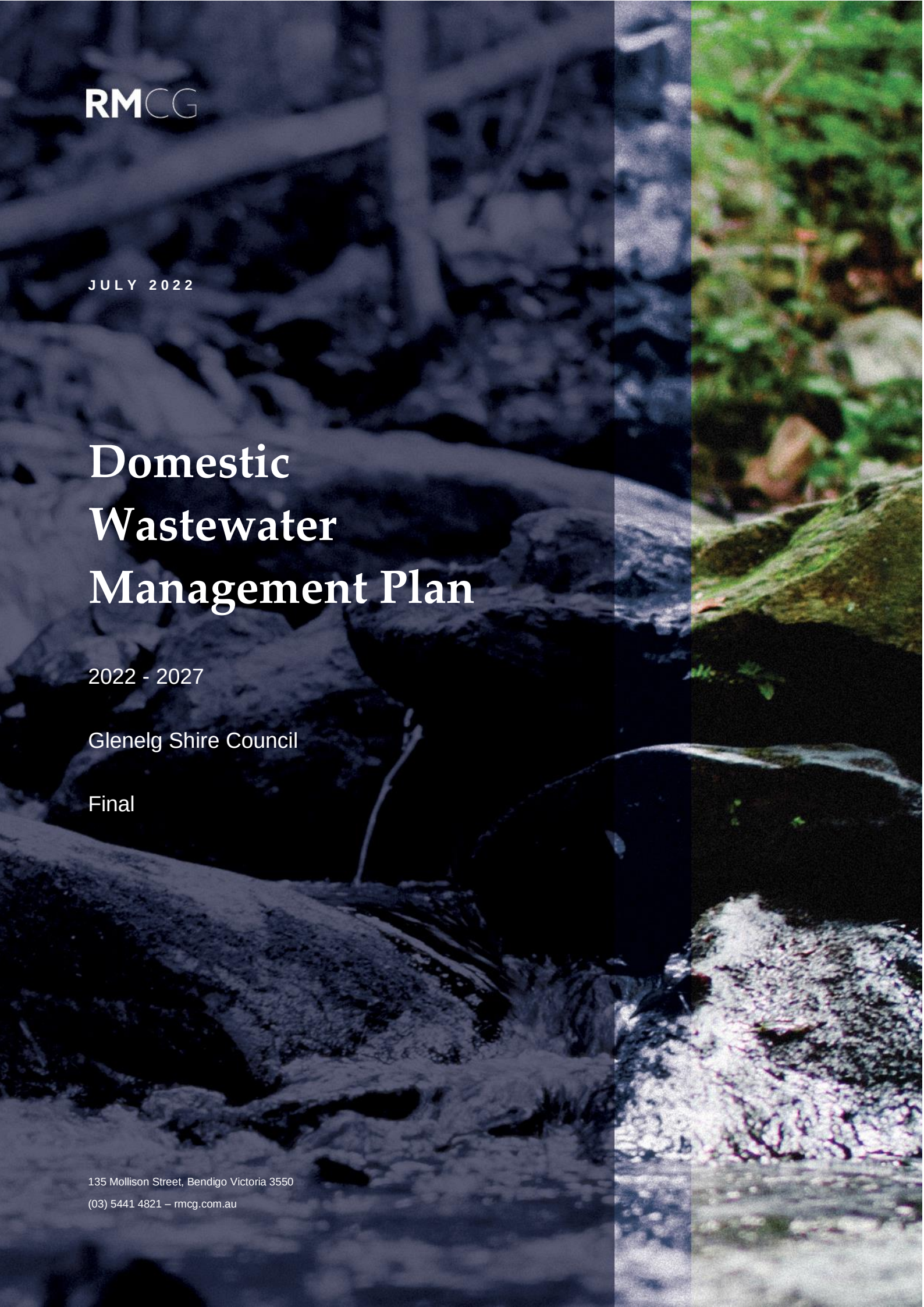

RMCG

JULY 2022

Domestic Wastewater Management Plan

2022 - 2027

Glenelg Shire Council

Final

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Glossary

TERM/ABBREVIATION	DEFINITION
Alternative services	Wastewater systems and servicing approaches, that are different to traditional sewer and onsite solutions, but treat and manage wastewater in a way that provides equivalent environmental and public health outcomes.
Blackwater	Wastewater from toilets containing faeces and urine
DWMP	Domestic Wastewater Management Plan
Domestic wastewater	Wastewater from toilets, kitchens and laundries. While the term suggests wastewater from domestic households only, it also covers commercial premises (e.g. offices/shops/public buildings) where wastewater is mainly from toilets and kitchens.
Drinking water	Water suitable for human consumption or for purposes connected with human consumption, such as preparation of food or making ice for consumption or for the preservation of unpackaged food.
Evapotranspiration	Transfer of water from the soil to the atmosphere through evaporation and plant transpiration.
Greywater	Domestic wastewater from sources other than the toilet, urinal or bidet. This includes wastewater from showers, baths, hand basins, washing machines, laundry troughs and kitchens.
Irrigation	The artificial supply of water to land and vegetation.
Nutrients	Organic and inorganic substances used in an organism's metabolism which must be taken in from the environment. Nutrients are molecules that include elements such as carbon, nitrogen, phosphorus, potassium, calcium, magnesium and a range of trace elements.
Onsite wastewater systems	Standalone systems designed to treat and contain waste within a property's boundaries. These are used for management of wastewater from residential, community and business premises in locations where a sewer network is not available. Onsite systems include a wastewater treatment plant and all connected drains, pipes, fittings, appliances and land used. Onsite systems are the responsibility of the property owner.
Organic matter	Solids and contaminants in wastewater including a combination of toilet excrement and paper as well as hair and skin particles from basins and showers, lint from the laundry, personal care and household cleaning products, and fats, oils and food particles from the kitchen.
Organic loading rate	The level/amount of organic matter in wastewater. The organic loading rate must be considered as well as the flow rate (or volume) when selecting the most suitable treatment system.
Pathogen	A disease-causing micro-organism
Potable water	Water suitable for human consumption (see also Drinking water)
Primary treatment of wastewater	The physical processes of screening, filtration, sedimentation, flocculation and/or flotation to remove solid matter from wastewater. The first step in the wastewater treatment process.

TERM/ABBREVIATION	DEFINITION
Pump-out	The removal of biological sludge and inert sediment from a wastewater treatment system, including the surface crust (scum) material. A pump-out should not drain tanks dry, because some residual sewage is needed to provide a seed source of digesting micro-organisms for ongoing treatment to function.
Reticulated water	Water that is delivered to a dwelling through a network of pipes
Secondary treatment	Biological and/or physical treatment following primary treatment of wastewater. Disinfection to kill pathogens may also occur.
Septic tank	A common primary treatment method using filtration, sedimentation, flocculation and flotation to remove organic and inorganic matter from wastewater in combination with anaerobic microbiological digestion.
Sewer or sewerage	The network of pipes, pumps and equipment that transfers sewage (including domestic wastewater) from homes and businesses to a central treatment plant. Sewer systems are operated by water corporations.
Sewered (sewerable) land	Properties that have access to a sewer network.
Sustainable	Able to continue indefinitely without any significant negative impact on the environment or its inhabitants.
Unsewered land	Properties that do not have access to a sewer network and therefore rely on onsite wastewater management.

1 Introduction

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this Domestic Wastewater Management Plan is to guide and support the management of domestic wastewater across the Glenelg Shire Local Government Area, in a manner that provides a healthy environment, a prosperous economy and thriving community, now and into the future.

The objectives of the Domestic Wastewater Management Plan are to:

- Identify current and emerging domestic wastewater management issues facing the municipality
- Prioritise the issues and provide management actions to address the issues
- Articulate the public health, wellbeing, environmental and economic benefits of sustainable management of domestic wastewater
- Provide policies to address domestic wastewater management matters and for the management of onsite wastewater management systems within the municipality
- Outline the consultation process undertaken during plan development, and its outcomes.

1.2 COUNCIL RESPONSIBILITY

Municipal councils have statutory responsibilities for overseeing the installation, use and management of onsite wastewater systems which treat flow rates of up to 5,000 litres per day, on any day.

Under the *Environment Protection Regulations 2021*, onsite wastewater management systems are a prescribed permission activity (A20), and this is a permit activity that is administered by the council in whose municipal district the onsite wastewater management system is located.

The EPA *Code of practice – onsite wastewater management*, 2016 clearly identifies Council's statutory responsibilities in relation to the planning and management of onsite wastewater systems. These include to develop a Domestic Wastewater Management Plan as provided by this document.

1.3 RISK MANAGEMENT APPROACH

The goal of wastewater management is to protect the natural environment, community health, and social wellbeing against the risks posed by wastewater, while enabling appropriate development.

Wastewater can contain nutrients, pathogens, and other pollutants. If onsite wastewater systems have deteriorated, are poorly maintained, and/or of insufficient size, this can lead to wastewater discharging offsite and polluting nearby land and waterways.

A risk management framework has been applied to development of this DWMP and is outlined in Chapter 3.

1.4 SCOPE

The focus of this DWMP is all types of onsite wastewater systems which treat flow rates of up to 5,000 litres per day on any day, including blackwater and/or greywater, generated from domestic (including multi-dwellings) and/or commercial premises.

Under the *Environment Protection Regulations 2021*, this is a prescribed permission activity A20 (On-site wastewater management systems). It applies to proposed new systems and alterations to existing systems, which includes alterations that increase the system's flow or load, such as a house extension or installation of a spa.

Prescribed permission activity A20 is a permit activity that is administered by the council in whose municipal district the on-site wastewater management system is located.

Onsite wastewater management systems that can treat more than 5,000 litres per day are classified as prescribed permission activity A03 (Sewage treatment) and need an EPA development licence and operating licence (unless an exemption applies). This applies to both proposed new systems and existing systems. Landholders deal directly with EPA Victoria on these larger systems.

The volumetric threshold of 5,000 litres per day relates to the design capacity OR the actual flow rate.

1.5 CONCEPTUAL FRAMEWORK

The following matrix shows the conceptual framework for this DWMP. Elements of domestic wastewater management fall within one of the four cells of the matrix.

Note that the top half of the matrix, is focussed on proactive management of existing systems, while the bottom half aims to prevent future issues.

Four Sector Approach to Onsite Wastewater Management

	UNSEWERED LAND	SEWERED (SEWERABLE) LAND
EXISTING SYSTEMS	▪ Develop & maintain information for the purposes of managing existing onsite systems ▪ Monitor & inspect onsite systems & request upgrades where necessary ▪ Achieve ongoing compliance with relevant legislation ▪ Request water authorities to investigate sewer or alternative services in response to high-risk clusters	▪ Facilitate the abandonment of onsite systems by connection of existing houses to sewer whenever possible ▪ Work with water authorities to plan and investigate community sewerage schemes, including alternative services
FUTURE SYSTEMS	▪ Ensure land subdivision creates allotments that can sustain onsite systems ▪ Ensure new onsite systems are installed to comply with best practice requirements ▪ Where increased development density is sought and proposed allotments cannot sustain onsite systems, work with water authorities to investigate sewer or alternative services	▪ Avoid the installation of any new onsite systems in sewered areas ▪ Ensure that new houses connect to sewer at time of construction ▪ Liaise with water authorities to understand sewerage extent and capacity for future development

1.6 DWMP DEVELOPMENT PROCESS

STAGES

Development of the DWMP commenced in mid 2021 and involved the following stages:

- Background research, data gathering and analysis
- Risk analysis and evaluation
- Stakeholder engagement and collaboration
- Preparation of a draft DWMP
- Draft DWMP Consultation
- Final DWMP (This document adopted by council 26 July 2022).

STAKEHOLDER ENGAGEMENT

Engagement with stakeholders occurred via phone and video conferencing to focus on individual stakeholder needs and concerns; and via workshops to collaborate and share knowledge between stakeholders.

The engagement included a focus on relationship development that can be carried forward into successful implementation of the DWMP.

Key stakeholders include Council Officers, Wannon Water, Glenelg Hopkins CMA, EPA Victoria, neighbouring municipalities and the community.

Action 1: Continue to engage with key stakeholders including:

- Collaboration with Wannon Water on expansion of sewer networks and provision of alternative services
- Active participation in the Great South Coast Integrated Water Management Forum

COMMUNITY ENGAGEMENT

A draft of this DWMP was circulated for public consultation during April and May 2022. Circulation occurred via the online consultation portal, local newspaper and social media. No comments or feedback was received.

An important step in implementing this DWMP will be to continue to engage the community. The intent is to inform the community of existing and proposed programs in relation to onsite wastewater systems and test that policy settings are appropriate. This will occur through a number of Actions identified in this DWMP, including Action 4 (inspection program), Action 8 (solutions for small lots) and Actions 9 & 10 (community education).

2 Glenelg Shire Context

2.1 THE REGION

Glenelg Shire (Figure 2-1) is located in the far south west of Victoria and has a resident population of approximately 19,600. It includes the communities of Portland, Casterton, Heywood, Dartmoor, Nelson, and Cape Bridgewater.

The Shire is projected to experience minimal population growth in unsewered areas over the next 25 years.

The landscape comprises rolling hills and rich agricultural land to the north, a scenic and secluded river region to the west, extensive pine and blue gum plantations through the hinterland, and a huge expanse of coastal beaches and cliffs on the southern perimeter.

The shire is renowned for its dramatic coastal and cultural landscapes, which include the Budj Bim Cultural Landscape. It is also known for its recreational fishing and its manufacturing, agricultural, commercial fishing and forestry commodities.

The Traditional Owners of the region are the Gunditjmara, Bunganditj and Jarwadjali people.

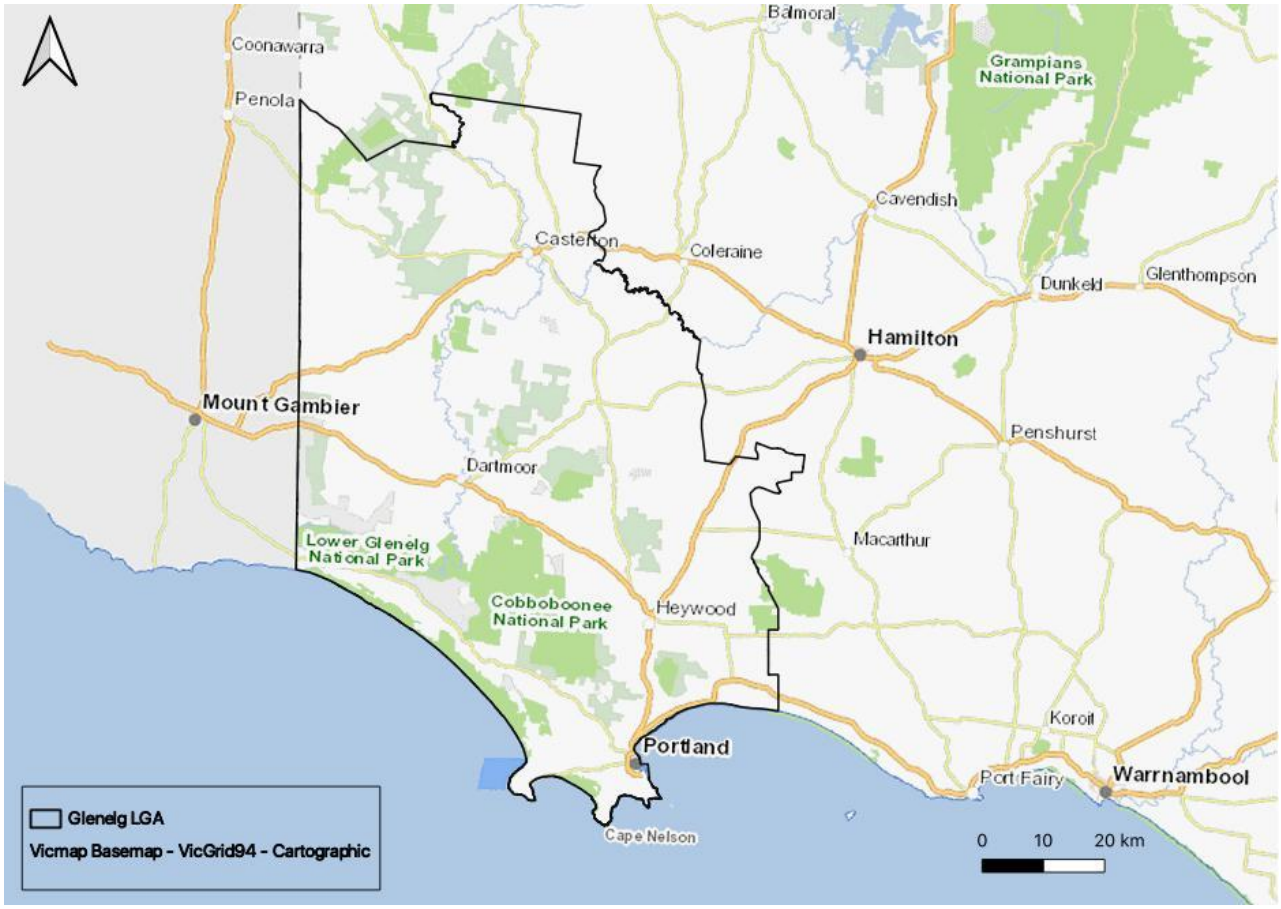

Figure 2-1: Glenelg Shire Council Area

2.2 CURRENT ONSITE WASTEWATER SITUATION

The Glenelg Shire currently has 3,678 properties that have been identified as domestic wastewater generators that are not connected to sewer. These properties need to use onsite wastewater systems.

The key domestic wastewater management issues identified across the Shire are:

- Key areas of existing high density for onsite wastewater systems are Nelson, Merino, Dartmoor, Narrawong and Cape Bridgewater
- There is development pressure along the coastal fringe in towns and localities without sewerage, including Nelson and Cape Bridgewater. (Noting that Dutton Way, along the coast northeast from Portland, has had sewerage recently constructed which has resolved domestic wastewater problems in that area.)
- There are numerous existing small lots that are zoned for residential development but may have difficulty sustainably managing wastewater onsite
- Soil types that create risk for wastewater management include the highly permeable sand dune areas, particularly along the coast, and poorly drained sodic clay soils associated with some inland areas (e.g. Merino Tablelands)
- There are sensitive surface and ground water environments across the Shire. Where these are close to unsewered development there can be risk of contamination. Examples include the town of Nelson which is along the Glenelg River, Sandford on the Wannon River, and Tyrendarra on the Darlot Creek.
- Risks of contamination of Wannon Water's potable water supply intakes are not of immediate concern but setting in place planning controls across bore field recharge areas near Tulloch and Dartmoor is under consideration to prevent future issues.

A DWMP was developed for Glenelg Shire in 2009. Key recommendations from the 2009 plan that have been implemented include:

- Installation of sewer for Dutton Way, along the coast northeast of Portland
- Increased use of advanced treatment and irrigation systems for wastewater management on smaller lots
- Community education and awareness raising through e.g. factsheets on the Glenelg Shire website.

This new DWMP incorporates legislative and policy changes that have occurred since 2009, takes into account advances in onsite wastewater management technology, and responds to local community changes such as population growth along the coast.

2.3 POLICY AND STRATEGIC CONTEXT

COUNCIL VISION

The Glenelg Shire 2040 Community Plan and Vision provides a shared vision for community members, businesses, and government to work towards over the next 20 years. The Plan will be used to guide the future decisions of Council.

It outlines the following overall vision:

> *By 2040, Glenelg Shire is known as a very liveable region of Australia, featuring rich Indigenous heritage, outstanding natural beauty, and providing access to diverse economic and educational opportunities.*

There are six priority themes and 23 community priorities for 2040. Improving onsite wastewater management can help in achieving the following priorities:

- Enhance environmental responsibility
- Encourage and maintain all aspects of sustainable practices
- Responsible management of waste and recycling
- Our community is healthy, safe and supported
- Enable possibilities in the use of land while protecting the natural environment
- Strengthen our regional townships to enhance collective prosperity.

COUNCIL PLANNING SCHEME

Planning, and the planning scheme, play an important role in onsite wastewater management. Council has within its control many of the tools and powers to ensure that development occurs in a manner consistent with the constraints and opportunities provided by onsite wastewater management.

The *Glenelg Shire Council Wastewater Management Plan* (2009) is listed as a background document in the Glenelg Planning Scheme.

The following extracts from the Glenelg Planning Scheme illustrate key clauses related to onsite wastewater management. These are the existing objectives, policies and provisions relating to onsite wastewater management and provide the framework for Council domestic wastewater operations.

Strategic Direction

02.03-1 Settlement: Managing growth: The Shire seeks to achieve growth by:

- Consolidating development within regional and district towns where there is reticulated infrastructure such as water, sewerage and stormwater drainage
- Supporting rural residential development only where it is linked to an existing urban area, where it does not impact on land capability, productive agricultural land use or water quality and where it can be serviced by infrastructure.

State Policy

11 Settlement: Planning is to facilitate sustainable development that takes full advantage of existing settlement patterns and investment in transport, utility, social, community and commercial infrastructure and services.

11.02-3S Managing Growth: Sequencing of development: Ensure that planning for water supply, sewerage and drainage works receives high priority in early planning for areas of growth.

12.03-1S Water Bodies and Wetlands: River corridors, waterways, lakes and wetlands:

- Ensure development responds to and respects the significant environmental, conservation, cultural, aesthetic, open space, recreation and tourism assets of water bodies and wetlands
- Ensure development is sensitively designed and sited to maintain and enhance environmental assets, significant views and landscapes along river corridors and waterways and adjacent to lakes and wetlands
- Facilitate growth in established settlements where water and wastewater can be managed.

14.02-1S Catchment planning and management: Ensure land use and development minimises nutrient contributions to water bodies and the potential for the development of algal blooms.

14.02-2S Water quality: Ensure that land use activities potentially discharging contaminated runoff or wastes to waterways are sited and managed to minimise such discharges and to protect the quality of surface water and groundwater resources, rivers, streams, wetlands, estuaries and marine environments.

16.01-3S Rural residential development: Encourage the consolidation of new housing in existing settlements where investment in physical and community infrastructure and services has already been made.

19.03-3S Integrated water management:

- Sustainably manage water supply, water resources, wastewater, drainage and stormwater through an integrated water management approach
- Provide for sewerage at the time of subdivision or ensure lots created by the subdivision are capable of adequately treating and retaining all domestic wastewater within the boundaries of each lot
- Ensure that the use and development of land identifies and appropriately responds to potential environmental risks and contributes to maintaining or improving the environmental quality of water and groundwater.

Local Provisions

11.02-3L Managing Growth: Sequencing of development: Discourage the expansion of unserviced town areas unless all wastewater and sewerage can be treated onsite.

11.03-4L Coastal Settlement:

- Confine development to within existing coastal settlements
- Locate development in flatter locations outside of dune areas.

19.03-3L Integrated water management: Ensure soil is not contaminated by the discharge of domestic wastewater.

Zones

32.03 Low Density Residential Zone: To provide for low-density residential development on lots which, in the absence of reticulated sewerage, can treat and retain all wastewater.

32.03-1 LDRZ: Use for one or two dwellings or a dependent person's unit: Each dwelling must be connected to reticulated sewerage, if available. If reticulated sewerage is not available, all wastewater from each dwelling must be treated and retained within the lot in accordance with the requirements in the Environment Protection Regulations under the *Environment Protection Act 2017* for an on-site wastewater management system.

32.03-3 LDRZ: Subdivision: Any area specified must be at least 0.4 hectare for each lot where reticulated sewerage is not connected.

32.03-6 LDRZ: Decision guidelines: In the absence of reticulated sewerage: The capability and suitability of the lot to treat and retain all wastewater as determined by a Land Capability Assessment on the risks to human health and the environment of an on-site wastewater management system constructed, installed, or altered on the lot in accordance with the requirements of the Environment Protection Regulations under the *Environment Protection Act 2017*.

32.05-3 TZ, 35.03-2 RLZ, 35.06-2 RCZ, 35.07-2 FZ, 35.08-2 RAZ: Use of land for a dwelling: Each dwelling must be connected to reticulated sewerage, if available. If reticulated sewerage is not available, all wastewater from each dwelling must be treated and retained within the lot in accordance with the requirements of the Environment Protection Regulations under the *Environment Protection Act 2017* for an on-site wastewater management system.

32.05-5 TZ: Subdivision: Each lot must be provided with reticulated sewerage, if available. If reticulated sewerage is not available, the application must be accompanied by:

- In the absence of reticulated sewerage, include a Land Capability Assessment on the risks to human health and the environment of an on-site wastewater management system constructed, installed or altered on the lot in accordance with the Environment Protection Regulations under the *Environment Protection Act 2017*.
- A plan which shows a building envelope and effluent disposal area for each lot.

Particular Provisions

56.07-3 Waste water management objective: To provide a waste water system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.

Waste water systems must be:

- Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority and the Environment Protection Authority
- Consistent with a domestic waste water management plan adopted by the relevant council.

ENVIRONMENT PROTECTION LEGISLATION

Recent changes in Victoria's environmental laws strengthen and clarify the onsite wastewater management obligations for landowners and Councils.

The amended *Environment Protection Act 2017* came into effect in Victoria on 1 July 2021. These new environment protection laws, and supporting regulations, focus on preventing waste and pollution impacts, rather than managing impacts after they have occurred.

The **general environmental duty** is a centrepiece of the new laws and regulations. It applies to all Victorians. If you conduct activities that pose a risk to human health and the environment, you must understand those risks. You must also take reasonably practicable steps to eliminate or minimise them. Onsite wastewater management systems can be a risk to human health and the environment if they are poorly installed or maintained.

The general environmental duty is underpinned by the *Environment Protection Regulations 2021* which set out duties and obligations for persons in management or control of land where an onsite wastewater management system is located. These include requirements for the landholder or land manager to:

- Take all reasonable steps to operate the system so it does not pose a risk to human health or the environment
- Take all reasonable steps to maintain the system in good working order (for residential properties, this applies to the owner but not to a renter)
- Check for signs the system may be failing or is not in good working order and, from 1 July 2022, notify council if this is the case
- Respond to system failures
- Provide information to occupiers regarding the correct operation and maintenance of the system
- Keep maintenance records and, on request, provide them to council.

Onsite wastewater management systems are a prescribed permission activity under the new environment protection regulations:

- A permit from the local Council is required to construct, install or alter an onsite wastewater management system with flow rates of up to 5,000 litres per day on any day. Under the regulations this is prescribed permission activity A20 (as set out in item 28 in the Table in Schedule 1 of the regulations). It applies to proposed new systems and alterations to existing systems, which includes alterations that increase the system's flow or load, such as a house extension or installation of a spa.
- Onsite wastewater management systems that can treat more than 5,000 litres per day are classified as prescribed permission activity A03 (Sewage treatment) and need an EPA development licence and operating licence (unless an exemption applies). This applies to both proposed new systems and existing systems.

Councils can refuse a permit if the onsite wastewater management system doesn't meet EPA's specifications.

The Regulations also set offences and allow councils to order system maintenance and enforce breaches of duties.

These Regulations apply to all existing onsite wastewater systems, including older systems installed before installation permits were introduced. People may still operate old systems, but they must take all reasonable steps to ensure the system is maintained in good working order and operated so as not to pose a risk to human health or the environment.

Further guidance on on-site wastewater management includes:

- Code of practice – onsite wastewater management (EPA Publication 891)
- Guidance for owners and occupiers of land with an OWMS ≤ 5000 litres on any day (including septic tank systems) (EPA Publication 1976)
- Regulating onsite wastewater management systems: local government toolkit (EPA Publication 1974)
- Victorian land capability assessment framework (Municipal Association of Victoria).

The EPA *Code of practice – onsite wastewater management* clearly identifies Council's statutory responsibilities in relation to the planning and management of onsite wastewater systems. These include:

- Assessing land development applications to determine the suitability of a site for an onsite wastewater management system where reticulated sewerage is not available
- Assessing onsite wastewater management permit applications to ensure systems are designed in accordance with the relevant Victorian regulations and the Australian Standard
- Issuing Permits to Install/Alter and Certificates to Use onsite wastewater management systems
- Refusing to issue permits for a proposed development where wastewater cannot be contained within the boundaries of the site and reticulated sewerage is not available or will not be provided at the time of subdivision
- Overseeing the installation of onsite wastewater systems to ensure compliance with legislative requirements
- Ensuring systems are managed in accordance with their permit, and the relevant Australian Standard and Victorian regulations, through relevant compliance and enforcement programs
- Developing Domestic Wastewater Management Plans
- Investigating issues with onsite wastewater systems that may be causing impact to public health, amenity and/or the environment
- Referring high-risk unsewered areas to water authorities so they can be investigated for connection to either a sewer system or an alternative service.

3 Risk Assessment

3.1 RISK FRAMEWORK

"Risk is the effect of uncertainty on objectives"[1]. In other words, risk arises where there is uncertainty about achieving an objective. Risk management assists in making informed decisions and setting strategy in the face of uncertainty. This section provides a risk assessment approach that is informed by the Australian Standards (AS/NZS ISO 31000:2018) and the Victorian Government Risk Management Framework Practice Guide (VMIA, 2016).

Wastewater is a source of risk as it contains contaminants that have potential to impact on:

- Public health – through contamination of drinking water and recreational water bodies with human pathogens
- The environment – via pollution of surface waters and groundwater, with nutrients, pathogens and other pollutants, which can cause harm to aquatic fauna and indigenous vegetation
- Amenity – including offensive odours and unsightly discharges leading to reduced amenity and potentially impact on property values.

In relation to onsite wastewater management, these impacts can occur due to runoff or leaching of poorly treated or excess wastewater. This is more likely when onsite systems have deteriorated, are poorly maintained, are not fit for purpose (e.g. inadequately sized), and/or are not properly located.

There can be uncertainty as to the extent of the impact occurring, particularly when considering the cumulative impact across a town or the Shire as a whole. As such, there is a need to take a risk management approach in determining the actions Council should take to improve wastewater management.

Once the level of risk has been determined, priority risks should be dealt with first. That is, the higher the risk the higher the priority. Also, risk is dynamic and therefore managing risk is iterative. This risk assessment and the selected risk treatments (actions) will need to be monitored and reviewed on a regular basis.

The risk assessment considers established practices at Glenelg Shire Council. As such, the assessment is of residual risk.

[1] Australian Standard AS/NZS ISO 31000:2018 Risk Management – Guidelines

3.2 CURRENT RISK LEVEL

This DWMP uses a four-sector approach to capture all aspects of onsite wastewater management and an overview of risk is provided below based on this approach.

Appendix 1 provides risk assessment matrices that give likelihood, consequence and risk definitions.

Onsite Wastewater Management Risk

	UNSEWERED LAND	SEWERED (SEWERABLE) LAND
EXISTING SYSTEMS	Likelihood: *Likely* 3,700 systems approx., including legacy offsite discharges and old failing systems. Minimal monitoring undertaken with current resourcing. Consequence: *Moderate* Area has highly valued waterways with recreational, stock & domestic and irrigation use of both surface and groundwater. Clusters of existing systems could be harmful to regional ecosystem and public health. **RISK = HIGH**	Likelihood: *Not Likely* Cost of transfer to sewer can be prohibitive for individuals, but processes in place to support transition. Consequence: *Minor* Potentially harmful to public health and/or environment but impact expected to be localised. **RISK = LOW**
FUTURE SYSTEMS	Likelihood: *Potential* Onsite wastewater management embedded in planning scheme and resources in place to respond to applications. However, challenges across area with small lot sizes, coastal development pressure, sandy soils and so on. Consequence: *Minor* Potentially harmful to public health and/or environment but impact expected to be localised. **RISK = MODERATE**	Likelihood: *Not Likely* Clear procedures in place to ensure houses in sewered areas are connected. Consequence: *Minor* Potentially harmful to public health and/or environment but impact expected to be localised. **RISK = LOW**

3.3 SPATIAL RISK ASSESSMENT

Many of the risks associated with onsite wastewater management vary spatially. This is of importance when investigating the cumulative risk associated with onsite systems. Therefore, spatial risk assessment has been undertaken. This is a mapping exercise that combines various types of geographic information. Risk factors include density of onsite systems, lot size, slope, soil type and proximity to sensitive water systems and natural environments.

The spatial risk assessment was tailored to suit the Glenelg Shire. A report is provided in Appendix 2. It draws on recent approaches used by other councils in Victoria, and particularly the Edis Method that was developed for Mansfield Shire in 2014.

The risk assessment combines multiple risk factors to form an overall risk rating. The risk mapping can be used for the purposes of:

- Prioritising sites to be audited/monitored under an inspection program
- Understanding constraints on future development and the level of assessment required to ensure sustainable onsite wastewater systems are installed

- Streamlining requirements for low-risk areas to reduce red tape and cost
- Understanding the need for and potential benefit of future sewerage connections or alternative services.

Conclusions drawn from the spatial risk assessment include:

- The highest risk areas identified are Nelson and Merino due to a high density of existing systems and availability of small vacant lots, combined with other risk factors such as difficult soils and proximity to water environments. These areas should be targeted for future auditing and monitoring.
- A key issue across the Shire is determining appropriate approaches for development of small lots. This is particularly the case where there are other risk factors such as difficult soils and steep slopes at locations such as Cape Bridgewater, Narrawong and Sandford.
- There are some areas of high risk that warrant consideration by Wannon Water for future sewerage schemes. Nelson is a key example. Through auditing of existing systems and water quality monitoring within these high-risk areas, further information can be obtained on current impact and potential risk to human health and the environment. This will assist in building understanding of the need for sewerage.

The findings from this spatial risk assessment have been used to inform the Action Plan within this document.

Full details of the spatial risk assessment are contained in a separate report (RMCG 2021, *DWMP Spatial Risk Assessment – Glenelg Shire Council*).

Action 2: Review and refine the onsite wastewater management risk assessment at least every five years (as part of DWMP review), to incorporate improved datasets and changing circumstances.

4 Existing Onsite Systems in Unsewered Areas

4.1 INTRODUCTION

This chapter discusses the existing fleet of onsite wastewater systems in unsewered areas and identifies actions for their improved management.

This is the area of highest risk for Glenelg Shire particularly where onsite systems are clustered together. There is limited monitoring of existing systems and limited information on older systems, and this creates risk to the sensitive local environments.

The long-term goals in relation to existing onsite systems in unsewered areas are as follows.

- Council will improve the compliance of onsite wastewater systems through an integrated program of education, monitoring and compliance
- A risk-based approach will be used to guide the expansion of the sewerage network or provide alternative services where required.

4.2 ONSITE SYSTEM DATABASE

At the heart of good management of the existing fleet of onsite systems is a comprehensive database.

Council currently uses Open Office software and effectively captures information on new/altered systems in response to permit applications. However, the database is not comprehensive – there are a number of older systems that are not included.

The database will continue to be improved over time. For example, there are boxes of files from pre-amalgamation that are currently being scanned. Results from monitoring inspections and compliance actions will also be incorporated into the database.

The database will include all onsite wastewater systems with flow rate of less than 5000 L/day, whether they are private residences, commercial, Council owned, or State government owned.

Action 3: Continue to develop, populate, maintain and utilise the onsite system database as a tool for improved onsite wastewater management of existing systems and to inform planning decisions about future systems.

4.3 PERFORMANCE OF EXISTING SYSTEMS AND HIGH-RISK CLUSTERS

Approximately 3,700 houses in Glenelg Shire rely on onsite wastewater systems. Some of the issues associated with these systems include:

- Ageing septic tanks
- Inadequate onsite disposal areas

- Lack of system maintenance
- Discharge of wastewater offsite, including into drains, creeks and rivers.

At present non-compliances are dealt with in response to complaints, or when there is a major onsite change (such as a house extension) that requires a planning and/or a building permit.

Inspection of a sample of onsite systems is recommended to confirm whether the existing systems are performing well or not. There will be a cost, but inspections will generate facts that will help Council to more accurately assess the risks posed by the existing onsite systems and sensibly plan for their ongoing management. Inspections can also have flow-on benefits through awareness raising in the wider community.

Based on the results from the Spatial Risk Assessment, the following towns are recommended as the priority for the inspection program due to density of existing systems, combined with other risks such as proximity to waterways:

- Nelson
- Merino
- Dartmoor
- Narrawong
- Cape Bridgewater.

Older systems that are not in the database, systems on small lots (<4,000m^2) and those within 100m of a waterway will be targeted as high priority in the initial monitoring and compliance program.

Inspection protocols developed by other neighbouring Councils and the inspection form in the Australian Standards (AS 1547, Appendix U) can be used as the basis of a checklist.

In relation to site access, Council authorised officers[2] have powers of entry under the *Environment Protection Act* 2017. However, for residential premises, entry for inspections can only occur:

- With the consent of the occupier
- If the authorised officer reasonably believes that a person has contravened, is contravening or is about to contravene a provision of the Act or Regulations; or
- If the authorised officer reasonably believes there is an immediate risk of material harm to human health or the environment.

If one of the last two points applies, the authorised officer can only investigate the part of the residential premises necessary to determine the suspected contravention. For example, this may only require the authorised officer to enter the land surrounding a house to inspect the system.

Action 4: Design and implement a dedicated program of inspections, targeting 50 onsite wastewater systems in high-risk areas each year.

Action 5: Use compliance and enforcement tools as appropriate to respond to inspection findings and record in the onsite system database.

[2] Council employees appointed as authorised officers under section 242(2) of the *Environment Protection Act 2017*.

4.4 PROTECTING WATER QUALITY

The Glenelg Shire has a number of highly valued waterways, including the Glenelg River, which is the largest river in south-west Victoria. Both the Glenelg and the Portland Coast basins have high value environmental reaches, which support rare and threatened fauna and flora. Recreational water use is a feature of the region and surface and groundwater resources sustain the region's economic production.

A number of existing onsite wastewater systems are located in close proximity to high value waterways. It is recommended that water quality monitoring is undertaken to understand the impact of onsite systems on downstream water quality. The spatial risk assessment identifies Nelson as the highest priority area for monitoring. This could consider monitoring of town drains as well as the Glenelg River itself.

Water quality monitoring could be expanded in future to other locations based on the outcomes of the onsite system inspections.

Action 6: In collaboration with Glenelg Hopkins CMA and Wannon Water, develop a water quality monitoring program for Nelson.

Action 7: In collaboration with Wannon Water and subject to the outcomes of onsite system inspections (Action 4) and water quality monitoring (Action 6), determine the need for sewerage or an alternative system in Nelson.

4.5 MINIMISING WASTEWATER VOLUMES

A key method in minimising risk to the environment and public health from domestic wastewater, is to minimize the volume of wastewater produced. Minimising wastewater volumes can be achieved by:

- Using water saving fixtures and fittings[3]
- Installing a dry composting toilet[4]
- Not installing a bath (low flow rate shower only)
- Not installing extra wastewater producing facilities (e.g. spa, kitchen food waste grinder)
- Adopting indoor recycling[5] (toilet flushing and/or washing machine use) of advanced secondary-treated greywater.

Table 4-1 provides the daily flow rates per person associated with various combinations of water supply and types of fixtures. Figures were derived from AS/NZS 1547:2012.

The Australian Standard recommends an allowance of 25% extra domestic wastewater flow be made for residential premises connected to reticulated water supplies. There is evidence that houses with access to reticulated water use more water compared to those reliant on onsite rainwater tank supplies. A number of the unsewered townships across the Glenelg Shire have access to potable water supplies so the implications for domestic wastewater management have been addressed in this plan.

[3] Minimum '3 Stars' for appliances and minimum '4 Stars' for all fittings and fixtures based on the Water Efficiency Labelling Scheme (WELS). As directed by the EPA Code of Practice – onsite wastewater management.

[4] Note that this will require the installation of a greywater system in conjunction, to accommodate the treatment and disposal of other household liquid wastes. Currently there are no greywater systems approved under AS 1546.4 as required by the EPA in Victoria.

[5] Suitable for single households only (not permitted at any multi-dwelling, business, commercial or school premises)

Table 4-1: Typical Domestic Wastewater Design Flow Allowances (L/day per person)

	RETICULATED WATER SUPPLY[6]	ONSITE WATER TANK SUPPLY
All wastewater (standard water fixtures)	180	150
All wastewater (water saving fixtures)	150	120
Dry composting toilet installed (with water saving fixtures)	100	70

Volume of wastewater produced is proportional to the number of household occupants. EPA regulations use the number of bedrooms within a house as a measure of the number of occupants. A house with fewer bedrooms is likely to produce less wastewater and therefore require a smaller area for treated wastewater application. To calculate total wastewater flow rates, multiply the figures in the table above by the number of bedrooms plus 1. For instance, a four-bedroom house with town water supply and standard water fixtures is expected to house five people, and so produce 900 L/day (180 L/person/day multiplied by 5).

Note that the organic loading rate must be considered as well as the hydraulic flow rate when designing onsite wastewater management systems. The organic loading rate does not change in response to the use of water saving fixtures.

It is recommended that the message about the importance of conservative household water use is incorporated into all communication and education programs related to onsite wastewater systems. Refer to Section 4.8 for further discussion.

4.6 ONSITE SYSTEMS ON SMALL LOTS

There are a number of existing onsite wastewater systems on ‘small lots’. For this study we assume small lots are those with an area less than 4,000 m^2. These can create risk to the environment and public health as it is difficult to retain wastewater onsite due to the limited space available.

Where these small lots are in high-risk locations, they will be targeted as part of the inspection program (see Action 4). If the inspections identify that upgrades are required to enable improved onsite wastewater management, Council will work with existing landowners to identify sustainable solutions.

There may be opportunity to reduce wastewater volumes through use of water saving fixtures and other options as outlined in Section 4.5. Upgrading to secondary treatment and drip irrigation can also reduce the area required for wastewater management.

Where multiple neighbouring small lots are currently being used to assist with onsite wastewater management – e.g. dwelling on one lot, wastewater treatment and disposal on neighbouring lot – consideration could be given to amalgamation of these lots to avoid the risk of the lots being sold separately.

Where there are clusters of existing systems on small lots, consideration could be given to alternative sewerage services in consultation with Wannon Water.

A pump-out tank is an option of last resort but may be installed for an existing dwelling which cannot contain all its wastewater onsite. The contents of the tank are regularly pumped into a sewage sludge truck and

[6] Includes reticulated town water supply, groundwater bores and/or stock and domestic waterway diversion licences (where connected to household use).

transported for discharge to an approved centralised sewage treatment plant. This is not an option for new dwellings or where additions or renovations will occur that are expected to increase wastewater flows.

Action 8: Work with existing landowners on small lots to determine sustainable solutions for onsite wastewater management. This may include consideration of alternative sewerage services in consultation with Wannon Water.

4.7 HOUSE EXTENSIONS OR RENOVATIONS

Household wastewater flow rates can increase with a change of ownership, a higher number of occupants, connection to reticulated water supply and/or the addition of a bedroom, bathroom, spa or other water-using fixture. Where the wastewater treatment and/or land application system is not large enough to cope with the increase in flow, the system may fail, causing a risk to public health and the environment.

Where additions or renovations require a permit, Council can determine whether the onsite wastewater management system needs to be adapted to an increased flow rate.

Where the existing onsite wastewater system needs to be altered, the owner must apply to Council for an Onsite Wastewater System Permit (often referred to as a Septic Tank Permit) before the house alterations begin. A Land Capability Assessment may be required to support the application, as discussed in Section 5.2 for new dwellings.

4.8 COMMUNITY EDUCATION

Council provides a range of education and information material to help residents manage their onsite systems. Information on Councils' web page needs to be kept up to date. The spatial risk assessment outcomes can be used to target education to high-risk areas.

Areas of focus for education could include:

- The new EPA regulations and the General Environmental Duty
- Water conservation - A key method in minimising risk from wastewater, is to minimize the volume produced
- Use of cleaning products that are suited to the onsite treatment system in place. Chemicals that contain large amounts of antibacterial compounds can kill the good bacteria inside the wastewater system that help to break down the waste
- Avoiding food waste, oils and fats going down the kitchen sink as these can block pipes and decrease the function of the onsite system
- Encouraging regular maintenance of onsite systems as appropriate to the type of system installed
- Protection of effluent disposal/irrigation areas from inappropriate development (e.g. driveways, sheds) and diversion of stormwater around the area.

Once adopted, this DWMP can also be published on the Council's web page.

Action 9: Continue to provide community education on the correct operation and maintenance of onsite wastewater systems, as well as water conservation. Incorporate information that supports implementation of domestic wastewater priorities and actions, and align with other education programs or focusses for Council where possible.

Action 10: Evaluate the benefits, and if justified, provide targeted education materials to high-risk areas based on the information from the spatial risk assessment and outcomes of the inspection program (Action 4).

Action 11: Publish the endorsed Domestic Wastewater Management Plan on the Glenelg Shire website.

A particular opportunity for provision of education materials is when properties change hands. It is important to ensure that owners not previously familiar with onsite systems are made aware of the importance of correct operation and management of their onsite system

Section 32 Vendor Statements provide a mechanism to inform prospective new owners of properties reliant upon onsite wastewater systems. Vendor Statements must disclose services that are not connected – i.e. not connected to reticulated sewerage.

Council could also provide information on its website targeted to new buyers and send information on onsite wastewater management to new owners of properties in unsewered areas.

Action 12: Alert new buyers to the existence of onsite systems and the associated wastewater management requirements (e.g. through website information).

4.9 SHIRE OWNED ONSITE WASTEWATER SYSTEMS

Glenelg Shire Council manages properties with onsite wastewater systems across the region. These are associated with public halls, recreation reserves and public toilets. The Shire seeks to lead by example and ensure that these onsite wastewater systems are adequately maintained and upgraded where required.

In tourist areas, there is concern that cassette toilet waste from caravans, recreational vehicles or house boats may be being dumped into public toilets which are reliant on onsite systems. This waste should be deposited at designated locations in sewered areas[7], but some tourist towns are quite remote from these and may need additional facilities provided. It is proposed to review this issue as part of the audit of Council onsite systems.

Action 13: Conduct an audit of Council owned onsite wastewater systems.

[7] Dump points are available in Portland, Heywood, Casterton and Dartmoor.

5 Future Onsite Systems in Unsewered Areas

5.1 INTRODUCTION

This chapter addresses the planning, technical assessment, and decision-making processes that Council will undertake, in collaboration with landowners and agency stakeholders, to ensure that onsite systems installed in the future meet best practice.

Onsite wastewater management is embedded in the planning scheme and resources are in place to respond to new applications. The risk associated with future development is moderate.

The long-term goals for future onsite wastewater systems in unsewered areas are:

- Ensure new development requiring onsite wastewater systems occurs in a sustainable manner
- Ensure land subdivision creates allotments that can sustain onsite systems.

5.2 LAND CAPABILITY ASSESSMENTS

Land capability assessments (LCAs) are required to support applications for new onsite wastewater systems. An LCA is a report that assesses the viability of onsite wastewater management on a site where there is no reticulated sewerage.

Further guidance on LCA requirements is provided by the EPA[8] and MAV[9].

To reduce the financial cost to landowners and the administrative workload on Council, it is recommended that the spatial risk assessment developed alongside this DWMP be used to guide the level of complexity of the LCA, as illustrated in Table 5-1. All applications for new onsite wastewater systems will still need to be accompanied by an LCA. However, standard proposals in lower risk areas need not have the same level of detail as higher risk proposals.

Action 14: Implement the risk-based approach detailed in Table 5-1 to guide the level of detail provided in land capability assessments.

[8] Code of practice – onsite wastewater management, EPA Victoria, Publication 891.4

[9] The Victorian Land Capability Assessment Framework (2nd Edition 2014), Municipal Association of Victoria (MAV), Department of Environment and Primary Industries (DEPI) and Environment Protection Authority Victoria (EPA) 2nd Edition 2014 (or as amended).

Table 5-1: Land Capability Assessment Requirements and Referrals

RISK	RISK DEFINITION	LCA REQUIREMENTS	CONDITIONS
Low	All sites not considered moderate or high risk as per definitions below.	Description of proposed onsite treatment, land application and management strategies, including design maximum peak daily hydraulic flow and organic load. Plan of proposed onsite system, (including location of reserve land application area where absorption/transpiration trenches/beds are proposed). Confirmation that setback distances meet requirements in EPA Code of Practice (see Table 5 in Code).	Landowners must comply with conditions on permits granted by Council.
Moderate	Site is between 4,000m^2 and 10,000m^2. OR Site is mapped as moderate or high risk to water environments. OR Slope is steeper than 10%. OR Site is mapped as medium-risk soil type.	As above, plus: Soil profiling and texture assessment in line with site-and-soil evaluation procedures detailed in AS/NZS 1547:2012.	As above, plus: Secondary wastewater treatment standard preferred where there is high risk to water environments.
High	Site is smaller than 4,000m^2 OR Site is mapped as high-risk soil type (includes Nelson Dunes and Plains, Merino Tablelands) OR High density of existing onsite systems: Site is within townships of Nelson, Dartmoor, Merino, Narrawong or Cape Bridgewater. OR A commercial residential development is proposed.	As above, plus: Full feature survey of the site. Detailed soil analysis, including in-situ permeability testing. Water and nutrient balance calculations.	As above, plus: Refer to special design considerations as appropriate to site (see Section 5.3). Council will prioritise inspection and monitoring of high-risk areas to ensure routine maintenance is undertaken by landowners into the future.

5.3 SPECIAL DESIGN CONSIDERATIONS

Challenges associated with installation of onsite wastewater systems in the Glenelg Shire include wet winters, sandy soils, heavy clays and intermittent use of tourist/holiday facilities.

Wet Winters

When high rainfall is combined with relatively cool climate conditions, this impacts on management of wastewater as evapotranspiration[10] is reduced. It also means there is natural runoff and accessions to groundwater, which should not be contaminated by the nutrients, salts, or pathogens in wastewater.

In Glenelg Shire this is more likely to occur in the cool winter months and in the southern parts of the Shire where there is higher average rainfall.

The wastewater disposal/irrigation area needs to be designed with sufficient area for management of wet periods, and/or storage needs to be provided. Water balance modelling is used to support appropriate design and a model template is available from the Municipal Association of Victoria[11].

The following recommendations should also be considered in the higher rainfall areas:

- Minimise wastewater volume produced
- Require secondary treatment where sites are in proximity to waterways or have shallow watertables. Also consider disinfection and nutrient removal
- Install land application areas that are shaped to shed rainfall, and incorporate cut-off/diversion drains to prevent stormwater run-on
- Select land application areas with preference given to good exposure to wind and a northerly/westerly aspect, to maximise evapotranspiration
- Avoid surface spray irrigation due to risk of contaminated runoff in wet periods.

Sandy soils

Sandy soils are highly permeable and have low nutrient retention capacity. Where used for onsite wastewater irrigation/disposal, they can pose a risk to the environment via accession of nutrients and other contaminants to groundwater.

There are large areas of sandy soils along the coastal dunes in the south of the Shire. Where onsite wastewater systems are used on these soils, the following practices are required:

- Minimise wastewater volume produced
- Promote uptake of wastewater by evapotranspiration. Avoid use of absorption trenches/beds
- Require secondary treatment where sites are in proximity to waterways or have shallow watertables. Also consider disinfection and nutrient removal
- Use nutrient balance analysis to assist in determining irrigation/disposal area
- Select high nutrient use species
- Minimise use of detergents containing phosphorus.

[10] Uptake of wastewater by plants and through evaporation from the soil.

[11] https://www.mav.asn.au/what-we-do/policy-advocacy/environment-water/on-site-domestic-wastewater-management

Heavy clay soils

Clay dominated soils have low permeability creating risk of waterlogging and runoff when used for wastewater disposal. This can be exacerbated where soils are dispersive (sodic) or show shrink/swell behaviour.

Examples of soils with high clay content, that are often sodic, are the Merino Tablelands.

Where onsite wastewater management is undertaken on heavy clay soils:

- Minimise wastewater volume produced
- Promote uptake of wastewater by evapotranspiration. Absorption trenches/beds and LPED (low pressure effluent distribution) are not considered suitable as they rely mainly on soil absorption
- Require secondary treatment if evapotranspiration beds are to be used for disposal
- Minimise wastewater loading rate by increasing size of irrigation/disposal area. Use water balance analysis to assist in design
- Prepare receiving soil by deep-ripping, cultivation, gypsum application and/or addition of more permeable topsoil
- Install stormwater cut off drains up-slope of application area
- Avoid using soaps and detergents with high sodium content to minimise discharge of sodium salts
- Where soils have dispersive (sodic) or shrink/swell behaviour, seek specialist soil advice and consider special design techniques.

Where there are heavy clay soils, a larger irrigation/disposal area is typically required and experience shows that lot sizes need to be at least 4,000 m^2, and preferably larger (subject to other site constraints), to enable sustainable onsite wastewater management.

Irregular and intermittent flows

In tourist areas, houses and commercial premises may only be used on occasion and this can create irregular or intermittent wastewater flows.

Treatment systems powered by electricity that must run continuously may not be suitable for these sites. For example, aerated wastewater treatment systems must not be switched off or the aerobic microbiological ecosystem in the tank will die and the water become anaerobic. Some aerated systems have a low-flow switch that recirculates effluent during periods of non-occupancy.

Simple anaerobic septic tanks are relatively good at coping with shock loading. Trickling filters (e.g. sand filters) can also cope with intermittent flows because the aerobic microbes that are attached to the media (sand, gravel, foam, textile, etc.) continue to live in the moist air environment.

Consideration should also be given to the potential peak flows or surge flows associated with holiday periods. This may require a larger than normal pre-treatment balance tank, an additional septic tank or a larger model of treatment plant, and/or installation of an effluent storage tank.

Action 15: Incorporate special design considerations into factsheet for local land capability assessors and/or community education.

5.4 TRAINING AND DEVELOPMENT

Training and information for land capability assessors and Council EHOs should result in better assessments, savings to homeowners and efficiencies for Council. All land capability assessors should meet the requirements of Section 1.8.3 of the EPA Code of Practice with respect to qualifications, experience, professional membership, professional indemnity, and independence.

Training and development opportunities available for land capability assessors and Council EHOs include being active in the Environmental Health Professionals Association (EHPA), attending relevant forums and sharing resources and experiences with neighbouring local government areas. The EHPA Barwon South West Community of Practice[12] is an excellent regional forum.

Action 16: Work with Barwon South West Community of Practice to establish an annual meeting with local/regional land capability assessors to discuss local issues and to share knowledge.

5.5 MINIMUM SUBDIVISION RULES

In many locations, restrictions on subdivision and dwelling development are already in place that support sustainable onsite wastewater management, even if they were not set for this purpose. For example, subdivision rules in the Planning Scheme limit small lots in the farming zone to protect land for agriculture, while in the rural conservation zone it supports conservation of environmental and landscape values.

In the Low-Density Residential Zone each lot must be at least 4,000 m^2 where reticulated sewerage is not connected (refer to Clause 32.03-3 in the Glenelg Planning Scheme). The Township Zone does not specify a minimum lot size.

Sustainable management of wastewater on a 4,000 m^2 lot or smaller, requires restrictive controls (refer to Section 4.6). It is recommended that average lot size in new unsewered subdivisions should be higher to provide greater flexibility to landholders and a degree of conservatism that will minimise both risk and management input from Council. Note that the EPA Code of practice for onsite wastewater management states the following:

> *The feasibility of providing a reticulated sewerage system should be seriously considered for the development of individual lots and for subdivision proposals that would result in allotments smaller than 10,000 m^2 (1.0 hectare). This area should not be seen as a minimum lot size but as a risk threshold, as lots smaller than 10,000 m^2 may be unable to retain all wastewater onsite.*

Any future rezoning or subdivision proposals in unsewered areas will be referred to the Environmental Health team where the proposed or allowable lot size is less than 10,000 m^2. In the absence of reticulated sewerage, subdivision applications must include a Land Capability Assessment, building envelope, and effluent disposal area for each lot, to demonstrate that each lot can treat and retain all wastewater in accordance with the requirements of the Environment Protection Regulations under the *Environment Protection Act 2017.* Risk based LCA requirements are also discussed in Section 5.2.

Action 17: Formalise the referral process between Glenelg Shire Planning and Environmental Health teams for rezoning or subdivision proposals in unsewered areas.

[12] https://www.ehpa.org.au/EHPA-Groups/

5.6 VACANT SMALL LOTS

Across the Glenelg Shire, and particularly in the unsewered townships, there are existing vacant lots that are smaller than 4,000 m^2 and do not have access to reticulated sewerage. Development of existing small lots can become an ongoing compliance and resource issue for Council to maintain, so care needs to be taken when approving these to avoid creating future problems.

Frequently, new owners or potential new owners of these lots are unaware of the onsite management constraints and can be shocked when they make enquiries to Council seeking to build a new dwelling only to find that it may be impossible to comply with wastewater management requirements.

The following conditions will be required to enable existing small lots to treat and retain all wastewater onsite:

- Onsite soil analysis provides evidence of higher permeability than clay dominated Category 6 soils
- The wastewater volume to be generated is minimised through use of water saving fixtures, use of a dry composting toilet, indoor recycling of treated greywater or another alternative approach (see Section 4.5)
- Secondary treatment with nutrient reduction is used to improve wastewater quality irrigated
- Subsurface drip irrigation is used to minimise the land application area required.

Dwelling size may be constrained on small lots as the EPA regulations use number of bedrooms as a measure of occupancy and therefore daily wastewater production rate.

Where there are multiple neighbouring small lots, consideration could be given to amalgamation, or where there is desire for development, alternative sewerage services could be considered (in consultation with Wannon Water).

As noted previously in Section 4.6, Section 32 Vendor Statements must disclose that a property is not connected to mains sewerage. Council could also provide information on its website targeted to new buyers and send information on onsite wastewater management to new owners of properties in unsewered areas. Refer to Action 12.

5.7 SEWERAGE TO ENABLE DEVELOPMENT

Installing sewerage in high-risk areas where there are clusters of existing onsite systems is discussed in Section 4.3. The other potential benefit of sewerage is that it can enable more intensive future housing development.

In Glenelg Shire, the main opportunities for sewered development are likely to be on the edges of the towns that are already sewered, including Portland, Heywood, and Casterton. It is usually easier to extend an existing sewerage system than it is to create an entirely new system.

Expansion areas have been identified by Glenelg Shire based on servicing advice from Wannon Water and advice regarding industrial buffers from the EPA. This includes identification of where Low-Density Residential land can be considered for rezoning to General Residential/Neighbourhood Residential Zone.

Action 18: Monitor development trends to determine need for sewerage expansion to enable increased housing density and consult with Wannon Water where required.

5.8 DRINKING WATER CATCHMENTS

Risks of contamination of Wannon Water's potable water supply intakes are not of immediate concern as there is minimal development pressure in proximity to these locations. However, setting in place planning controls across bore field recharge areas near Tulloch and Dartmoor is under consideration by Wannon Water, to prevent potential for future issues.

Action 19: Work with Wannon Water to implement appropriate land use planning controls on development within recharge areas for drinking water bore fields.

5.9 CONCLUSION

This chapter has explored a range of issues and makes various recommendations regarding future onsite systems in unsewered areas. The general theme is to actively manage and anticipate the planning and installation of all future new onsite systems so that they are fit for purpose and compliant from Day 1. Avoiding the creation of new domestic wastewater management issues is a key objective of this management plan.

6 Sewered Areas

6.1 INTRODUCTION

Provision of sewerage is an important tool in the management of wastewater in densely developed areas. It significantly reduces the risk by comparison to onsite wastewater systems. Houses should be connected to sewer wherever it is readily available, as clearly identified in the Planning Scheme (e.g. Clause 35.03-2). Good understanding of sewerage networks and communication links between Glenelg Shire and Wannon Water staff are key.

6.2 EXISTING ONSITE SYSTEMS IN SEWERED AREAS

There are very few existing onsite systems within the sewered areas of Portland, Heywood and Casterton.

Houses in sewered areas that rely on onsite systems should migrate to sewer whenever practical. Upgrades to onsite systems should be actively discouraged by not issuing permits for onsite wastewater systems and transferring applicants to Wannon Water for provision of sewerage connection.

Where onsite systems in sewered areas comply with EPA regulations, the urgency is not so great. These systems can be progressively resolved by opportunistic connection aligned with sewer connections to neighbouring new properties.

Premises with failed onsite systems in sewered areas (found through inspection or complaint) should be connected to sewerage as a priority. EPA regulations provide a framework and agency powers for this connection process.

6.3 FUTURE HOUSES IN SEWERED AREAS

Development within and on the fringe of sewered areas should be connected to sewer wherever it is readily available, as clearly identified in the Planning Scheme (e.g. Clause 35.03-2).

Clear understanding needs to be established and maintained between sewerage planning engineers at Wannon Water and town planners at Glenelg Shire Council about which land can be sewered. As such, it should be rare for any new houses to be installed in these areas without connecting to sewer.

Information statements and general information for homeowners in sewered areas play an important role in informing prospective and current occupants of their obligations in relation to connecting to sewerage.

7 Implementing the DWMP

7.1 RESOURCING

Council is committed to implementing the actions identified in this DWMP and recognises that resources are required. Many DWMP actions reinforce current practices or enhance existing systems and can be achieved within existing budgets by existing staff. Some actions, however, will require additional resources if they are to be implemented effectively, and Council has already employed an additional Environmental Health Officer in preparation.

The monitoring and compliance inspections targeting 50 onsite systems (refer to Action 4), are expected to cost approximately $10,000 per year, based on other Councils' experience of approximately $150 per site inspection plus administrative costs. There will also need to be an allocation of resources for enforcement of the compliance actions identified as these will need to be followed up. A further $10,000 per year is proposed for this function.

An audit of Council owned onsite systems is estimated to cost $10,000. Subject to findings of the audit, infrastructure upgrades could then be required at various sites.

Experience from other Councils indicates that approximately 2 days per week support will be needed over and above the normal environmental health functions. The estimated cost for this is $40,000 per year.

Other Councils in Victoria and the MAV have explored options for raising additional funds to cover onsite system management resourcing through, for example, a levy or special rate on properties with onsite systems, or regular renewal of permits with associated application fees. However, due to State Government rate capping and fee limitations in the Environmental Protection Regulations, these options are currently not available.

7.2 MONITORING AND EVALUATION

Council recognises the importance of monitoring and evaluating this DWMP for continuous improvement.

Periodic review and improvement of this DWMP, will be undertaken including:

- Annual review of the action plan and reporting to Council and stakeholders on progress, including results of inspection and monitoring program
- Based on annual review, determine priorities for implementation and recommend to Council for consideration via the regular budget process
- Refine the spatial risk assessment as necessary if better resolution datasets become available or other risk factors come to light
- A full review of the DWMP (including independent audit) five years after its adoption by Council.

Council will report back to the community on the implementation of the DWMP.

Action 20: Undertake annual review of the DWMP action plan and report to Council and stakeholders on progress.

Action 21: Undertake a full review of this DWMP, including the spatial risk assessment, five years after its adoption by Council.

8 Action Plan

Table 8-1: Glenelg Shire DWMP Action Plan

NO	ACTIONS	PRIORITY	COST	TIMING
1	Continue to engage with key stakeholders including: ▪ Collaboration with Wannon Water on expansion of sewer networks and provision of alternative services ▪ Active participation in the Great South Coast Integrated Water Management Forum	High	Within current budget	Ongoing
2	Review and refine the onsite wastewater management risk assessment at least every five years (as part of DWMP review), to incorporate improved datasets and changing circumstances. (Links to Action 20)	Moderate	Refer to Action 20	Q2 2027
3	Continue to develop, populate, maintain and utilise the onsite system database as a tool for improved onsite wastewater management of existing systems and to inform planning decisions about future systems.	Moderate	Within current budget	Ongoing
4	Design and implement a dedicated program of inspections, targeting 50 onsite wastewater systems in high-risk areas each year.	High	$10,000/y	Q3 2022 (and ongoing)
5	Use compliance and enforcement tools as appropriate to respond to inspection findings and record in the onsite system database	High	$10,000/y	Q1 2023 (and ongoing)
6	In collaboration with Glenelg Hopkins CMA and Wannon Water, develop a water quality monitoring program for Nelson.	High	To be determined	Q1 2023
7	In collaboration with Wannon Water and subject to the outcomes of onsite system inspections (Action 4) and water quality monitoring (Action 6), determine the need for sewerage or an alternative system in Nelson.	High	Within current budget[13]	Q1 2024
8	Work with existing landowners on small lots to determine sustainable solutions for onsite wastewater management. This may include consideration of alternative sewerage services in consultation with Wannon Water.	Moderate	Within current budget[12]	Ongoing
9	Continue to provide community education on the correct operation and maintenance of onsite wastewater systems, as well as water conservation. Incorporate information that supports implementation of domestic wastewater priorities and actions, and align with other education programs or focusses for Council where possible.	Moderate	Within current budget	Ongoing

[13] Not including any infrastructure works identified in undertaking this action.

NO	ACTIONS	PRIORITY	COST	TIMING
10	Evaluate the benefits, and if justified, provide targeted education materials to high-risk areas based on the information from the spatial risk assessment and outcomes of the inspection program (Action 4).	Moderate	To be determined	Q2 2023
11	Publish the endorsed Domestic Wastewater Management Plan on the Glenelg Shire website.	Moderate	Within current budget	Q3 2022
12	Alert new buyers to the existence of onsite systems and the associated wastewater management requirements (e.g. through website information).	Moderate	Within current budget	Ongoing
13	Conduct an audit of Council owned onsite wastewater systems	High	$10,000	Q2 2023
14	Implement the risk-based approach detailed in Table 5-1 to guide the level of detail provided in land capability assessments.	High	Within current budget	Q4 2022
15	Incorporate special design considerations into factsheet for local land capability assessors and/or community education.	Moderate	Within current budget	Q1 2023
16	Work with Barwon South West Community of Practice to establish an annual meeting with local/regional land capability assessment providers to discuss local issues and to share knowledge.	Moderate	Within current budget	Q3 2023
17	Formalise the referral process between Glenelg Shire Planning and Environmental Health teams for rezoning or subdivision proposals in unsewered areas.	Moderate	Within current budget	Q3 2022
18	Monitor development trends to determine need for sewerage expansion to enable increased housing density and consult with Wannon Water where required.	Moderate	Within current budget	Ongoing
19	Work with Wannon Water to implement appropriate land use planning controls on development within recharge areas for drinking water bore fields.	Low	Within current budget	Q3 2027
20	Undertake annual review of the DWMP action plan and report to Council and stakeholders on progress.	High	Within current budget	Q2 annually
21	Undertake a full review of this DWMP, including the spatial risk assessment, five years after its adoption by Council (Links with Action 2)	High	$40,000	Q3 2027

Appendix 1: Risk Assessment Matrices

Table A1-1: Likelihood Ratings

INDICATOR	DESCRIPTION
Almost certain	Is expected to occur almost all of the time
Likely	Is expected to occur most of the time
Potential	Might occur
Not Likely	Might occur but not expected to
Rare	Only expected to occur under atypical conditions

Table A1-2: Consequence Ratings

DESCRIPTOR	DETAIL
Severe	Health - Major impact for large population
	Environment - Potentially lethal to regional ecosystem Widespread on-site and off-site impacts
	Economic - Immense financial loss
Significant	Health – Major impact for small population
	Environment – Potentially lethal to ecosystem. Predominantly local but potential for some off-site impacts
	Economic - Major financial loss
Moderate	Health – Minor impact for large population
	Environment – Potentially harmful to regional ecosystem with local impacts primarily contained to on-site
	Economic - Large financial loss
Minor	Health – Minor impact for small population
	Environment – Potentially harmful to local ecosystem with local impacts contained to on-site
	Economic - Small financial loss
Negligible	Insignificant impact or not detectable

Table A1-3: Risk Matrix

LIKELIHOOD	CONSEQUENCE				
	Severe	Significant	Moderate	Minor	Negligible
Almost certain	High	High	High	Moderate	Low
Likely	High	High	High	Moderate	Low
Potential	High	High	Moderate	Moderate	Low
Not likely	High	Moderate	Moderate	Low	Low
Rare	High	Moderate	Low	Low	Low

Appendix 2: Spatial Risk Assessment Report

RMCG

JANUARY 2022

DWMP Spatial Risk Assessment

Revised Draft Report

Glenelg Shire Council

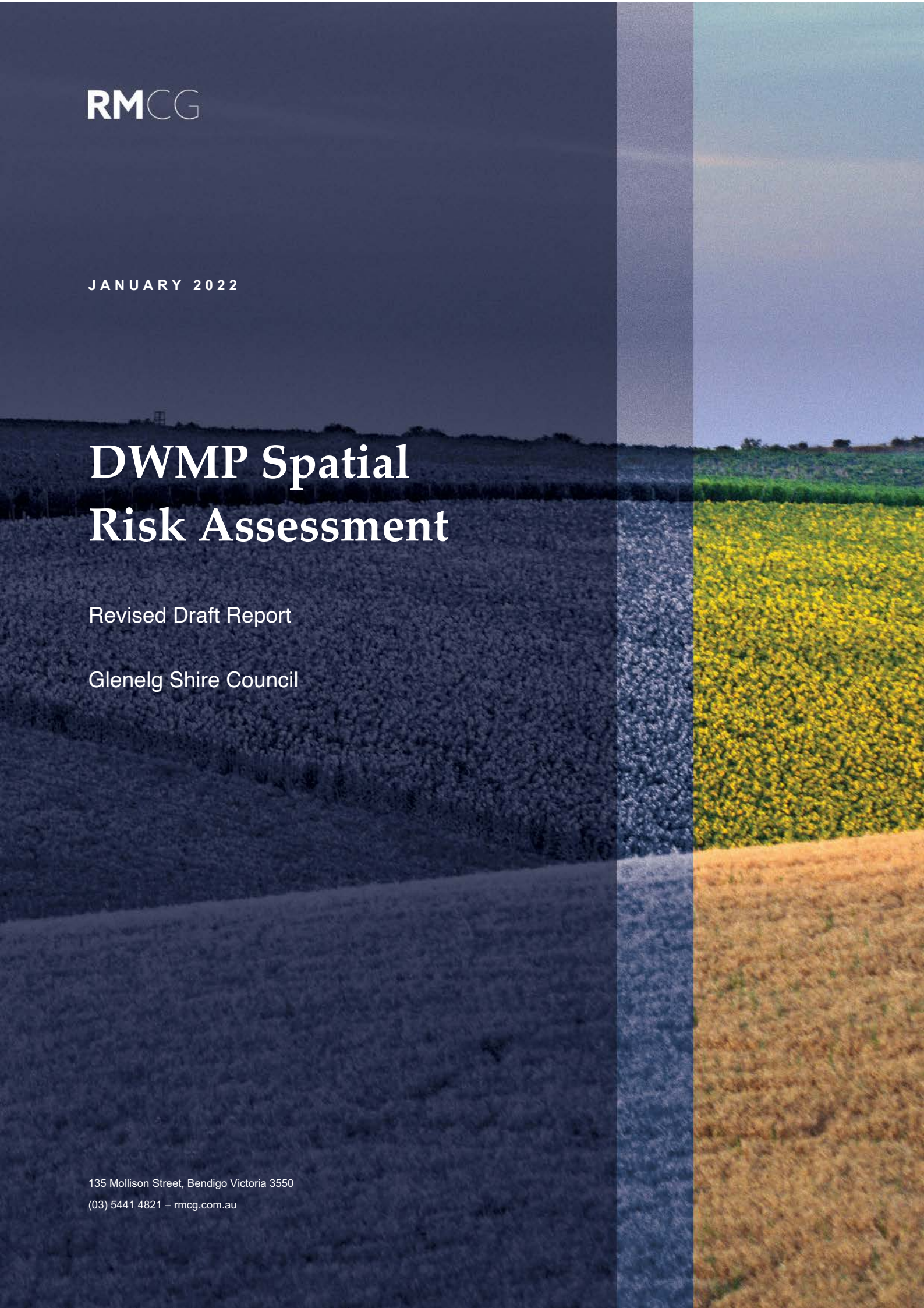

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Table of Contents

1 Introduction and limitations

1.1 THIS REPORT

This report presents the method and results of a spatial risk assessment undertaken to inform development of a Domestic Wastewater Management Plan for Glenelg Shire Council.

Firstly, this report discusses the risk assessment process, then presents the results for key risk factors and conclusions in relation to the management of onsite systems.

Drawing on various spatial data sets, the risk assessment has generated a series of maps designed to illustrate the spatial nature of key risk factors that affect domestic wastewater management and how these factors combine to form an overall risk. The risk assessment also identifies locations that are inherently higher risk for onsite wastewater management and so can be used for the purposes of prioritising sites to be audited under any upcoming inspection programme.

The focus of the risk assessment is on existing systems that are not currently connected to the sewer network; however, the results are also useful for management of future development.

Conclusions and observations for consideration in the Domestic Wastewater Management Plan are provided.

1.2 SCALE

The purpose of this report is to inform, rather than to replace, management of domestic wastewater within the Shire. It provides a guide, not answers.

This spatial risk assessment has been prepared for the whole Shire area to identify the key management issues. It is not possible to map all the risks across the whole study area at the fine scale needed to inform site assessments for individual parcels of land.

While many of the risk factors apply equally well at a property scale, given the level of detail of the mapping inputs, the results presented in this report can only be used to infer the likely risk at a specific site.

Nonetheless, at the whole of Shire scale, some interesting trends emerge, and the results can inform the actions and recommendations for the Domestic Wastewater Management Plan.

2 Spatial Risk Assessment Process

2.1 OVERVIEW

The spatial risk assessment was tailored to suit the Glenelg Shire area. It draws on recent approaches used by other councils in Victoria, including Alpine, Wangaratta, Golden Plains, Mansfield, Benalla and Yarra Ranges.

The following method was used for the Glenelg Shire risk assessment. This is largely based on the Edis Method that was developed for Mansfield Shire in 2014.

The risk assessment was done for all private land across the whole shire. Public land is shown on all maps and has been excluded from the analysis.

A "traffic light" colour coding system is shown on the maps in which high risk is shown red and medium risk is orange. To avoid clutter, low risks are shown with no colour (transparent).

The following risk factors were developed and combined to form an overall picture of risk:

1. Soil type
2. Density of onsite systems
3. Small parcels of land
4. Proximity to water environments
5. Slope and erosion
6. Rainfall.

2.2 RISK FACTOR 1 – SOIL TYPE

Soil type is an important spatial characteristic for domestic wastewater management. The structure and permeability of the soil help determine the risk rating of the soil type. Well-structured soils with moderate permeability pose the lowest risk, while weakly structured soils with low permeability or with very high permeability, pose a higher risk.

The best soil data available for the study area is the Land Resource Assessment[1], that was done by the Centre for Land Protection Research in conjunction with the Glenelg Hopkins CMA, Agriculture Victoria and the (then) Department of Natural Resources and Environment. The land resource assessment project in the Glenelg Hopkins region of Victoria was published in October 2001. The project produced soil and landform information at a scale of 1:100 000 and comments in the preface that "*The detail available in current datasets is good for this scale but is not sufficient to provide landscape analysis at finer scales"*.

For this spatial risk assessment, we developed a risk rating for domestic wastewater management, which combined the Australian Soil Classification and Land Units codes with the subsoil texture codes, as shown Table 2-1. Refer to Appendix 1 for the results of soil type risk analysis.

[1] http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/slsd_sur132
Baxter & Robinson (2001). A Land Resource Assessment of the Glenelg Hopkins region. Agriculture Victoria – CLPR.

Key soil types that are challenging for domestic wastewater management in the region are:

- Sand dune areas, particularly along the coast, which have very high permeability and create risk of contaminating groundwater
- Soils with high clay content, that are often sodic, such as the Merino Tablelands. These have very low permeability that can lead to waterlogging and surface runoff of wastewater.

Table 2-1: Soil Type Risk Rating

ACC Soil Type_& Subsoil Texture	Risk_RMCG
Chromosol_FSCL	Low
Chromosol_HC	Medium
Chromosol_LC	Low
Chromosol_LMC	Low
Chromosol_MC	Low
Chromosol_MC-HC	Medium
Chromosol_MHC	Medium
Chromosol_SCL	Low
Chromosol_SL	Low
Dermosol_HC	Medium
Dermosol_L-CL	Low
Dermosol_LC	Low
Dermosol_MC	Low
Kurosol_MC	Medium
Kurosol_SCL	Medium
Podosol_S	High
Rudosol_HC	High
Rudosol_KS	High
Sodosol_HC	High
Sodosol_MC	High
Tenosol_CS	High
Tenosol_S	High
Vertosol_HC	High
Vertosol_MC	Medium
Vertosol_MHC	High
Waterbody	Waterbody

2.3 RISK FACTOR 2 – DENSITY OF ONSITE SYSTEMS

The cumulative impact of domestic wastewater needs to be considered. Risk increases when the density of onsite systems across the landscape increases. The Edis Method that was developed for Mansfield Shire in 2014 adopted a rating scale that less than 20 houses/km^2 is “low”, between 20 and 40 is “medium” and greater than 40 houses/km^2 is “high” risk.

For the Glenelg Shire area, Council provided a reliable dataset of properties coded by land use. There were 11,450 unique properties across the shire. We created points at the centroids of each property and used the land use code [Classification] field to determine which of these properties would generate domestic wastewater (or not), as shown in Table 2-3. Of the 11,450 properties, 10,921 were identified as domestic wastewater generators.

Using an up-to-date map of the location of Wannon Water's sewerage network, we categorised each domestic wastewater generator according to the following logic:

a) Connected to sewer (7,243 properties)

b) Not connected to sewer (3,678 properties)

An onsite system density heat map (Appendix 1) was generated for all properties not currently connected to sewer, based on the following densities and risk ratings (Table 2-2) The majority of the Shire has a low density of onsite systems. Key areas of high density are Nelson, Merino, Dartmoor and Cape Bridgewater.

Table 2-2: Density of Onsite Systems Risk Rating

RISK RATING	DENSITY OF ONSITE SYSTEMS
High	Greater than 40 houses/km^2
Medium	20 to 40 houses/km^2
Low	Less than 20 houses/km^2

Table 2-3: Land Use Coding

Classifican (Glenelg Shire Council)	Domestic wastewater generator? (RMCG)	Classifican (Glenelg Shire Council)	Domestic wastewater generator? (RMCG)
Charitable/C R & L - Church	No	Industrial - Quarry	Yes
Charitable/C R & L - Church - Presbytery	No	Industrial - Saw Mill	Yes
Charitable/C R & L - Dwelling	No	Industrial - Smelter Site/Village	Yes
Charitable/C R & L - Hall/Rooms/Garage	No	Industrial - Warehouse	Yes
Charitable/C R & L - Recreational Fclty	No	Industrial - Wool Stores	Yes
Charitable/C R & L - School	No	Industrial - Workshop	Yes
Commercial - Accomodation	Yes	Local Govt - Airport	Yes
Commercial - Apartments	Yes	Local Govt - Car Park	No
Commercial - Bakery	Yes	Local Govt - Caravan Park	Yes
Commercial - Bank	Yes	Local Govt - Cemetery	Yes
Commercial - Bed and Breakfast	Yes	Local Govt - Child Care Centre	Yes
Commercial - Cafe Restaurant	Yes	Local Govt - Clubrooms	Yes
Commercial - Caravan Park	Yes	Local Govt - Depot	Yes
Commercial - Dentist	Yes	Local Govt - Drainage Reserve	No
Commercial - Hall/Rooms	Yes	Local Govt - Dwelling	Yes
Commercial - Holiday Units	Yes	Local Govt - Hall/Rooms	Yes
Commercial - Hotel	Yes	Local Govt - Kindergarten	Yes
Commercial - Kiosk	Yes	Local Govt - Office	Yes
Commercial - Medical Surgery	Yes	Local Govt - Pound	Yes
Commercial - Motel	Yes	Local Govt - Recreational Reserve	Yes
Commercial - Museum	Yes	Local Govt - Reserve	Yes
Commercial - Nursery	Yes	Local Govt - Road Splay	No
Commercial - Nursing (Private)	Yes	Local Govt - Shop	Yes
Commercial - Office	Yes	Local Govt - Sporting	Yes
Commercial - Office and Dwelling	Yes	Local Govt - Tip Reserve	Yes
Commercial - Physio Clinic	Yes	Local Govt - Tourist Facility	Yes
Commercial - Service Business	Yes	Portland Water Board - Pumping Station	No
Commercial - Service Station	Yes	Residential - Buildings	Yes
Commercial - Shop	Yes	Residential - Dwelling	Yes
Commercial - Shop	Yes	Residential - Dwelling & Land	Yes
Commercial - Shop and Dwelling	Yes	Residential - Flat (Rental)	Yes
Commercial - Sporting	Yes	Residential - Flat (Rental)	Yes
Commercial - Store	Yes	Residential - Special Accommodation	Yes
Commercial - Theatre	Yes	Residential - Strata Unit	Yes
Commercial - Tourist Facility	Yes	Rural - Farm - Built	Yes
Commercial - Tower	No	Rural-Plantation	No
Commercial - Unspecified	No	Rural-Residential-Built	Yes
Commercial - Veterinary Clinic	Yes	Rural-Residential-Built	Yes
Commerical - Health Clinic	Yes	State Govt - Depot	Yes
Federal Govt - Depot	Yes	State Govt - Hospital - General	Yes
Industrial - Car Yard	Yes	State Govt - Office	Yes
Industrial - Depot	Yes	State Govt - Port of Portland	Yes
Industrial - Factory	Yes	State Govt - Recreational Reserve	Yes
Industrial - Meat Works	Yes	State Govt - Reserve - Other	Yes
Industrial - Port	Yes	State Govt - School	Yes
Industrial - Power sub-station	Yes		

2.4 RISK FACTOR 3 – PARCEL SIZE

Small allotments with insufficient area for sustainable effluent absorption fields can be problematic in domestic wastewater management. As an indicator of this risk factor, existing parcels have been mapped and ascribed a risk rating according to their size.

There are existing small lots scattered through the Shire. Risk is greatest where these are clustered together and there is development pressure such as at Nelson, Cape Bridgewater and Narrawong. Around Dartmoor there are areas of forest that appear to have been subdivided into small lots for forestry plantation schemes.

Table 2-4: Parcel Size Risk Rating

RISK RATING	PARCEL SIZE
High	Less than 4000m^2
Medium	4000 to 10,000m^2
Low	Greater than 10,000m^2

2.5 RISK FACTOR 4 – PROXIMITY TO WATER ENVIRONMENTS

Risks from onsite systems to the water environment can be evaluated in terms of the groundwater and surface water risks. We explored four different factors and combined these into one:

1. **Depth and quality of groundwater**

   Onsite systems near good quality shallow groundwater pose a risk.

   According to Visualising Victoria's Groundwater (http://www.vvg.org.au), the groundwater in Glenelg Shire area is mostly good quality in the south and west. Areas with low salinity are at higher risk if affected by domestic wastewater, as this groundwater has a greater range of beneficial uses.

   Depth to water table (also from VVG) varies according to topography and ranges considerably from less than 5m below ground surface (bgs) to over 100 m bgs. There is greater likelihood of domestic wastewater contamination reaching shallow groundwater than deeper groundwater.

   For this high-level spatial assessment, we used the following categories:

   a. High Risk: <5m depth and <1000 mg/L Total Dissolved Solids (TDS)
   b. Medium Risk: 5 - 10m depth and <1000 mg/L TDS, OR <5m depth and 1000 - 3500 mg/L TDS
   c. Low Risk: >10 m depth and >1000 mg/L TDS OR >5 m and >3500 mg/L TDS

2. **Proximity to watercourses and water areas**

   Onsite systems that are close to a watercourse pose a higher risk than those further away. Using the watercourses and water areas from DataVic, buffer distances of 30m and 60m were applied to reflect this.

   a. High Risk: <30m from a watercourse
   b. Medium Risk: 30 to 60m from a watercourse
   c. Low Risk: >60m from a watercourse

3. **Potable water offtakes and water supply catchments.**

   Proximity to surface water potable water offtakes is a relevant risk factor, but consultation with Wannon Water confirmed that there are no potable water offtakes in the Glenelg Shire area, so this factor was not required to be mapped.

The only designated potable water supply catchment in Glenelg Shire is located south of Casterton. This is covered by a rural flooding overlay and therefore considered as discussed in the next point.

4. **Flooding overlays**

   Council has two flood related overlays: Land Subject to Inundation Overlay (LSIO) and Rural Floodway Overlay (RFO). Land that falls within the overlays is considered high risk for domestic wastewater management.

   a. High Risk: Land within flooding overlays
   b. Low Risk: Land not in flooding overlays

The four water-related risk factors (groundwater, surface water, distance to potable water supply and flooding) were combined for the analysis as shown in Table 2-5. Refer to Appendix 1 for the mapped results.

Table 2-5: Proximity to Water Environments Risk Rating

RISK RATING	DESCRIPTION
High Risk	<5m Depth and <1000mg/L TDS, or <30m from a watercourse, or Within flood overlay
Medium Risk	5-10m Depth and <1000mg/L TDS, or <5m Depth and 1000-3500mg/L TDS, or 30-60m from a watercourse
Low Risk	>10 m depth and >1000 mg/L TDS, or >5 m and >3500 mg/L TDS, and > 60m from a watercourse, and Not in flood overlay

2.6 RISK FACTOR 5 – SLOPE AND EROSION RISK

Slope and the related issue of erosion risk are important factors in onsite wastewater management.

Glenelg Shire provided a very detailed slope dataset derived from Lidar, but this dataset was too detailed for the resolution of a shire-wide study. We therefore used Data.Vic 20m DTM to derive slope across the shire.

The following risk ratings have been used, as per the Edis Method that was developed for Mansfield Shire in 2014:

a. High Risk: >20% slope
b. Medium Risk: 10% to 20% slope
c. Low Risk: <10% slope

Only a relatively small portion of the Shire is subject to steep slopes and these are generally away from residential development areas.

2.7 RISK FACTOR 6 – RAINFALL (NOT USED)

The risks associated with onsite systems increase with increasing rainfall. In previous spatial risk assessments, we have adopted a risk scale where rainfall below 600 mm/year is considered low risk, between 600 and 900 mm/year is moderate risk and above 900 mm/year is high risk.

The average rainfall varies across Glenelg Shire from 600 mm in the north to 900 mm in the south. Because all of Glenelg Shire falls within the moderate range, rainfall has not been used as a risk factor for the mapping.

3 Results

3.1 COMBINING THE RISK FACTORS

A two-step approach has been used to combine the risk factors and derive a total score.

Firstly, the risk factors were grouped into three themes as follows:

- Soil and slope => Biophysical
- Onsite system density and parcel size => Development
- Water courses, groundwater and water overlays => Water environment

Each theme was rated high/medium/low (Value 2/1/0) and then the three themes were combined as follows:

- Overall Risk = 2 x Development risk + Biophysical risk + Water environment risk

The overall risk rating layer was created by performing a union of all risk analysis layers. This cut the land into unique combinations of all risk factors and the risk values from each factor were added together. There was a possible score range of 0 to 8.

The overall risk rating scores can be seen in Table 3-1. The highest score from the analysis was 8. Overall risk is represented using a traffic light colour scheme.

Table 3-1 Overall Risk Rating Scores

OVERALL RISK	SCORE	COLOUR
High	7 – 8	Red
Medium	4 – 6	Yellow / Orange
Low	< 4	Not coloured / transparent

3.2 RISK MAPPING

Appendix 1 shows the results of the combined spatial risk analysis and the overall risk rating.

4 Conclusions and observations

This chapter presents conclusions and observations drawn from the results. The findings from this spatial risk assessment will be used to inform the development of the Domestic Wastewater Management Plan.

4.1 OVERALL OBSERVATIONS

The highest risk areas identified are Nelson and Merino due to a high density of existing systems and availability of small vacant lots, combined with other risk factors such as difficult soils and proximity to water environments. These areas should be targeted for future auditing and monitoring.

A key issue across the Shire is determining appropriate approaches for development of small lots. This is particularly the case where there are other risk factors such as difficult soils and steep slopes at locations such as Cape Bridgewater, Narrawong and Sandford. The Domestic Wastewater Management Plan will identify and document these approaches which include limits to house size, lot consolidation and so on.

4.2 NEED FOR BACKLOG SEWERAGE

A strip of coastal land north of Portland, known as Dutton Way, has been sewered within the past decade. Advice from Wannon Water confirms that the water corporation currently has no plans to install backlog sewerage schemes within any other parts the Glenelg Shire area.

The main patches of high-risk area are identified and discussed in the local observations below. These are dominated by some unsewered areas with very high density of onsite systems. There are some areas of high risk – Nelson is a key example – that warrant consideration in the water corporation's future backlog schemes.

Through auditing of existing systems and water quality monitoring within these high-risk areas, further information can be obtained on current impact and potential risk to human health and the environment. This will assist in building understanding of the need for sewerage.

4.3 LOCAL OBSERVATIONS

AREA	OBSERVATIONS FROM RISK ASSESSMENT MAPS
Heywood	Overall, the risks in and around Heywood are low. Central Heywood is serviced by Wannon Water reticulated sewerage. Beyond the edge of the sewered area, the density of onsite systems is low, and the lot sizes are generally large. The Fitzroy River runs around the town, but soils and slope are typically low risk.
Narrawong	The overall risk at Narrawong is medium due to density of existing systems, small parcel sizes and proximity to the Surrey River mouth.
Tyrendarra	At Tyrendarra there is an area of moderate to high risk. There is currently low density of onsite systems, but the area is surrounded by Darlot Creek and has moderately small parcel sizes.
Allestree / Dutton Way	A strip of houses in Dutton Way have been sewered within the past ten years which has removed a significant risk factor along this coast. Rural living development away from the coast is generally low risk.

AREA	OBSERVATIONS FROM RISK ASSESSMENT MAPS
Portland West	Rural living development areas west of Portland have low to moderate overall risk. In some areas there are risks related to soil and water environments. However, larger lot sizes provide sufficient space for sustainable onsite wastewater management.
Cape Bridgewater	The central part of Cape Bridgewater is moderate to high risk overall. This is due to a combination of small lots sizes, high density of existing systems, sandy soils and slope.
Nelson	Nelson is one of the highest risk parts of the shire. The density of existing onsite systems (unsewered houses) is very high, parcel sizes are small, soil types are high risk (sandy dunes) and it is in close proximity to sensitive water environments.
Dartmoor	Central Dartmoor has moderate overall risk. There is a moderate density of onsite systems, some small lot sizes and moderate soil risk, but the town is mostly at reasonable distance from the Glenelg River. The area surrounding Dartmoor (and nearby Drik Drik) has many small lots associated with plantation forestry schemes.
Condah	Risk is generally low in and around Condah.
Digby	The township areas of Digby are low to moderate overall risk rating. There are small existing lots but other risks are low. Risk increases with proximity to the Stokes River where there are small lot sizes.
Merino	Merino is one of the highest risk parts of the shire. The density of existing onsite systems is high, lot sizes are small, soils are poor (clayey and often sodic) and water environments (including the Merino and Palmer Creeks) are close by.
Sandford	Sandford has high overall risk. The density of existing onsite systems is moderate, lot sizes are small, soils are poor (clayey and often sodic) and the Wannon River is close by.
Casterton	Casterton is sewered by Wannon Water. Beyond the edges of the sewered area the onsite system risks are relatively low.

Appendix 1 – Risk Mapping

The results of the risk mapping are shown in this Appendix at a shire-wide scale. There are 6 maps in total including:

- Overall risk rating
- Density of onsite systems
- Parcel sizes
- Soil types
- Proximity to water environments
- Slope

An atlas of risk maps for local areas has been provided to Glenelg Shire separately to enable consideration of risk at a finer detail.

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1.0	Draft	05/11/2021	K Ross D Wallis	A Kelliher	--	D Wallis	A Kennett, Glenelg Shire
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2.1	Revised draft	27/1/2022	K Ross D Wallis	A Kelliher	M. McIntosh	A Kelliher	A Kennett, Glenelg Shire

Overall Risk Map

0 5 10 km

1:460,000

- Town
- Highway
- Road
- Public Land
- Sewered area

Overall Risk Rating

- 4
- 5
- 6
- 7
- 8

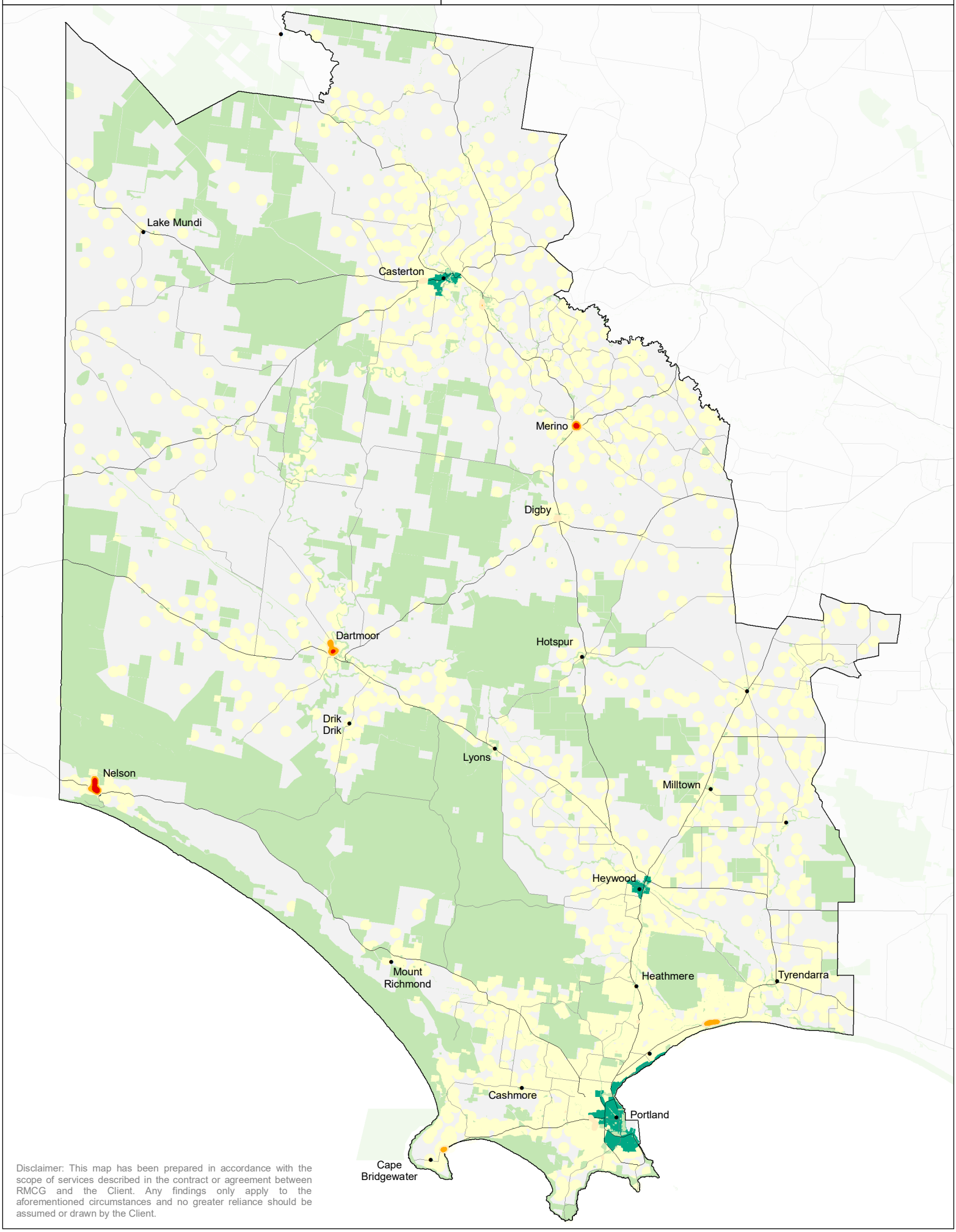
Lake Mundi
Casterton
Merino
Digby
Dartmoor
Hotspur
Drik Drik
Lyons
Nelson
Milltown
Heywood
Mount Richmond
Heathmere
Tyrendarra
Cashmore
Portland
Cape Bridgewater

Density of Onsite Systems Risk Map

0 5 10 km

1:460,000

- Town
- Highway
- Road
- Public Land
- Sewered area
- Very Low: < 10 houses per sqkm
- Low: 10 - 20 houses per sqkm
- Medium: 20 - 40 houses per sqkm
- High: 40 - 80 houses per sqkm



Parcel Size Risk Map

0 5 10 km

1:460,000

- Town
- Highway
- Road
- Public Land
- Sewered area

Parcel Size Risk Rating

- High: < 4,000m2
- Medium: 4,000 - 10,000m2

Lake Mundi
Casterton
Merino
Digby
Dartmoor
Hotspur
Drik Drik
Lyons
Nelson
Milltown
Heywood
Mount Richmond
Heathmere
Tyrendarra
Cashmore
Portland
Cape Bridgewater

Soil Type Risk Map

0 5 10 km

1:460,000

- Town
- Highway
- Road
- Public Land
- Sewered area
- High soil risk
- Medium soil risk

Lake Mundi
Casterton
Merino
Digby
Dartmoor
Hotspur
Drik Drik
Lyons
Nelson
Milltown
Heywood
Mount Richmond
Heathmere
Tyrendarra
Cashmore
Portland
Cape Bridgewater

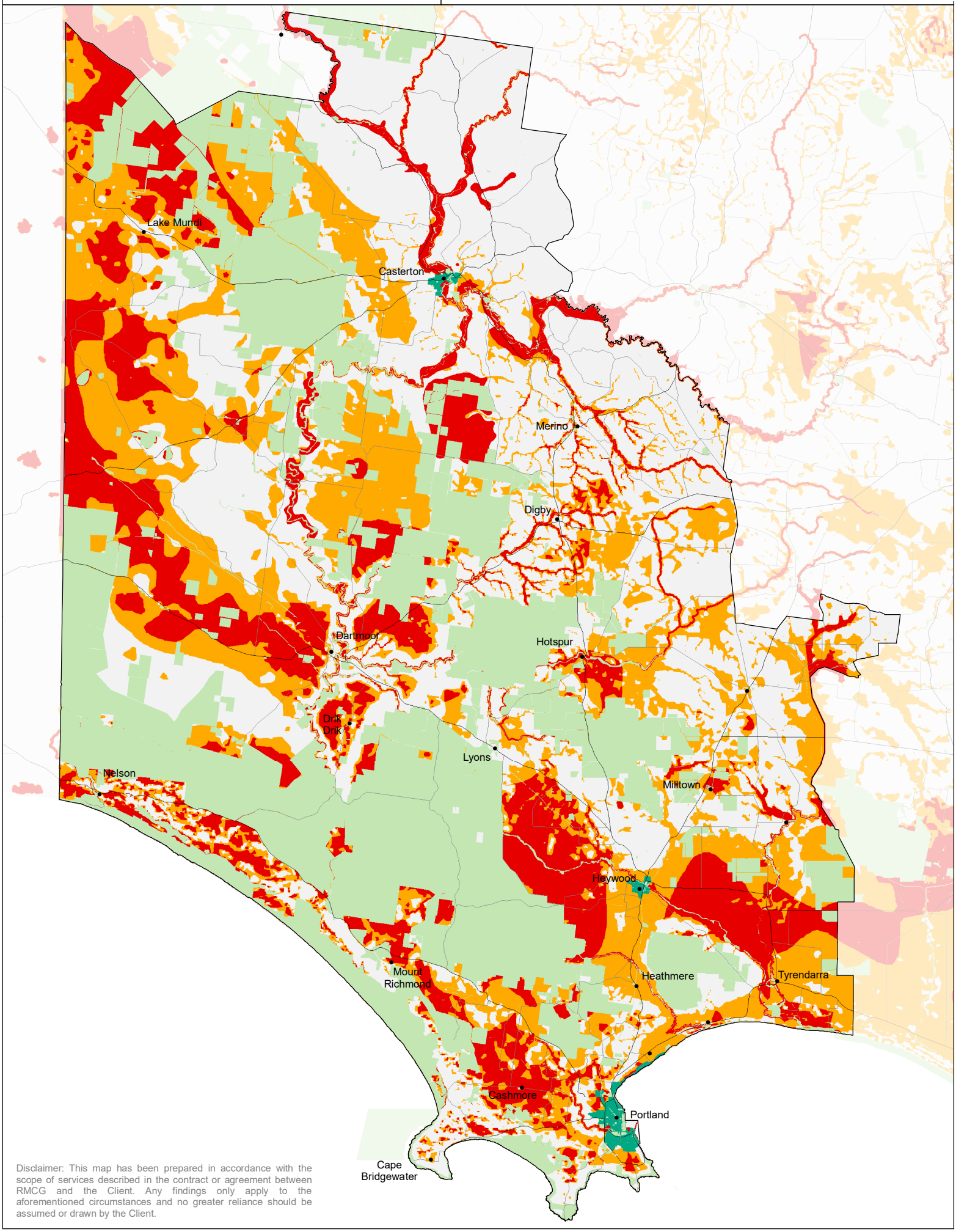
Proximity to Water Environments Risk Map

0 5 10 km

1:460,000

- Town
- Highway
- Road
- Public Land
- Sewered area

- High: <5m Depth and <1000mg/L TDS, or <30m from a watercourse, or In LSIO
- Medium: 5-10m Depth and <1000mg/L TDS, or <5m Depth and 1000-3500mg/L TDS, or 30-60m from a watercourse, and Not in LSIO



Slope Risk Map

0 5 10 km

1:460,000

- Town
- Highway
- Road
- Public Land
- Sewered area
- Medium: 10% - 20% slope
- High: > 20% slope

Lake Mundi
Casterton
Merino
Digby
Dartmoor
Hotspur
Drik Drik
Lyons
Nelson
Milltown
Heywood
Mount Richmond
Heathmere
Tyrendarra
Cashmore
Portland
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3.0	Draft for public exhibition	02/03/2022	J Scally D Wallis A Kelliher	A. Kelliher	-	A. Kelliher	A Kennett, Glenelg Shire
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