

Preliminary EES Information Sheet for Existing Conditions

Geology and Contaminated Land

Introduction

The purpose of this document is to provide a summary of the existing conditions identified for geology and contaminated land within the Western Renewables Link area of interest (AOI). Identifying the existing geology and contaminated land within the AOI is an important step towards understanding the potential impacts, interactions and considerations for the project.

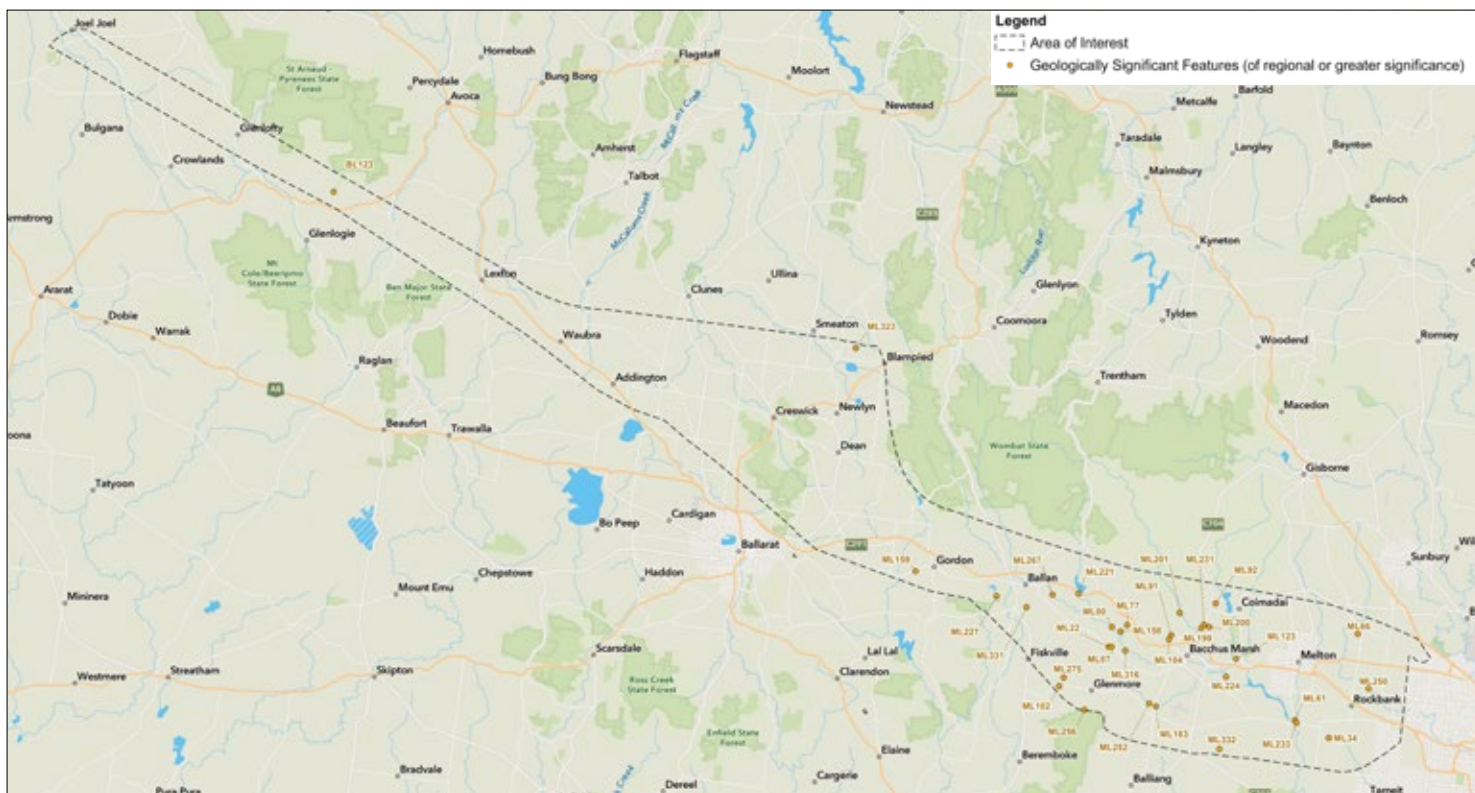


Geology refers to the surface and sub-surface soil and rock conditions. Contamination of land refers to soil, groundwater, surface water and ground gases that have the potential to harm human health and/or the environment. The existing conditions have been identified by qualified, independent technical specialists and include areas of erosion, salinity, significant geological localities and potentially contaminated sites. A review of geological maps and survey reports, landslide and erosion maps, salinity province mapping and contaminated land public registers (e.g., Victorian Landfill Register, Environment Protection Authority Priority Site Register) was undertaken. Contaminated site audits have also been undertaken and relevant legislation, policy and guidelines have been considered. Field surveys and investigations will be undertaken within the project corridor to gather more information, where required, about existing conditions and potential project impacts. The findings will be updated and included in the geology and contaminated land impact assessment for the Environment Effects Statement (EES).

Community and stakeholder feedback

The community has provided important input about existing conditions including:

- Sites of geological significance.
- Sites prone to erosion including landslips, gullying and tunnel erosion.
- Historical mine site locations.



Geologically Significant Features (of regional or greater significance) (Data source: SIGFEAT, DELWP, 2021)

Summary	Erosion	Salinity	Geologically significant sites	Potential contaminated land sites
Western section of AOI	Small areas covered by an Erosion Management Overlay within Hepburn and Ballarat Planning Schemes.	Up to 60% covered by salinity provinces (areas known for saline groundwater discharge).	Two identified including: Kangaroo Hills and Mount Direction Roof Pendant.	Intensive agriculture sites and historical gold mining sites southeast of Creswick and between Bulgana and Waubra.
Eastern section of AOI	Generally low susceptibility to erosion, however high to very high susceptibility to erosion around Maddingley, Gordon, Werribee Gorge State Park and Long Forest Nature Conservation Reserve. Small areas covered by an Erosion Management Overlay within the Hepburn Planning Scheme.	Up to 50% covered by salinity provinces.	30 identified including: Korkuperrimul Creek (national significance), Bald Hill (international significance) and Lerderderg River Morven (international significance).	Intensive agriculture sites, Maddingley open cut coal mine, Darley and Coimadai sand quarries, industrial areas and landfills, recycled water treatment plant and airport. Historical gold mining and extractive sites surrounding Ballarat and Creswick, including former gold mine at Gordon and quarry at Bungaree.

Western section of AOI – Bulgana to North Ballarat

The west of this section has poorly developed rocky or riverine-type soils with a low potential for erosion. The eastern half of this section toward Ballarat has well-draining acidic soils. Small areas of land in the precinct are covered by an Erosion Management Overlay in the Hepburn and Ballarat planning schemes. There is low probability of acid sulfate soils, which contain iron sulfide minerals that caused damage to the environment when disturbed, for most of this section of the AOI, except around established waterbodies e.g., reservoirs, lakes and wetlands and waterway areas.

Up to 60% of the western section of the AOI is covered by salinity provinces as defined by Agriculture Victoria, with saline discharges most likely to occur in low-lying depressions and along existing drainage lines.

Two sites of regional geological significance (Geology Survey Australia) have been identified in the western section of the AOI:

- Kangaroo Hills: prominent landforms relating to unusual style of historical eruption.
- Mount Direction Roof Pendant: exposed granite near the top of the intrusion shows mode of intrusion, and relationships with host rocks.

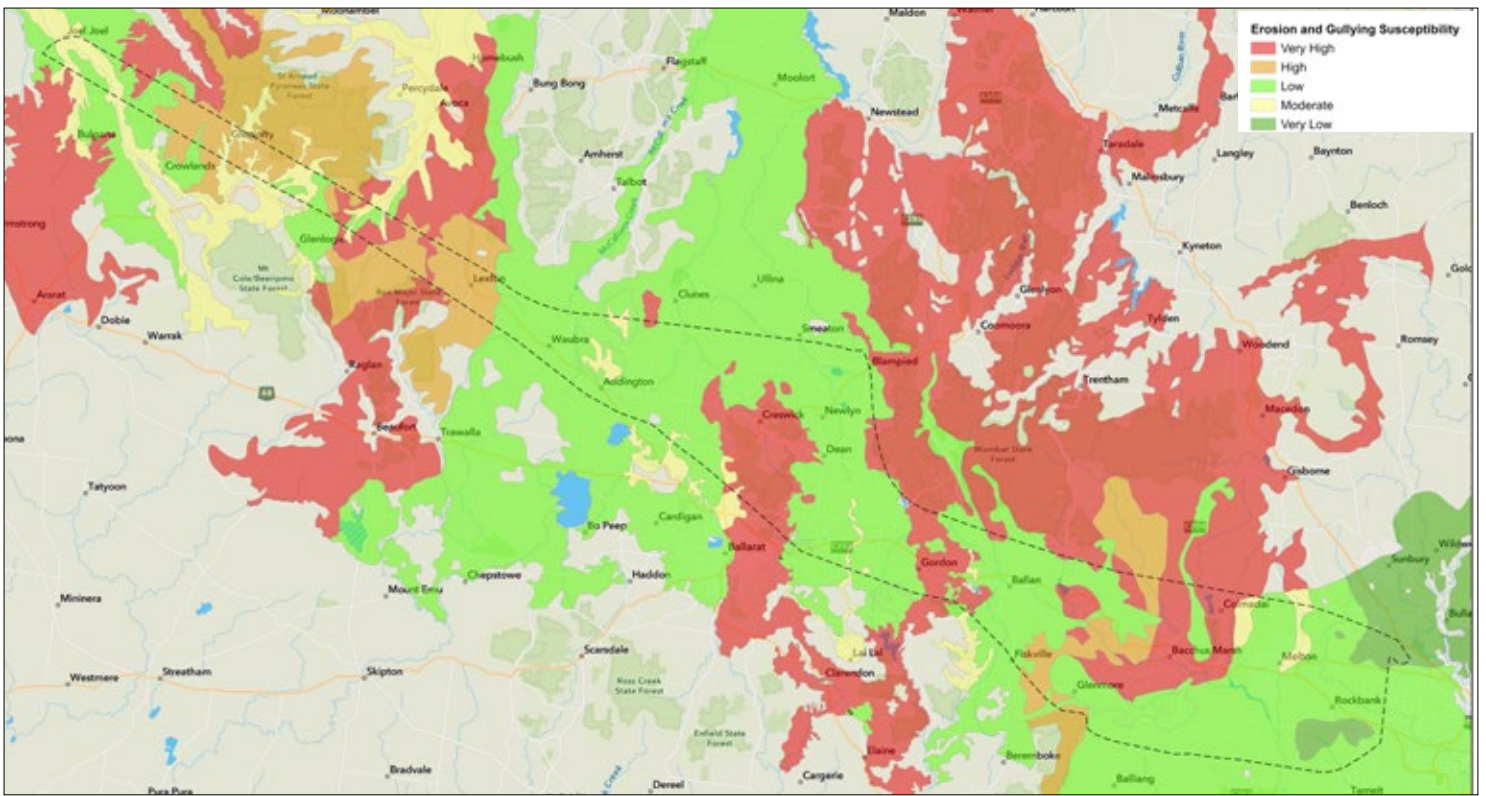
The main land use is agriculture and farming, with potential for intensive agriculture, including sheep and cattle dips, to result in land contamination risks. The former Creswick landfill site is a high-risk site for contamination. Historical mining activities, particularly to the southeast of Creswick and between Bulgana and Waubra, may have resulted in contamination of soil and groundwater from the discharge of mining waste to the environment.

Eastern section of AOI – Ballarat to North Sydenham

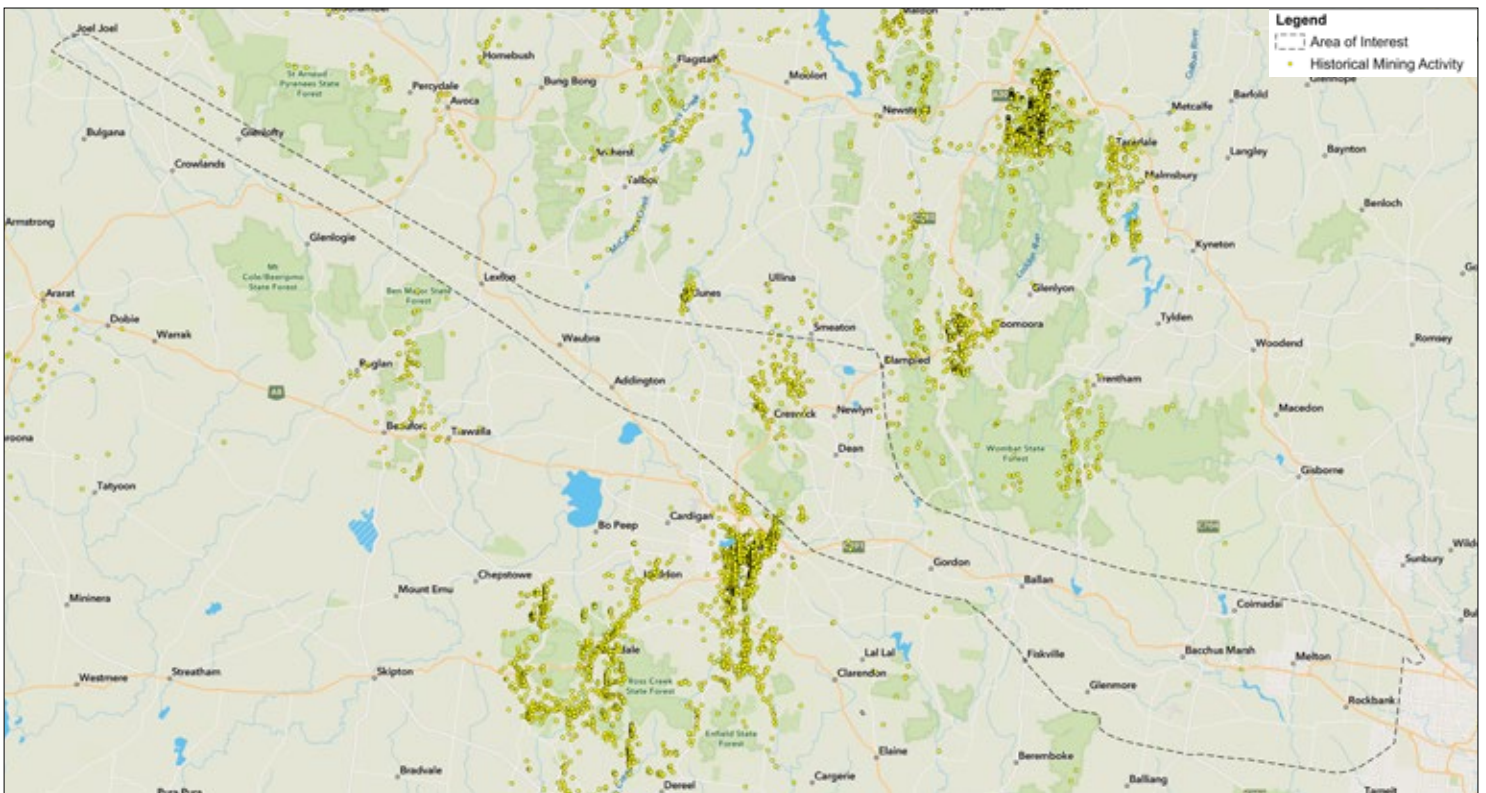
This section of the AOI has sodic soils susceptible to waterlogging and erosion. Small areas are covered by an Erosion Management Overlay. There is low probability of acid sulfate soils for the majority of this section of the AOI, except around established waterbodies e.g., reservoirs, lakes and wetlands and waterway areas. Up to 50% of the eastern section of the AOI is covered by salinity provinces with saline discharges most likely to occur in low-lying drainage basins and basaltic plains.

Thirty sites of geological significance (Geology Survey Australia) have been identified in the eastern section of the AOI including:

- Korkuperrimul Creek (national significance): Permian glaciogenic sediments, tillites, fluvio-glacial sandstones and conglomerate. Faulted against Ordovician bed-rock.



Erosion and gully susceptibility (Data source: GMU250, DELWP, 2021)



Historical mining activity (Data source: SHAFT, DELWP, 2021)

- Bald Hill (international significance): Complex small folds and faults, Gangamopteris in sandstone, marine Notoconularia, leaf remains (fossils).
- Lerderderg River Morven (international significance): Exposure of continuous 145m section of Permian glacial deposits including tillite, glacial outwash, ice rafts.

The main land use is agriculture and farming, with potential for intensive agriculture, including sheep and cattle dips, to result in land contamination risks. Current mining activities include an open cut coal mine at Maddingley, co-located with a waste and resource recovery hub, and quarries at Darley and Coimadai. There are isolated landfills and industrial areas at Bacchus Marsh, Melton, Ballan and Maddingley including the Western Water Melton Recycled Water Treatment Plant (sewage treatment), Bacchus Marsh Irrigation District and Bacchus Marsh airport.

The Western Irrigation Network, a major new recycled water irrigation scheme is also proposed for the Parwan-Balliang agricultural district and is expected to be delivering water to farmers in 2022. Historical mining and extractive activities occurred in isolated areas in the eastern half of the AOI, including a former gold mine near Gordon and former bluestone quarry near Bungaree.

Considerations for the project

A range of considerations have been identified for further investigation and management which will be addressed in the geology and contaminated land impact assessment including:

- Potential for land erosion resulting from construction and operation due to vegetation loss or other factors.
- Potential for disturbance of contaminated, saline, dispersive or acid sulfate soils impacting salinity management, waterways, vegetation and land degradation.
- Potential for impacts on sites of geological significance.
- Construction activities encountering historic mining waste potentially contaminated by high concentrations of arsenic and/or mercury, contaminated soils and/or groundwater.
- Potentially contaminated land sites including landfill sites, intensive agriculture, and a water treatment plant.
- Long term impacts of soil chemistry on project infrastructure.

Next steps

- Engage with landholders to undertake field surveys and investigations on properties in areas identified based on the findings to date.
- Undertake an assessment of the potential impacts of the project through site visits, undertake soil and groundwater sampling and laboratory testing as required.
- Further landowner, community and stakeholder consultation.
- Prepare a geology and contaminated land impact assessment based on the project corridor, including proposed mitigation measures to manage any potential impacts. The impact assessment will inform the proposed route and be published as part of the EES. The EES will be an important source of information about potential project impacts for the community, landholders, decision-makers and as part of the approvals process.



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