17 August 2021

Energy*Australia* Lithgow Region

Community Consultative Committee

Steve Marshall
Acting Head of Mt Piper

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Agenda

1. Welcome and introductions
2. Review of Notes From Previous Meeting
3. Site Update from EnergyAustralia
4. Project updates from EnergyAustralia – existing and planned
    - Water Interception Project
    - Lamberts North Ash Repository
    - Lake Lyell Pumped Hydro Energy Storage
5. General Discussion
6. Meeting Close

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Welcome and Introductions

Review of Notes from Previous Meeting

Response to Questions / Actions

Pine Tree Update
Discussions have been held with the closest neighbour to the pine trees in question and they have indicated that they prefer that the trees are not cleared as they provide visual amenity.

We also contacted the RFS who are not keen to burn pine trees.

Those pines close to houses on Wolgan Road are on land that isn't owned by EnergyAustralia. We have advocated for the clearing of pine trees with Council and the decision now rests with them. Unfortunately, EnergyAustralia have exhausted all avenues relating to the pine trees.

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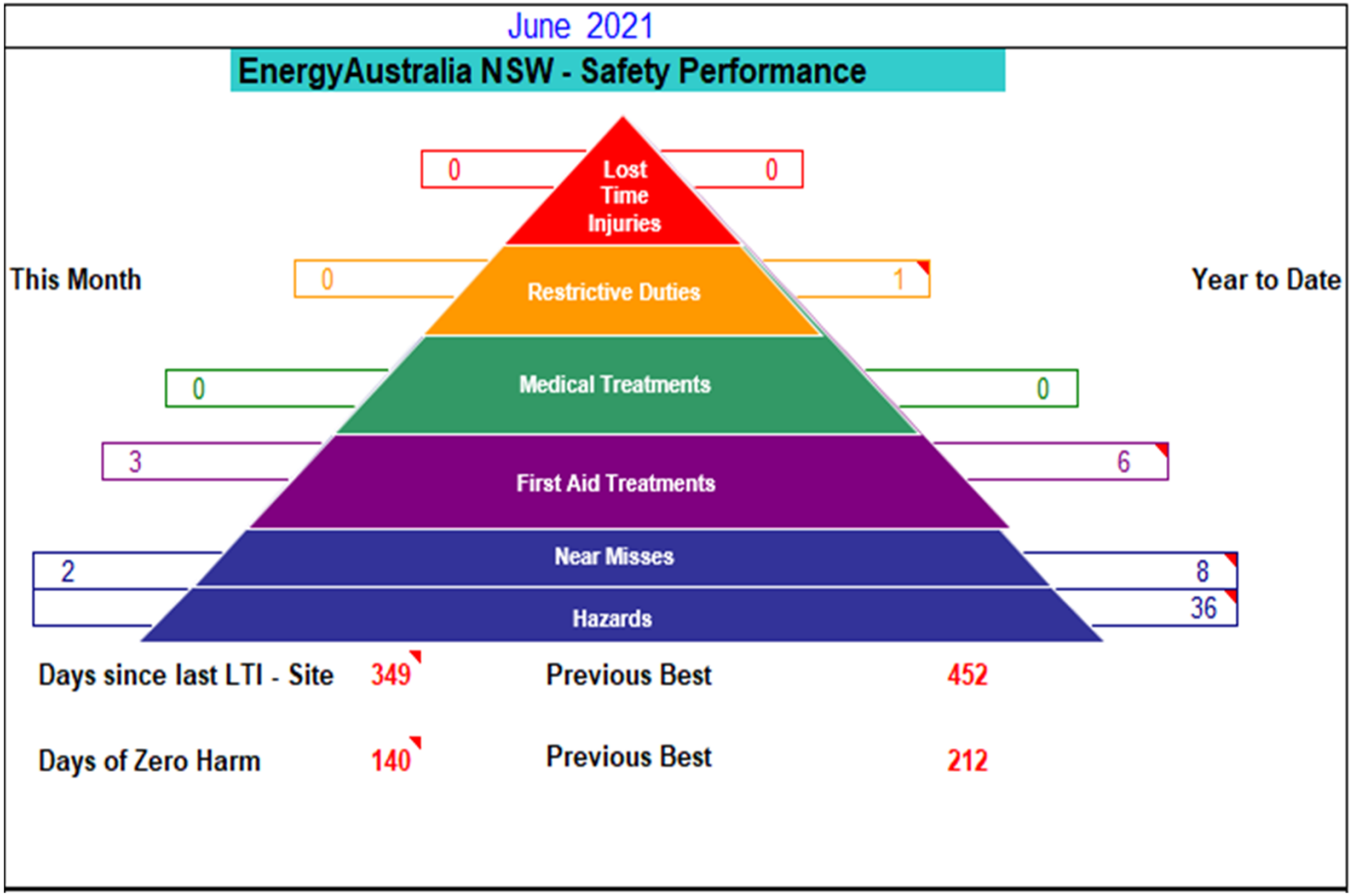
Site Safety

Site Safety – June 2021



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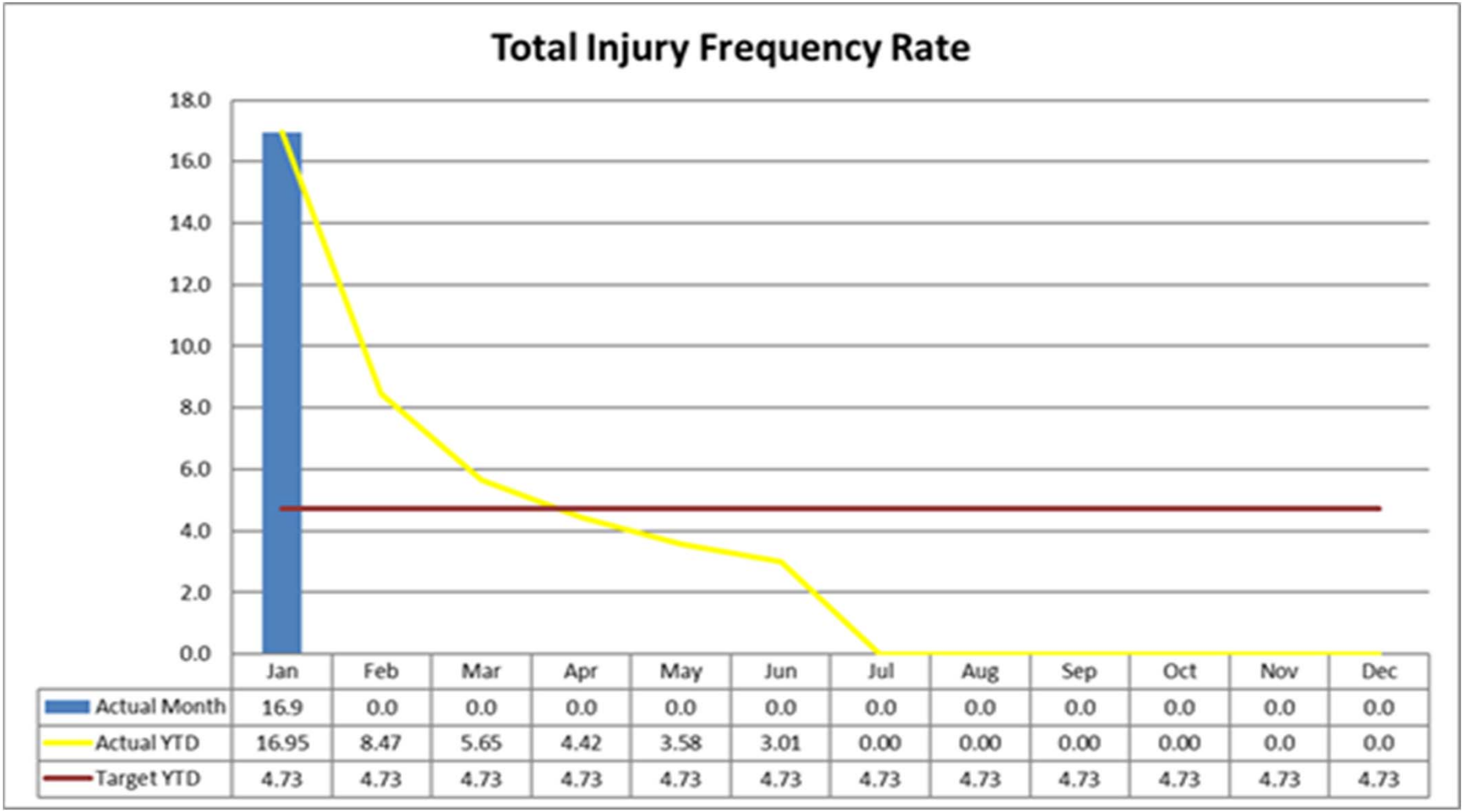
Site Safety – June 2021

TIFR

Actual = 3.01

Target <4.73



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Actual Month	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Actual YTD	16.95	8.47	5.65	4.42	3.58	3.01	0.00	0.00	0.00	0.00	0.0	0.0
Target YTD	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73

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Update - Water Management

Update on Water Management

- Oberon Dam level is at 66.01%
- Total Active Storage is at 94.2% with:
  - Lake Lyell at 100%
  - Lake Wallace at 107.1%
  - Thompsons Creek Dam at 86.4%
- No alerts for Blue-green algae within Lake Lyell and Lake Wallace.

Update – Lamberts North Ash Placement Project

Lamberts North Ash Placement Project Update

- Ash Placement Volume
- Brine Conditioned Ash to Mt Piper Area 1
  - Jan to June 2021 – 415,996 T
- Water Conditioned Ash to repositories
  - Jan to June 2021 – 257,888 T
- No complaints received
- No environmental incidents were recorded during the past quarter
- LNAR modification.
  - Application Approved, subject to the conditions.
  - Currently under review.

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Update – Lamberts North Ash Placement Project: MOD 1

Lamberts North MOD 1

- The Lamberts North MOD 1 was submitted to DPIE on 30 April 2021
- Key elements of the Project include:
  - Placement of BCA and Solid Mixed Salts and other authorised wastes from the surface of the liner (below 946m AHD) up to the approved height of LNAR
  - Replacement of the 1m thick WCA with a suitable cap
  - Staged installation of lined multipurpose storage ponds to manage leachate
  - Transfer of collected leachate to MPPS or reuse (as dust suppression)
  - Minor amendments to the approved LNAR footprint
- DPIE requested that a Biodiversity Assessment be undertaken for the additional area located on the eastern boundary – area of regrowth: sporadic areas of non endemic species and weeds
- Assessment completed and submitted on 17 May 2021
- DPIE site visit on 24 May 2021
- Mod Report has been Exhibited from 27 May – 9 June

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Lamberts North MOD 1

- 11 Submissions received including:
  - Lithgow Environment Group – Object
  - Bernadette Mullaney - Object
  - HECC - Object
  - EPA - Comment
  - Biodiversity Conservation Service - No Comment
  - Lithgow City Council - Support
  - Dam Safety – No comment
  - DPIE Water – NRAR – Comments
  - Resources Regulator - Comments
  - Transport for NSW - Comments
  - Water NSW - Comments
- Generally supportive – Response to Submissions currently being prepared

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LNAR Mod 1 Fact Sheet

Lamberts North Ash Repository Modification 1 fact sheet

The Mt Piper Ash Placement Project allows for the safe and sustainable disposal of ash produced by the Mt Piper power station. This fact sheet provides an overview of the proposed changes to EnergyAustralia's approved ash management practices at Mt Piper Lamberts North Ash Repository, which will result in more efficient operations and improved environmental outcomes.

Background

Mt Piper power station, owned and operated by EnergyAustralia, can generate enough energy to meet the needs of some 1.2 million homes in New South Wales every year.

The power station is critical to maintaining a reliable, affordable electricity supply, particularly at times of peak demand. It provides stability while other sources of power like wind and solar are integrated into a modern energy system.

Mt Piper is also an important part of the local community, providing direct and indirect employment for around 300 people and supporting multiple community initiatives and charities.

Current ash management

Coal ash is a by-product of electricity generation at Mt Piper power station. It is typically made up of bottom furnace ash (usually wet) and fly ash (dry). Ash produced by Mt Piper can either be sold and reused as an ingredient for cement-based products, or it can be stored in a purpose-built repository.

Ash is currently safely stored onsite at Mt Piper in two approved and operational repositories: the Mt Piper Ash Repository (MPAR), and the Mt Piper Ash Placement Project that consists of two ash repository areas: Lamberts North Ash Repository (LNAR) and Lamberts South Ash Repository (LSAR). The MPAR was developed in the mid 1990's, while the repositories associated with the Ash Placement Project were established in 2012. Since operation commenced, they have been maintained under strict compliance with the Environment Protection Authority guidelines.

Proposed modification

As the MPAR is reaching its approved capacity, EnergyAustralia is planning to transition those ash management activities into the LNAR.

EnergyAustralia is proposing some modifications to the approved practices already in place at the LNAR to ensure continued sustainability, efficiency and safety.

The proposed design changes include:

- the staged installation of a liner within the currently approved LNAR. The liner will be placed at the bottom of the ash placement area, and ash mixed with brine will be placed above the liner instead of directly above ash mixed with water. This improved separation of ash will allow for better recovery and reuse of the ash mixed with water, where possible
- the staged installation of lined multipurpose storage ponds to store any excess water onsite, allowing it to be treated and reused
- minor adjustments to the approved LNAR footprint to support these proposed activities, considering existing and proposed surrounding interactions.

These improvements, and the resulting new practices, will make LNAR, and by extension Mt Piper power station, more sustainable and efficient. While ash is a by-product of Mt Piper's current operations, EnergyAustralia is committed to containing and managing it in the safest, most secure way that protects the surrounding environment. These proposed changes will ensure we continue to do so, well into the future.

Information current as at June 2021

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All other activities and operations associated with LNAR, including operational hours, will remain as approved under the existing Project Approval.

After the LNAR reaches its maximum capacity, it will be lined with a low permeability cap. Soil will be placed above the liner within which low growing vegetation will be established.

Benefits of proposed modification

- **Improved environmental risk management:** the new liner will ensure any excess water/runoff from the ash is safely contained on site. There will also be increased site groundwater monitoring.
- **Using less water:** any excess water can be treated and reused for essential operations of Mt Piper such as irrigation and dust suppression, reducing the demand for freshwater resources.
- **Less waste:** improved separation practices will result in more ash that is suitable for reuse, avoiding the need for it to be contained.
- **Future-proofing:** less ash stored onsite will increase the LNAR's longevity, reducing the need for more repositories down the line and ensuring safe containment for many years to come.

Above: Compaction of ash mixed with water at LNAR

Get in touch

If you'd like to know more, please contact us at contactus@energyaustralia.com.au or (02) 6354 8111

Information about the project is also available at energyaustralia.com.au/mtpiperprojects

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Above: Location of LNAR (yellow hatch)

Next steps

To support these proposed changes, EnergyAustralia is modifying its Mount Piper Power Station Ash Placement Project Approval (PA 09_0186) with the Department of Planning, Infrastructure and Environment (DPIE).

EnergyAustralia consulted with relevant regulators, including Department of Planning, Industry and Environment throughout March and April 2021.

We're now informing the community and inviting their input into this proposal. Members of the public who would like to view our proposed changes in greater detail are encouraged to access the Department's Major Project website at: https://www.planningportal.nsw.gov.au/major-projects/project/41576

About EnergyAustralia

EnergyAustralia is a leading energy retailer and generator with 2.4 million accounts across eastern Australia. We supply energy to our residential and business customers from a modern energy portfolio, underpinned by coal and gas power plants, as well as renewable energy sources.

We operate Australia's largest energy sector carbon offsets program, with more than 1.6 million tonnes of CO_2e already fully offset and accredited by Climate Active. Under our offsets offering, more than 250,000 of our customers receive carbon neutral electricity and gas at no extra cost.

EnergyAustralia recognises its Mt Piper power station and Lake Lyell is on the traditional Country of Wiradjuri peoples and respects and acknowledges their continued connection to Country and culture.

Lamberts North Biodiversity Offset Area

Lamberts North Biodiversity Offset

- Application of Conservation Agreement was submitted to BCT on 17 March 2021
- BCT Site Visit 23 April - BCT prepared the Offsets Management Plan June 2021 and is now being internally reviewed
- Next steps:
  - Agree to the BCT Management Plan
  - Amend the CT to include the Offset area as an encumbrance in perpetuity
  - Undertake any recommended actions (ie signage, etc)
  - Budget for ongoing maintenance works and annual fee

Figure 1. Lamberts North Biodiversity Offset Area

Update – Pine Dale and Enhance Place

Pine Dale and Enhance Place Update

- No non compliances at the Pine Dale Mine
- No community complaints recorded for Enhance Place nor Pine Dale Mine
- Monthly reports as required under the Pine Dale EPL have been systematically uploaded on to the EnergyAustralia website (Pine Dale Coal Mine - EPA Reports | EnergyAustralia)
- 5 Yearly inspection undertaken by the EPA in March

Community Engagement Program

Community Engagement Program 2021

Community Grants Round 2

- $30,000 available
- Opens Monday 2 August and closes Tuesday 31 August

Quote from Round 1 Recipient – Cooerwull Public School

"Cooerwull students would like to thank EnergyAustralia Mt Piper for the new books that will be in their classrooms. The students are excited to choose different and interesting books to read. Some of the student's comments are "we love reading" and "reading is the best". The Cooerwull teachers greatly appreciate EnergyAustralia's generous donation."

Community Engagement Program 2021

Community Grants Round 1 – Successful Applicants

- *Cooerwull Public School – School Classroom Libraries Program*

Assists all children attending the school, but particularly those from low socio-economic families who might not have access to books at home. Designed to provide greater variety of literature to encourage kids to stretch their imaginations and promote self-learning.

- *LINC Neighbourhood Services – Train the Trainer*

Part of Let's Read – Let's Count Learning Program. Allows LINC to train not only their staff, but just as importantly, their volunteers & parents who assist with the program on effective learning & teaching methods that will be utilised in various literacy & numeracy programs.

Community Engagement Program 2021

Community Grants Round 1 – Successful Applicants

- *Lithgow District Men's Shed Association – New 18V Brushless Power Tools*

New power tools to allow members to do more in the manufacture of community projects, with greater flexibility & safety, with cordless tools

- *Pied Piper Preschool Association – eSafety Program*

This program is targeted at Pre-school children, families & the wider community in staying safe in a digital world. They haven't had equipment until now to use. This will now allow them to purchase a laptop & some iPads so participants can learn hands on.

Community Engagement Program 2021

Community Grants Round 1 – Successful Applicants

- *Portland Central School – Deadly Dreaming Indigenous Garden*

Establish an indigenous food & medicine garden for both the school children & the community. The area will also house indigenous art. Will be used as a learning & a meeting place, not only to improve their numeracy & literacy, but also our indigenous cultural heritage.

- *Wallerawang Memorial Men's Shed – Office Computer*

Purchase of computer to allow the Shed to be more self-sufficient, rather than members having to bring in their own personal computers to complete office work.

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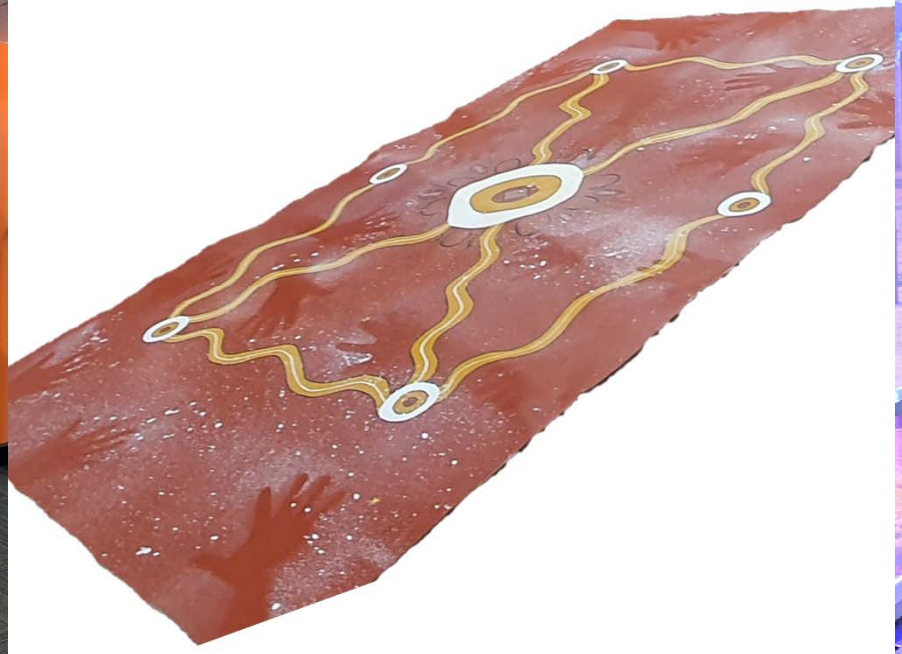
Cultural Keeping Place

- The new Cultural Keeping Place is taking shape
- Artifacts commissioned from Uncle Tom Barker are now placed into the custom-made cabinet
- Artwork by Aunty Sharon Riley has been mounted to the wall
- Welcome signage has been installed.
- There is still some additional signage and information for the touch screen to come, as well as the artifacts discovered at the Rail Unloader site at Pipers Flat.



Update – Water Treatment Project

Joint EANSW / Centennial Water Treatment Project

- The Water Treatment Facility (WTF) is treating up to 36Ml/day and the treated water is now being used in the power station.
- Final optimisation of the Water Treatment Facility is nearing completion with the introduction of the EA mixed waste & blowdown brine waters over the coming months for purification and finally re-use in the power station.

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PROJECT UPDATES –

- Groundwater Interception Project Assessment
- MPAR Decommissioning & Management

Groundwater Interception Project Assessment

Groundwater Interception Project

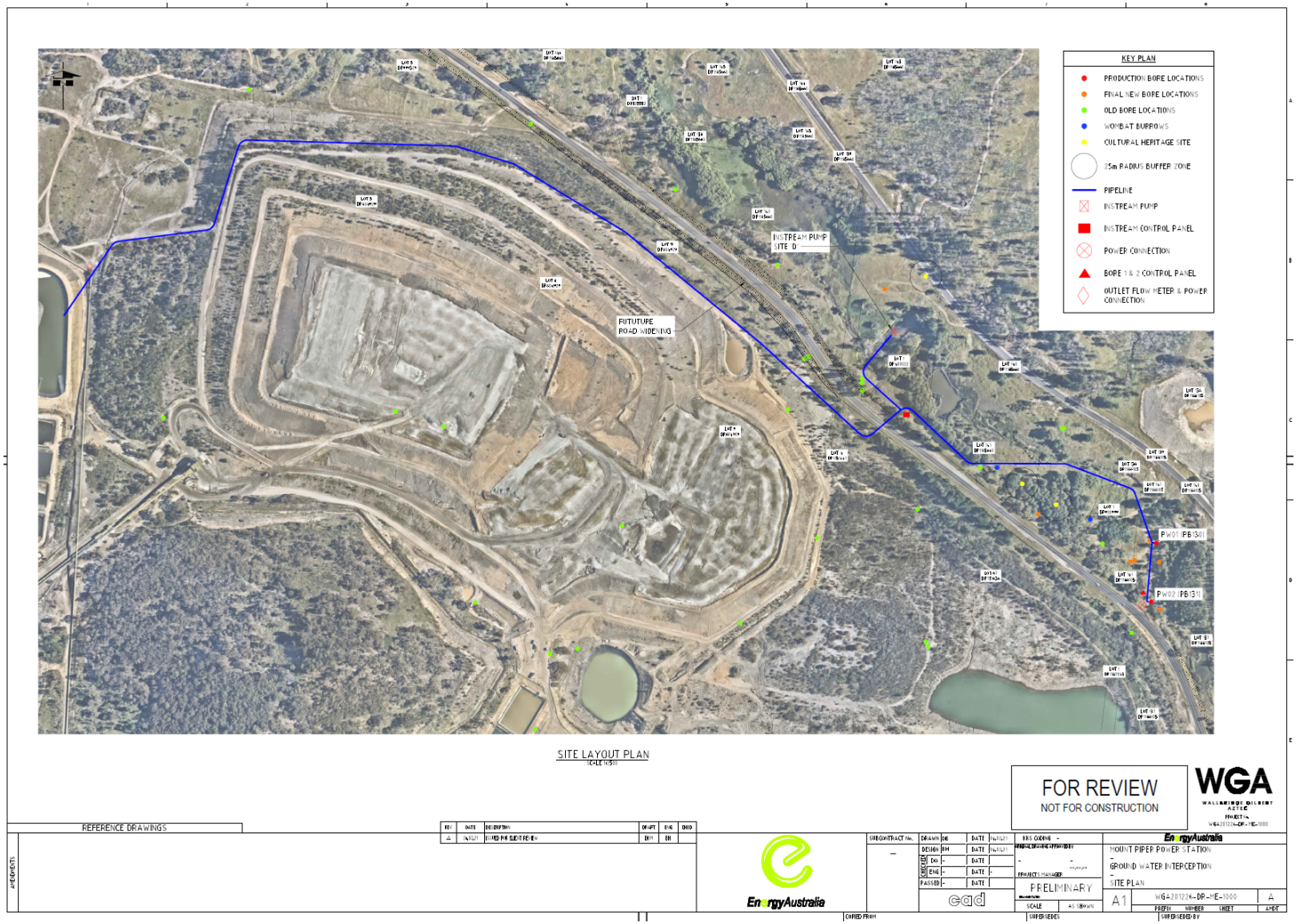
- Drilling completed November – December 2020
- All bores surveyed
- The 9 monitoring and 2 production bores have steel monument with labels – max 25m depth
- 5 scout holes rehabilitated
- Minimal disturbance

Groundwater Interception Project

- Pump testing completed to test the aquifer yields, water quality yields
- Surrounding monitoring bores recorded the influence on the aquifer(s)
- Based on the Detailed Design drilling, data collection and analysis, the Groundwater Interception Project is confirmed as a viable option for intercepting groundwater discharging to Wangcol Creek
- The Detailed Design is well advanced

Design Progress

- REF completed
- 80% Design - completed in June/July
- Includes:
  - Electrical arrangements
  - P&ID Drawings
  - Communications
  - Instrument supply
  - Wellhead details
  - Underbore details
  - Instrumentation lists – mechanical and electrical



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Ongoing Monitoring

- Throughout January and February, weekly water quality sampling was carried out
- Raw water quality very important to understand. Depending on its delivery point, it could have the potential to foul Brine Concentrators if certain parameters are too high*
- Water quality results showed elevated iron levels ranging between 19.3 – 39.6mg/L
- Water quality specialists from Canada, specialising in Brine Concentrators were engaged to review and analyse data
- Maximum iron in water for the Brine Concentrators – 0.05mg/L
- Problematical high iron naturally occurring – not the parameter the Project was designed to treat

Production Bore 1

Production Bore 2

Detailed Design Challenges

- Data and information collected since the drilling program has thrown up some significant challenges
- WATER QUALITY
  - Water with elevated iron levels above 0.05mg/L – water cannot be delivered directly into existing water management system
  - Water will need to be Pre-treated to remove iron – sludge treatment
  - Pre-treatment options will need to be scoped, costed and sited
- POWER CONNECTION
  - No readily available power
  - Power connections will need to be independently designed and constructed
- REMOTE COMMUNICATIONS
  - System will be operated and controlled away from the MPPS
  - As a result of data security and remote operations, communications system will need to be designed and costed

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Detailed Design Challenges

- EA is working to continue to progress detailed design to respond to the following issues:
- WATER QUALITY
  - Water treatment options for iron are being identified
  - Location for Pre-treatment infrastructure flagged

- REMOTE COMMUNICATIONS
  - Remote operations - Cloud based platform being investigated
- POWER CONNECTION
  - Conceptual power connections being analysed
- Road Realignment – Traffic NSW
- CONSEQUENCE:
  - Additional Costs – presently unknown
  - Timeline is being extended to address these design issues
  - May need to review REF to include any additional infrastructure

MPAR Decommissioning & Management

ERM Solute Modelling

- ERM has created a Numerical Groundwater Model (NGM) of the Ash Repositories focusing on MPAR and the underlying geology, Wangcol Creek and other surface water features in the near vicinity
- The NGM is informed by calibrated data from:
  - Approximately 50 boreholes (groundwater levels and water quality) drilled over the years (2003 – 2020)
  - Surface water quality (2018 – 2020)
  - Laboratory leach tests
  - Grab samples from drill holes within the ash
- The NGM is further informed by:
  - Record Tracings from underground workings
  - Open cut mining activities
  - Ash placement activities
  - Geological records

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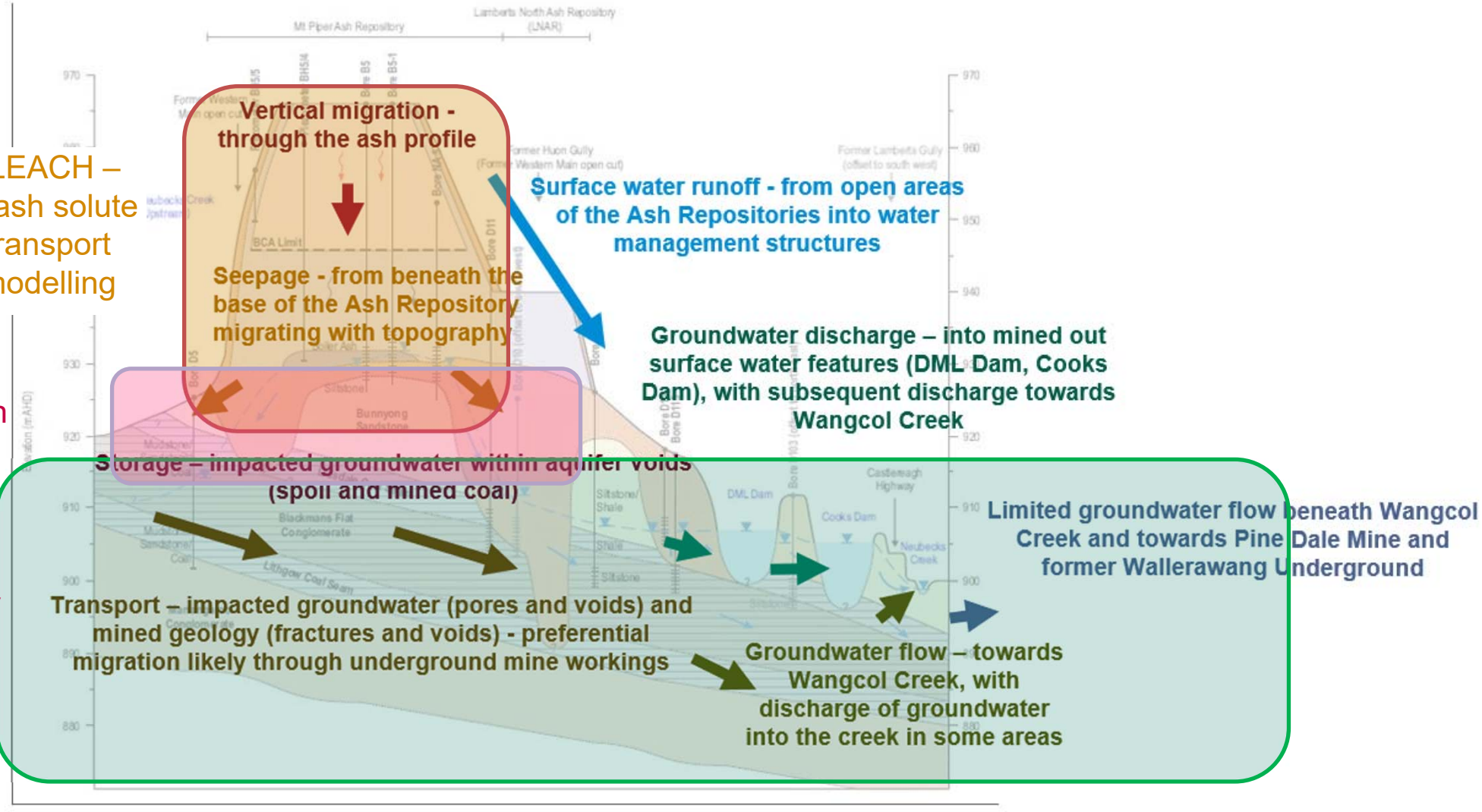
ERM Solute Modelling

- The Purpose - to model the behaviour of water (and solutes) moving through the MPAR and into the receiving geological and hydrogeological environment
- The model attempts to replicate what is an extremely complex hydrogeological setting, further confounded by anthropogenic influences including underground mining, subsidence, open cut mining, backfill, underground voids and open cut voids
- In its simplified form, the model comprises 6 layers including (and increasing with depth):
  - Ash placement
  - Overburden fill
  - Bunyong sandstone
  - Lidsdale Coal (most of which has been removed and replaced with fill
  - Blackmans Flat Formation
  - Lithgow Coal (most of which has been mined out, or coalesced with the Blackmans Flat Formation of the Lidsdale Seam)
  - Marangaroo Formation (mostly intact)

ERM Solute Modelling

VLEACH – in-ash solute transport modelling

Linkage: Source concentration vs time vs location from MPAR to groundwater



Groundwater Flow Model

Solute Transport Modelling

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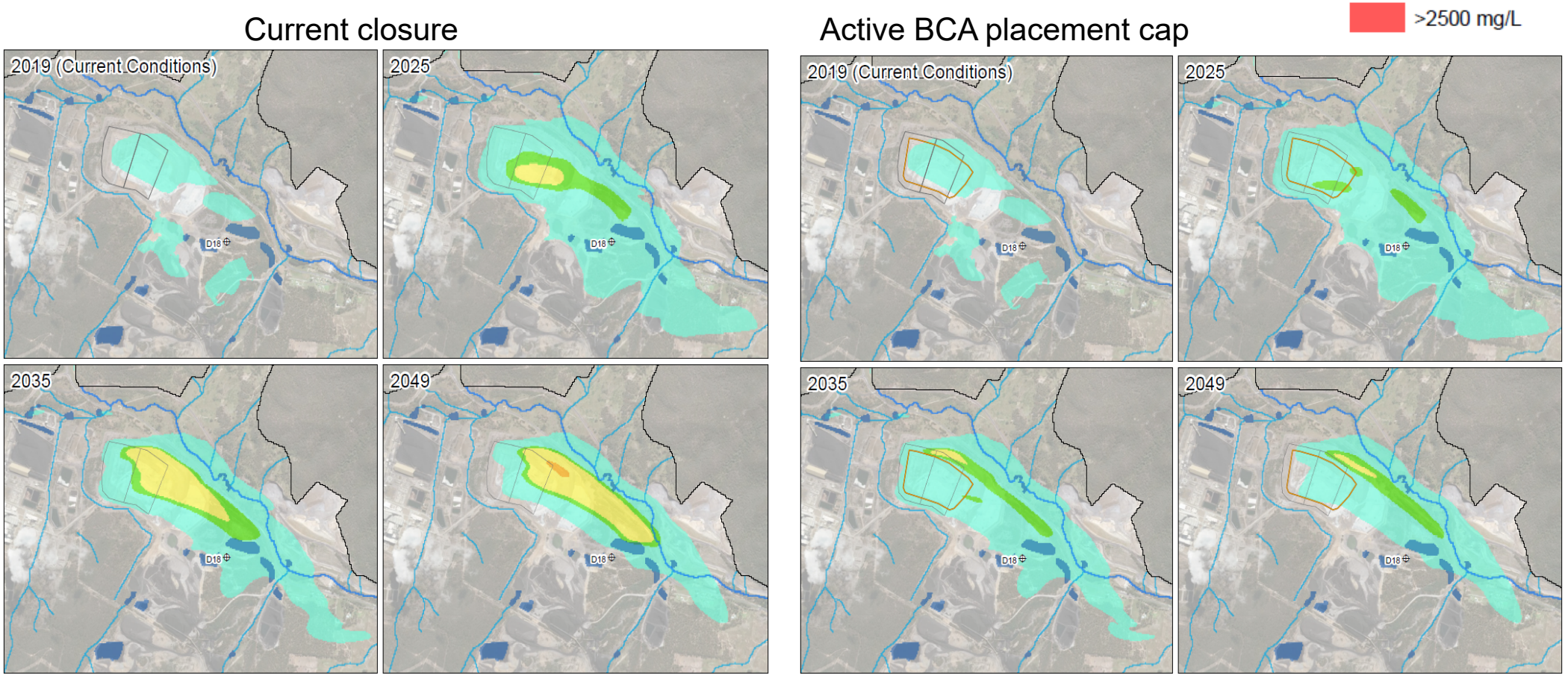
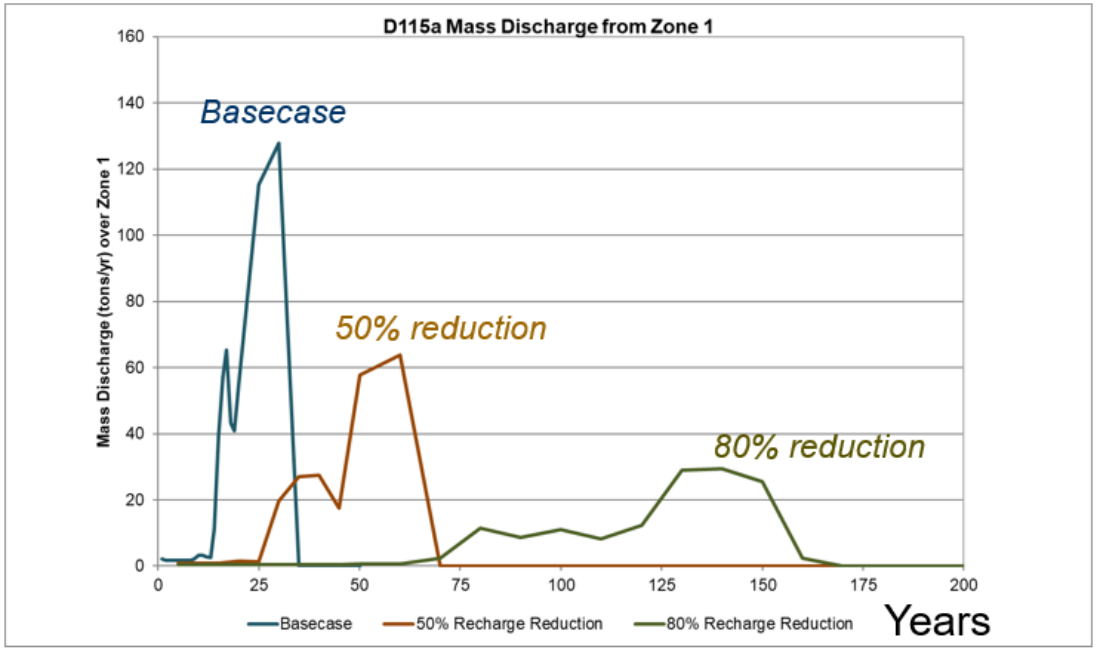
ERM Modelling: Impact of Capping

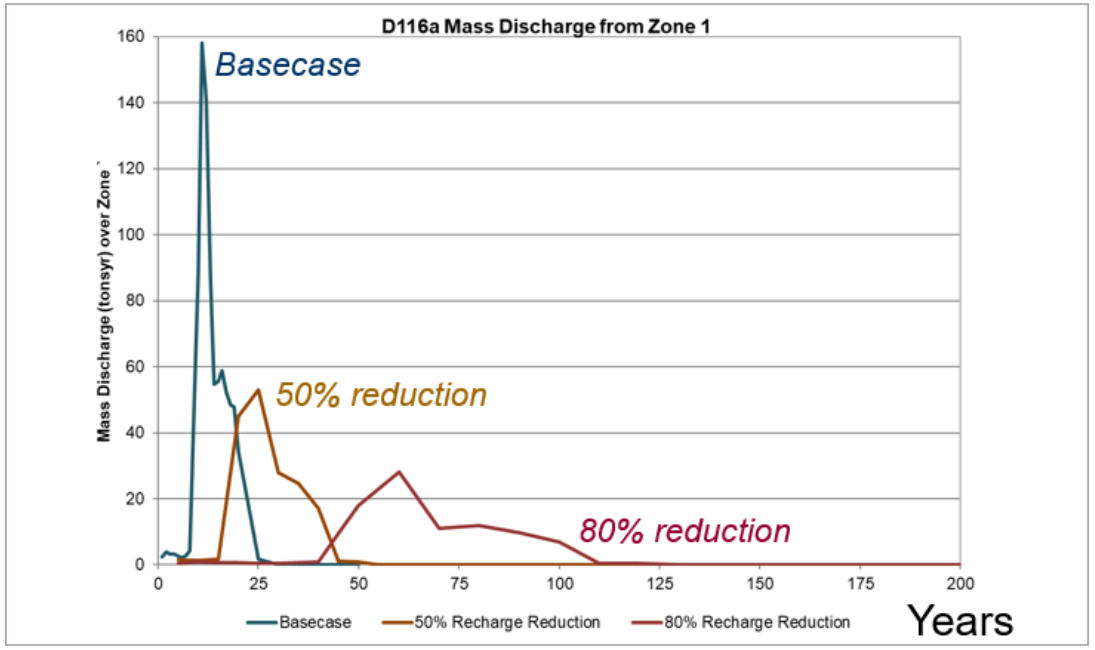
- Laboratory leaching tests show Chloride is mobile, moving through the ash
- Various scenarios of the model have been run based on reducing the “recharge rate”, ie placing a low permeability cap to reduce recharge ~ 80%
- Slows the migration of solutes and reduces peak volume movement AND concentration of the solutes that do migrate



ERM Modelling: Impact of Capping (Mass discharge)

Chloride





Active ash placement area

80% reduction from 0.38 = 0.08 (m/yr/m2)
Approximately 30% reduction of recharge

Recharge rate

m/yr/m2	
0.24	model other
0.38	model ash
0.38	V-leach

Covered ash placement area

50% reduction from 0.38 = 0.19 (m/yr/m2)
Approximately current recharge away from ash

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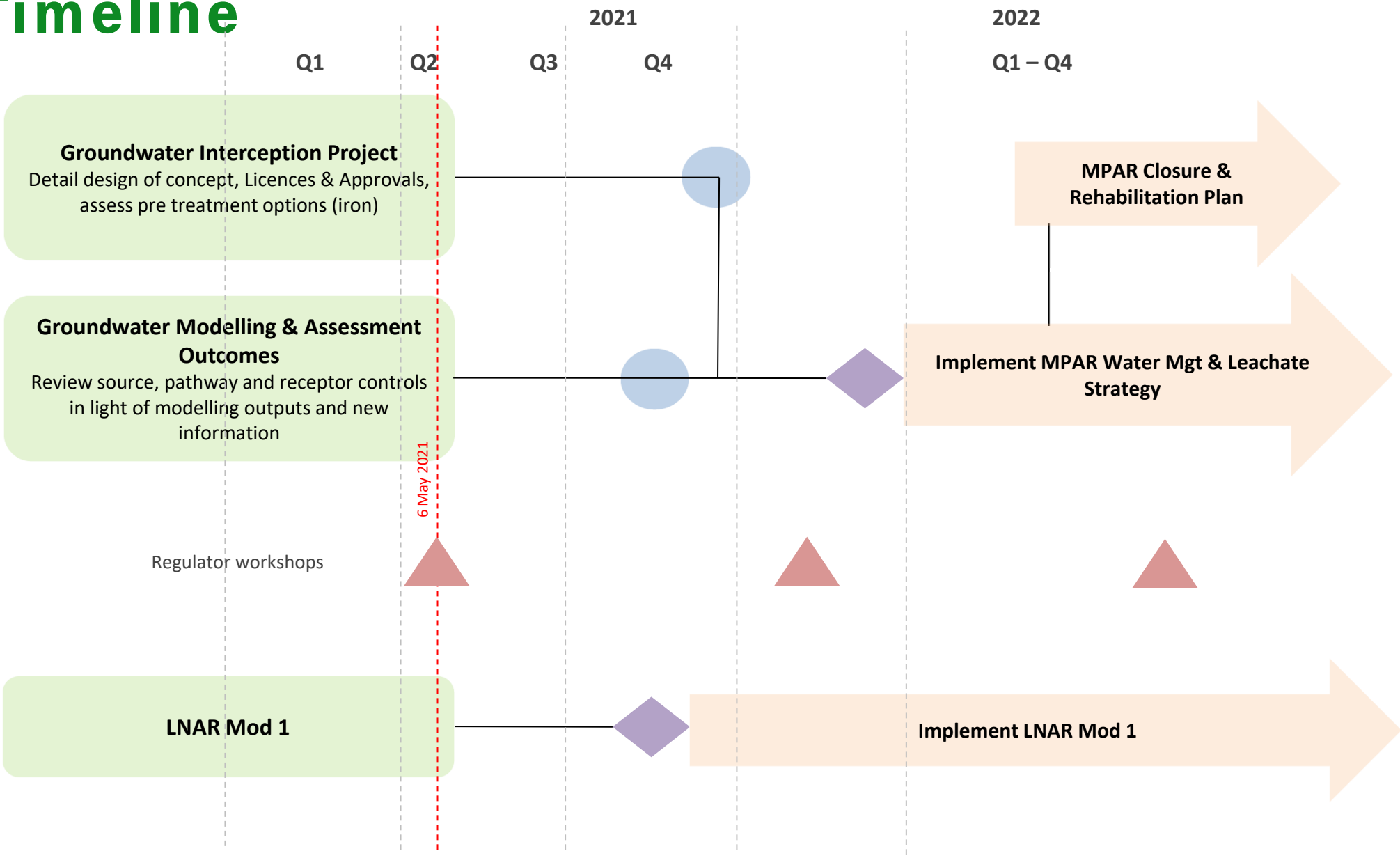
Review of Mitigation Measures

- Groundwater Interception Project cost = unknown due to identified challenges PLUS:
  - Solution is short term, invasive, costly and high maintenance
  - Final design is unlikely to be clear until end 2021
  - Modelling indicates – SW effects targeted, but whole GW plume may not be
  - Solution is effectively recycling the salts (waste brine to be replaced back onto the ash)

- If there are better, more cost effective, holistic solution targeting the long term?
  - Along with the LNAR liner, modelling outcomes from the NGM and solute transport models suggests that there may be

- It is now time to take a step back and review the options available

Timeline


2021
2022
Q1
Q2
Q3
Q4
Q1 – Q4
Groundwater Interception Project
Detail design of concept, Licences & Approvals, assess pre treatment options (iron)
MPAR Closure & Rehabilitation Plan
Groundwater Modelling & Assessment Outcomes
Review source, pathway and receptor controls in light of modelling outputs and new information
Implement MPAR Water Mgt & Leachate Strategy
6 May 2021
Regulator workshops
LNAR Mod 1
Implement LNAR Mod 1

Tallawarra B Project

Tallawarra B Project – Given the green light

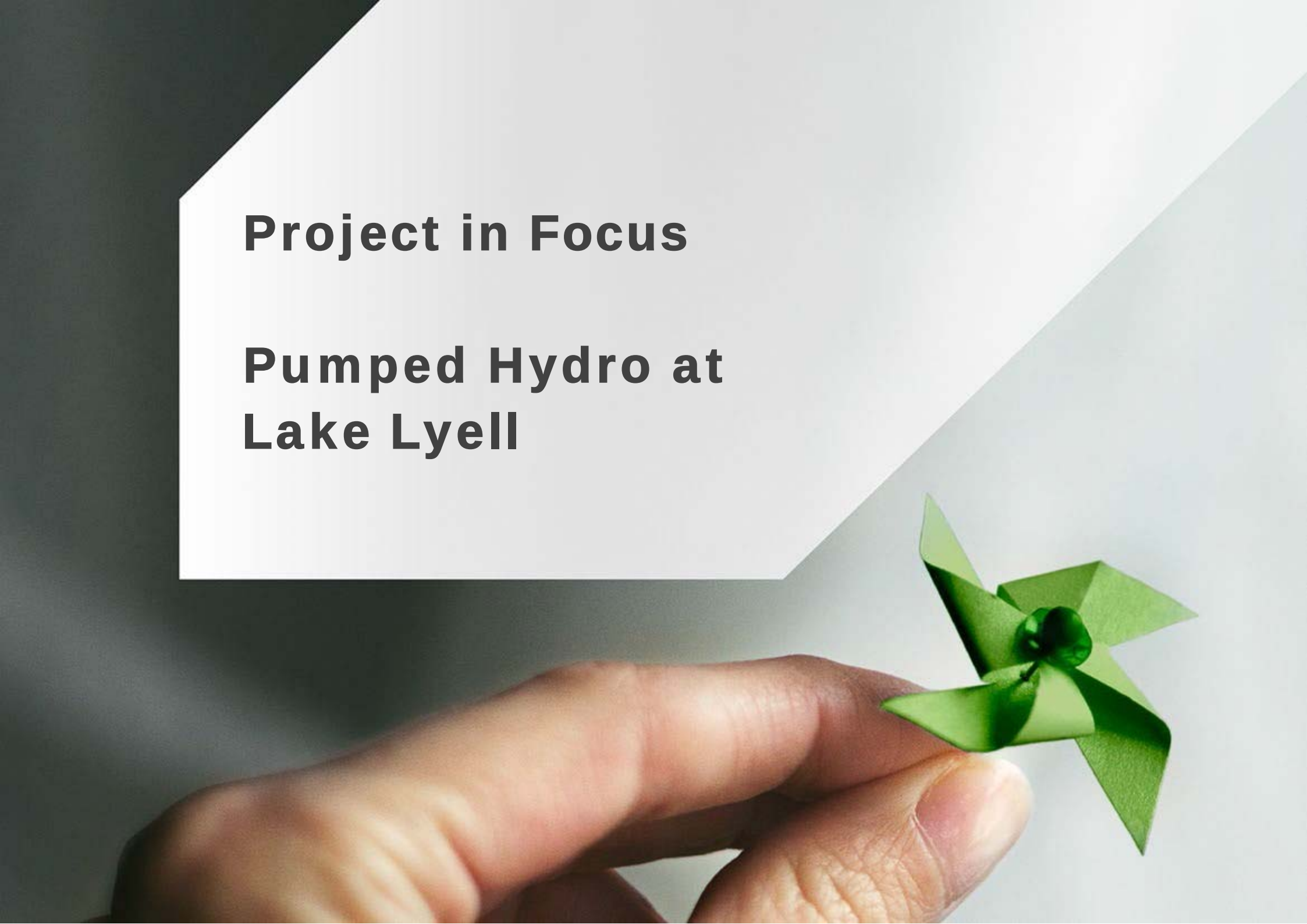
Australia's first net zero emissions hydrogen and gas capable power plant, with direct carbon emissions from the project offset over its operational life.

Tallawarra B Project

- Expansion of EnergyAustralia's Tallawarra Power Station at Yallah
- A 300+megawatt Open Cycle Gas Turbine power station
- Capable of using a blend of green hydrogen and natural gas
- Start within 25 minutes and power around 150,000 homes
- Aim to be completed and ready in time for the summer of 2022-23
- 250 jobs during construction
- Contribute $300m to the NSW economy

Project in Focus

Pumped Hydro at Lake Lyell



Lake Lyell Pumped Hydro Energy Storage Project

Community Consultative Committee

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Background

- Over the past six months, EnergyAustralia has been investigating the potential for a Pumped Hydro Energy Storage (PHES) facility at our Lake Lyell Dam, in the Lithgow area of NSW.
- Pre-feasibility studies conducted by Arup have found that a 335MW – 8-hour PHES is technically feasible.
- Our next focus will be Geotech investigations, engineering design, environmental studies and planning approvals, we are also working with our Lithgow based team on the important work of community engagement
- We are also preparing the project for the NSW Pumped Hydro Recoverable Grants Program
- EnergyAustralia is committed to transitioning our generation portfolio and we are making progress:
  - **Pumped Hydro**: Executed Australia's first PHES storage services agreement giving EA market control for the 250MW – 8-hour Kidston PHES in QLD;
  - **Batteries**: Committed to build the largest battery in the world in the La Trobe Valley, 350MW-4hour Jeeralang battery;
  - **Renewables**: Underwritten ~500MW of renewables since 2018, ~1000MW since 2010;

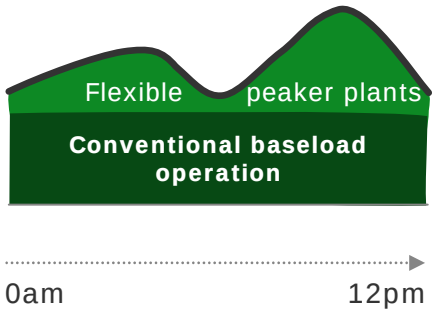
Why Pumped Hydro? As more renewables are integrated into the system, energy storage will become increasingly important

Past:
Baseload operation

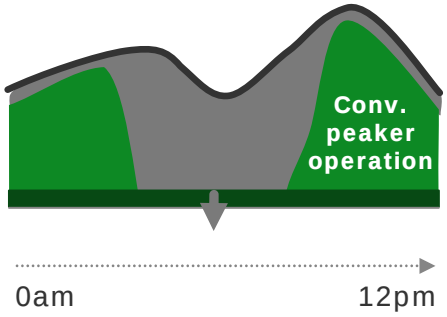
Present:
Peaker operation

Near future:
Emergence of storage

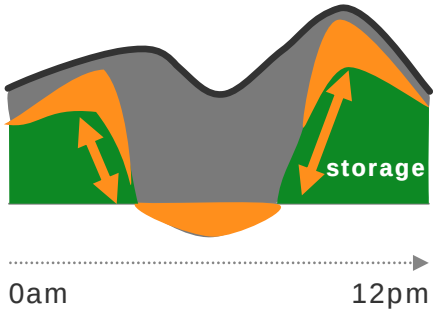
Long-term future:
Seasonal back-up



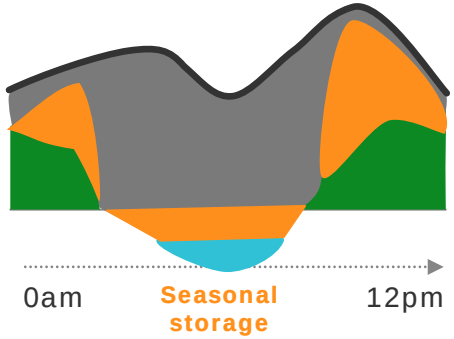
In the past, stations with **limited flexibility** operated as baseload plants, while flexible plants followed the changes in the demand curve



As **renewables** produce more in daytime, even baseload conventional plants increasingly need to turn down their production during
the day



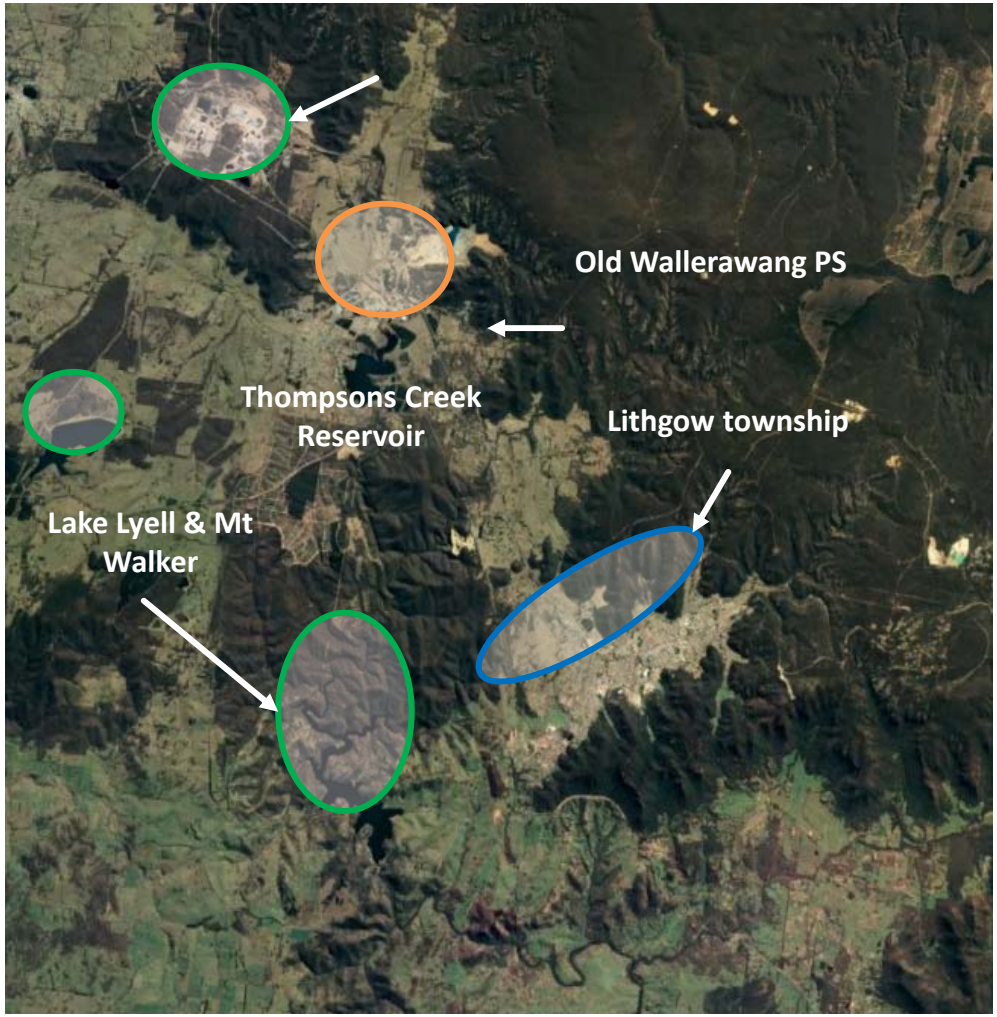
Storage is expected to take over some of peaker and short-term balancing positions from conventionals, which will see even shorter and volatile running pattern

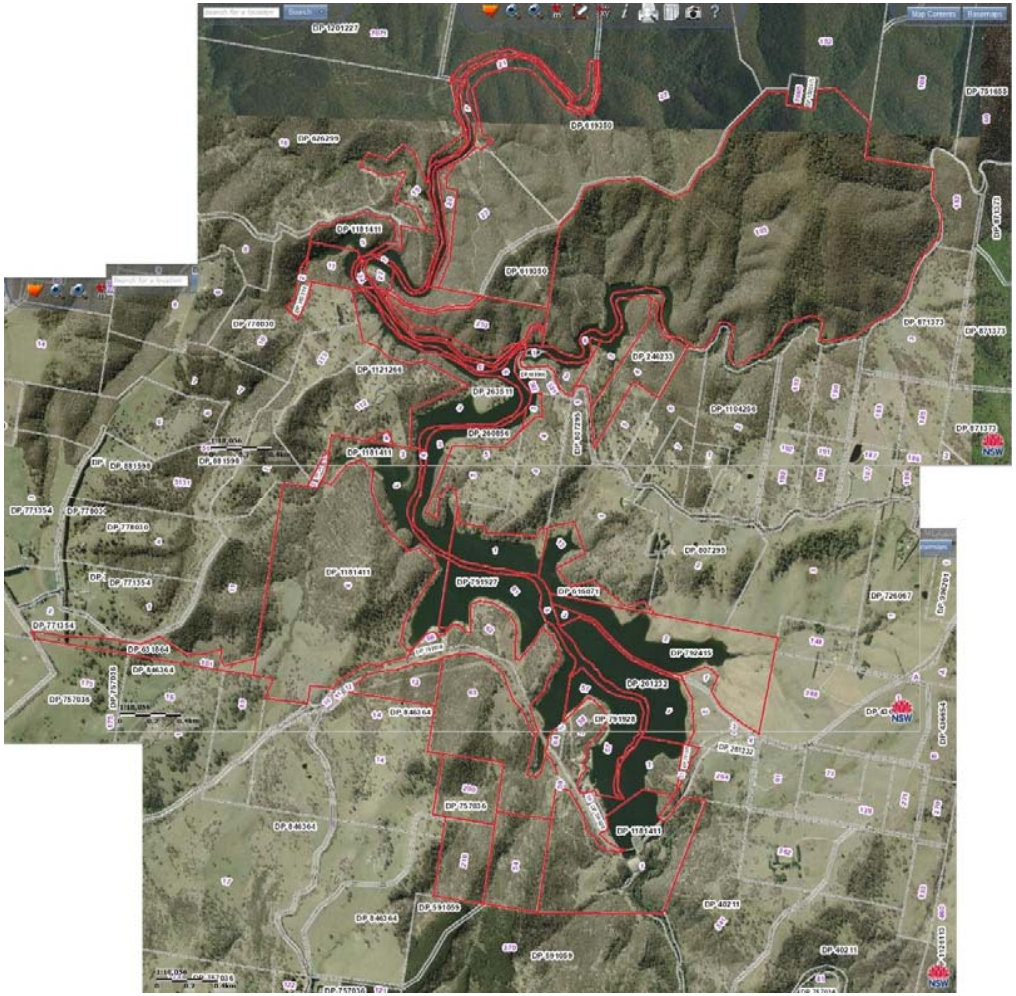


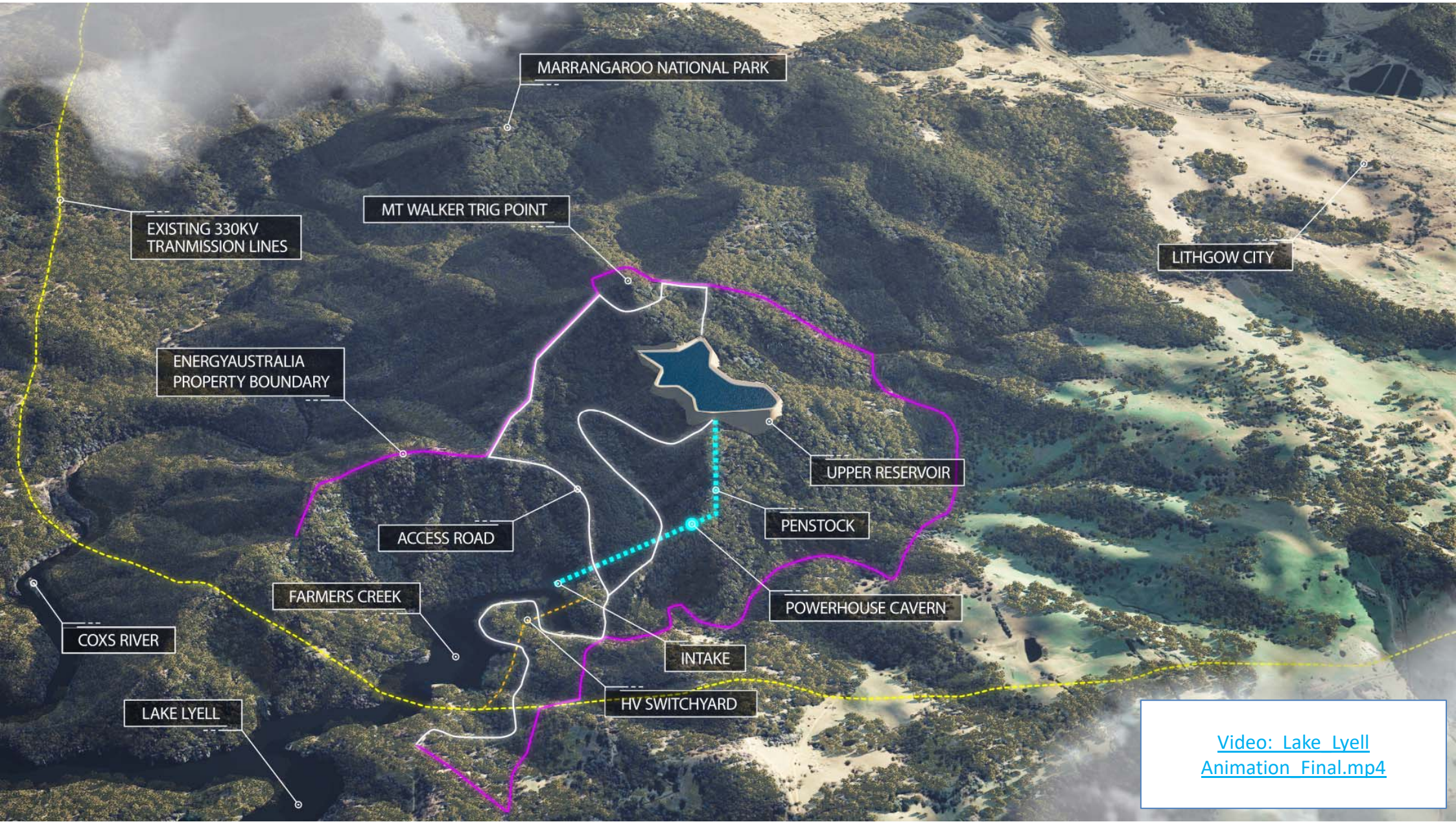
Conventionals will be utilized in **seasonal balancing**, renewable over generation may be stored through new technologies such as Power-to-Gas/H_2

Electricity demand | Peaker production | Baseload production | Renewable production | Storage | Seasonal storage

Project Location

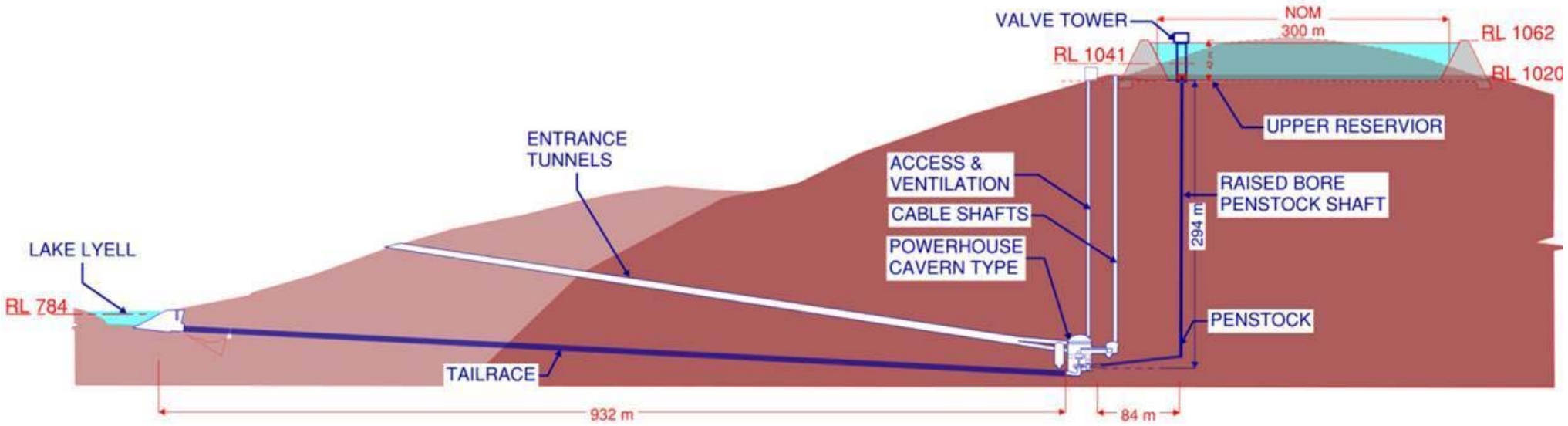






Video: Lake Lyell Animation_Final.mp4

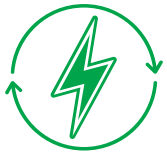
Concept Design – Proposed Section



Source: Arup Pre-feasibility study

Preliminary Feasibility highlights

The Project



All the hallmarks of a good site (land, water, lower dam & great HV connection)

Planning and zoning favorable to electricity generation

40+ years of operating history at Lake Lyell Dam

EA

Proof we can get storage projects built (Batteries & PHES)

NSW a critical market for EA, our largest customer base

Strong links to community with our long history as a major operator & employer in Lithgow

Technical overview

Concept Design Overview	
Number of Units & Combined Generation Output (MW)	• 1 x 335MW reversible Francis turbine (range of 167 – 335MW) • 8 hour generation (i.e. 2,680 MWh of stored energy)
Combined Pump Input (inc. transformer losses) (MW)	• 348 MW pumping for 10 hours
Upper Reservoir	• Reinforced cement concrete (RCC); • Storage Volume 4.4 GL (vs. approximately 31GL stored in Lake Lyell at 90% capacity)
Average System Head	• Gross Head: ~257m (Lower Res 784m, Upper Res 1041m)
Powerhouse	• Underground footprint (m): 25W x 50L (45m height from tailrace to roof) • Depth below ground: 294m
Penstock & Tailrace	• Penstock: Steel lined; Tailrace: Concrete • Penstock Shaft depth: 294m; Horizontal Length: 100m; Diameter: 5.5m • Tailrace: 930m; Diameter: 6.9m
Round Trip efficiency	~77-78%
Energy Security Services	Synchronous condenser mode, black start, frequency control ancillary services (contingency)