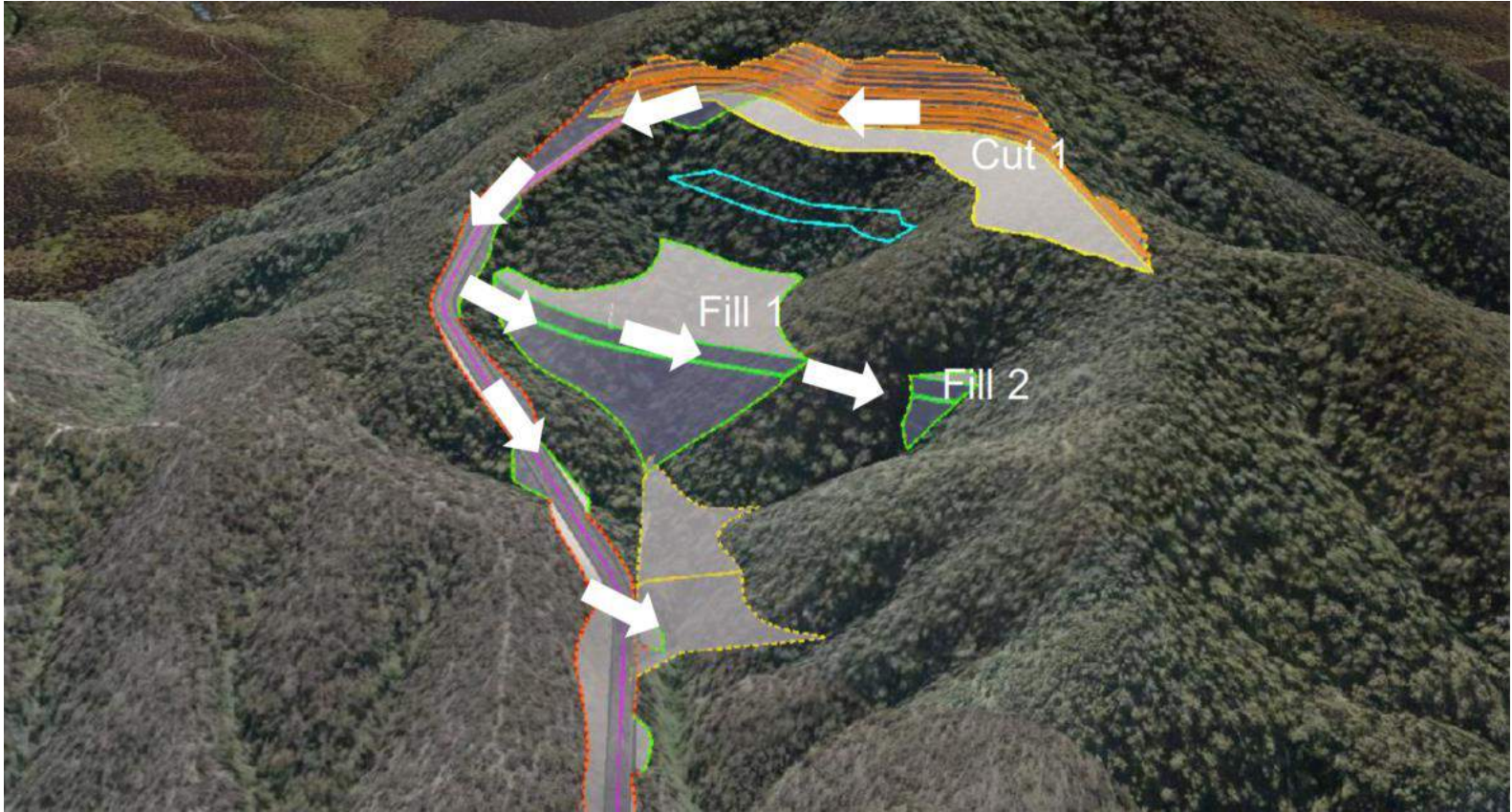
Switchyard

Drone view. Artist impression only. Subject to change.

Form of upper reservoir

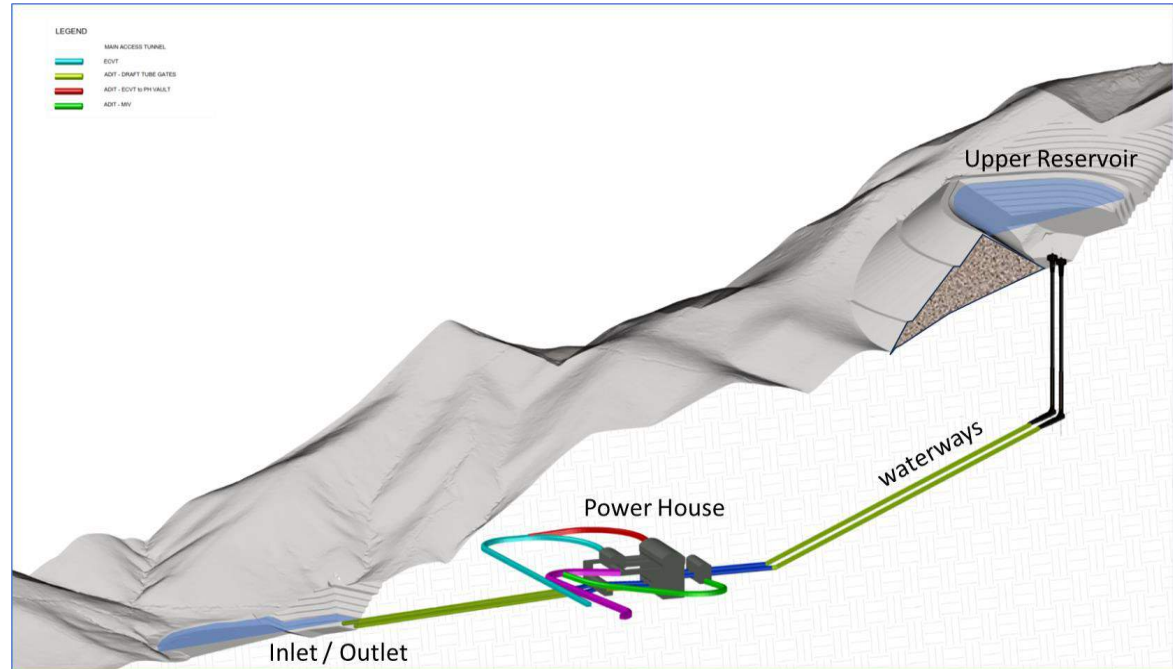
- Located within existing gully below ridgeline. No visual impacts for Lithgow township.
- Utilises a cut and fill construction approach. Significant reuse of extracted materials.
- Exterior dam face will be constructed with natural stone boulders from Mount Walker.
- Rockfill dam with geomembrane liner.
- Storage capacity of 4.65GL.
- Gross head 270m (40m level change).
- 50m reservoir depth.
- 63.5m upstream (internal) dam height. 143m downstream (external) dam height.
- Potential for further optimisation and size reduction as part of ongoing design.





Tunnels and hydraulics

- The power station will be located underground in a cavern.
- The tunnels will be constructed using a drill and blast method. Geotechnical investigations are underway.
- Tunnel height will be between 5.5 – 8m.
- Total tunnel length is approximately 4 kms.
- Vertical intake shafts are 175m deep.



Powerhouse form

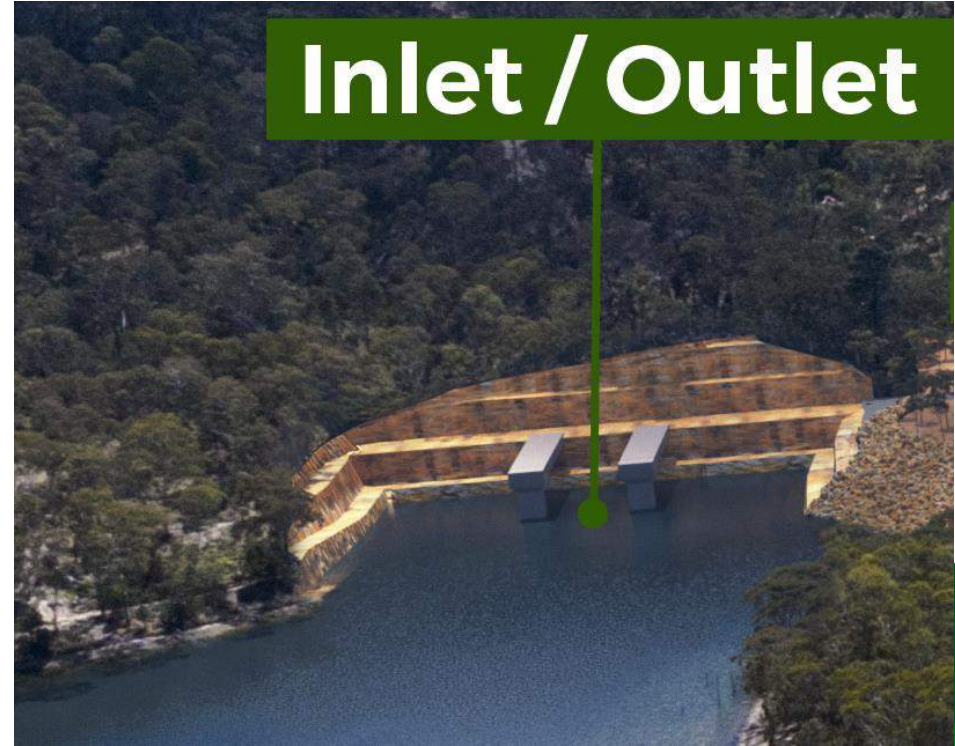
- Home of Lake Lyell PHES reversible turbine and generator.
- Entirely underground to reduce noise, vibration and visual impacts.
- Main cavern design approximately 62m high x 25m wide and x 67m long.
- Once excavated, supported by rock and bolts.
- Proven form for hydro generator location.
- Access to the powerhouse will be via two tunnels from portals built on the north side of Farmers Creek.
- Exact orientation and location flexible depending on further site investigations.



Gordon Power Station, Tasmania

Inlet/outlet

- Concrete and steel twin diffuser inlet/outlet structure to draw flow of 160m³/s into the inlet waterways to the pump-turbines.
- Facilitates gentle current, no noise or splashing.
- Includes maintenance gates and screens to prevent ingress of debris.
- Dimensions approx. 75m x 45m and 15m deep.
- Inlet/outlet located in the upper reach of Farmers Creek arm.
- Located away from through-flows from Farmers Creek.
- Barrier for safety to prevent boats and floating objects.



Diversion location and permanent bridge

- Diversion is to divert flood flows entering the lake from Farmers Creek to join downstream of inlet/outlet.
- Provides separation between the inlet/outlet and the river channel aquatic species are likely to use to travel up and down Farmers Creek.
- Further design will consider details of screens and other measures to prevent intake of aquatic species, debris and sediment.
- Permanent bridge provides access over the diversion to site compound and infrastructure on north side of the site.



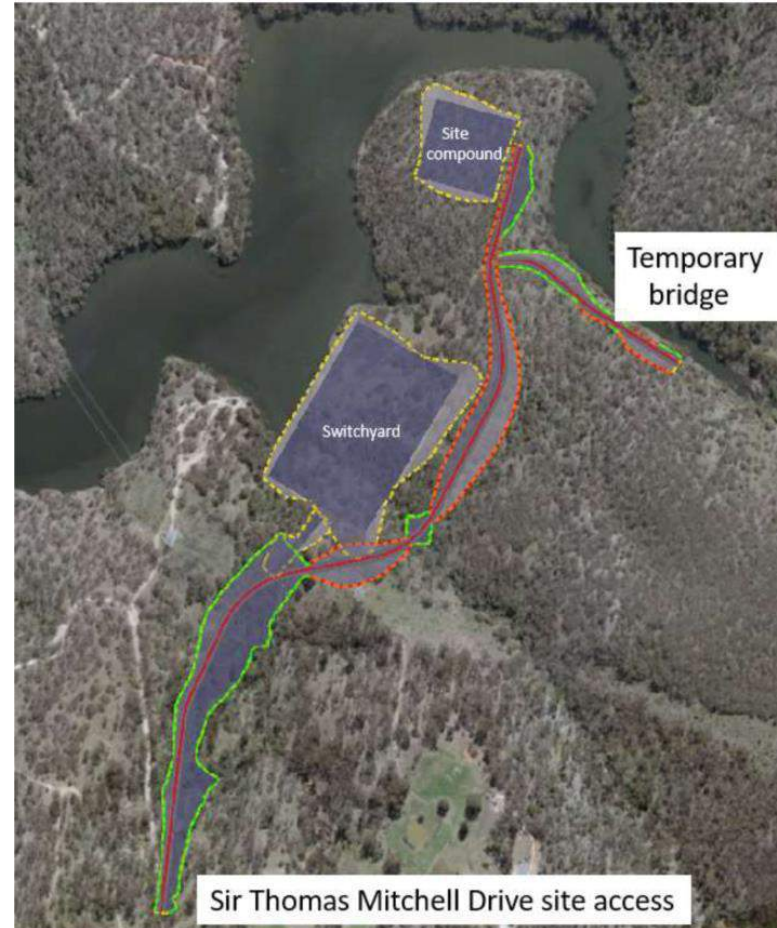
Inlet/outlet construction and infill

- Upstream and downstream cofferdams are needed for de-watering of inlet/outlet construction area.
- De-watering enables safe and efficient construction of the inlet/outlet.
- After de-watering the inlet/outlet can be constructed with tunnels to the powerhouse which is approximately 50m below lake water level.
- Surplus rock material from the tunnels will be stored in the infill. The infill provides permanent protection to the inlet/outlet from major flood flows.



Access roads

- New access road to support construction from Sir Thomas Mitchell Drive will also be the permanent facility access.
- Sir Thomas Mitchell Drive will be improved to be suitable for construction traffic.
- A temporary bridge over Farmers Creek will provide initial access to the north side of the site.



Temporary bridge over Farmers Creek

The temporary bridge will be removed when the permanent crossing to the tunnel portals is complete.



Switchyard pad

- The switchyard pad will provide a flat place to work from and be used as construction laydown.
- The switchyard pad will be built once the access road is finished.



330kV switchyard

- The 330kV switchyard provides electrical connection between the existing transmission lines and the pumped hydro facility.
- After construction the switchyard would be operated by TransGrid as part of the NSW electricity network.



Accommodation camp

- We'll provide accommodation for up to 400 workers during construction.
- We're exploring two possible locations:
 - Magpie Hollow Road
Lake Lyell
 - Pipers Flat Road
Wallerawang



Example of accommodation camp

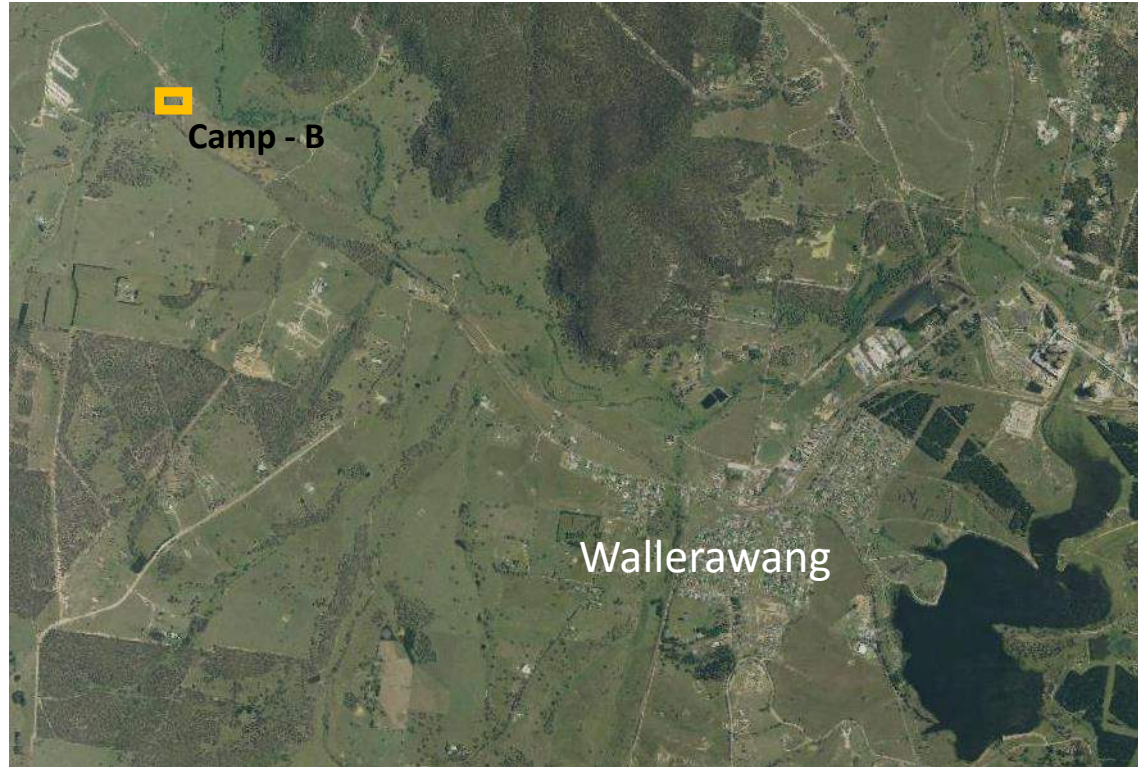
Magpie Hollow Road, Lake Lyell

Possible camp location - A



Pipers Flat Road, Wallerawang

Possible camp
location - B



Environmental and site assessments

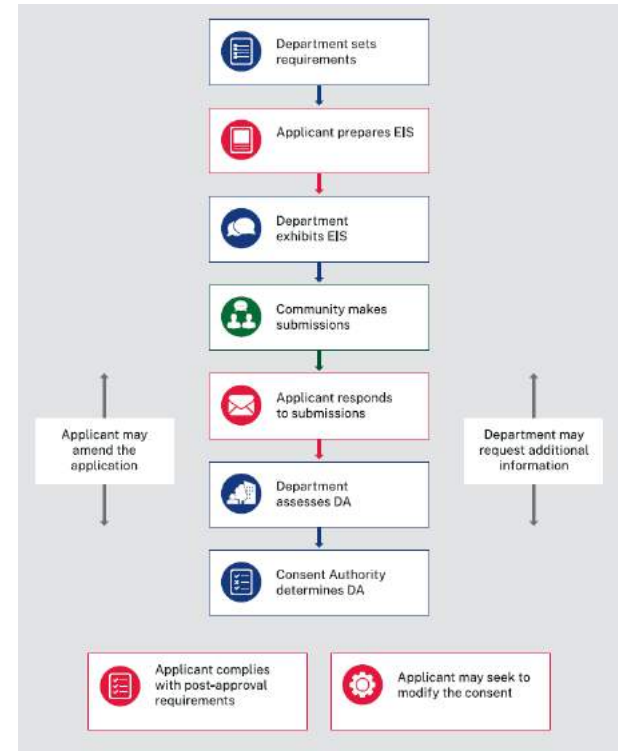
Alex Frolich

Associate Environmental Scientist

EMM

Environmental Impact Statement (EIS)

- Required by legislation and relevant guidelines will be followed.
- Environmental studies will:
 - Identify environmental characteristics likely to be affected by the project.
 - Outline efforts to avoid or mitigate impacts.
 - Consider any feasible alternatives.
- Community involvement is essential to the process.
- Study information will be included in the EIS.
- As a State Significant Development, development application will be exhibited for at least 28 days.



SSD Assessment Process (DPIE, 2022)

Scope of environmental and technical studies



Planned studies will include:

- Terrestrial biodiversity
- Aquatic ecology (Including platypus study)
- Aboriginal heritage
- Historic heritage
- Groundwater
- Surface water
- Landscape and visual impact
- Contamination
- Bushfire
- Economics
- Land, soil and erosion
- Waste
- Noise and vibration
- Air quality and greenhouse gas
- Climate risk
- Traffic and transport
- Social impact

Environmental and site assessments

What we know so far

- Vegetation at the site includes dry woodland and open forest to tall semi-mesic forest (i.e. wetter).
- Flora and fauna surveys are underway and targeting threatened species likely to occur.
- No direct impacts to Marrangaroo National Park are anticipated. Indirect impacts need to be assessed.
- Site investigations and cultural values mapping with registered Aboriginal parties are underway.



Environmental and site assessments

What we know so far

- Platypus are known to occur in Farmers Creek. The platypus study, including tagging and tracking, is underway.
- Groundwater monitoring network is being installed to inform understanding of hydrogeological environment and potential impacts.
- Site surveys and detailed environmental impact assessments will continue to inform design.



Questions?

**Please put your questions
in the Q&A box**

Next steps

- EnergyAustralia will provide more opportunities for engagement on new Concept Design in coming weeks and in 2024.
- Project HQ is now open for project information at 124 Main Street, Lithgow.
- Drop-in sessions happening this week in Portland, Wallerawang and Lithgow.
- Information for visitors will be provided over the holiday period.
- Further design refinement in response to environmental assessments and stakeholder feedback over the coming months.

**If you have questions we did not get to
or you would like to discuss the project further,
please get in touch:**

community@energyaustralia.com.au

1800 574 947

124 Main Street, Lithgow

lakelyellpumpedhydro.com.au

Thank you



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