

Understanding and assessing water resources

ENGIE Hazelwood is progressing a comprehensive technical assessment and consultation process for the Hazelwood Rehabilitation Project Environment Effects Statement (EES).

Delivering a safe, stable and non-polluting landform is central to the feasibility and success of the Hazelwood Rehabilitation Project and the site's potential for productive future uses.

A pit lake is proposed as the most effective solution to keep the mine void and surrounding areas stable and safe from risks of ground movement and fire.

This paper provides information on:

- How a lake would keep the mine void stable and safe
- How the proposed pit lake would be created over time
- Proposed water sources and alternatives
- How climate change scenarios are being considered
- How the four EES water studies will be prepared.



What are the water issues being assessed in the Environment Effects Statement?

An EES is a well-established process under the Victorian Environment Effects Act 1978, that provides a comprehensive framework for assessing projects with the potential for significant environmental effects.

Understanding water is central to the Hazelwood Rehabilitation Project EES, with four of the 16 EES technical studies examining aspects of groundwater and surface water use, flows and quality. The EES studies are connected – for example, the assessment of water quality will consider the assessment of water sources, soils and waste, and will inform the assessment of downstream waterways.

Scoping Requirements developed by the Department of Transport and Planning (DTP) will set out the matters to be assessed in the EES, and will define a specific evaluation objective related to landform safety and stability.

All environmental studies being prepared for the EES will be reviewed to ensure they are prepared in accordance with the final Scoping Requirements.

Why a full pit lake is proposed to rehabilitate the Hazelwood mine void

The size and close proximity of the Hazelwood mine void to the Princes Freeway, Morwell township and the Morwell River mean that long-term safety and stability are extremely important considerations for its rehabilitation.

If left unfilled and unmanaged, the Hazelwood mine void could lead to issues including unsafe ground movement and fire from exposed coal. These are significant risks for the community and ENGIE Hazelwood has a legal responsibility to manage these risks.

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 and the water will effectively eliminate the risk of coal fire.

Assessing effects on water both at and beyond Hazelwood

Four of the 16 EES technical studies will examine aspects of groundwater and surface water use, flows and quality. The study methods will be reviewed to ensure they respond to the final EES Scoping Requirements.

Technical study	Methods for assessment	Key considerations
<p>Water Resource Use and Regulation</p> <p>This technical study will assess the proposed pit lake's potential effects on availability of water resources for other uses.</p>	<ul style="list-style-type: none"> Review of publicly available information on water resource availability and use including Victorian Water Accounts, Victorian Water Register, regional water strategies, urban water strategies, and rehabilitation strategies for the mine site. In consultation with key water agencies, profiling existing and future potential water demands in the region. 	<ul style="list-style-type: none"> Regulatory frameworks for water resource allocation. Historic and future use trends impacting water availability and demand, including climate change. Other major users of water resources in the area and their needs.
<p>Lake Water Balance and Water Quality</p> <p>This study will investigate the amount of water flowing in to the mine void compared with the water leaving the system as run off or through evaporation and predict future water quality within the pit lake.</p>	<ul style="list-style-type: none"> Desktop assessments, field work and modelling will be used to identify potential water quality impact pathways at the mine lake and develop a conceptual model for the water quality of the mine lake. 	<ul style="list-style-type: none"> Potential effects of pit lake water quality on future uses. Water quality discharged from the pit lake to downstream waterways post filling.
<p>Catchments, Rivers and Wetlands</p> <p>This study considers waterways within the site and beyond the mine site into nearby catchments and water bodies.</p> <p>The study will assess the potential impacts of the project on catchments, rivers and wetlands, and consider key aspects including hydrology, geomorphology, water quality and aquatic ecology and cultural values.</p>	<ul style="list-style-type: none"> An existing water industry adopted daily timestep water balance model for the Latrobe River system will be used to identify baseline conditions. This model will also be used to identify the water resource demands and the impacts of the project on water resources by comparing the results against the baseline. The impacts on water resources will be used to inform an assessment of impacts on dependent ecosystems. 	<ul style="list-style-type: none"> Catchments, rivers and wetlands in the Gippsland region are part of an interconnected riverine system. This study will consider the implications of changes to the hydrologic regime at the site and beyond including: Eel Hole Creek; Morwell River Wetlands; Morwell River; Tyers River; Latrobe River; and The Lower Latrobe Wetlands The assessment will include review of potential impacts to water dependent values including native fish and vegetation communities.
<p>Groundwater</p> <p>The groundwater technical study will assess the potential effects of the proposal on groundwater flow into and out of the mine void during and after filling. It will consider potential impacts to groundwater availability, quality and the effects of pumping on the availability of groundwater to other users.</p>	<ul style="list-style-type: none"> Describe the existing conditions for groundwater in the region, including a review of existing users. Conduct predictive modelling scenarios based on the long history of groundwater monitoring and potential future conditions to assess potential effects on groundwater availability, quality and flows. 	<ul style="list-style-type: none"> Potential adverse effects on environmental values of groundwater from mine filling. Potential impacts on nearby existing groundwater resources and current and potential users.

Map of Latrobe River system from Hazelwood to Gippsland Lakes



How the pit lake would be created

ENGIE Hazelwood is proposing the creation of a lake filled to +45mRL or 45m above sea level.

A lake landform has been a central element of the rehabilitation plans for the site since the Mine was first developed.

The EES studies will consider:

- how much water would be needed
- where water would be sourced from and when
- how water sources and conditions in the void would affect water quality in the lake and downstream
- how quickly or slowly the pit lake could be filled
- whether connecting the lake to other waterways would have negative or positive effects.

Why is there already water in the mine void?

Some of the water already in the mine void is flood flows from the Morwell River Flood Diversion, which operated temporarily under emergency approvals to take flood waters from the Morwell River and enable batter repairs at the Yallourn Mine.

There is also water in the mine void from rainfall and water used for dust and fire suppression.

One of the other sources of water already in the mine is groundwater. Now that groundwater does not need to be pumped away to keep the void dry for coal mining, it is being allowed into the mine through a controlled process under existing approvals.

If groundwater pumps were simply turned off and the site was left, over decades the mine void would fill with water, to well over half full and potentially up to the level being proposed for the full pit lake.

If uncontrolled, this inflow of groundwater would likely result in floor heave and instability of the mine walls. Any events like this would likely affect the nearby Princes Freeway and Morwell township and limit land use in the vicinity of the mine, an impact which is clearly unacceptable.

The proposed lake landform is intended to permanently stabilise the mine void and minimise these risks.

Water sources and filling process

Water sources proposed to fill the pit lake are:

- groundwater, which is already collecting in the mine void
- water from Moondarra Reservoir which ENGIE purchases from Gippsland Water
- water from the Hazelwood Cooling Pond

The lake filling process is expected to take 10 to 15 years. The filling duration will be influenced by the availability of water – in periods of high rainfall it may be possible to speed up filling, whereas dry conditions would require filling to slow down to preserve water for other important uses in the Latrobe River catchment and the environment.

The EES will include an assessment of alternatives, including alternatives to a pit lake for achieving the project objectives and consideration of different options for water sources.

Assessing a river connection option

There are two types of mine or pit lakes – an unconnected lake, which has no connection with other waterways, and a connected lake which has connections to other lakes, rivers or wetlands.

Both options can have benefits and disadvantages. The EES will include an assessment of both an unconnected lake and an option to provide a limited connection between the Morwell River and the pit lake.

This connection would provide an option to use a proportion of floodwaters from the Morwell River during flood events.

The connection option could help the water quality in the lake by adding nutrients and circulating the water, making it more habitable for animals and improving options for recreation. It would also provide the option for water to flow back into the river downstream from the lake.

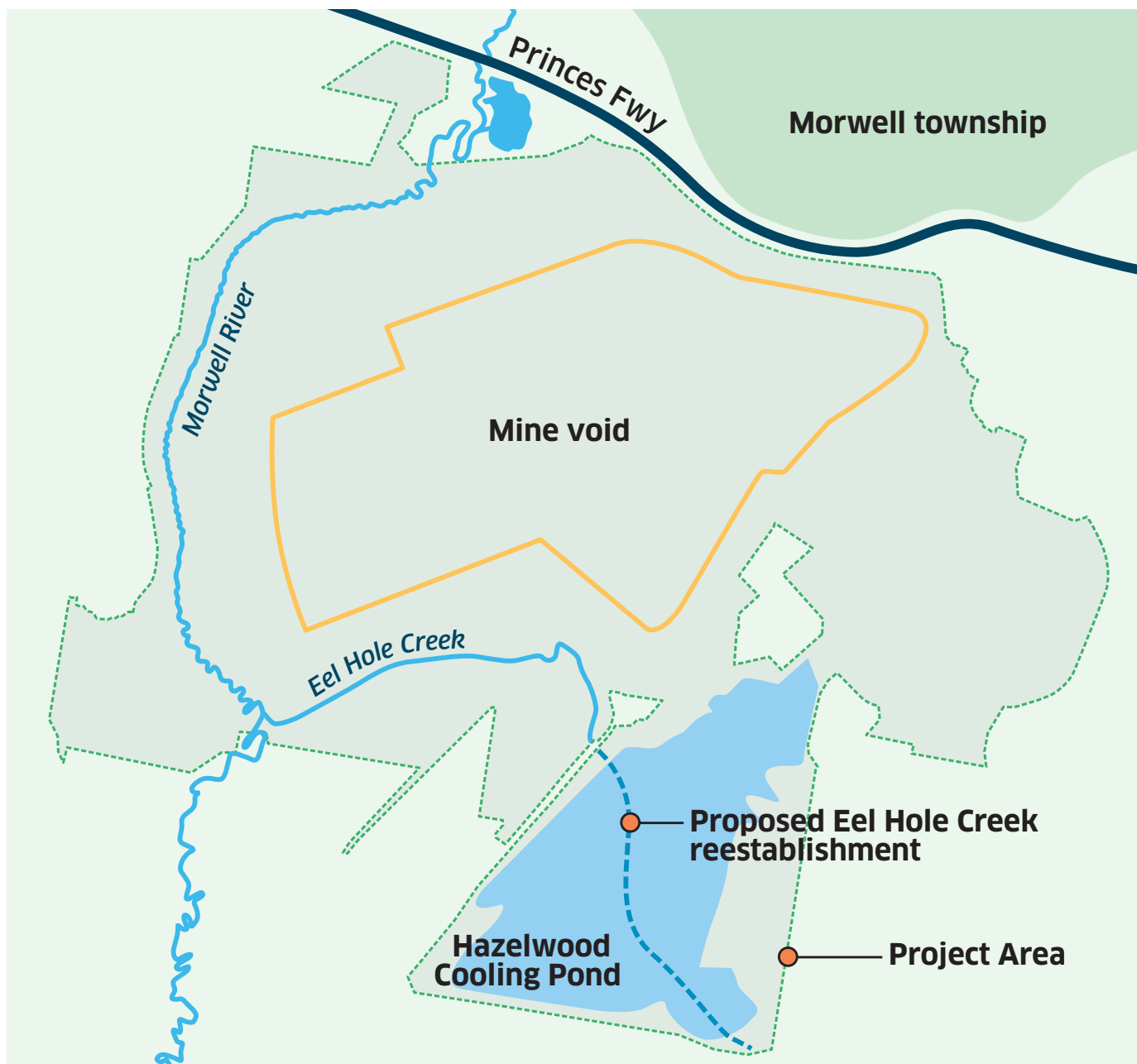
When it's dry and there's no flooding and extra water, this option would not be used. Importantly, the Morwell River would stay on its current course, with regular flow levels continuing to run through the existing river system even when some flood water is diverted to the pit lake.



What is Groundwater?

Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. Over time, water from rain and rivers migrates through the ground and is stored in porous soils and rocks, forming aquifers.

Aerial of mine void and surrounding waterways



Reinstating Eel Hole Creek to its natural course

At 4000 hectares, the Hazelwood site offers significant opportunities to reinstate areas of environmental and cultural value.

Eel Hole Creek currently flows through the Hazelwood Cooling Pond. The Hazelwood Rehabilitation Project proposes to transport water from the Hazelwood Cooling Pond into the pit lake and reinstate Eel Hole Creek to its natural alignment.

This proposal is being assessed through the EES and through discussions with the Gunaikurnai Land and Waters Aboriginal Corporation to ensure any effects from soils and waste and risks to cultural heritage and the environment are managed.



Assessing soils, waste and water quality

ENGIE Hazelwood needs to deliver a rehabilitation solution which is not only stable but non-polluting, sustainable and safe.

These are both the project's objectives and formal requirements ENGIE Hazelwood must comply with under its Mine Licence and under Victoria's mining and environmental laws.

Victoria's Environment Protection Act 2017 sets out a General Environmental Duty which applies to ENGIE Hazelwood and to all Victorians:

A person who is engaging in an activity that may give rise to risk of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.

The project's EES will include a Soils and Waste technical assessment and will:

- describe the composition of soils and any waste identified including some EPA licensed landfills in the assessment area
- inform assessment of any environmental effects soils and waste may have, including on ecology, air quality, water quality in the pit lake and on downstream waterways
- set out approaches to avoid or minimise these effects.

Will it be safe to cover coal, ash and other materials in the mine with water?

The EES will need to demonstrate to the satisfaction of the Minister for Planning that the rehabilitation approach including the pit lake provides acceptable outcomes for human health and the environment.

Before the decision that an EES should be prepared for the Hazelwood Rehabilitation Project, ENGIE Hazelwood initiated preparation of an independent Environmental Audit of the mine void by an EPA Appointed Auditor.

This independent Audit will play a key role in understanding and publicly describing the materials in the Hazelwood mine void and what would happen if these materials are covered with water through the creation of a pit lake.

What is the HARA?

The HARA is the Hazelwood Ash Retention Area. It contains thickened coal ash, a by-product from the combustion of coal for electricity generation. The HARA is one of five EPA-licensed landfills at the Hazelwood site, is located within the mine void and would be covered by water with the proposed full pit lake.

An Environmental Audit – formerly known as a 53V 'risk of harm' audit, Victoria's most stringent environmental audit process – is underway and is being prepared by an independent EPA-accredited Environmental Auditor.

The results of the Audit will feed into the project's EES and are expected to be publicly available in mid 2024. The Audit and the public report will include assessment of:

- the effects potentially contaminated material in the mine void would have on water quality in the pit lake
- options for the remediation of the ash disposal landfill
- groundwater flow and quality in relation to the materials in the mine void
- measures to mitigate or manage any unacceptable risks to human health and the environment.

ENGIE's aim is to achieve water quality in the lake capable of supporting associated ecosystems and options for future use, such as potential water-based recreation. The proposed rehabilitation approaches will be assessed for how well they achieve this aim.

Isn't there an alternative to using water to stabilise the mine void?

The EES will include a feasibility assessment of options and alternatives for stabilising and rehabilitating the large Hazelwood mine void, including other options for filling the mine and alternative water sources for creating the proposed pit lake.

Extensive previous technical assessments have been undertaken involving independent specialist advice, though the 2015-2016 Hazelwood Mine Fire Inquiry, the Latrobe Valley Regional Rehabilitation Strategy (LVRRS), the Integrated Mines Research Group and ENGIE Hazelwood's own study program.

Informed by this work, ENGIE Hazelwood considers a full pit lake to be the most effective and lowest risk method for achieving a long-term safe, stable, sustainable and non-polluting landform.

How will the EES consider the rivers, the Gippsland Lakes and climate change?

The EES will include an assessment of the proposed water resource use in different climate scenarios and the project's potential impacts on downstream waterways and ecosystems, including the Gippsland Lakes Ramsar site. The Climate Change technical study will consider evidence-based climate change scenarios that could impact:

- projected water availability
- potential downstream impacts to the Latrobe River catchment from continued water resource use
- fire risk due to changing climate.

During dry periods, proposed lake filling could require scaling back from sources which are more susceptible to climatic influences.

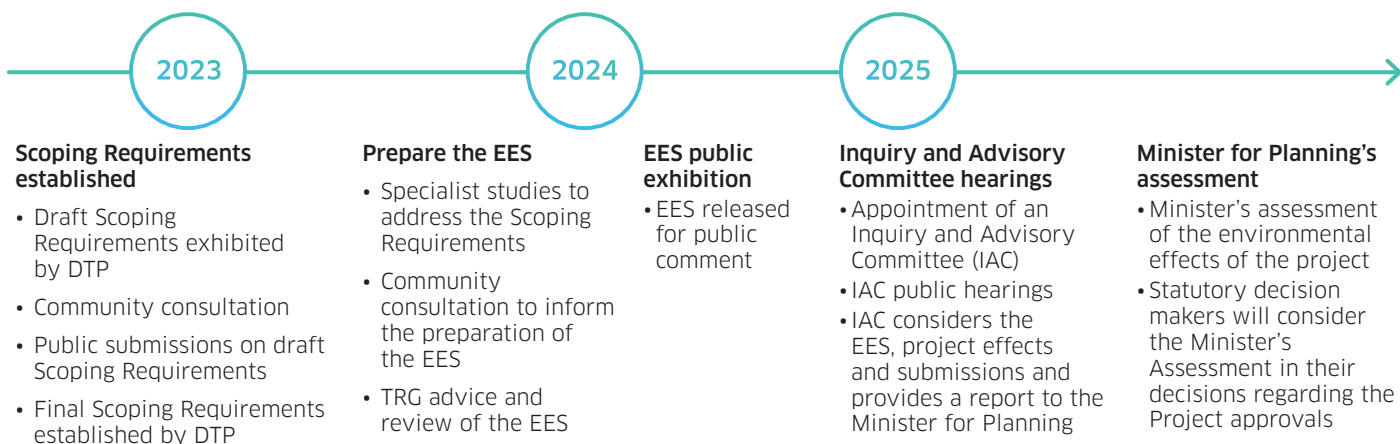
This proposed variable lake filling approach would ensure that the needs of other users and waterways can be balanced and prioritised, particularly during drier periods.



Have your say on the Environment Effects Statement

The EES for the Hazelwood Rehabilitation Project is being prepared and is expected to be exhibited for public comment from late 2024.

Key steps to prepare the Hazelwood Rehabilitation Project EES



Community and stakeholder input plays an important role in informing the preparation of the EES, well before it is finalised for exhibition.

ENGIE Hazelwood is holding a range of consultation activities to understand community views and feedback, and you can have your say any time.



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Ask a Question



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@hazelwood.au@engie.com ☎ 5135 5000

ENGIE Hazelwood acknowledges that the Gunaikurnai people are the Traditional Owners and Native Title holders of lands and waters in the Latrobe Valley and broader Gippsland region in which the ENGIE Hazelwood Rehabilitation Project is located, and we pay our respects to Elders past and present.

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