Western Victoria Transmission Network Project

Preliminary EES Information Sheet for Existing Conditions

Groundwater

Introduction

This document provides a summary of the existing groundwater conditions identified for the Western Victoria Transmission Network Project (WVTNP) area of interest (AOI). Identifying the existing groundwater values within the AOI is an important step towards understanding the potential impacts, interactions and considerations for the project.

The existing groundwater conditions have been identified by qualified, independent technical specialists. Existing conditions features for groundwater environments include aquifer locations, watertable depth and quality, protected groundwater uses and links to surface water features. A review of geological maps and survey reports, state-wide datasets including salinity and watertable depth, and registered groundwater users and groundwater dependent ecosystems was undertaken, and relevant legislation, policy and guidelines have been considered. Field surveys and investigations will be undertaken to gather more information, where required, about existing conditions and potential project impacts. The findings will be updated and included in the groundwater impact assessment for the Environment Effects Statement (EES).

Community and stakeholder feedback

The community has provided important input about existing conditions including:

- Importance of groundwater protection for the spa and tourism industries.
- Value of groundwater for agriculture and horticulture industries.
- Groundwater dependent ecosystem locations and their interaction with surface waters.

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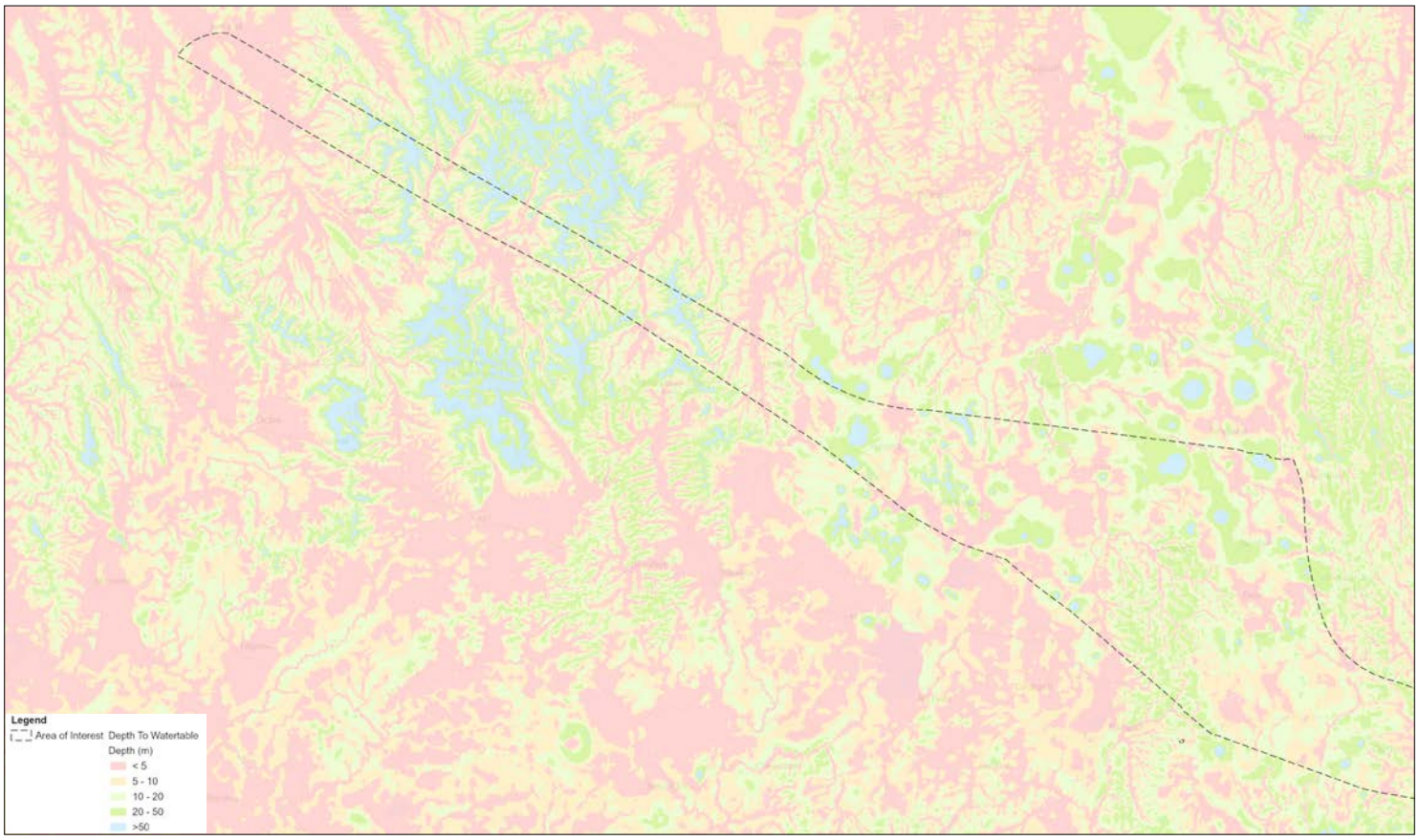


Western section of the AOI depth to water table (Data source: Water level, 2021)

About groundwater

Groundwater refers to water located beneath the earth's surface. Groundwater is rainfall that has seeped through the ground and become stored in porous soils and rocks, the spaces between soil and rocks or in fissures and fractures in the rock itself. Groundwater plays an important role in sustaining aquatic and terrestrial ecosystems (springs, rivers, wetlands, and vegetation), irrigation bores, agricultural and industrial uses. 'Groundwater receptors' is a term used to encompass groundwater users and groundwater dependent ecosystems.

Soils and rocks that receive, store and transmit large quantities of groundwater are known as aquifers. Aquifers can be recharged with water from rainfall or other surface water e.g., lakes and waterways. Unconfined (surficial) aquifers have no confining layer over them and readily interact with aboveground environments and surface water. The watertable refers to the upper surface of an unconfined aquifer. Confined aquifers have relatively impermeable rock or clay over them that limits groundwater movement into or out of the aquifer.

Protected groundwater uses

Groundwater is protected under the State Environment Protection Policy (Waters) / Environment Reference Standard. Protected uses for groundwater vary depending on the groundwater salinity in that location, measured in total dissolved solids. The protected uses or values are:

- Water dependent ecosystems and species.
- Potable water supply.
- Potable mineral water supply.
- Agriculture and irrigation – irrigation and stock watering.
- Industrial and commercial.
- Water based recreation – primary contact.
- Traditional Owner cultural values.
- Buildings and structures.
- Geothermal properties.

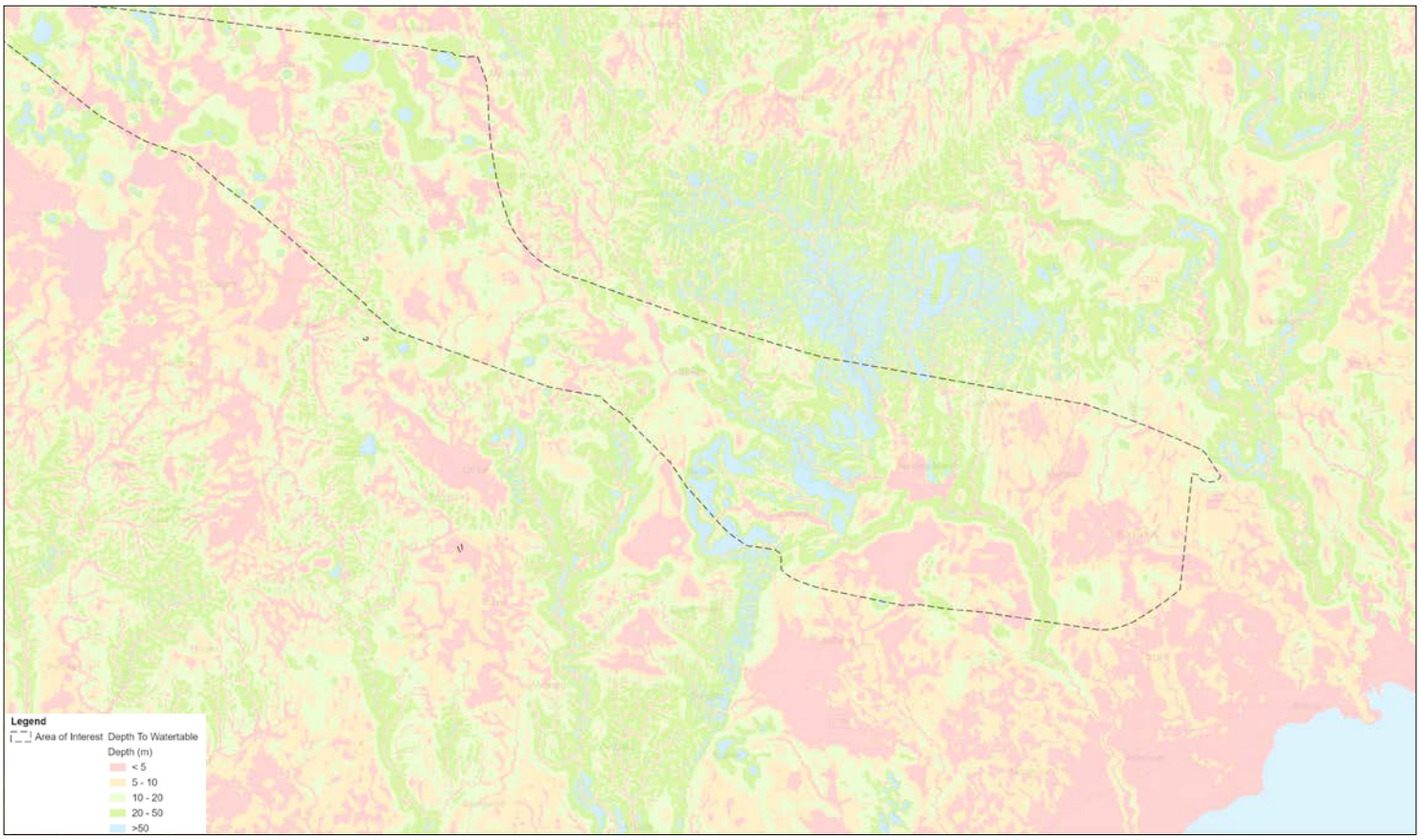
Western section of AOI – Bulgana to North Ballarat

Aquifers in this area include: unconfined aquifers associated with creeks and rivers and in direct hydraulic connection to surface water; the Newer Volcanics aquifer; and bedrock aquifers.

The expected depth to the watertable varies from less than 5m to greater than 50m across the area, with the majority between 5 and 20m. A shallow watertable (less than 5m) is likely to correspond with valleys and surface water. A deeper watertable is associated with outcropping bedrock in areas of high elevation. Watertable salinity is expected to vary from less than 500 to 3,500mg/L total dissolved solids. Based on this salinity level, groundwater in this section of the AOI varies from segment A1 to C in the Environmental Reference Standard, meaning the majority of uses are protected in most areas. In some areas the water is not considered potable or suitable for irrigation.

Almost all major surface water features are classed as having a high potential for groundwater dependence in the National Atlas for Groundwater Dependant Ecosystems[1]. Scattered areas of vegetation, mostly along drainage lines, are listed as having a moderate potential for groundwater dependence. There are several registered and licensed stock and domestic groundwater users in this section of the AOI. The majority of groundwater users are within the Loddon Groundwater Catchment, where groundwater extraction is managed under the Loddon Highlands Water Supply Protection Area. Groundwater bores in the area primarily target the Newer Volcanics aquifer because it's shallower and less saline.

1. http://www.bom.gov.au/water/groundwater/gde/



Eastern section of the AOI depth to water table (Data source: Water level, 2021)

Eastern section of the AOI - Ballarat to North Sydenham

Aquifers in this area include: unconfined aquifers associated with drainage lines; the Newer Volcanics, Older Volcanics and Werribee Formation aquifers; and bedrock aquifers.

Similar to the western section of the AOI, the expected depth to the watertable varies from less than 5m to greater than 50m, with the majority between 5 and 20m. A shallow watertable (less than 5m from the ground surface) is likely to correspond with the shallow plains of the Newer Volcanics and alluvial layers associated with rivers and creeks. A deeper watertable is associated with outcropping bedrock in areas of high elevation. Watertable salinity is expected to vary from less than 500 to 13,000mg/L total dissolved solids, which is higher than in the western section. Based on this salinity level, groundwater in this section varies from segment A1 to F in the Environmental Reference Standard, meaning all uses are protected in some areas. Potable uses are however limited to the Loddon Highlands and Bungaree Groundwater Management Areas.

Almost all major surface water features are classed as having a high potential for groundwater dependence in the National Atlas for Groundwater Dependant Ecosystems. Scattered areas of vegetation, mostly along drainage lines, are listed as having a moderate potential for groundwater dependence. There are several registered and licensed stock and domestic groundwater users in this section of the AOI, the majority of which are within the Bungaree Groundwater Management Area due to the fresher water (<1,000 mg/L total dissolved solids).

Considerations for the project

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

- Vicinity of infrastructure construction to groundwater users and environmental receptors.
- Potential change to groundwater flows due to installation of impervious infrastructure, for example, tower footings.
- Potential for displaced slurry containing groundwater from construction to enter waterways.

Next steps

- Undertake a qualitative assessment of the potential impacts of the project on groundwater systems.
- Further landholder, community and stakeholder consultation.
- Prepare a groundwater impact assessment, including proposed mitigation measures to manage any potential impacts. The impact assessment will inform the project design 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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