ENGIE Australia & New Zealand

Accelerating the transition to a carbon-neutral world

HAZELWOOD REHABILITATION PROJECT

TECHNICAL CONVERSATION WEBINAR

Thursday 2 May

We acknowledge the Traditional Custodians of the lands on which we are meeting, the Gunaikurnai People, and recognise their continuing connection to land, sea, culture and community.

We pay our respects to Elders past and present.

Welcome and evening program overview

Welcome and introductions
Jenni Forrester, Nation Partners
7:00

About the project and proposed approach
Adam Moran, ENGIE Australia and New Zealand
7:05

Stabilising a large mine void
Dr Chris Haberfield, Principal Geotechnical Engineer , WSP Golder
7:20

Groundwater resources
Dr Tamie Weaver, Technical Fellow, ERM
7:30

Water quality in the pit lake
Dr Matt Landers, Principal Geochemist, RGS Environmental
7:40

Waterways and wetlands
Ross Hardie, Director, Alluvium Consulting
7:50

Expert panel discussion and Q&A
8:00

Catchment, waterways and wetlands

Landform stability and safety

Water quality in pit lake

Groundwater resources

Session ends
8:30

About the project and proposed approach

Adam Moran, Environment & Planning Manager

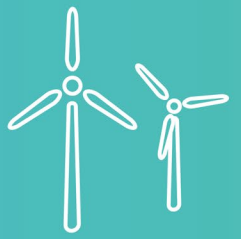
ENGIE Australia and New Zealand

Our Activities

In Australia, ENGIE is developing the energy portfolio of the future, with more than 2,000 MW of wind, solar and industrial-scale battery storage capacity projects under development.

1996
ENGIE established in Australia

2,000MW
renewable energy under development



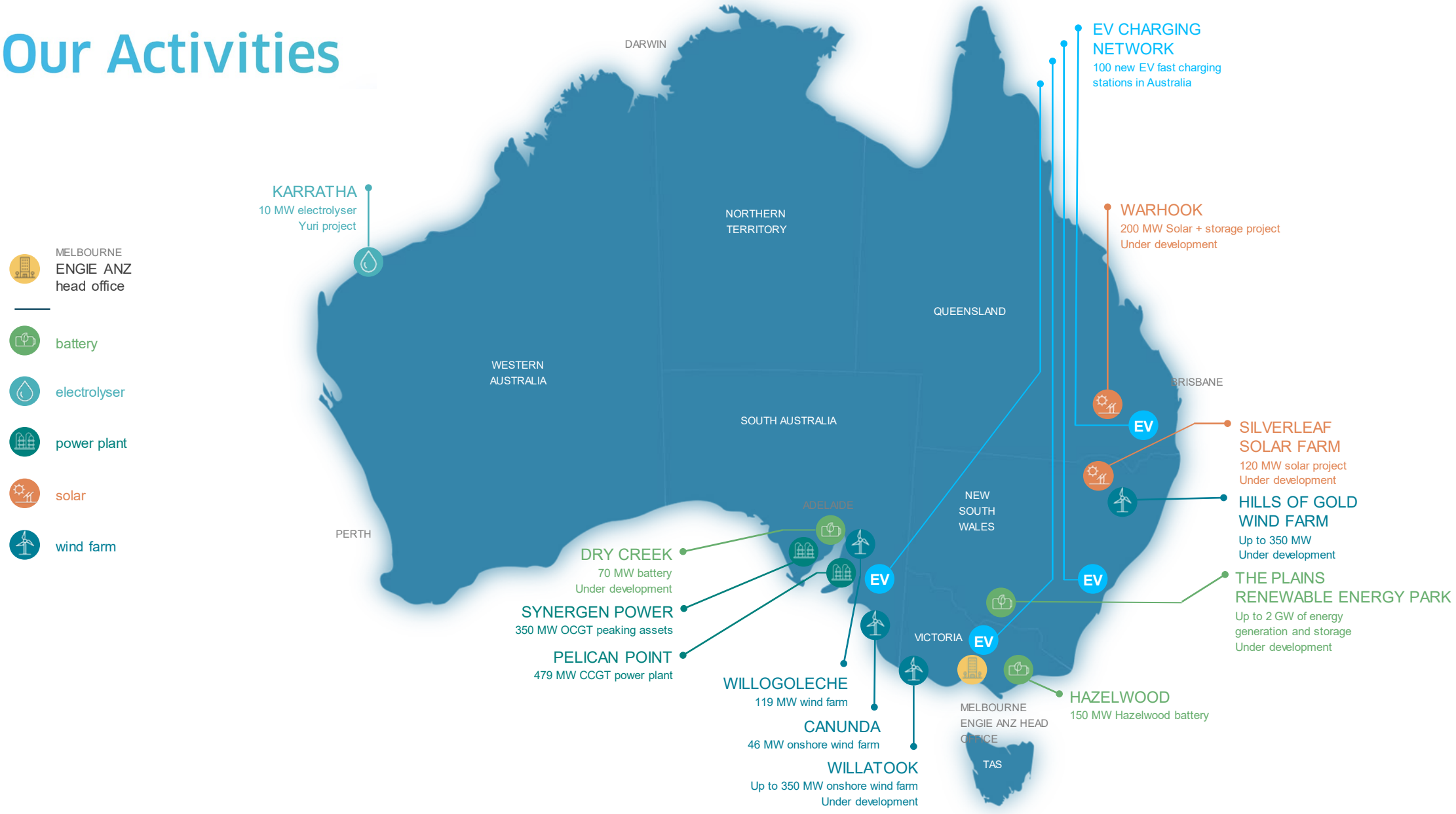
1,000MW
of renewable and low-carbon energy capacity

360
team members

Simply energy® by ENGIE

680,000
customers

Our Activities



New energy generation at Hazelwood

HBESS has the capacity to store the energy equivalent of 1 hour of energy generation from the rooftop solar systems of 30,000 Victorian homes

- ENGIE are looking at opportunities to expand energy generation capacity at Hazelwood
- As an established power generation site with access to 1.6GW of dormant transmission capacity
- A new development would add further storage capability to the grid

Hazelwood BESS

Key Facts

- **Construction Complete & Commissioning Started**
- **Installed Capacity –** 150MW / 150MWh
- **Joint Venture** – 70% ENGIE / 30% Macquarie Green Investment Group
- **Main Contractor –** Fluence (A Siemens and AES company)
- **O&M** – Fluence (20 years)
- **Revenue** – 100% Merchant (Australian first). Fluence Digital - Auto Bidder
- **Future Expansion** – Additional 150MW/150MWh+ being planned to take advantage of abundant land and ~1760MW of network capacity

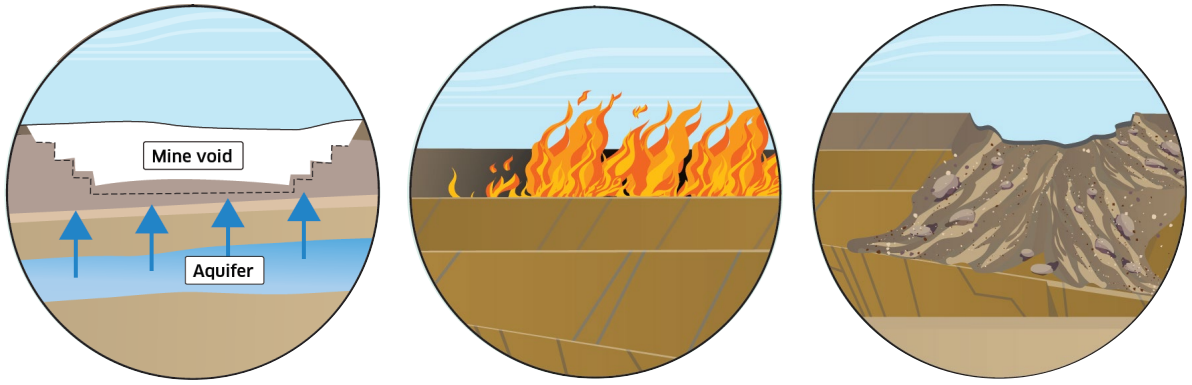
About Hazelwood Rehabilitation Project

ENGIE Hazelwood is rehabilitating the former Hazelwood Mine and Power station to deliver a safe stable, sustainable and non-polluting site that enables productive future uses.

The Hazelwood site

- The Hazelwood mine void is very large - 6 km long, 3.5 km wide and up to 135 metres deep.
- Site requires constant management to keep the mine void stable and safe.
- Proximity to the Princes Freeway and Morwell township.
- There is no ‘do nothing’ option.

Why is a lake proposed?



If left unfilled and unmanaged, the Hazelwood mine void could lead to issues including unsafe ground movements, fire in exposed coal, and batter instability.

A full pit lake is proposed because the weight of the water would push down on the floor and out on the walls of the mine.

This pressure will keep the very large mine void, walls and the land around it stable and safe, as well as effectively eliminating the risk of coal fire.

Water sources and lake top-up

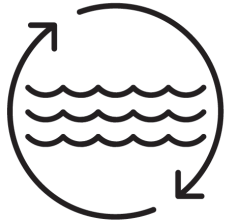
Water sources proposed to fill the pit lake are:

1) Groundwater, which is already collecting within the Mine void

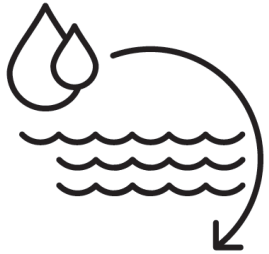
2) Water from the Moondarra Reservoir which ENGIE buys from Gippsland Water

3) Water from the Hazelwood Cooling Pond which would be piped into the pit lake in a single event several years after lake filling starts

Two options for the pit lake will be assessed in the EES:



An unconnected lake, which does not connect with any other waterways



A connected lake, allowing floodwaters from the Morwell River in periods of high rainfall to flow into and out of the lake

Considering alternatives to a pit lake

The final Scoping Requirements from the Minister for Planning require ENGIE Hazelwood to consider alternatives to a pit lake and for water sources.

- The EES will include an alternatives chapter and technical reports that consider potential alternatives to a pit lake and different water sources.
- Alternatives have been considered and raised through the Hazelwood Mine Fire Inquiry, Latrobe Valley Regional Rehabilitation Strategy (LVRRS) and Integrated Mines Research Group.
- The EES will consider if a partial lake is feasible and meets project requirements

ENGIE Hazelwood is required under Mining Licence and mining and environmental laws to deliver a site that is **safe, stable, sustainable** and **non-polluting.**

All potential options for the site's rehabilitation must be considered against these objectives.

Post EES – Declared Mine Rehabilitation Plan

We're starting work to prepare a draft Declared Mine Rehabilitation Plan (DMRP)

The DMRP enables:

- Government, and mining operators **to make decisions** relating to the rehabilitation of declared mine land
- **Clearer decision-making processes** on declared mine rehabilitation plan and variations, reporting on and assessment of rehabilitation activity and outcomes against rehabilitation plans.
- **Stakeholders** have an opportunity to **contribute** to the management of rehabilitation activities and outcomes.
- Specific **relinquishment (closure) criteria** that must be met before relinquishment of the mining licence can occur. Including agreed milestones for rehabilitation of various components of the site.
- Develop an understanding of post relinquishment risks and the transparent and evidence-based determination of the **Declared Mine Fund**

The three Latrobe Valley coal mines (Hazelwood, Yallourn and Loy Yang) are '*Declared Mines*' under the MRSD Act and required to each prepare a DMRP.

Covers from approval of the DMRP through to post relinquishment monitoring and maintenance of the rehabilitated landform, including relinquishment of the mining license and bond return.

Environment Effects Statement

The options and impacts of the proposed pit lake are being considered through the preparation of an Environment Effects Statement (EES).

Scoping Requirements established

- Draft Scoping Requirements exhibited by DTP
- Community consultation
- Public submissions on draft Scoping Requirements
- Final Scoping Requirements established by DTP

Prepare the EES

- Specialist studies to address the Scoping Requirements
- Community consultation to inform the preparation of the EES
- TRG advice and review of the EES

EES public exhibition

- EES released for public comment

Inquiry and Advisory Committee hearings

- Appointment of an Inquiry and Advisory Committee (IAC)
- IAC public hearings
- IAC considers the EES, project effects and submissions and provides a report to the Minister for Planning

Minister for Planning's assessment

- Minister's assessment of the environmental effects of the project
- Statutory decision makers will consider the Minister's Assessment in their decisions regarding the Project approvals

Key topics we'll look at tonight

- Why is filling the mine void with water the preferred rehabilitation approach?
- Would partial filling to create a lower lake achieve the stability and safety objectives?
- How will the EES assess the effects of the proposed water use on waterways and groundwater resources?
- What will happen to material in the HARA once it's covered with water and how will this affect water quality in the pit lake and surrounding waterways?
- What would moving the HARA out of the mine void involve?

Stabilising a large mine void

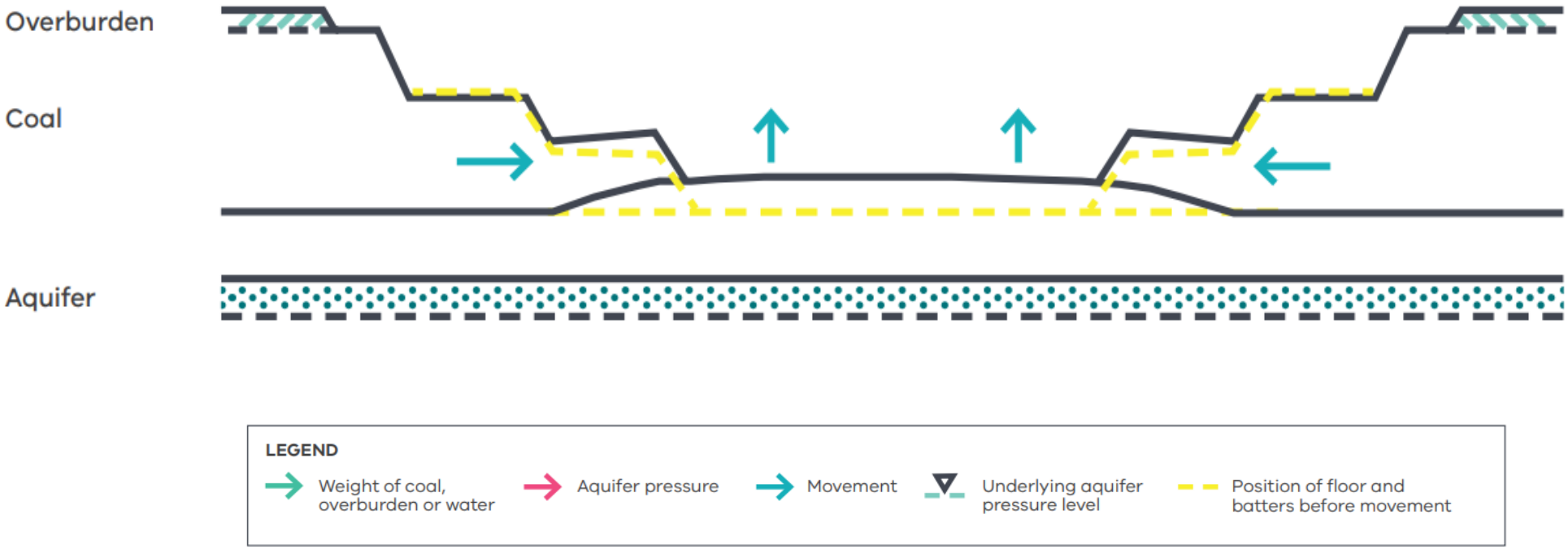
Dr Chris Haberfield, Principal Geotechnical Engineer
WSP Golder

Stabilising a large mine void

What are we doing?

- Assess the proposed rehabilitation project
- Provides a landform that is safe and stable during rehabilitation project and into the future
- Safe and stable means:
    - ground movement risks are acceptable to stakeholders
    - The final landform does not suffer any unacceptable instability

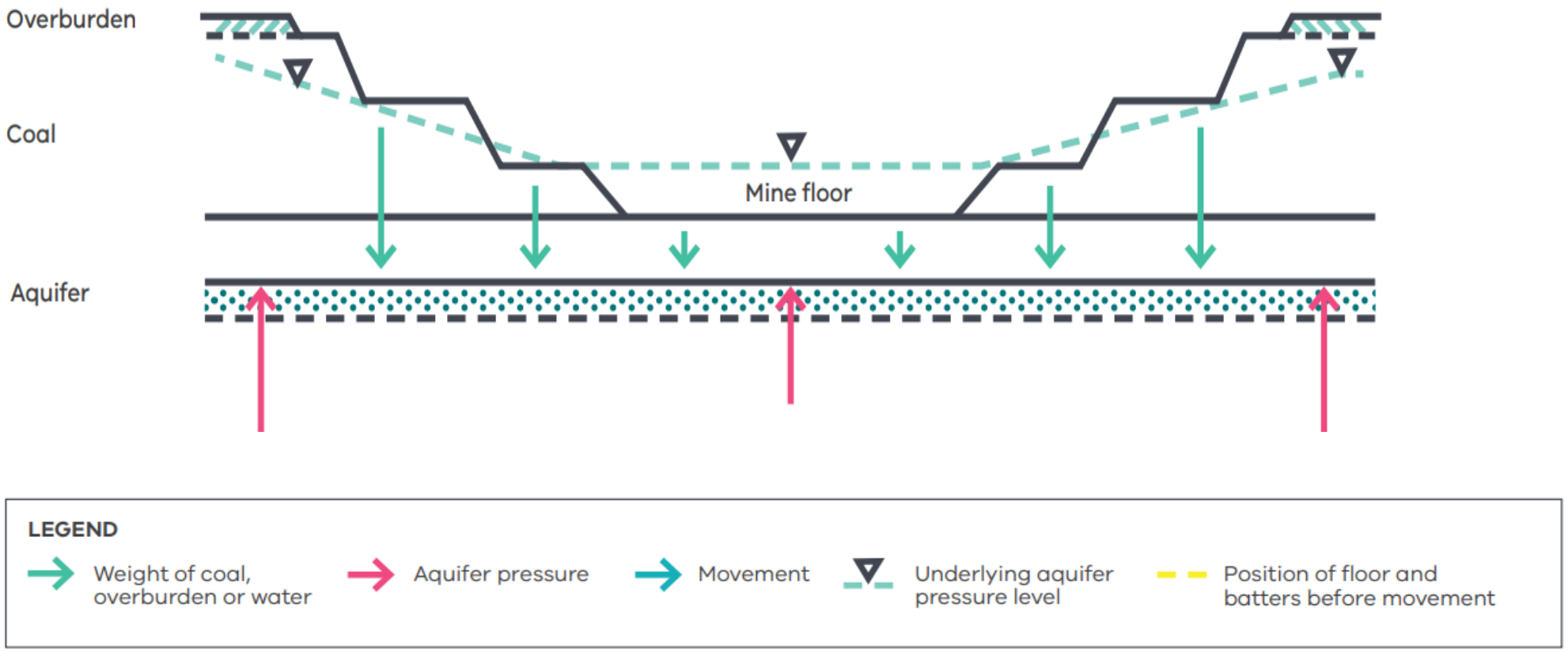
Safe and stable: Latrobe Valley site context



- Throughout the operation of Hazelwood, aquifer pressure was reduced to allow for safe mining
- 17GL of water pumped annually from underlying aquifers at Hazelwood, Yallourn and Loy Yang

Taken from Hazelwood Mine Fire Inquiry Report 2015/16 Volume IV – Mine Rehabilitation

Safe and stable: Latrobe Valley site context



Taken from Hazelwood Mine Fire Inquiry Report 2015/16 Volume IV – Mine Rehabilitation

Safe and stable: Now and into the future

Same movement and instability risks apply now and into the future

- Rehabilitation must mitigate instability and limit ground movement to acceptable risk levels
- Do nothing requires aquifer pumping into perpetuity with high fire risk

If filled with water, pit instability and fire risk is mitigated:

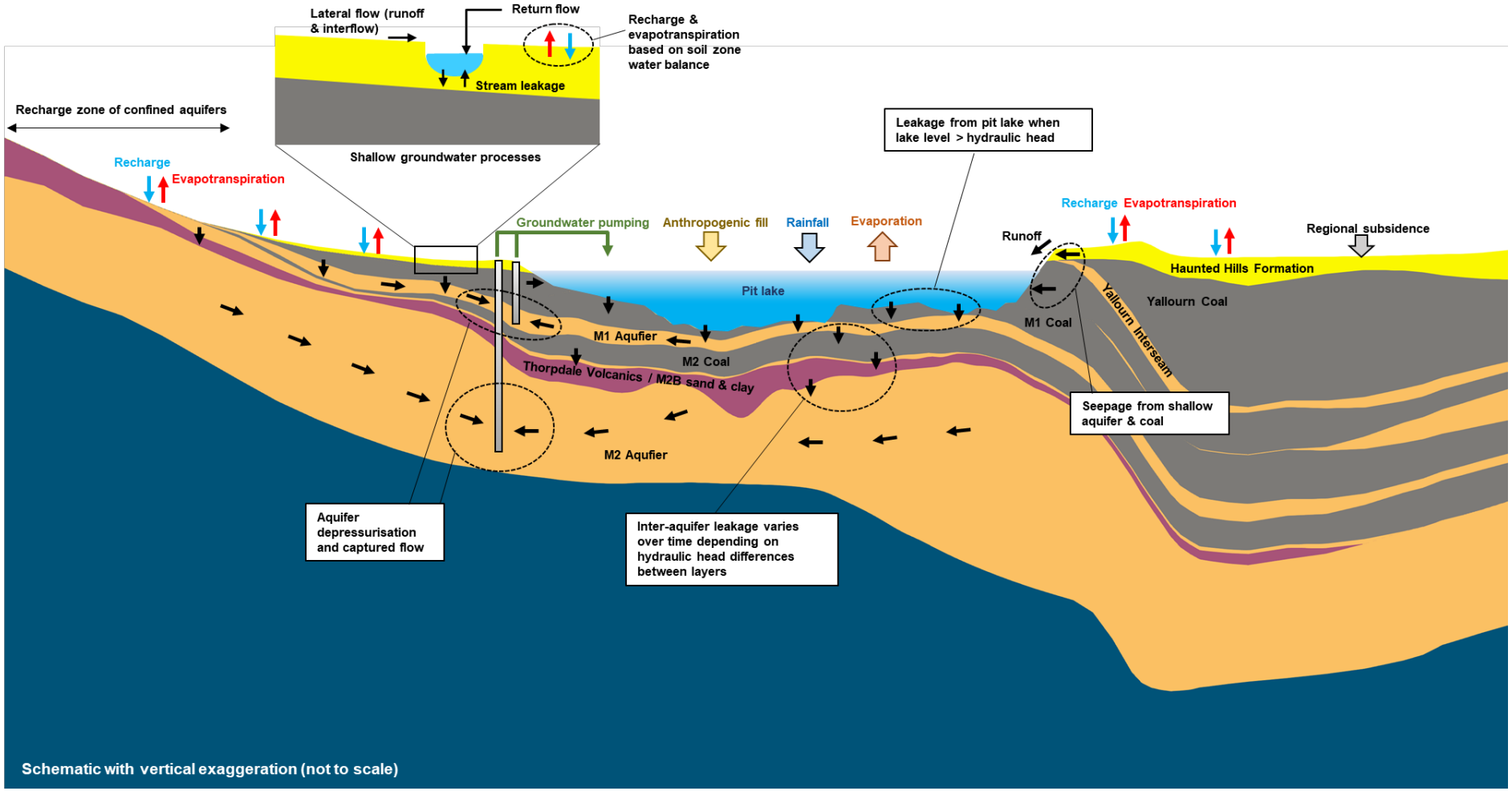
- Aquifer pumping no longer required for stability
- Aquifer levels recover and ground movements reverse (heave rather than subsidence)
- Significantly lower magnitude than historical subsidence resulting in the lowest risk of asset damage since start of mining (1950's)

Groundwater resources

Dr Tamie Weaver, Technical Fellow

ERM

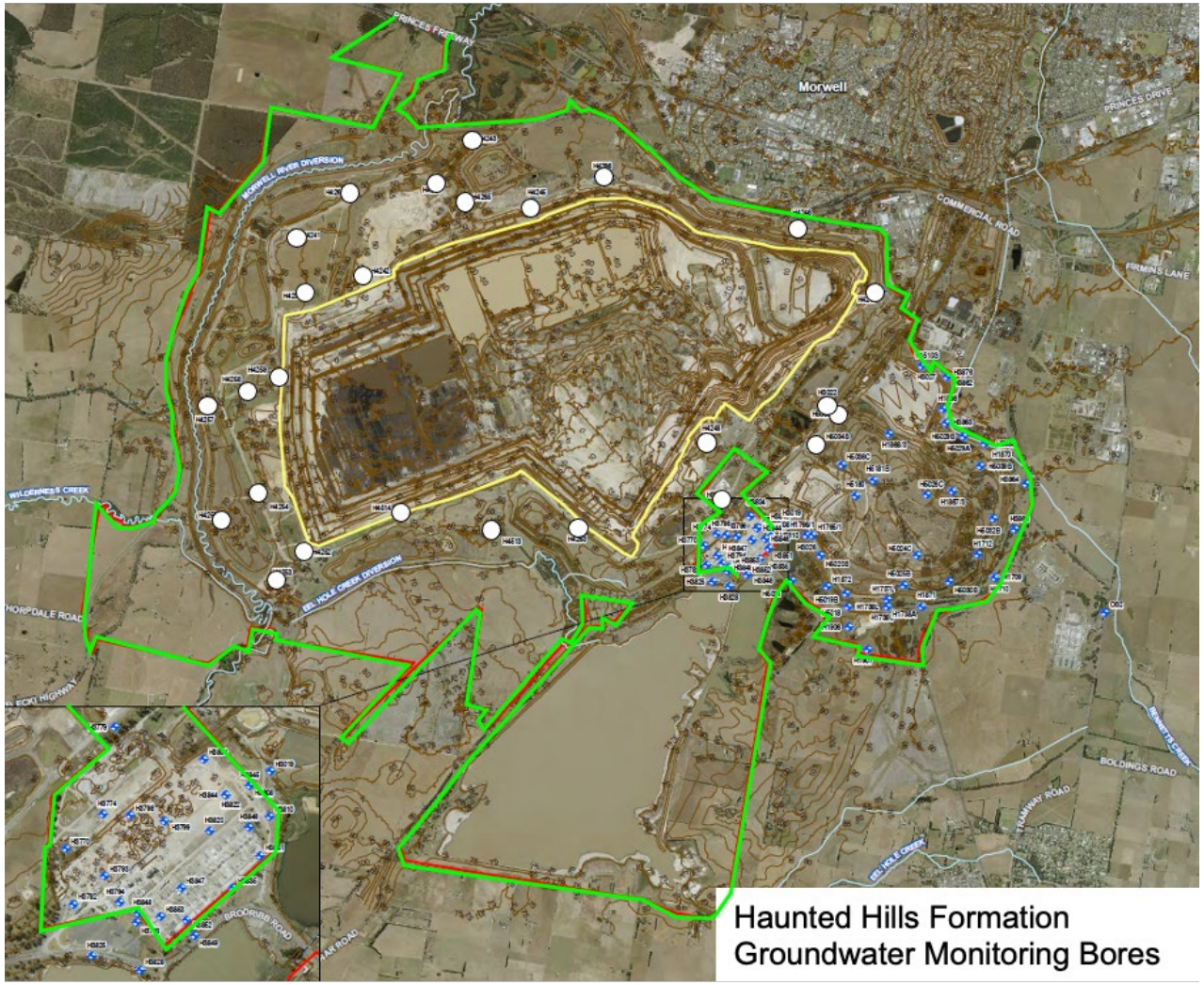
Groundwater at Hazelwood



- Groundwater has been extracted at Hazelwood since 1960's to create a safe environment for coal mining and maintain a dry void.
- Haunted Hills Formation
- M1 and M2 Aquifers (Morwell Formation)
- Deeper confined aquifers also subject to groundwater extraction and depressurisation at Yallourn and Loy Yang

Preparing the groundwater study

- Groundwater is one source of water proposed to fill the mine void to create a mine lake – already being extracted near of the mine and currently retained in the mine void
- After mine lake is established
  - Groundwater pumping will cease or substantially reduce
  - Groundwater pressures will recover locally to pre-mining conditions
- Groundwater model is a key input to assess project and cumulative impacts from other mines
- Long history of groundwater monitoring and assessment against which model has been evaluated



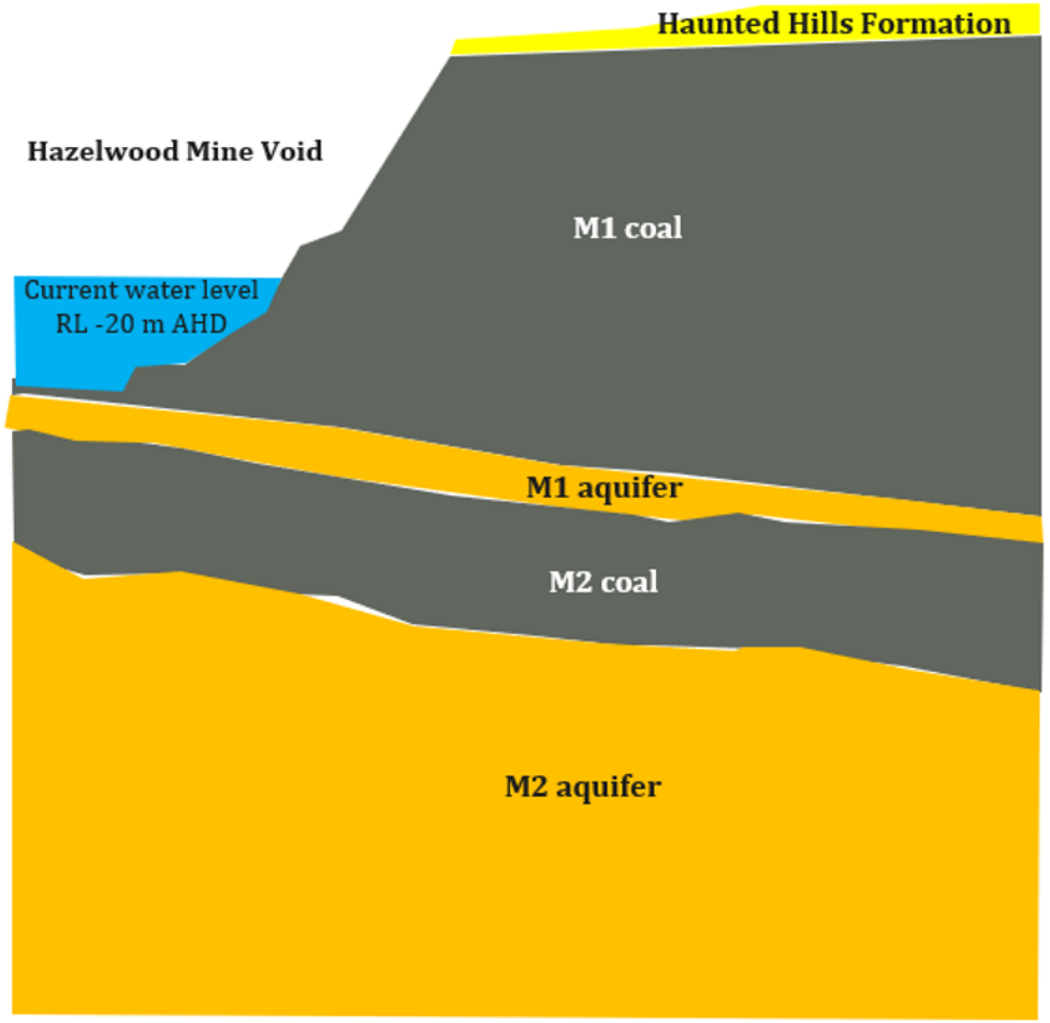
Haunted Hills Formation
Groundwater Monitoring Bores

© ENGIE 2024 - TECHNICAL CONVERSATION SESSION APRIL 2024

Assessing cumulative impacts on groundwater resources

Groundwater model used as assessment tool to consider:

- Varying filling rates
- Four climate scenarios
- Shallow to deep aquifer system
- Groundwater conditions during mine filling
- Groundwater conditions after mine filled
- Modelled through 2120



Waterways and wetlands

Ross Hardie, Director

Alluvium Consulting Australia

Scope of investigations: Themes, phases and cases

Themes

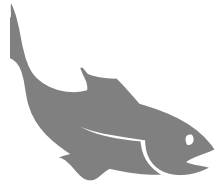
- Hydrologic and hydraulic impacts
- Geomorphic impacts
- Water quality impacts
- Vegetation (instream, riparian, wetland)
- Fauna impacts (fish, mammals, amphibians)

Phases

- Fill phase
- Post fill (Operations / implementation) phase

Cases

- Base case
- Hazelwood project
- Cumulative impact of Hazelwood, Yallourn and Loy Yang



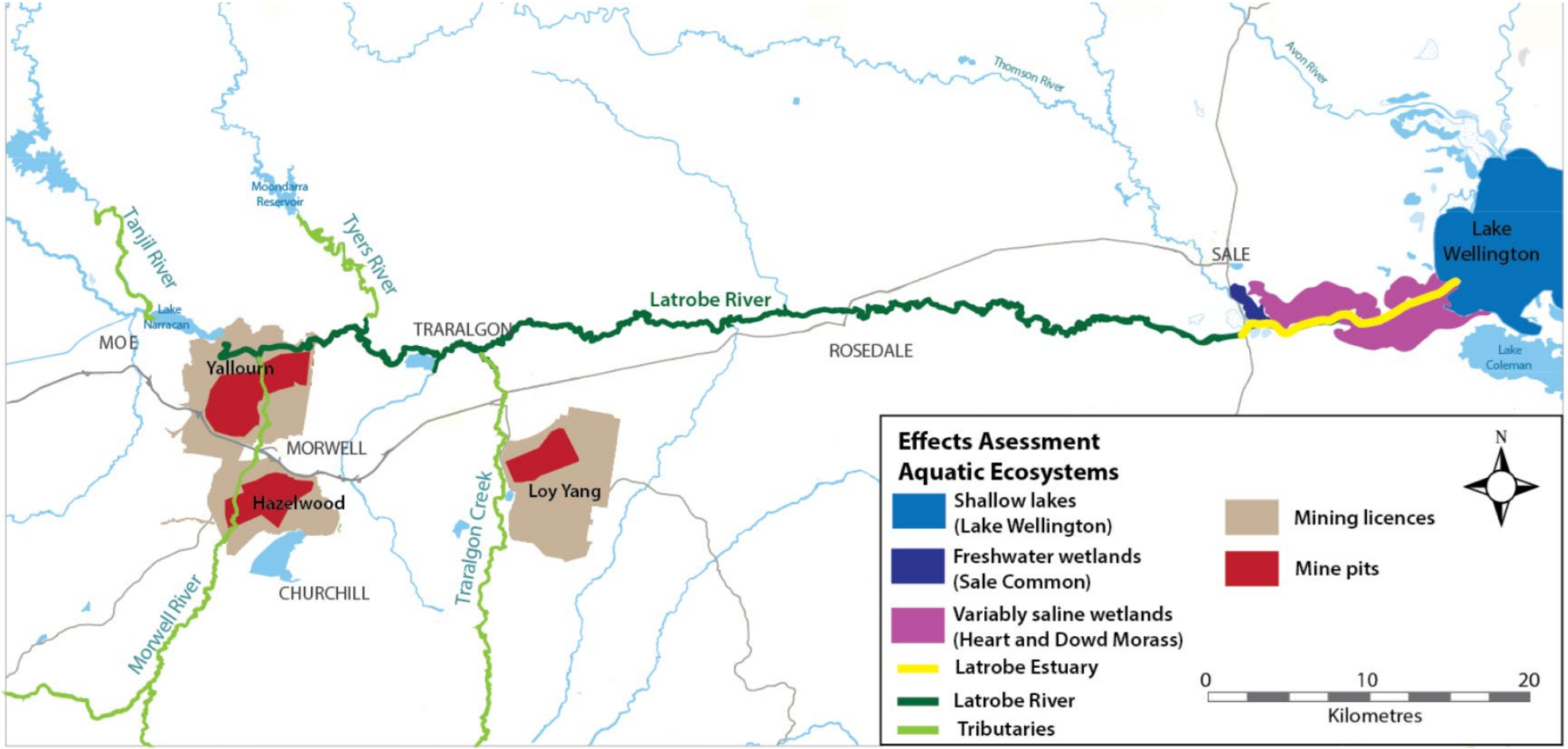
Connected waterways in the Latrobe Valley

Waterways:

- Eel Hole Creek
- Morwell River
- Tyres River
- Latrobe River

Wetlands:

- Morwell wetlands
- Lower Latrobe wetlands



Using commercially available water

- Gippsland Water have a Bulk Entitlement for the use of Water from Moondarra Dam and Blue Rock Dam for domestic and commercial purposes
- Gippsland Water determines how they use this entitlement, and who they sell water to for commercial use
- ENGIE currently purchases water from Gippsland Water, largely from Moondarra Reservoir, for active fire management and other site activities, under an existing commercial agreement
- The amount of water made available for use by ENGIE and other commercial users will respond to climate scenarios. Less water is and will be available for use in dry and drought conditions
- If water purchased under the existing commercial agreement is no longer required by ENGIE, Gippsland Water can make that water available for other users

Downstream effects

Measuring downstream effects

- Ensuring availability of flood flows and freshwater downstream
- Impacts to downstream ecological values
- Impact to water storage and connected waterways during low rainfall or availability

Maintaining freshwater flows downstream

- Salt water (from Gippsland Lakes) is flushed through the system through regular flood events and freshwater flows
- Ensure the level of flood harvesting from Morwell River (in a connected scenario) only comes into effect at a point when those levels have been reached

Water quality in the pit lake

Dr Matt Landers, Principal Geochemist,

RGS Environmental

Scope of the Water Quality technical study

1) Develop a climate change database (rainfall and evaporation) used as input into various modelling assessments.

2) Develop a pit lake water balance and water quality model with the objectives to:

- Estimate the pit lake water quality at closure and determine how it will evolve into the future and over the long term
- Understand the demand for water to fill and maintain the pit lake
- Understand how climate change and climate variability will affect the water balance and water quality

Method of assessment

A pit-lake model will assess different scenarios.

- **Pit lake model** is developed according to leading industry standards (Australian Groundwater Modelling Guidelines, National Water Commission).
- Developed using GoldSim which is a Windows-based program for carrying out dynamic, probabilistic simulations.
- Scenarios will be simulated using probabilistic (stochastic) rainfall data, consistent with the DELWP (2020) climate change guidelines (specific to the Latrobe Valley).

The results of several years of hydro-geochemical assessments, regular monitoring data, and outcomes of other technical disciplines (groundwater and surface water modelling), are used to **develop inputs to the pit lake model.**

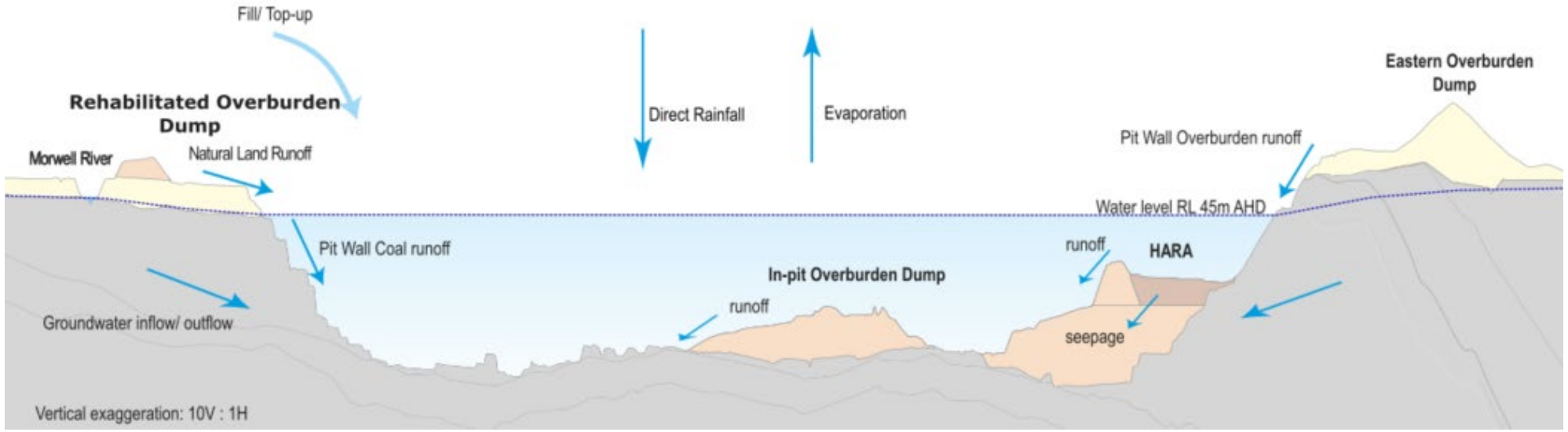
The model has been developed as a decision support tool for assessing closure options.

Pit lake water quality model

The model has a daily time-step, to run for a period of up to 100 years.

Model all pit lake inflow and outflows each day:

Inflows
- Direct rainfall
- Local runoff (catchment, pit walls, overburden dumps, etc.)
- Groundwater inflow
- External fill/ top-up

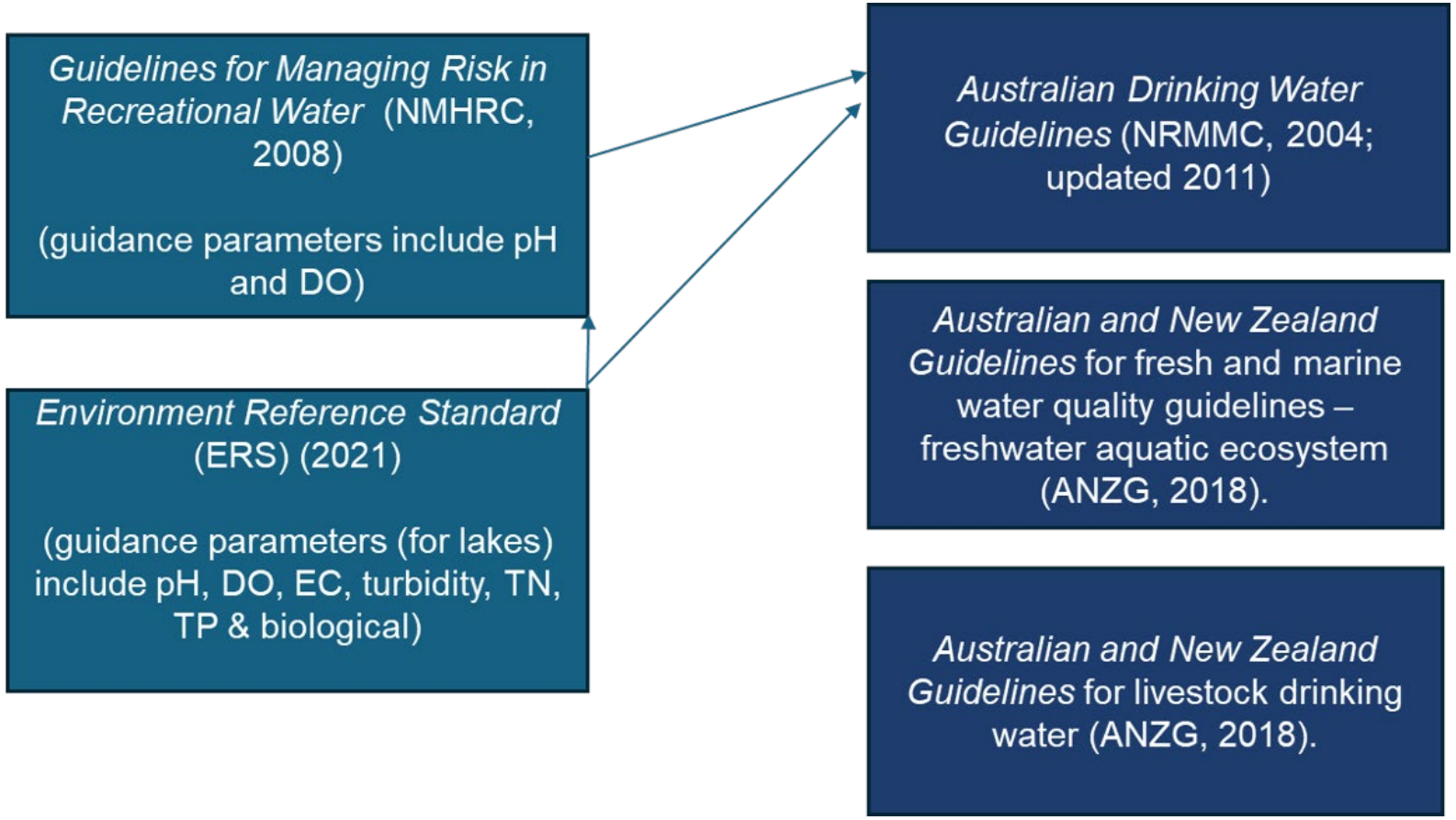


Outflows
- Evaporation
- Pit overflow/ through flow Morwell River
- Groundwater

Assessment criteria

For the lake water balance and water quality assessment, the key impact of concern is reduced water quality.

The guidelines cover a range of modelled parameters, which have different thresholds.



Expert Panel and Q&A

Wrap up

Please provide your feedback on tonight's session:

1) How useful was this event for understanding the project and providing feedback for the EES?

2) How can we improve our consultation approach?

3) What aspects in the EES do you most want to read about or make a submission on?

If you have questions we did not get to, or you would like to discuss further after tonight, please get in touch with us.

Sign up to e-news or ask us a question	**hazelwoodrehabilitation.com.au**
Send us an email	**hazelwood.au@engie.com**
Call us	**(03) 5135 5000**