Yangery BESS

Surface Water Assessment

Yangery BESS Development Pty Ltd

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1 Introduction

Aurecon Pty Ltd (Aurecon) was commissioned by South Energy, on behalf of Yangery BESS Development Pty Ltd ('the Proponent') to undertake a Surface Water and Groundwater Assessment to inform the development of a Battery Energy Storage System (BESS) in Yangery, Victoria called Yangery BESS (herein referred to as 'the Project').

1.1 Purpose

The purpose of this report is to provide a technical Surface Water and Groundwater Assessment to support the Yangery BESS development. A desktop review of the surface water and groundwater characteristics of the site is required to determine if there are any matters that would impact on the final location of the BESS to determine if a potential impact is expected as a result of the proposed work, and if so, recommend mitigation measures.

The scope of the surface water assessment includes:

- Review current legislative requirements and guidelines
- A desktop review of existing local surface water and groundwater features in the Project Area and regional flood information.
- Assess potential impacts to surface water including:
  - Drainage
  - Flooding
  - Sensitive Water Environments
- Assess local groundwater conditions
- High-level mitigation measures to address any identified surface water impacts
- Conclusions and recommendations for further work.

1.2 The Project

The Project proposes a Battery Energy Storage System (BESS) with a nominal installed capacity of 120 MW / 480 MWh.

The Project works include:

- BESS modules, inverters and transformers.
- Construction of internal access roads and access (and egress) points.
- Underground cabling (33kV) to provide a connection between the battery modules and inverters and on-site substation.
- On-site substation including transformer to step up from 33 kV to the connection voltage.
- Underground or overhead cabling (66kV) to connect the onsite substation to the adjoining.
- An Operations and Maintenance Facility.
- Water storage (including firefighting water supply and fire water runoff containment).
- Fencing around the perimeter of the BESS facility.
- Car parking.
- Business identification signage, at site entry.
- Potential realignment of the water course within the southern half of the Project Area at a future date

A desktop review was completed of publicly available information in relation to the relevant legislation and guidelines, hydrology, hydrogeology and catchment conditions of the Project site. Information collated during this review has been used to prepare this Surface Water and Groundwater Assessment.

Yangery BESS Development is proposing to develop a BESS with a nominal installed capacity of 120 MW / 480 MWh at the site. The Project will also include a connection to Powercor's Koroit zone substation.

Figure 1-1 Site location and layout

1.3 The Project Area

The Project is located at 689 Tower Hill Road, Yangery, Victoria 3283, approximately 250 km west of Melbourne. The Project Area is located in Yangery, in south-western Victoria, approximately 6km east of Koroit and 9km northwest of Warrnambool. The Project Area sits within the Warrnambool City Council, with Moyne Shire Council directly adjacent to the north and west. The Project Area is adjacent to the Koroit zone substation, which is owned and operated by Powercor.

The Project Area is privately owned, agricultural land which is void of native vegetation. It is intersected by a degraded and eroded drainage line that adjoins one isolated waterbody in the southern paddock.

Vehicle access to the site is proposed from Conns Lane, which runs north to south along the western site boundary.

The location of the BESS infrastructure will be determined through detailed design, once a BESS supplier has been selected and will be in accordance with commitments made in this planning application.

2 Legislative requirements and guidelines

This section summarises the current legislative requirements and guidelines for the Project relevant to surface water.

Figure 2-1 Legislative requirements

Relevant Legislation and Guidance	
Relevant Commonwealth Legislation and Guidance	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, termed Matters of National Environmental Significance. Under the EPBC Act, an action that has, will have, or is likely to have, a significant impact on a MNES must be referred to the Commonwealth Minister for the Environment. The Minister will then determine whether the proposed action requires formal assessment and approval under the EPBC Act.
National Water Quality Management Strategy	The objective of the NWQMS is to achieve sustainable use of water resources, by protecting and enhancing their quality, while maintaining economic and social development. The NWQMS provides a framework for the development and implementation of management plans for catchment, aquifer, coastal waters and other water bodies, by community and government. The NWQMS includes a number of guidelines covering water quality benchmarks, groundwater management, diffuse and point sources, sewerage systems, effluent management, and water recycling. The guidelines relevant to the Project include: ■ Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000; ANZG, 2018). ■ Australian Guidelines for Water Quality Monitoring and Reporting.
Relevant State Legislation and Guidance	
Environment Effects Act 1978	Provides for assessment of proposed projects (works) that are capable of having a significant effect on the environment. The Act does this by enabling the Minister administering the *Environment Effects Act 1978* to decide that an Environment Effects Statement (EES) should be prepared. The Minister might typically require a proponent to prepare an EES when: ■ There is a likelihood of regionally or State significant adverse effects on the environment. ■ There is a need for integrated assessment of potential environmental effects (including economic and social effects) of a project and relevant alternatives; and ■ Normal statutory processes would not provide a sufficiently comprehensive, integrated and transparent assessment. A final assessment of the effects of a project requiring an EES is provided to relevant decision-makers by the Minister to enable them to make decisions about a project in the knowledge of its environmental effects and the Minister's advice about whether the project provides an acceptable outcome. The criteria for referral are focused on the potential for a significant effect on the environment. For surface water individual potential environmental effects include: ■ Potential long-term change to the ecological character of a wetland listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'. ■ Potential extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems, over the long term. ■ Potential extensive or major effects on the health, safety or well-being of a human community, due to emissions to air or water or chemical hazards or displacement of residences.

Relevant Legislation and Guidance	
	Combination potential environmental effects include: ■ Potential extensive or major effects on beneficial uses of waterbodies over the long term due to changes in water quality, streamflows or regional groundwater levels. Potential exposure of a human community to severe or chronic health or safety hazards over the short or long term, due to emissions to air or water or noise or chemical hazards or associated transport.
Planning and Environment Act 1987	Victoria's statutory land use planning system operates through Planning Schemes, which are subordinate legislation under the *Planning and Environment Act 1987*. Planning Schemes set out policies and provisions for the use, development and protection of land. Planning Schemes include a compulsory, which sets out the state-wide principles, policies and strategies for how land is used and developed. The Planning Policy Framework recognises the impacts of natural hazard hazards, including flood, and sets strategies for development to be located away from flood areas. An assessment of the *Planning and Environment Act 1987* triggers as they relate to water can be found in the Land Use Assessment Report prepared as part of this feasibility stage of investigations.
Environment Protection Act 2017 (EP Act)	The EP Act creates the legislative framework to protect the environment and came into effect on 1 July 2021. The Environment Protection Authority Victoria (EPA Victoria) has implemented a broad range of new statutory instruments and policies, subordinate legislation and tools under the EP Act. This includes the Environmental Reference Standard, which sets environmental values for water, land and air, and mechanisms for regulation of the discharges to these elements of the environment. The EP Act aims to prevent pollution and environmental damage by setting environmental objectives and establishing programs to meet them. The EP Act establishes the powers, duties and functions of the EPA Victoria. These include the administration of the EP Act and any regulations and orders made pursuant to it, recommending State Environment Protection Policies (SEPPs), issuing works approvals, licences, permits, pollution abatement notices and implementing National Environment Protection Measures. Furthermore, under the General Environmental Duty (GED) all organisations have a responsibility to reduce risk to human health and the environment. It states that you must manage your activities to reduce the risk of harm: ■ to human health and the environment ■ from pollution or waste.
State Environment Protection Policy (Waters)	The State Environment Protection Policy (Waters) (SEPP (Waters)) released in 2018 supersedes previous State Environment Protection Policy (Waters of Victoria) and State Environment Protection Policy (Groundwaters of Victoria) and all amending orders. The SEPP (Waters) provides a legislative framework to protect and improve the quality of Victoria's waters under the principles of environment protection outlined in the EP Act. The aim of the policy is to protect and restore the environment, specifically surface water, groundwater and protection of human health. This is achieved by reducing the harmful effects of pollution and waste and improving and / or maintaining the ecological integrity of Victorian surface waters and groundwaters. It provides a structure of how the water environment is to be protected using the waste avoidance, minimisation and resource recovery principles as guidance to inform environmental measures.
Water Act 1989	The *Water Act 1989* provides the legal framework for water management and use across Victoria, including the issuing and allocation of water entitlements and the provision of water services by state-owned water corporations and catchment management authorities. Under the *Water Act 1989*, the designated waterways, regional drainage and floodplain management authority for the Project area is the Glenelg Hopkins Catchment Management Authority (GHCMA). The GHCMA is one of ten floodplain management authorities which operate across Victoria and manages the land and water resources in the south west region. The CMA is the caretaker of river health and carries out works to protect and enhance the quality of water and condition of rivers.

3 Surface Water conditions

3.1 Regional hydrology

The Project Area is located in the South Eastern Coastal Plains of the Glenelg Hopkins Catchment (Glenelg Hopkins CMA, 2024). The South Eastern Coastal Plains are drained by several waterways that generally flow from north to south including Hopkins, Merri, Moyne and Eumeralla (see Figure 3-1).

The Project Area is located in the Merri River catchment, which flows through Warrnambool and is highly valued for recreation, tourism, fishing and amenity values. The Merri River estuary has two channels to the sea – one flows to Stingray Bay in Warrnambool and another flows through the DIWA-listed Lower Merri Wetlands and exits at Rutledges Cutting.

Key management documents for the Project Site include:

- Glenelg Hopkins Regional Catchment Strategy 2021 – 2027 (Glenelg Hopkins CMA, 2024)
- Western Region Sustainable Water Strategy (The State of Victoria Department of Sustainability and Environment, 2011)
- Merri River Local Management Plan (Southern Rural Water, 2016)
- Warrnambool Planning Scheme (Department of Transport and Planning, 2024)

The Project Site is not located within a Declared Special Water Supply Catchment Area (Agriculture Victoria, 2024).

3.1.1 Climate and rainfall

The Project Area has a mild temperate climate, with four distinct seasons, characterised by hot summers with moderate humidity, and cool winters with low humidity. Long-term average rainfall and temperature data for the closest BOM weather station (Warrnambool Airport – 90186, located 3.2 km from Yangery) is shown in Figure 3-2.

Rainfall patterns in the Project Area correspond to a single maximum rainfall season between May and September, where August is the month with the highest average rainfall with values of 91.4 mm. January to March are the months with the lowest rainfall values. Rainfall values may be inversely proportional to temperature values (see Figure 3-1).

3.1.2 Existing regional flood risk

A review of existing and publicly available databases and flood studies indicate no flood studies or flood mapping are available for the Project footprint. The Dennington Flood Study (Water Technology, 2007) indicates the Yangery Creek catchment is small compared to the Merri River catchment and does not contribute significantly to design flood peaks.

The Warrnambool planning scheme shows that there is no floodway overlay associated with regional flooding (Figure 3-4).

3.1.3 Sensitive Receiving Environments

As previously identified, the site ultimately drains to the Merri River, and the Merri River estuary has two outlets to the sea, one of which flows through the DIWA-listed Lower Merri Wetlands and exits at Rutledges Cutting. The Lower Merri wetlands include Kelly's Swamp, Saltwater Swamp and the South Warrnambool Wetlands (WCC) and support the EPBC-listed orange-bellied parrot and migratory bird species protected under international agreements (Glenelg Hopkins CMA, 2024). These wetlands are 4 km south of the Project Area.

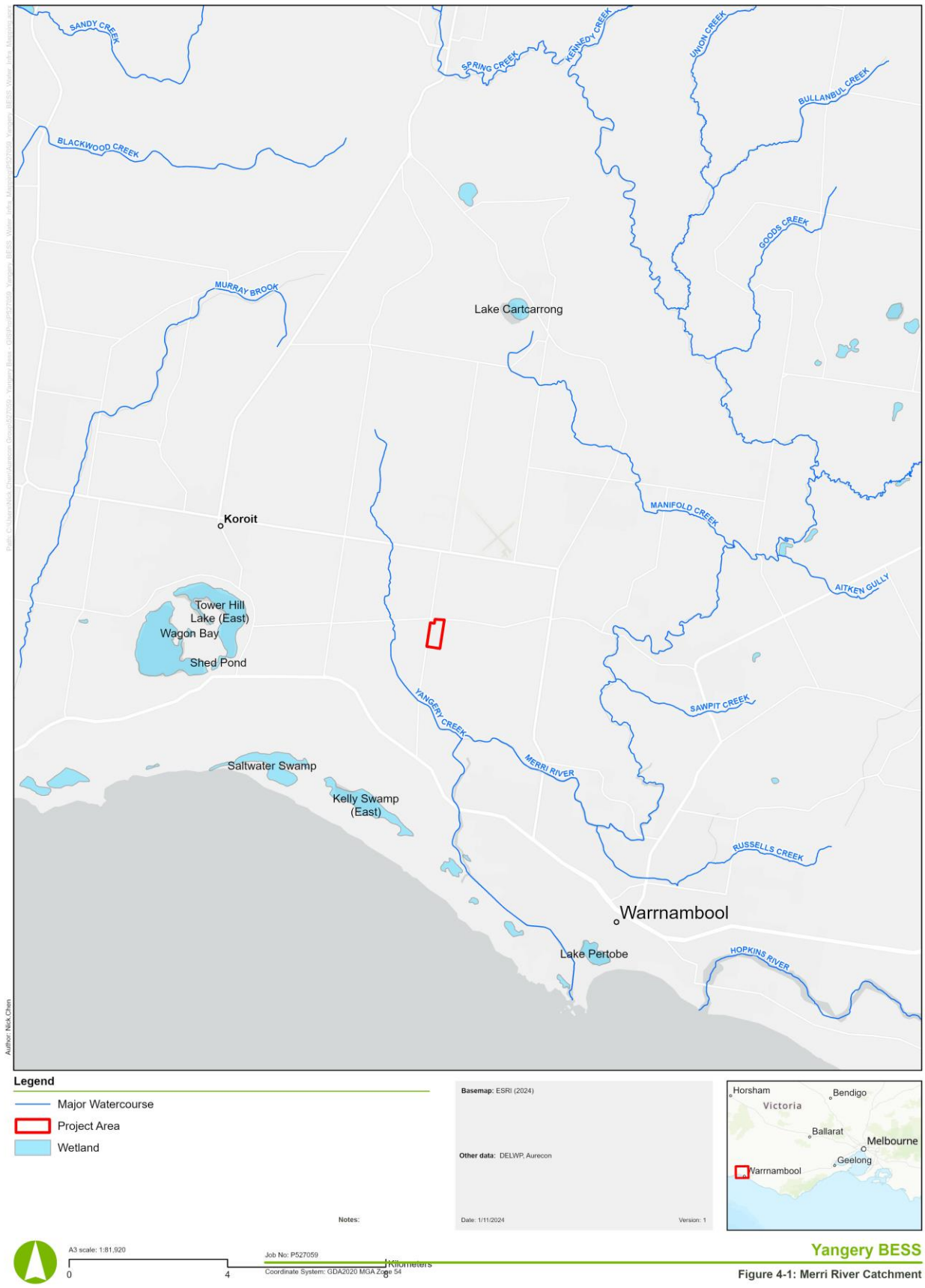

Figure 3-1 Merri River Catchment

Figure 3-2 Monthly average rainfall and temperature (Warrnambool Airport - 90186)

Month	Rain (mm)			Temperature (°C)		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum
January	38.9	0.6	119.2	24.6	20.9	27.5
February	30.5	1.4	73.4	24.6	21.9	28.7
March	45.2	10	90	23.1	20.5	26.9
April	52.8	1.2	130.2	19.9	17.4	23.2
May	74.6	22.2	141	16.5	14.7	17.8
June	79.3	26.4	133.6	14.1	12.7	15.4
July	83.5	46.6	144.6	13.5	12.5	14.4
August	91.4	32.8	204.4	14.4	12.8	15.8
September	73.2	30.6	155.2	16.1	14.4	18
October	70.7	23.2	160.6	18	15.4	22.4
November	51.6	12.6	129.4	20.4	17.8	24.4
December	45.3	1.6	120.4	22.5	18.5	26.4
Annual	737.6	518.6	944.4	19	18.2	19.6

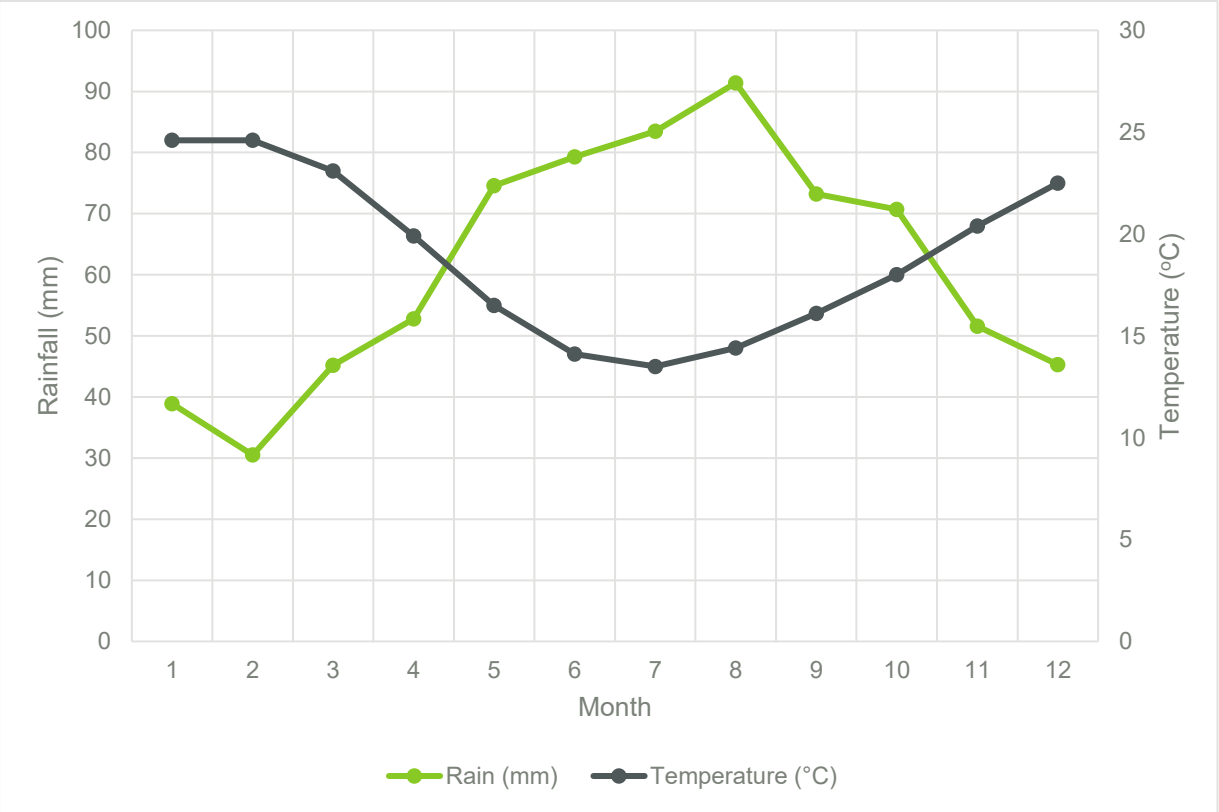

Figure 3-3 Monthly average rainfall and temperature

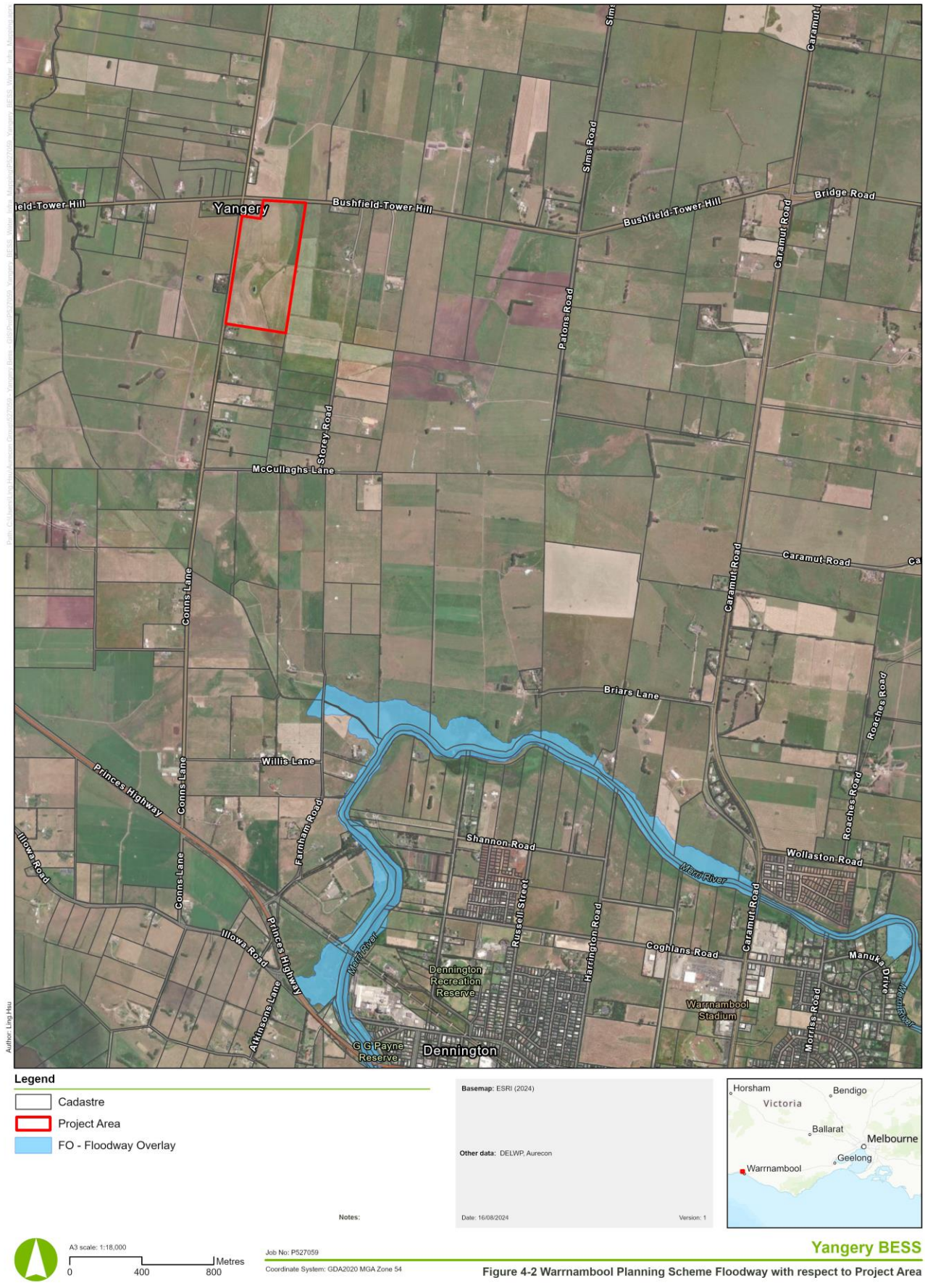

Figure 3-4 Warrnambool Planning Scheme Floodway with respect to Project Area

3.2 Local hydrology

3.2.1 Site topography

The topography of the Project Area ranges from 38 m AHD at the north-western corner of the site to 16 m AHD at the southern boundary of the site. The slope in the north-western corner of the site is relatively steep, ranging from 8-10%. The remainder of the site has relatively shallow grades of 1-2%, and the un-named drainage line has an approximate grade of 1%. Figure 3-5 shows the topography of the area.

3.2.2 Local waterways and waterbodies

There is a local un-named drainage line through the Project Area as shown in Figure 3-5. This un-named drainage line drains to the property south of the Project Area, and ultimately connects to Merri River via Yangery Creek. The local catchment contributing to this drainage line is approximately 360 hectares. The un-named drainage line in the Project Area is ephemeral and only flows following rainfall events.

There is an option to relocate the drainage line in the southern half of the site to follow the eastern boundary of the site, and to decommission the existing farm dam. Preliminary discussions with the CMA indicated that this option is feasible provided discussions are held with the landowner to the south (such discussions are not required if the option is not pursued). Any earthworks that change the rate of flow across a property boundary will trigger planning approval. Approvals will also be required for any works on or near waterways from the CMA.

It is assumed that only a small portion of the broader catchment north of Mailors Flat Koroit Road, including some of the airport land, drains to this local drainage line, while the remaining land north of Mailors Flat Koroit Road instead drains west to Yangery Creek or east to Merri River (there is insufficient LiDAR available of this land to confirm).

3.2.3 Existing local flood risk

There is no existing local flood modelling that covers minor flow paths in the Project Area and no flood modelling was undertaken for the proposed scope of works.

To estimate the magnitude of the 1% Annual Exceedance Probability (AEP) (i.e. the 100-year Average Recurrence Interval) flood event within the Project Area, the Australian Rainfall & Runoff Regional Flood Frequency Estimation (RFFE) Model was used. The RFFE calculation takes into account the catchment size, centroid coordinates and outlet coordinates, and computes an estimate of the 1% AEP within confidence limits. It is estimated that the 1% AEP event would result in a flow of 1.92 m^3/s through the drainage line in the Project Area. The upper confidence limit of the RFFE estimate (95^{th}-percentile) predicts a flow of 6.04 m^3/s. Basic hydraulic calculations using Manning's formula have been undertaken assuming a Manning's roughness coefficient of 0.05 and slope of 1.3% to understand the approximate 1% AEP levels across the site.

The high-level calculations indicate that the RFFE flow estimate (including the 95^{th}-percentile estimate) may extend beyond the un-named drainage line in some areas of the northern portion of the site. This suggests that the proposed location of the BESS could encroach into the 1% AEP flood extent and that flows may pond near the noise walls in some locations (see Figure 1-1 for location of noise walls)Figure 1-1.

Flood modelling is recommended to confirm flood extent, potential impacts of the BESS on downstream flows and inform design levels.

Figure 3-5 Site survey (0.2m contours)

4 Groundwater conditions

4.1 Regional hydrogeology

The Project site is located in the South West Limestone coast and the groundwater resources are managed under the South West Limestone Groundwater Management Area (GMA) which is administered by Southern Rural Water. The South West Limestone GMA replaces the former Nullawarre and Yangery Water Supply Project Areas.

Groundwater resources in this area are regionally significant and provide 50% of the total water use for farming, industry and urban water supplies (Southern Rural Water, 2023). Around Warrnambool, groundwater is extracted from the Port Campbell Limestone, which supports dairy irrigation areas such as Nullawarre, and supplements urban supply to Warrnambool, Koroit and Allansford.

The Port Campbell Limestone aquifer is recharged by infiltration of direct rainfall and groundwater flows typically from north to south towards the coast. As well as irrigation and urban water supplies, the aquifer also support groundwater dependent ecosystems.

The depth to groundwater across the Project site is shallow, generally within 5 meters of the surface. In the northern half of the site, the water table is deeper, around 10-15 m below the surface (Figure 4-3).

Groundwater salinity is slightly brackish (1,000 – 3,500 mg/L total dissolved solids (TDS)) across the north eastern half of the site and is fresher in the south western corner of the site (below 1,000 mg/L TDS), refer to Figure 4-2.

4.2 Local hydrogeology

There are 17 bores within 1 km of the site (see Figure 4-3 and Appendix 1) and a summary is provided below:

- Bore depths are typically shallow and range between 12 and 46m
- Bores are registered to be use for stock, domestic, irrigation and dairy.
- Groundwater salinity is available for 13 bores and ranges between 963 and 3,200 mg/L.

There are 3 bores located within the site boundary and these are detailed in Table 4-1. These bores are registered for stock and domestic purposes and could be encountered during work at the site. If encountered, these bores will need to be decommissioned.

There are no groundwater dependent ecosystems (GDEs) within 1 km of the site. The closest GDE is Merri River, which is located 2.3 km to the south.

Table 4-1 Onsite bores at 689 Tower Hill Road, Yangery

Bore ID	Easting, Northing	Year drilled	Bore depth	Registered Use
107218	625035E 5758030N	1967	29 m	Domestic and Stock
107219	624989E 5758094N	1967	29 m	Domestic and Stock
144583	625221E 5758226N	2001	17 m	Domestic and Stock

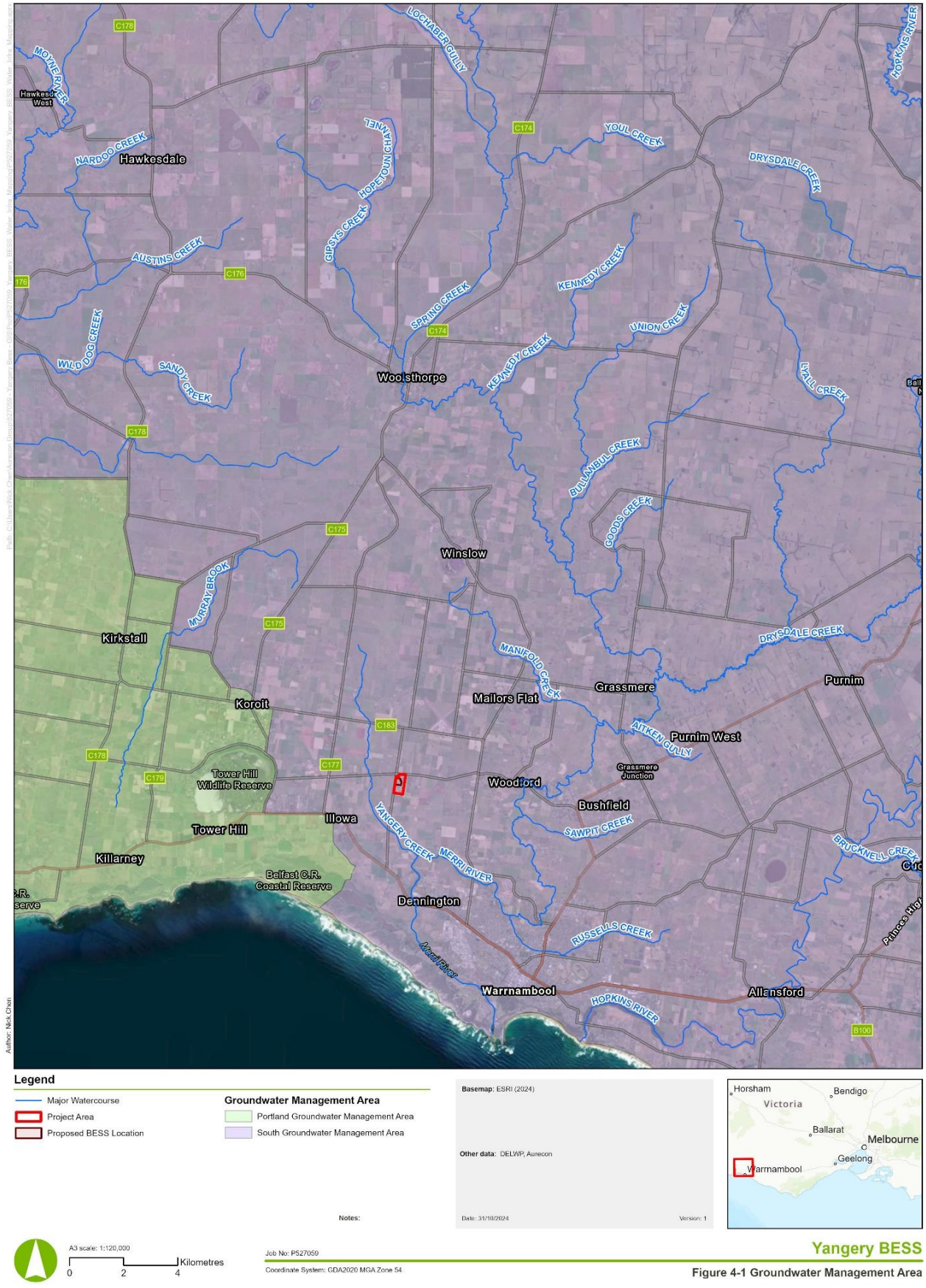

Figure 4-1 Groundwater management area's

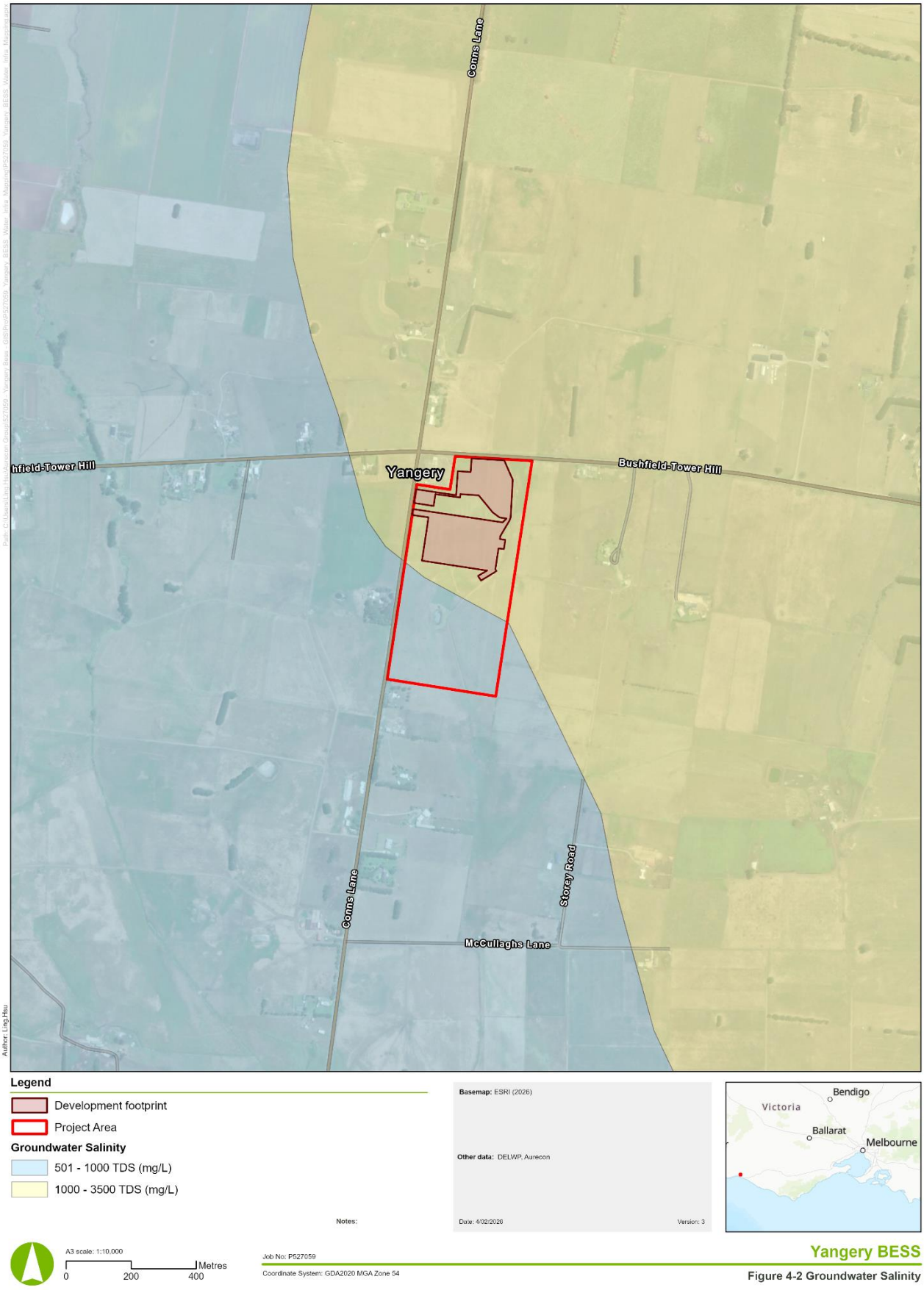

Figure 4-2 Groundwater salinity

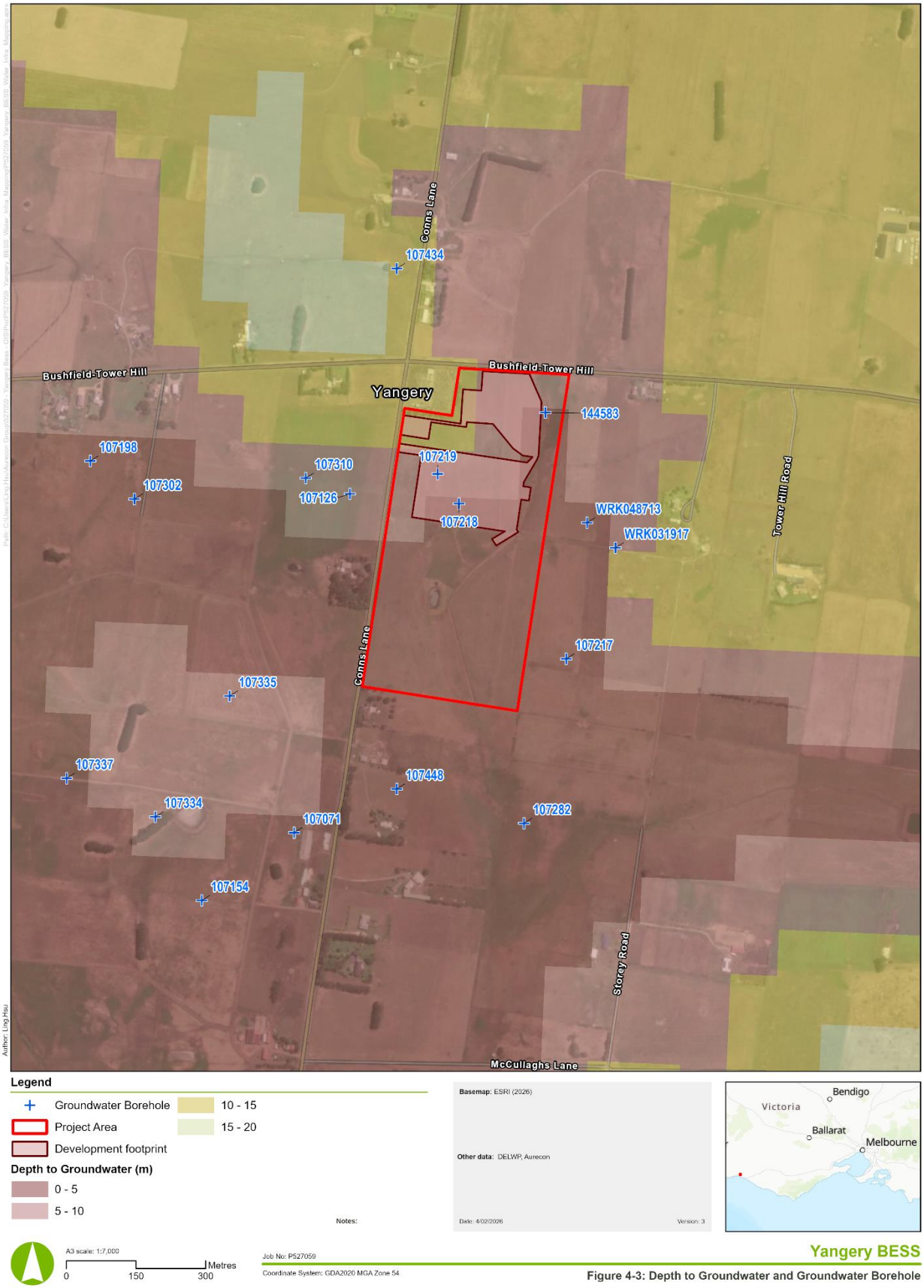

Figure 4-3 Location of nearby groundwater bores

4.3 Soils

Soil texture affects the movement and retention of water. The ease with which water can move through the soil profile depends on the porosity of the soil. The porosity is larger in coarse-textured soils (sands) than in fine-textured soils (clays). As a result, water (and dissolved nutrients) can move faster through coarse-textured soils than fine-textured soils; conversely, fine-textured soils will tend to generate more surface runoff.

According to the Glenelg Hopkins CMA website, soils in the region are variable but can be clayey in some areas, which restricts the movement of water. Soils could also be slightly acidic.

5 Impact assessment

An impact assessment has been completed describing the potential impacts to drainage, flood, groundwater and sensitive receiving environments. With the exception of potential flood impacts, which require flood modelling to confirm flood extent, potential impacts of the BESS on downstream flows and inform design levels are considered to be low.

Key impact mitigation measures include:

- Construction Environmental Management Report (CEMP) to manage soils and waste on site
- Stormwater Management Plan to manage drainage before and after construction
- Soils investigation to confirm potential soil contamination and waste management on site to inform CEMP
- Groundwater investigation to confirm depth to water table, if excavations works are likely to exceed 2m depth.

Impacts and mitigation measures are outlined in the following sections.

5.1 Drainage

Table 5-1 Drainage Impacts

Impact code	Phase	Impact description	Mitigation measures
D01	Construction	Stockpiles would obstruct localised overland flows. Stockpiles are susceptible to mobilisation of sediments which may be transported to drainage lines.	The project proposes to locate the substation control building and the facilities and laydown area on a relatively steep section of the site, that drains towards the minor drainage line through the site. A Construction Environmental Management Report (CEMP) would be required to mitigate any risk regarding stockpiles. Minimising the number of stockpiles and the area / duration that the stockpiles are exposed would reduce risk. Locating stockpiles away from drainage lines and where they will be least susceptible to wind erosion. Refer to EPA Publication 1895 for further mitigation measures. **Residual risk rating: Low**
D02	Construction	Construction material / waste or sedimentation transported to drainage lines, impacting natural or existing drainage regimes by impeding drainage and reduction of environmental values such as visual amenity and aquatic ecosystem health.	Construction waste and material should be properly managed on site, to reduce the risk of such materials ending up in the minor drainage line that runs through the Project Area. A CEMP should be prepared to outline storage of materials and waste. Refer to EPA Publication 480 for further mitigation measures. **Residual risk rating: Low**
D03	Construction / Operation	Changes to the topography as a result of grading or levelling has the potential to create changes to local flow paths. It may also cause areas for water to pool and create localised waterlogging issues.	Changes to topography should be minimised as a result of construction and earthworks within the Project Area. A stormwater management plan to mitigate any impacts to overland flow paths will be required to support any planning application. Design of the site drainage infrastructure should accommodate overland flow paths. **Residual risk rating: Low**
D04	Operation	An increase of impervious surface area due to construction of the concrete foundations could increase surface runoff and increase the risk of local flooding / drainage impacts.	The design should consider stabilisation of the concentrated flow pathways off the impermeable hardstand to prevent erosion. Opportunities to intercept and retard peak stormwater flows should be investigated such as beneficial water reuse (vegetation planting / site amenities). A stormwater management plan to mitigate any short-term / localised impacts as a result of increased runoff, will be required to support the planning application. **Residual risk rating: Low**

5.2 Flooding

Table 5-2 Flooding Impacts

Impact code	Phase	Impact description	Mitigation measures
F01	Construction	Stripping of topsoil and excavations may increase flood risks downstream of the project by increasing runoff.	The requirement for excavation is limited to small areas of construction for the substation control building, the facilities and laydown area and the BESS site. Opportunities to intercept and retard peak stormwater flows should be investigated such as beneficial water reuse (vegetation planting / site amenities). Any local impacts will be mitigated through a CEMP. Refer to EPA Publication 480 for further measures. **Residual risk rating: Low**
F02	Operation	Increase of impervious surfaces has the potential to increase runoff to the surrounding area potentially increasing flooding risks. Overland sheet flows on the flat plateau of the Project area can collect and discharge flood waters slowly.	The project is likely to cause limited change in annual runoff volume due to the limited amount of impervious surfaces increase, and as a result will have a minimal impact on flooding in the area. A stormwater management plan to mitigate any short-term / localised impacts as a result of increased runoff, will be required to support the planning application. Stormwater infrastructure, such as onsite detention, will be considered during detailed designs to mitigate any offsite flooding impacts to downstream properties. **Residual risk rating: Low**
F03	Operation	Construction of any Project infrastructure either within or immediately adjacent to waterways or ephemeral waterbodies increases the potential of the infrastructure being flooded during or following high rainfall events. Building within depressions across the site may result in the displacement or diversion of storm water flows. This may result in an increase in localised flood levels in the immediate vicinity of the newly constructed infrastructure.	Avoid locating Project infrastructure adjacent to waterways or within depressions across the site to avoid increasing flood levels or diverting flood flows. It is expected that in the 1% AEP flood event, the local upstream catchment will produce flows that may exceed the minor drainage line that runs from north to south through the Project area (section 3.2.3) along the length where the Project infrastructure is proposed. The proposed BESS is also located above another local depression within the site. Design of the site drainage infrastructure should accommodate overland flow paths to prevent any increase in flood levels against the newly constructed infrastructure. A stormwater management plan to mitigate any short-term / localised impacts as a result of increased runoff, will be required to support the planning application. **Residual risk rating: Moderate**
F04	Operation	Effect of flooding of the region on the proposed Infrastructure.	Warrnambool Planning Scheme shows no regional floodway overlay for the Project Area from the Merri River. Regional flooding is not expected to be a risk to the Project Area. **Residual risk rating: Low**

5.4 Groundwater

Table 5-3 Groundwater Impacts

Impact code	Phase	Impact description	Mitigation measures
G01	Construction	The Project will require some excavation works and there is the potential that excavations may intercept the shallow groundwater that can be present in the Project Area. If excavations result in groundwater interactions, there is potential for groundwater intrusion into works area.	Groundwater investigations should be conducted to confirm the depth to watertable, and if dewatering is required depending on the depth of the excavations. There are three existing groundwater bores on site and these could be used to inform the groundwater investigation. If dewatering is required, an impact assessment should be completed to assess potential impacts on groundwater and surrounding groundwater users.

5.5 Sensitive Receiving Environments / Water Quality

Table 5-4 Water Quality Impacts

Impact code	Phase	Impact description	Mitigation measures
WQ01	Construction	A key potential impact from construction work is an increase in sediment runoff from disturbed construction areas and exposed soil. Construction activities will result in soil disturbance with disturbed areas being more vulnerable to erosion and the generation of sediment during rainfall events. Any increase in sediment loads has the potential to impact on receiving waterways.	▪ Implement appropriate sediment and erosion control measures to minimise the amounts of sediment entering the waterways. This should be done both throughout the construction period (where more rigorous sediment controls will need to be implemented due to high soil disturbances associated with excavation works) and operational period. ▪ During construction, divert clean stormwater away from the parts of the site where the soil will be disturbed, to not contaminate clean stormwater ▪ Prevent dust generation by applying dust suppression methods, to avoid increase in dust and soils entering waterways. In general, these measures can be achieved through compliance with all industry standard guidelines relating to construction, sediment and erosion control. ▪ Appropriate soil testing should occur to confirm the potential contamination and pH of native soils and hence their broader suitability for the proposed construction activities
WQ02	Construction	Any increase in sediment generation and transport as a result of construction activities is likely to also be associated with increased nutrient transport to waterways, as nutrients adsorb to sediment particles. An increase in nutrient loads to receiving waterways will result in a decrease in water quality and may result in an increased presence of nuisance plants and algae. This impact particularly applies during summer when weather conditions are warmer, however as this is an ephemeral stream there is likely to be negligible flow during summer months.	

Impact code	Phase	Impact description	Mitigation measures
WQ03	Construction / Operation	There is the potential for spillage of chemicals such as oils, fuels, and sprays associated with construction activities. Spills or leaks of liquids have the potential to impact water quality and aquatic biota in waterways and wetland within the Project Area and downstream. Spills and leaks can also collect on constructed hard surfaces, and wash into waterways with stormwater runoff	▪ Implement appropriate spill control and bunding measures to control and contain spills, minimise the amount of fuels and chemicals stored on site and implement contingency plans to handle spills and document in CEMP.
WQ04	Operation	An increase in the proportion of impervious surfaces in the Project Area could result in higher flow peaks and shorter flow durations during rainfall events. This can in turn result in an increase in pollutant and sediment transport to waterways, and can also create in-stream scour, generating additional sediment loads in receiving waterways.	▪ Design of stormwater infrastructure, such as drainage channels and detention basins should be designed to the sufficient rainfall event to avoid unnecessary impacts to downstream properties.
SW05	Operation	Clearing of vegetation from the site could lead to increased erosion and sediment runoff. Loss of riparian or site vegetation can lead to a loss of natural nutrient buffer/filter capacity. This can result in greater concentrations of sediment and nutrients entering waterways in surface runoff	▪ Avoid any instream or riparian works that could cause direct damage to waterways, including loss of riparian or instream vegetation, or construction or installation of instream barriers.

6 Conclusions and Recommendations

The potential impacts to surface water and groundwater associated with the development of a BESS at the Project site are manageable with the right mitigation measures.

6.1 Surface Water

The Project Site is located in the Merri River catchment, which flows through Warrnambool and is highly valued for recreation, tourism, fishing and amenity values. The Project site has an unnamed drainage line that is ephemeral and flows north to south in the eastern half of the site. The drainage line joins the Yangery Creek downstream of the site, which is a small tributary of the Merri River.

High level analysis of flow within the catchment indicates that during a flood, flows may extend beyond the drainage line and pond near the sound walls in some locations.

There is also the option to relocate the drainage line in the southern half of the site, so that it continues to flow along the eastern boundary. Discussions with the CMA have confirmed this is feasible and should also be agreed with the landowner to the south. The CMA will grant a licence to conduct works on or near a waterway, application for a works on waterway licence is completed online. Any earthworks that change the rate of flow across a property boundary will trigger planning approval.

6.2 Groundwater

The Project site is located in the South West Limestone coast and the groundwater resources are managed under the South West Limestone Groundwater Management Area (GMA). Groundwater resources in this area are from the Port Campbell Limestone which is a regionally significant aquifer that supports dairy irrigation areas such as Nullawarre, and supplements urban supply to Warrnambool, Koroit and Allansford.

The depth to groundwater across the Project site is shallow, generally within 5 meters of the surface. In the northern half of the site, the water table is deeper, around 10-15 m below the surface. Groundwater salinity is slightly brackish (1,000 – 3,500 mg/L total dissolved solids (TDS)) across the north eastern half of the site, and is fresher in the south western corner of the site (below 1,000 mg/L TDS). There are three existing bores on site, and these should be located to confirm if they need to be decommission prior to commencing construction.

If construction works are likely to extend beyond 2 m depth, it is recommended that a groundwater investigation is undertaken to confirm the depth to watertable. The existing groundwater bores (if located) could be used to inform the groundwater investigation. If dewatering is required, an impact assessment should be completed to assess potential impacts on groundwater and surrounding groundwater users.

6.3 Potential Impacts and Recommendations to Mitigate Impacts

It is recommended that flood modelling be undertaken to confirm flood extent, potential impacts of the BESS on downstream flows and inform design levels.

Potential impacts to surface and groundwater are generally considered to be low and key impact mitigation measures include:

- Construction Environmental Management Report (CEMP) to manage soil and waste on site
- Stormwater Management Plan to manage drainage during and after construction
- Soils investigation to confirm potential soil contamination and waste management on site to inform CEMP
- Groundwater investigation to confirm depth to water table, if excavations works are likely to exceed 2m depth.

7 References

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Appendix A: Bore data

Bore data in a 1 km radius at 689 Tower Hill Road, Yangery collected from Visualising Victoria's Groundwater (VVG) 2024.

Bore ID	Easting, Northing	Year drilled	Bore depth	Registered Use
107071	624680E 5757322N	1970	12 m	Stock and domestic
107126	624800E 5758051N	1970	12 m	Stock and domestic
107154	624481E 5757176N	1970	18 m	Stock and domestic
107198	624241E 5758122N	1970	17 m	Stock and domestic
107217	625266E 5757696N	1970	25 m	Stock and domestic
107218	625035E 5758030N	1967	29 m	Stock and domestic
107219	624989E 5758094N	1967	29 m	Stock and domestic
107282	625175E 5757342N	1976	15 m	Stock and domestic
107302	624336E 5758040N	1977	44 m	Stock and domestic
107310	624705E 5758085N	1977	27 m	Stock and domestic
107334	624381E 5757356N	1979	46 m	Irrigation
107335	624541E 5757616N	1979	30 m	Irrigation
107337	624190E 5757439N	1979	23 m	Irrigation
107434	624901E 5758536N	1988	30 m	Stock and domestic
107448	624901E 5757416N	1991	22 m	Stock and domestic
144583	625221E 5758226N	2001	17 m	Domestic and Stock
WRK031917	625372E 5757935N	1970	25 m	Stock and domestic
WRK048713	625311E 5757989N	1970	25 m	Stock and domestic
107366	624326E 5758256N	1985	25 m	Groundwater
107434	624901E 5758536N	1988	30 m	Domestic
107437	625931E 5758356N	1990	24 m	Groundwater
115158	624121E 5758176N	1993	32 m	Domestic
115160	624171E 5758076N	1993	37 m	Domestic and Stock
WRK031927	624190E 5757485N	1979	30 m	Irrigation
WRK048692	624765E 5758077N	1970	24 m	Irrigation
WRK078994	624983E 5758593N	2014	30 m	Dairy
WRK982545	624218E 5758256N	Unknown	150 m	Groundwater
WRK983556	624964E 5758455N	Unknown	150 m	Groundwater

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