

# Landform Safety and Stability

**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 sustainable landform is central to the feasibility and success of the Hazelwood Mine 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:

- What rehabilitation methods are proposed
- Safety risks from empty coal mines
- How a pit lake would keep the mine void safe and stable
- How landform safety and stability will be assessed in the EES



## What aspects of landform safety and stability will the EES assess?

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.

The EES will include 16 technical study areas to understand the potential environmental effects of the Hazelwood Rehabilitation Project. These studies are connected – for example, the assessment related to landform stability needs to consider the assessment of groundwater.

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 stability is a central driver of the Hazelwood Rehabilitation Project

The Hazelwood mine void is very large, at 6 kilometres long, 3.5 kilometres wide and up to 135 metres deep.

The size and close proximity of the Hazelwood mine void to the Princes Freeway and Morwell township mean long-term safety and stability is an extremely important consideration for 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. Rehabilitation and stabilisation works have been required at the site for many years. The site is required under existing approvals to maintain safety and stability.

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

## Why do coal mine voids have stability risks?

ENGIE Hazelwood's project objectives and legal obligations are to ensure a safe, stable, sustainable and non-polluting site.

If the Hazelwood mine void walls or batters become unstable, the nearby Princes Freeway and communities in Morwell could be affected.

There are two main ground movements that are a risk for an empty coal mine void:

- **Floor heave** occurs when the aquifers below the mine floor put upward pressure on the empty mine void, causing instability in the mine walls.
- **Coal block movements** occur when water from high rainfall events can build up in the gaps between coal blocks. Increasing water pressure can push the coal blocks into the empty void, which can cause the mine walls to collapse.

The pressure of water from a full pit lake stops the steep sides of the mine void collapsing. This is achieved as the weight of water in the mine lake counteracts the upward pressure from the aquifers below and the inward pressure from the sides. Pit lake landforms within former coal mines are a common rehabilitation method successfully implemented in a number of mines nationally and internationally.

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

A lake landform has been a central element of the rehabilitation plans for the site before the mine was privatised in the 1990's, having been developed for the site by the State Electricity Commission of Victoria (SECV).

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 studies program.

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.

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

## Will sinkholes be an issue?

Sinkholes are unlikely to be an issue. If the groundwater pumps at Hazelwood were turned off, the aquifers under the mine floor would recover in an uncontrolled way, risking floor heave, mine wall movement and potential for land subsidence in the broader area.

Filling the mine with water would provide a weight to counteract the natural groundwater pressures. Carefully controlling the return of groundwater will minimise the risk of ground movement and other land stability issues.

## How will landform safety and stability be assessed?

A Geotechnical Hazards and Ground Movement study is being prepared by a specialist geotechnical consultant to assess the stability of the Hazelwood Mine and surrounding areas during and after the proposed rehabilitation works.

This study will describe the landform and geology of the project area and review historic reports on ground movement across the region.

The geotechnical hazards to be assessed in the study will include coal block sliding, batter or mine wall instability, floor heave and other ground movement considerations.

A focus for this study will be assessing potential public safety hazards and developing a clear approach for risk monitoring and management.

## Will changes in groundwater flows impact land stability?

Understanding potential changes in groundwater flows and how these can be safely managed are a key element of the EES for the Hazelwood Rehabilitation Project.

Groundwater has been pumped from below coal mines in the Latrobe Valley since they were built to provide a dry and stable area suitable for mining. Effects on ground levels and movement are monitored regularly.

The Groundwater study will assess how groundwater levels would change with the proposed creation of the pit lake, how these changes would affect land stability, and the methods needed for controlled and safe management of groundwater recovery.

## Could you leave the mine void as is?

There is no do-nothing option. An empty mine void would have substantial ongoing stability and fire risks and would require the permanent pumping of significant volumes of groundwater from below the mine. The large Hazelwood site would need to be permanently fenced, would never be usable for the public and would negatively impact the future of Morwell and the Latrobe Valley.

# Rehabilitation for a safe, stable and sustainable site

The Hazelwood site's size and close proximity to the Princes Freeway and southern part of the Morwell township means that long-term safety and stability are extremely important considerations for its rehabilitation.

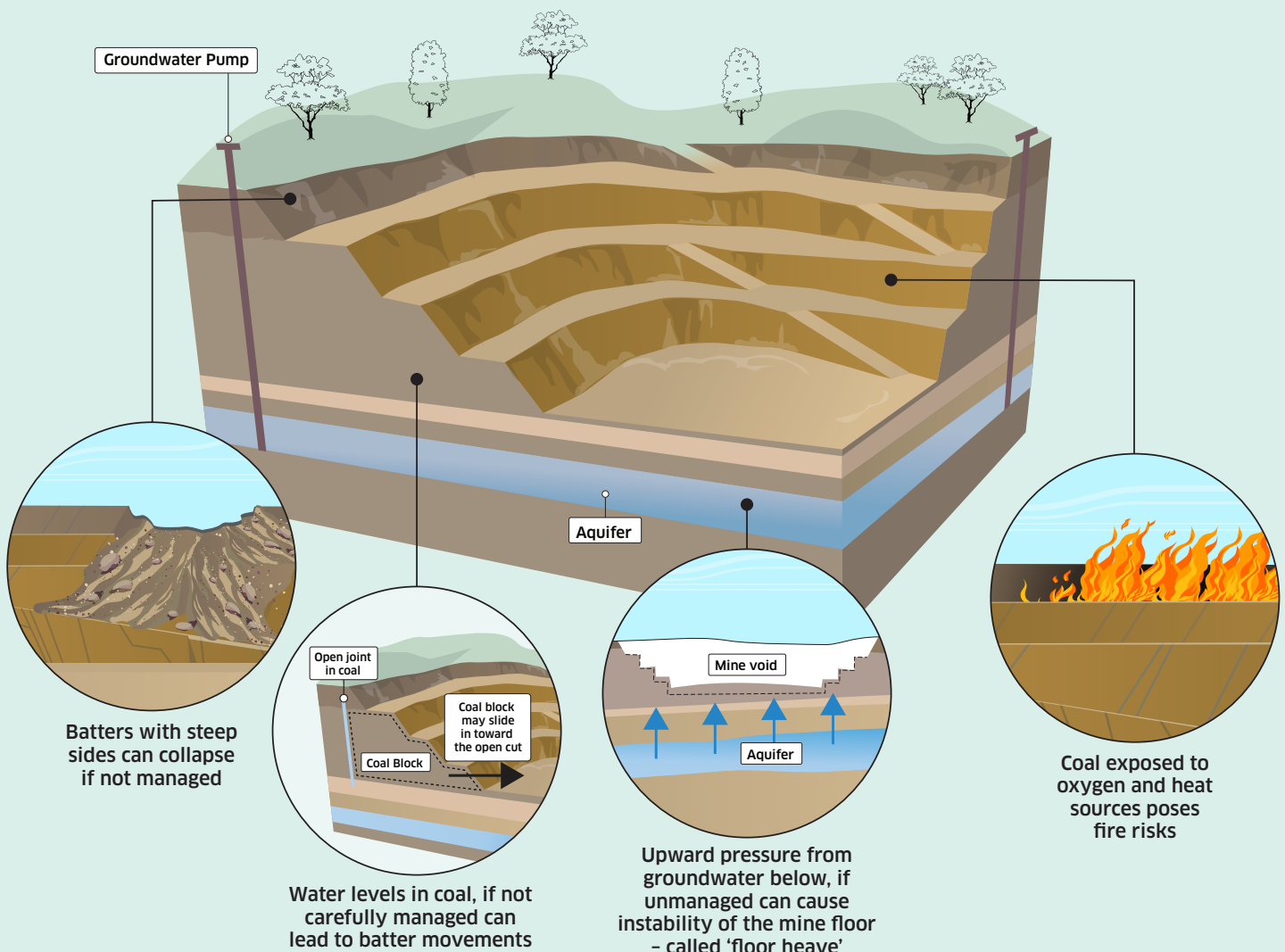
The Hazelwood mine void is very large. The safety issues of an empty mine would require long term management and pose ongoing risks across the site and for surrounding areas.

A full lake would not just make the site stable and safe in the long term - it would provide significant potential economic, recreational and flood mitigation benefits to local communities and the region.

## Coal facts

- The walls or 'batters' of open cut mines are made up of large sections of coal
- Brown coal is naturally jointed and contains gaps
- High rainfall can lead to a build up of water and hydrostatic pressure within coal joints, leaving mine walls at risk of movement
- During mine operation, groundwater was pumped away from the void to keep the mine stable
- Ongoing groundwater pumping is needed to stabilise the empty void until it is filled.

## Risks of an empty mine void



## Safe, stable and sustainable means

1

Is not likely to cause injury or illness

2

Structurally, geotechnically and hydrogeologically sound

3

Non-polluting

4

Aligns with principles of sustainable development

## What could happen at the Hazelwood site once rehabilitation is complete?

ENGIE Hazelwood has a legal obligation to provide a safe, stable, sustainable and non-polluting site.

A key objective of the project is to provide opportunities for future alternative productive land uses across the 4,000 hectare site. These uses might include recreation, cultural activities, tourism and agriculture. Minimisation of stability, ground movement and fire risks are fundamental to the site's potential.

ENGIE Hazelwood developed a draft Concept Master Plan in 2019 to explore possible opportunities for redevelopment at the site following the completion of rehabilitation works.

The Victorian Government has also considered land use opportunities associated with coal mine rehabilitation through consultation on the development of a Preliminary Land Use Vision as part of the Latrobe Valley Regional Rehabilitation Strategy (LVRRS).

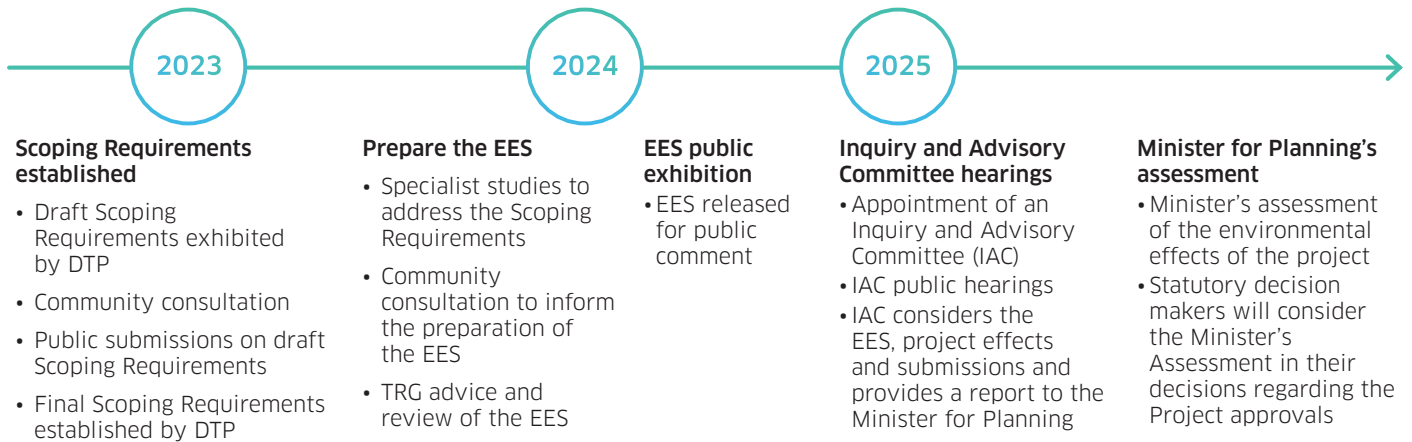
Future uses of the pit lake and surrounding land would be informed by a range of factors including government or third-party investment, accessibility, topography, future water access, final lake water quality and further community consultation.



## 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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## Find out more and stay involved

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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.

[hazelwoodrehabilitation.com.au](http://hazelwoodrehabilitation.com.au)

