Cardinia Shire Council

# Onsite Wastewater Management Plan 2026-29

January 2026

# Contents

# 1. Definitions

| Term | Definition |
|---|---|
| Authorised officer | Environmental Health Officer, Environmental Health Technical Officer or plumber engaged and authorised by Council. |
| Blackwater | Wastewater from toilets. |
| Environmental Significance Overlay | To identify areas where the development of land may be affected by environmental constraints and to ensure that development is compatible with identified environmental values. |
| Onsite Wastewater Management System | An onsite wastewater treatment plant is defined in the Environment Protection Regulations 2021 as a system with a design or actual flow rate of sewage not exceeding 5,000 litres on any day and includes all beds, sewers, drains, pipes, fittings, appliances, and land used in connection with the treatment plant. |
| Onsite Wastewater Management Plant | A treatment plant for the bacterial, biological, chemical or physical treatment of sewage generated onsite. Examples include septic tank system, wet or dry composting toilet, aerobic treatment and sand filter. |
| Enforcement | In this OWMP, enforcement is broadly defined to include informal education and advice to duty holders, through to formal legal directions or orders to compel compliance. |
| Failed OWMS with offsite discharge | Components of the OWMS are no longer functioning so that untreated effluent is discharging beyond the property boundaries. |
| Greywater or sullage | Domestic wastewater from bathrooms, kitchens, and laundries. |
| Land capability Assessment (LCA) | The assessment of the capability of the land to support a particular use and in this case, effluent disposal. |
| Primary treatment | The separation of suspended material from wastewater by settlement and/or flotation in onsite wastewater treatment plants primary settling chambers or other structures. In addition to physical separation of solids from liquid, liquid and solids may be decomposed by aerobic or anaerobic microbiological processes and digestion |
| Treated effluent with onsite discharge | The OWMS is satisfactorily treating the waste, but the distribution of the treated effluent is not functioning satisfactorily and is discharging within the property boundary. |
| Treated effluent with offsite discharge | The OWMS is satisfactorily treating the waste, but the distribution of the treated effluent is not functioning satisfactorily and is discharging beyond the property boundaries. |
| Secondary treatment | Microbiological digestion and physical settling and filtering processes and decomposition of wastewater constituents following primary treatment |
| Sewage | Wastewater containing any of human excreta, urine and toilet flush water and includes greywater (which is also called sullage and may include water from the shower, bath, basins, washing machine, laundry trough and kitchen) |

| | |
|---|---|
| Special Water Supply Catchment | An area where water is collected by the natural landscape and all rain and surface water eventually flow to a creek, river, lake, ocean or ground water system. |
| Stormwater | Rain that flows over ground surfaces as runoff and appears in surface streams and creeks. |
| Wastewater | Waste principally consisting of water and includes any of the following: sewage or other human-derived wastewater, wash down water or cooling water, irrigation runoff or contaminated stormwater, contaminated groundwater, water containing any commercial, industrial and trade waste (Environment Protection Regulation 2021). |

# 2. Introduction

Cardinia Shire is a diverse and rapidly expanding region on Melbourne's south-eastern fringe, stretching from the foothills of the Dandenong Ranges to the shores of Western Port Bay. This growth intensifies the need for a robust and effective approach to managing the risks associated with onsite wastewater disposal systems (OWMS) used in areas not connected to the reticulated sewerage network.

When properly designed, installed, and maintained, OWMS provide a safe and sustainable method of wastewater treatment. However, poor management can pose significant risks to public health, the environment, and local waterways.

Cardinia Shire Council is required to have an Onsite Wastewater Management Plan (OWMP) to fulfill legal obligations under the Environment Protection Act 2017 and to mitigate risks to public health and the environment from systems like OWMS (septic tanks) in unsewered areas. These plans are essential for managing wastewater in areas that are not connected to reticulated (mains) sewerage.

Cardinia Shire Council plays a critical role in regulating OWMS and ensuring compliance with relevant legislation. Council is committed to:

- Protecting community health and environmental integrity
- Promoting sustainable wastewater practices
- Supporting residents and businesses in meeting their obligations under the General Environmental Duty (GED)

The Onsite Wastewater Management Plan (OWMP) has been developed to guide Council's approach and support the community through:

- Establishing a risk-based framework for consistent decision-making in OWMS regulation
- Building community awareness of wastewater risks and legal responsibilities under the GED
- Outlining strategies and actions for Council to implement over the life of the plan
- Providing localised risk assessments to inform planning and prioritisation

This plan reflects Council's proactive stance on wastewater management and its commitment to long-term environmental and public health outcomes.

## 2.1 Background

OWMS have been widely used across Victoria since the 1930s, when they were considered an approved method of domestic sewage disposal. In 1973, a planning directive issued by the former Melbourne and Metropolitan Board of Works required all new subdivisions and developments to either connect to sewer or contain wastewater entirely on-site.

Today, Cardinia Shire has approximately 7,000 OWMS. Alarmingly, around 50% of these systems are over 20 years old, and many are believed to be poorly maintained or operating outside acceptable parameters. While OWMS can be effective solutions, they must be properly maintained to ensure wastewater is fully treated and contained on-site. Failure to do so can result in untreated effluent escaping into surrounding soils, waterways, or groundwater—posing significant risks to public health, environmental quality, and local amenity.

Local Government, under the guidance of the Environment Protection Authority (EPA), is responsible for regulating the installation, maintenance, and compliance of OWMS. Over the past decade, community sewerage schemes funded by Yarra Valley Water and South East Water have enabled approximately 1,800 properties to transition from OWMS to reticulated sewerage systems, with another 1,400 properties programmed for connection between now and 2032–33 is an essential step in protecting public health in densely developed areas.

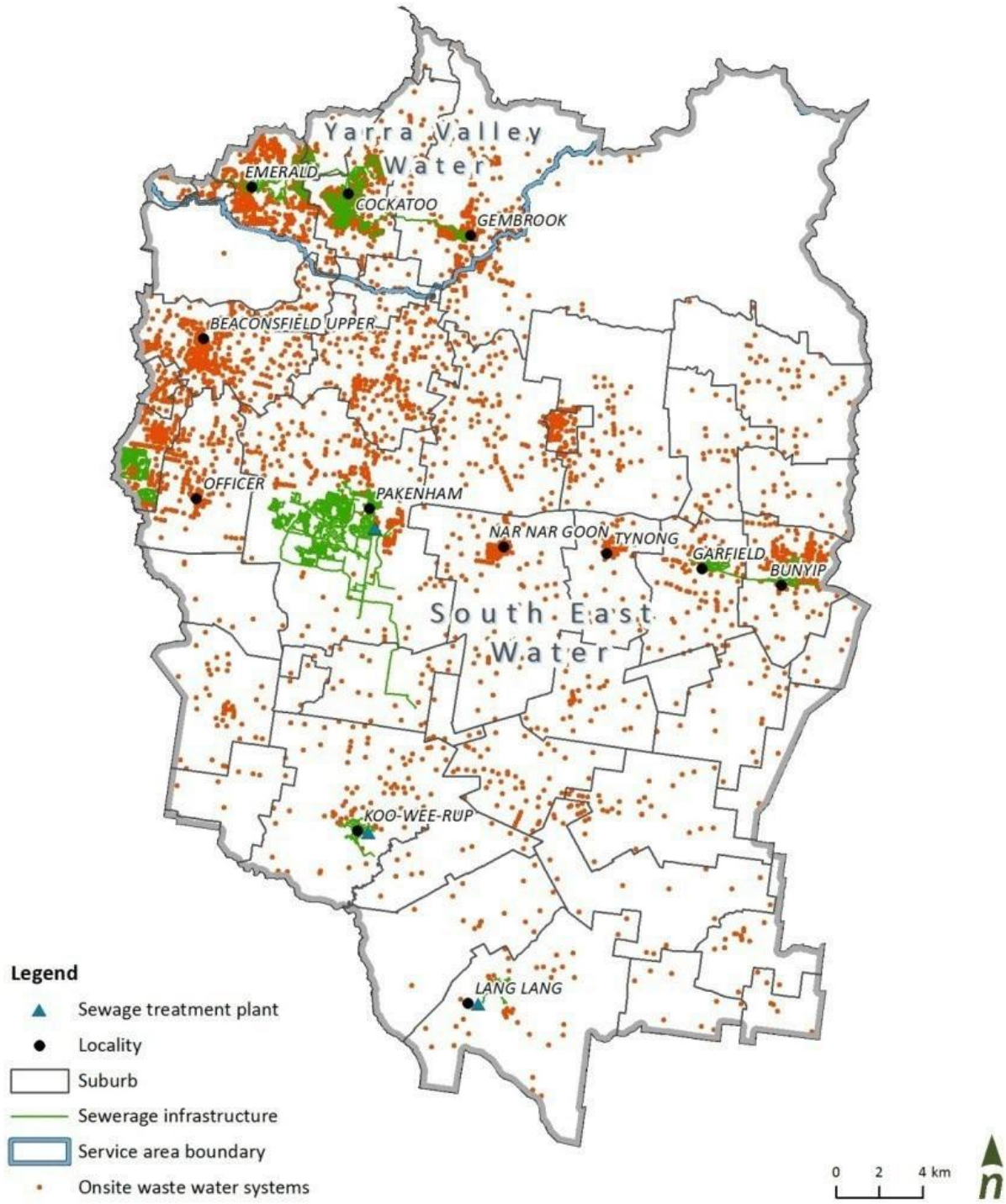



*Figure 1: Sewerage infrastructure and onsite wastewater systems across shire, by suburb (source: Integrated Water Management Plan 2015–25)*

## 2.2 Key challenges facing Cardinia Shire Council

Despite progress, several persistent obstacles continue to hinder effective wastewater management:

| Obstacle | Explanation |
|---|---|
| Information Management | Many OWMS lack accurate records regarding their location, age, and condition. High concentrations of ageing systems can lead to cumulative environmental impacts, particularly on downstream water bodies. However, where systems are properly designed, installed, and maintained—including necessary upgrades—these risks can be significantly reduced. |
| Sewer Connection Compliance | Even where reticulated sewerage is available, a proportion of property owners fail to connect. Currently, there is no reliable mechanism to track connection status or enforce compliance. |
| Legacy Systems on Small Lots | Historic developments on undersized lots often lack the space required for compliant OWMS, increasing the likelihood of untreated effluent discharging offsite. Stronger collaboration with Water Authorities is needed to support sewer expansion and manage associated risks. |
| Resourcing and Funding | Effective implementation of the OWMP depends on adequate resourcing. Without sufficient funding and staffing, Council's ability to manage wastewater risks and deliver long-term improvements remains limited. |

# 3. Purpose

Council's OWMP provides a strategic framework for identifying and managing the diverse risks associated with onsite wastewater disposal. It supports the development, implementation, and monitoring of targeted strategies to protect public health and the environment and aims to:

- Plan for the future by prioritising long-term, sustainable solutions for managing OWMS.
- Support informed decision-making through clear policies on system approvals, compliance, and enforcement.
- Collaborate with stakeholders including the community, water authorities, and relevant organisations to improve wastewater outcomes.
- Protect health, environment, and amenity by improving wastewater management in unsewered areas of the municipality.
- Foster sustainability by promoting responsible wastewater practices that benefit the entire community.

The OWMP outlines Cardinia Shire Council's approach to managing the risks associated with OWMS, particularly in areas not connected to the reticulated sewerage network. The plan aims to:

- Engage with the community and stakeholders to understand wastewater management priorities.
- Review and update Council's actions to address risks from OWMS.
- Incorporate legislative changes, including the *Environment Protection Act 2017* and *Environment Protection Regulations 2021*

Council's onsite wastewater strategies for the 2026–2030 period are built around four core strategic pillars:

| Strategy | Focus |
|---|---|
| Healthy environments | Promote sustainable wastewater practices and support community understanding |
| Public Health & Environment | Ensure that protection of health and the environment is central to all wastewater decisions |
| Regulatory Management | Ensure that Council policies and procedures to manage wastewater reflecting regulatory frameworks and utilising available tools to assist with clear, accountable, transparent decision-making and enforcement |
| Collaboration | Strengthen partnerships with stakeholders to improve outcomes and share responsibility |

To deliver on these strategies, Council has developed a series of targeted actions, which are referenced throughout the plan and detailed in Appendix 1.

# 4. Scope and legislative framework

Cardinia Shire Council's OWMP applies to OWMS that treat less than 5,000 litres of wastewater per day. These systems are typically used on properties not connected to the reticulated sewerage network.

To ensure effective regulation and alignment with broader planning and environmental goals, the OWMP draws on a comprehensive legislative and strategic framework.

| Relevant Legislation | Council Plans and Strategies |
|---|---|
| The OWMP is informed by the following Acts and Regulations:<br>• Building Act 1993 and Building Regulations 2018<br>• Catchment and Land Protection Act 1994<br>• Environment Protection Act 2017 and Regulations 2021<br>• Infringements Act 2006 and Regulations 2015<br>• Local Government Act 2020<br>• Planning and Environment Act 1987<br>• Public Health and Wellbeing Act 2008 and Regulations 2019<br>• Safe Drinking Water Act 2003 and Regulations 2015<br>• Subdivisions Act 1988<br>• *Water Act 2020* | The OWMP also aligns with key Council planning instruments, including:<br>• Cardinia Shire Planning Scheme<br>• Cardinia Shire Council Plan<br>• Cardinia Shire's Liveability Plan 2017-2029<br>• Climate Change Adaptation Strategy 2022 - 2033<br>• Cardinia Shire Council Economic Development Strategy 2023-2025<br>• Integrated water management plan 201525<br>• Sustainable Environment Policy 2018–28 |

This integrated approach ensures that onsite wastewater management supports Council's broader objectives for public health, environmental protection, land use planning, and sustainable development.

# 5. Legislative context

A range of legislative powers have been enacted to safeguard human health and protect the environment from risks associated with onsite domestic wastewater management. These laws form the backbone of Victoria's regulatory framework, guiding how systems are installed, operated, monitored, and enforced.

This section of the OWMP highlights the critical role of these legislative instruments in shaping responsible wastewater practices. They empower councils, landowners, and regulators to:

- Identify and mitigate environmental and public health risks.
- Enforce compliance through permits, inspections, and corrective actions.
- Promote preventative, risk-based approaches to wastewater governance.
- Align local planning with state-wide environmental protection objectives.

By embedding these tools into strategic planning and day-to-day decision-making, the OWMP ensures that wastewater management across Cardinia Shire remains safe, sustainable, and legally robust.

It is important to highlight that for all wastewater management decisions, the Australian / New Zealand Standard (NS/NZS 1547:2012) will be applied.

## 5.1 Environment Protection Act 2017 and Environment Protection Regulations 2021

The Environment Protection Act 2017 and Environment Protection Regulations 2021 form the primary legislative framework used by local governments to regulate OWMS. Under this framework, councils are responsible for:

- Issuing permits for the installation, alteration, or use of OWMS
- Enforcing compliance to manage risks to public health and the environment
- Applying the GED to ensure systems are operated responsibly.

### *5.1.1 Orders for Obligations of Managers of Land or Infrastructure (OMLI)*

Section 156 of the Environment Protection Act 2017 introduces the Order for Obligations of Managers of Land or Infrastructure (OMLI)—a new legislative instrument designed to enhance strategic oversight of urban stormwater and onsite wastewater management across Victoria.

Under the OMLI:

- Councils are required to develop and implement strategic plans for managing urban stormwater and onsite wastewater.
- Water corporations must formally respond to councils' OWMP, outlining preferred sewage management solutions.
- The OMLI replaces relevant clauses from the former State Environment Protection Policy (SEPP) – Waters, which were temporarily preserved under the Environment Protection Transitional Regulations 2021.

This framework reinforces a coordinated, risk-based approach to environmental protection—ensuring that infrastructure planning and wastewater governance are aligned with contemporary legislative standards and community needs.

Key requirements under an OMLI:

- **Councils must develop, consult on, and publish OWMP's** - These plans must reflect local conditions, risks, and priorities, and be informed by community and stakeholder engagement.
- **Water corporations are required to respond to council plans** - Responses must outline preferred sewage management solutions, including opportunities for reticulated sewerage connections or alternative treatment options.
- **Plans must be reviewed and updated at least every five years** - This ensures ongoing relevance and responsiveness to changing environmental, population, and infrastructure conditions.
- **Implementation progress must be publicly reported** - Councils are required to publish updates on their websites, promoting transparency and accountability in wastewater management.

The introduction of the OMLI framework marks a significant shift toward integrated, risk-based planning for wastewater and stormwater systems—ensuring that infrastructure decisions are aligned with environmental protection, public health, and long-term sustainability.

### *5.1.2 Councils' implementation of the new Legislative Framework*

Cardinia Shire Council's OWMP presents a timely opportunity to apply the Environment Protection Act 2017 and Environment Protection Regulations 2021 as they were designed through a risk-based, preventative approach to environmental protection.

This legislation forms the foundation of the regulatory framework that governs how councils, landowners, and occupiers must manage OWMS. It clearly defines responsibilities for the installation, operation, and ongoing compliance of these systems, supported by Council's authority to issue permits and enforce non-compliance.

To assist Victorian councils in implementing this framework effectively, the Environment Protection Authority (EPA) Victoria has released a suite of technical guidelines that inform and support the development and execution of OWMPs.

These resources provide practical direction on system design, performance standards, environmental risk mitigation, and community engagement—ensuring that wastewater is managed safely, sustainably, and in alignment with legislative intent.

### *5.1.3 New obligations for all Victorians*

The Environment Protection Act 2017 introduced the General Environmental Duty (GED), marking a significant shift in how EPA Victoria regulates pollution, waste, and contamination across the state. Rather than relying on reactive enforcement, the GED establishes a preventative, risk-based approach—requiring individuals and organisations to take reasonably practicable steps to prevent environmental harm before it occurs.

Under the GED, owners and occupiers of land with OWMS have a legal obligation to actively reduce risks associated with wastewater discharge. This includes:

- Ensuring systems are properly installed, operated, and maintained.
- Preventing pollution and protecting human health and the environment
- Recognising that wastewater risks are a shared responsibility across the community.

The GED applies to all Victorians, embedding environmental responsibility into everyday activities and land management practices.

A breach occurs when a person fails to take actions that are reasonably practicable to minimise environmental risk. Examples include:

- Failing to use or maintain equipment, systems, or processes that reduce pollution and waste.
- Not implementing or maintaining effective risk management systems
- Mishandling, storing, or transporting substances in ways that increase environmental harm.
- Neglecting to provide appropriate training and information to staff or relevant persons

The GED reinforces the importance of proactive compliance and continuous improvement in wastewater management—ensuring that environmental protection is embedded in both policy and practice.

## 5.2 Public Health and Wellbeing Act 2008

The Public Health and Wellbeing Act 2008 empowers authorised officers to investigate and address public health nuisances, including those arising from OWMS.

Council is legally obligated to:

- Investigate all complaints relating to nuisance or the unlawful operation of OWMS.
- Determine whether a nuisance exists under the Act.
- Take appropriate action to abate the nuisance and protect public health.

## 5.3 Local Government Act 2020

The Local Government Act outlines the provisions under which Council operates and empowers Council's to have local laws and regulations for OWMS.

## 5.4 Building Act 1993

For the purpose new buildings not connected to sewer, a certificate to use an onsite wastewater management system is required prior to the occupancy permit being issued.

## 5.5 Planning and Environment Act 1987

The Planning and Environment Act 1987 sets out the planning provisions, planning schemes, procedures for obtaining permits and enforcing compliance with planning schemes. Planning schemes set out how land may be used and developed.

"We are responsible for advocating that infrastructure is put in place." - Statutory Planner during OWMP consultation.

# 6. Stakeholders

There are a range of stakeholders that contribute to the protection of health and the environment.

## 6.1 Community

The community is responsible for complying with the General Environmental Duty (GED) associated with wastewater, these include:

- obtaining the required Permits and Certificates prior to installation and use
- obtaining a permit to make alterations to an existing OWMS
- engaging with qualified plumbers and assessors

Any application for a new OWMS must demonstrate that a proposed use, development, or subdivision of land will comply with all applicable laws, policies, and guidelines, within the scope of this plan.

All landowners and occupants are required by law to ensure their OWMS is operating effectively. Any system failures pose a significant risk to human health and the environment. Council would like to highlight obligations required under the GED relating to OWMS maintenance include:

- operate and maintain OWMS in a way that minimises risks to human health and the environment - Environment Protection Regulations Section 159 (1)
- take all reasonable steps to ensure the system is maintained in good working order.
- (Environment Protection Regulations Section 159(2)
- ensure the OWMS does not overflow - Environment Protection Regulations Section 159(3)
- keep and hold maintenance records for a period of 5 years after each maintenance activity (and make them available to councils or EPA for inspection when requested) Environment Protection Regulations Section 162(1) & (2)
- notify the council as soon as practicable if the system poses a risk of harm to human health or the environment or is otherwise not in good working order Environment Protection Regulations Section - 161(2)

*"The general environmental duty (GED) is at the centre of the Environment Protection Act 2017 and it applies to all Victorians, and all businesses located in Victoria. The GED states that you must manage your activities to reduce the risk of harm to human health and the environment from pollution or waste."* - EPA statement.

## 6.2 Water corporations

Both rural and urban water corporations have a responsibility for assessing and responding to all referred applications under clause 66 of Council planning schemes for Special Water Supply Catchments as listed in schedule 5 of the Catchment and Land Protection Act 1994.

Wastewater services within the shire are predominantly provided by the following agencies.

- **Yarra Valley Water**: Yarra Valley Water provides water and sewer services to parts of the Cardinia Shire primarily the northern region of the shire in the Dandenong Ranges, including Emerald, Cockatoo and Gembrook.
- **South East Water:** South East Water is one of Victoria's state-owned water corporations, providing water and sewerage services to the Melbourne's south-east and South Gippsland regions, including most of the Cardinia Shire.

### *6.2.1 Sewerage networks in Cardinia Shire*

The provision of sewerage is an important tool in the management of wastewater in areas where the existing population density is high, new housing developments are planned, or high levels of wastewater is generated. The provision of sewer is generally dependent on a combination of factors including the level of identified risk, the feasibility of installation and cost effectiveness.

Council can work with local water corporations to help identify areas where sewer connection is most needed to help negate the potential risk created by wastewater treatment systems. This may include:

- properties recognised in existing sewerage backlog programs where new issues have been identified that increase the risk or consequences created by wastewater.
- townships that have been identified for increased residential infill development on small allotments (to assist with increase in urban populations).
- providing historical data to water corporations regarding existing wastewater treatment systems; and
- working with the water corporations regarding alternative solutions to wastewater disposal where the feasibility of sewer connection is low.

Properties are included within the YVW or SEW backlog sewerage program if they're deemed not to be able to contain their wastewater on site. The backlog sewerage program aims to connect these properties to the metropolitan sewerage system.

Council collaboration with both YVW and SEW indicates that the backlog program has provided reticulated sewerage to more than 1,500 properties in Cardinia Shire. Approximately 1,400 lots are still on the backlog program for connection to sewer between now and 2032–33.

Figure 5 shows the planned backlog sewerage works including the number of lots and proposed timing.

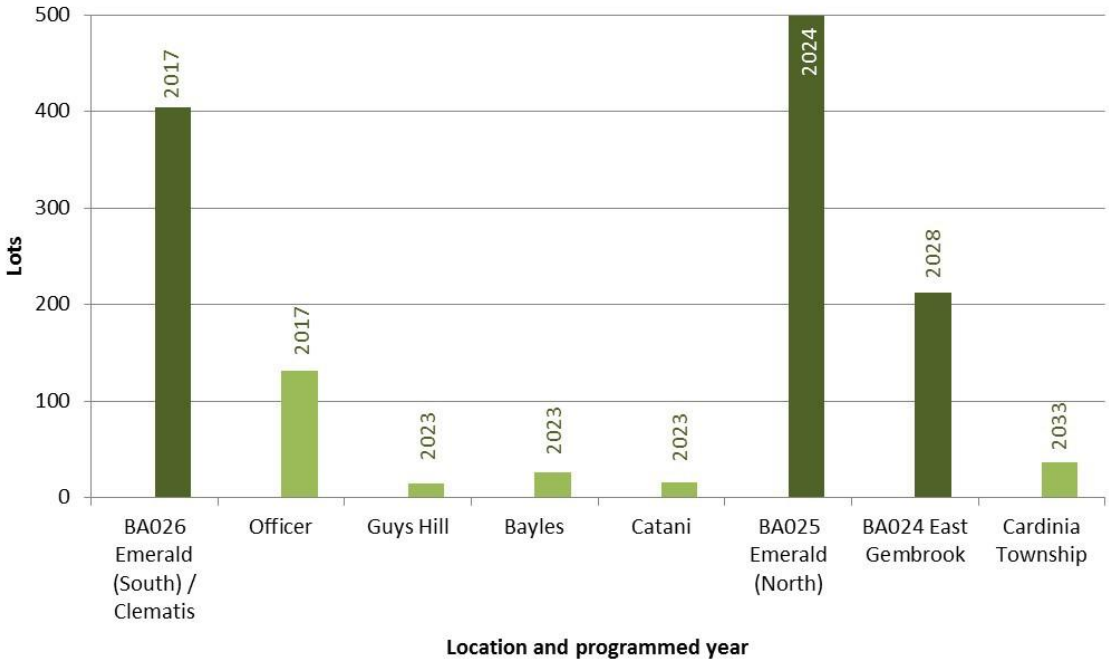



*Figure 2: Future programmed backlog works by number of lots, location and timing (source: Integrated Water Management Plan 2015–25)*

Council is committed to working with relevant stakeholders to explore (where possible) innovative and cost-effective solutions to wastewater disposal in recognition of potential concerns regarding maintaining public heath, the preservation of the natural environmental and the protection of local amenities.

If reticulated sewerage is identified in the onsite wastewater management plan as the preferred option for improved onsite wastewater management, water authorities, in conjunction with the EPA and Councils, and in consultation with the local community, need to develop and submit to Government a sewerage management plan.

## 6.3 Environment Protection Authority Victoria

As Victoria's environmental regulator, the EPA Victoria plays a central role in overseeing the management of OWMS. Its responsibilities under this OWMP include:

- Administering the Environment Protection Act 2017 and associated Regulations
- Developing policies and guidelines to support consistent application by regulators, including councils
- Providing guidance materials to help the community understand and meet their environmental obligations.
- Issuing Certificates of Conformance, which outline the types of OWMS permitted for installation in Victoria.
- Approving high-volume systems that discharge more than 5,000 litres per day.

## 6.4 Department of Energy, Environment and Climate Action (DEECA)

DEECA is responsible for the management of water resources, climate change, bushfires, public land, forests, and ecosystems in Victoria. DEECA may be referred to by Council for specialist advice in circumstances where OWMS may impact on land or water resources.

## 6.5 Victorian Department of Health

The Victorian Department of Health (DH) have responsibilities under the Public Health and Wellbeing Act 2008 and administering the Safe Drinking Water Act 2003.

## 6.6 Service providers

The effective design, installation, and maintenance of OWMS relies on a network of qualified service providers, each with distinct responsibilities under Victorian legislation and council procedures:

- Land Capability Assessors Conduct detailed assessments of site conditions to determine the suitability of land for OWMS installation. These assessments inform system design and risk mitigation strategies.
- Licensed or Registered Plumbers Responsible for installing associated pipework in accordance with plumbing regulations. Only licensed plumbers can issue compliance certificates, verifying that the work meets required standards.
- Building Surveyors Ensure that properties with OWMS have obtained the necessary permits and certifications prior to issuing an occupancy permit or certificate of final inspection. Their role supports regulatory compliance and public safety.

- Service Technicians Perform scheduled servicing of OWMS as prescribed by system type and permit conditions. Technicians must submit service reports to Council when required, supporting ongoing monitoring and enforcement.

# 7. Cardinia Shire context

Cardinia Shire is located approximately 55 km southeast of Melbourne's CBD and is recognised as one of Victoria's "interface councils"—a group of municipalities that form the transitional zone between metropolitan Melbourne and regional Victoria.

This unique positioning presents both opportunities and challenges, particularly in planning and delivering infrastructure and services that keep pace with rapid population growth across a diverse and expansive landscape of approximately 1,280 square kilometres.

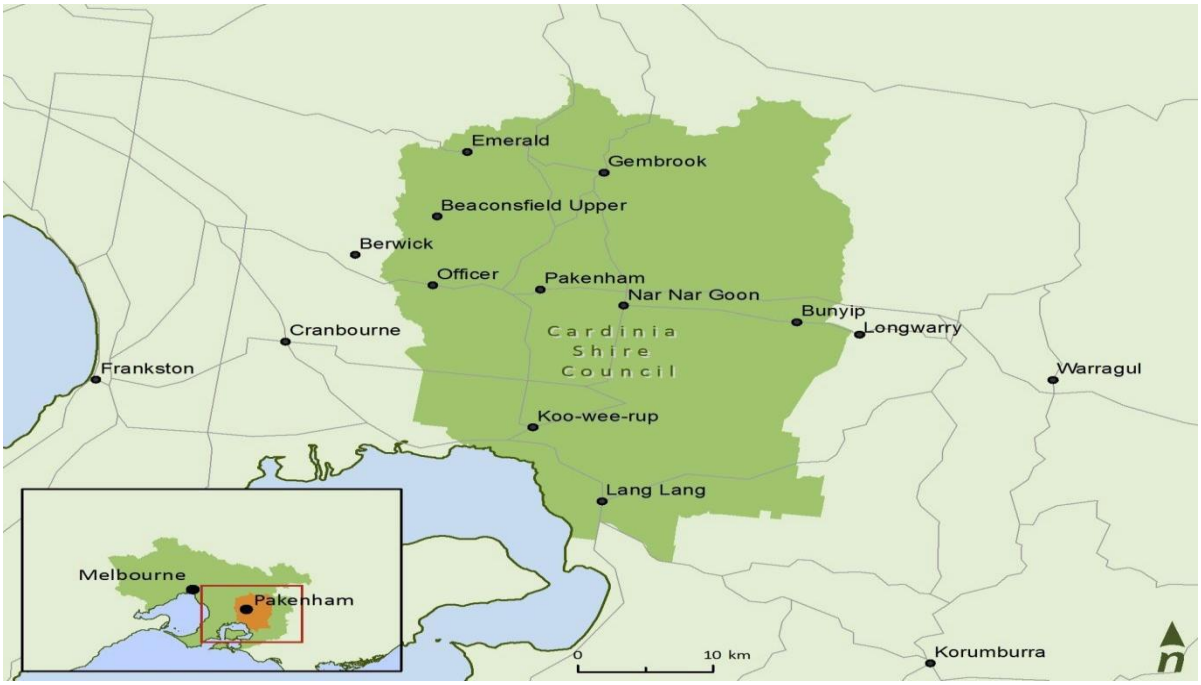



*Figure 3: Cardina Shire Council (source: Integrated Water Management Plan 2015–25)*

Cardinia Shire is committed to fostering a liveable, resilient community where the natural environment thrives and residents are healthy, connected, and included.

As of 2025, Cardinia Shire's population is estimated at 132,289. By 2046, this figure is projected to reach 167,989, reflecting an increase of over 33,500 residents and 13,312 new households. The Shire continues to play a vital role in providing affordable home ownership opportunities for families relocating from Melbourne's south-eastern suburbs.

The shire's growth area is characterised by those areas that have experienced significant growth in recent times or are planning for urbanisation. The growth region follows the Princes Highway and Princes Freeway west–east through the centre of the shire. The growth region was originally populated by graziers and farmers with Pakenham becoming the commercial and service centre for the area. In the 1980s, the residential population began to grow accelerating rapidly from 1991 onwards.

Balancing the evolving needs of these regions—while supporting both emerging and established communities—is central to maintaining Cardinia Shire's liveability and sustainability. Strategic planning, infrastructure investment, and inclusive community engagement will be key to navigating this growth successfully.


*Figure 4: The shire regions and municipal boundaries (source: Integrated Water Management Plan 2015–25)*

## 7.1 Impacts of climate change

Cardinia Shire is already experiencing the effects of a changing climate. In recent years, the region has seen shifts in rainfall patterns, an increase in high bushfire risk days, and more frequent storms and flooding events. These trends are expected to continue, making it essential to consider the long-term implications of natural disasters on infrastructure and land use planning.

Properties with OWMS are particularly vulnerable to climate-related events. Flooding can compromise system integrity, leading to environmental contamination and public health risks. Bushfires may also damage system components or alter soil conditions, affecting performance and safety.

Following emergency events, Environmental Health Officers conduct Secondary Impact Assessments to evaluate the condition and compliance of existing OWMS. If systems are found to be compromised or no longer fit for purpose, property owners may be required to submit applications for alterations or replacement systems to ensure ongoing environmental protection and regulatory compliance.

## 7.2 Why is onsite wastewater important?

The significant population growth forecast for Cardinia Shire—spanning both urban and rural areas—demands comprehensive planning to ensure that infrastructure, housing, and essential services evolve in step with the needs of a diverse and expanding community.

One critical component of this planning is wastewater management. Effective treatment and recycling of wastewater is essential to:

- Protect public health by preventing the spread of waterborne diseases.
- Avoid environmental degradation, including algal blooms and pollution of waterways.
- Conserve precious freshwater resources.
- Enable resource recovery, such as the capture of nutrients and energy.

Proper wastewater management is a cornerstone of both sustainable development and the circular economy, ensuring that waste is not simply discarded but repurposed in ways that benefit the environment and community.

Domestic wastewater, which is generated from everyday household activities, contains harmful substances like microbial pathogens, organic matter, and chemical pollutants. When on-site wastewater management systems (OWMS) malfunction, they can release untreated or partially treated effluent into the surrounding soil and waterways. This leakage can lead to contamination, environmental damage, and increased health risks.

Cardinia Shire Council already has 10,000 domestic on-site wastewater treatment systems. As Cardinia Shire continues to grow, ensuring the integrity, maintenance, and regulation of OWMS will be vital to protecting both the natural environment and the wellbeing of its residents.

If not managed well, the public health risks associated with these systems arise when bacterial contamination associated with human waste contaminates drinking water, waters used for recreational purposes or where there is direct human contact with effluent. They also contribute nitrogen and phosphorous to their catchments. Beyond this, there are social implications of poorly maintained onsite systems including odour.

A summary of Council onsite wastewater risks in locality areas is highlighted in the table below:

| Area | Risk | Comment |
|---|---|---|
| Upper Yarra (Emerald, Avonsleigh, Cockatoo and Gembrook) | Very high | These areas have high rainfall and thin soil profiles. Some systems installed prior to the early 1970's were permitted to discharge to the stormwater system. Since the time that the management plan was written, wastewater infrastructure has been constructed in this area connecting these areas to the metropolitan wastewater network. |
| Upper Beaconsfield | High | The area features poor soil permeability, thin soils, relatively steep slopes and high rainfall. Areas with high concentrations of unsewered properties also cause amenity and public health impacts. |
| Bunyip | High | Poor soil permeability, thin soils and high rainfall. |

| | | |
|---|---|---|
| Nar Nar Goon | High | High rainfall and moderate soil thickness. Flat, with roadside drains tending to pond water. When OWMS leak to these drains it causes public health issues. |

| Environmental receptor | Risk | Comment |
|---|---|---|
| Westernport estuarine, intertidal and immediate marine environment | Very high | The estuarine, intertidal and immediate marine habitat of Westernport Bay is described as an area of very high environmental value with international geological and geomorphological significance (Cardinia Shire Council, 1999).<br><br>The saltmarsh and mangrove areas are one of the few remaining examples of this type of landscape in southern Australia (Western Port Regional Planning and Co-ordination Committee, 1992). The impact of OMWS is associated with the nutrient loads conveyed to these receiving waters. |
| Westernport Bay | Very high | Westernport Bay is an area with very high environmental values with the bay listed under the Ramsar Convention (Cardinia Shire Council, 1999) |

### *7.2.1 Priority waterways within our shire*

A number of river systems traverse Cardinia Shire including the Bunyip and Lang Lang rivers and Cardinia Creek. It is important to note that while much of the lower waterways have been historically converted to drainage lines, they nonetheless retain many important aspects of natural waterways, such as habitat for endangered species including the Southern Brown Bandicoot and the Australian Greyling.

While Melbourne Water is primarily responsible for managing natural and constructed rivers, creeks and wetlands, Council can influence waterway health, particularly through planning policies and decisions that influence the nature of urban and rural land use within the catchment.

The four key waterways flow into Westernport Bay are:

| Waterway | Description | Threats |
|---|---|---|
| Cardinia Creek | Starts beneath the Dandenong Ranges until it reaches Koo Wee Rup where it is diverted into the Cardinia Drain/Dalmore Drain system. | Rural activities (farming and agriculture), runoff from unsealed roads and the impact of contaminates from the wastewater systems. |
| Toomuc, Pakenham and Ararat Creeks | Origin is the foothills of the Yarra Ranges and flows through the urban township of Pakenham prior to being diverted into the Cardinia Drain system and the Bunyip Drain system. | Existing and developing urban area (urban stormwater) Bunyip River – begins in the Bunyip State Forest and flows along the eastern boundary of the municipality. |

| | | |
|---|---|---|
| Lang Lang River | Flows from the Strzelecki Ranges to the swamp land and out to Westernport Bay | Rural activities (farming and agriculture), runoff from unsealed roads and contaminants from wastewater systems. |
| Bunyip River | Begins in the Bunyip State Forest and flows along the eastern boundary of the municipality. The river deteriorates and becomes a drain through the swamp land. | Rural activities (farming and agriculture), runoff from unsealed roads and the impact of contaminants from wastewater systems. |

The key waterways that flow into the Yarra River system, which flows into Port Phillip Bay are:

| Waterway | Description | Threats |
|---|---|---|
| Cockatoo Creek | Cockatoo Creek – flows through the Cockatoo and Gembrook areas | Runoff from unsealed toads and contaminants from wastewater systems |
| Shepard Creek | Flows through the Cockatoo and Gembrook areas | Runoff from unsealed roads and contaminants from wastewater systems |

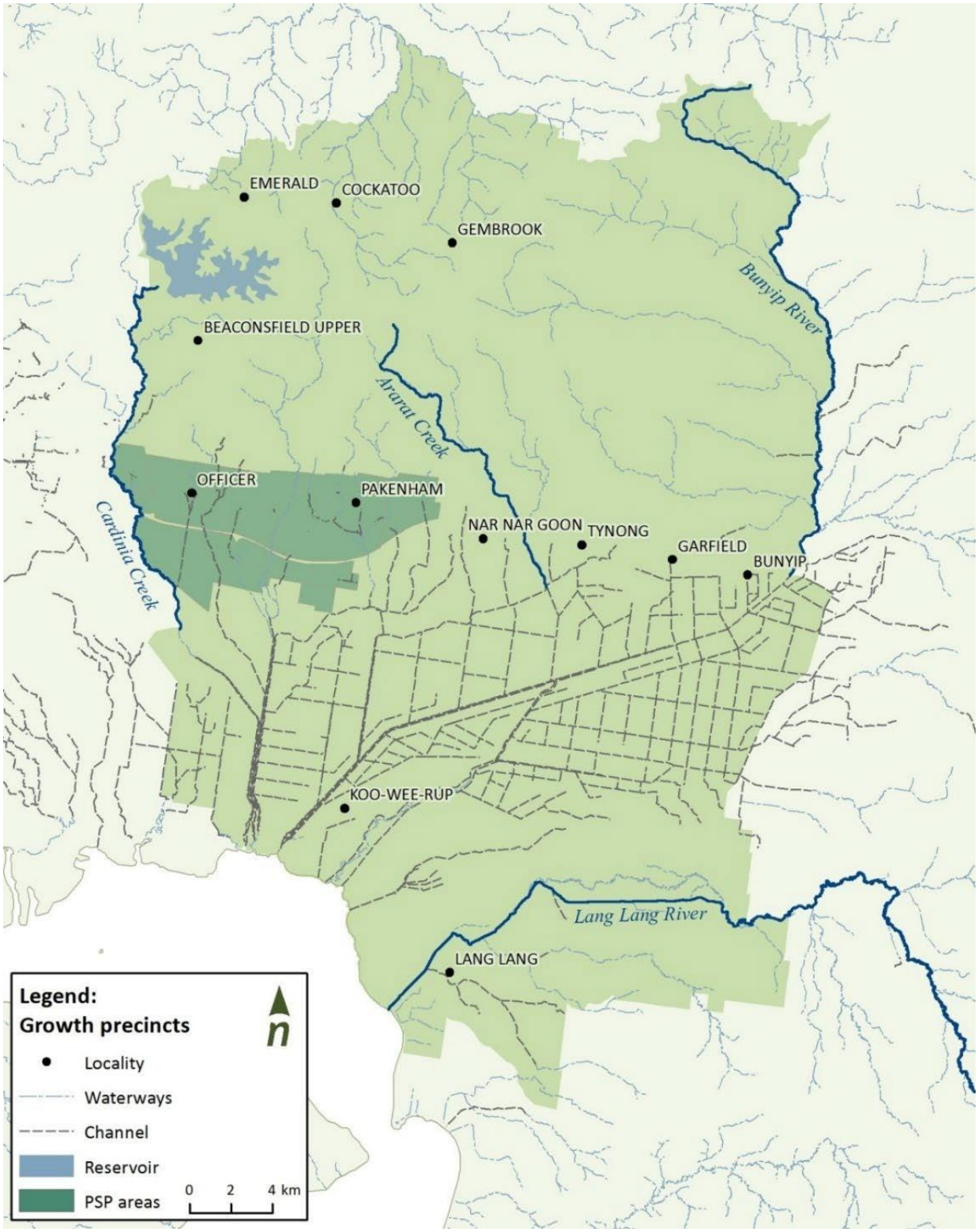



*Figure 5: Selected waterways and agricultural drains in Cardinia Shire (source: (source: Integrated Water Management Plan 2015–25).*

### *7.2.2 Council process*

The table below provides an overview of the different applications that are lodged to Council when a property owner or developer is considering the development of land, the building of a new building, housing or accommodation, or the alteration of an existing building or dwelling. Cardinia Shire Council has established internal referral procedures across the relevant Council Departments to facilitate consistency and quicken the application process.

| | |
|---|---|
| **Planning application** | **What are the wastewater considerations during the Planning Permit application process?**<br>The Planning and Environment Act 1987 requires Council to consider environmental issues in decision-making. This is done via a Planning Referral to the Council's Environmental Health Officer who assesses the proposal against the requirements of the legislation.<br>At this point, Council's Environmental Health Officer may advise the Planning Department of any conditions that may be required on the Planning Permit. |
| **Permit to construct, install or alter OWMS** | **What is a permit to construct, install or alter an OWMS?**<br>Under the EP Act, a permit is required from Council before the installation or alteration of an OWMS. This permit is a homeowner's opportunity to inform Council of their intentions, such as:<br>• Details of what is proposed, such as a new dwelling, building or extension of existing dwelling.<br>• Descriptions and details of the number of habitable rooms.<br>• Confirmation of OWMS proposed, and plumber details.<br>• Site plan, including where the OWMS will be located.<br><br>How do I lodge an application for a Permit to Construct, Install or Alter?<br>Applications are available via:<br>• Council's website.<br>• Customer service.<br>• Phone request to Council's Environmental Health Officer.<br>Council must assess this application within 42 business days of the submission. If Council does not have all the relevant application information, this clock can be paused and re-commenced upon receival. Councils Environmental Health Officer would advise the applicant when the assessment period is paused. |
| **Approval for an OWMS – Certificate to use** | **What is a certificate to use an OWMS?**<br>Before using an OWMS, Council must inspect the OWMS, preferably during the installation process. If Council is satisfied that the OWMS complies with the Permit to Install, a Certificate for Use will be issued after receiving the as-installed plans of the OWMS, commissioning certificate, and plumbing compliance certificate. In some instances, electrical compliance certificate may be required.<br>A Certificate for Use which details the conditions of compliance will be sent to the applicant within 7 days of approval. |

### *7.2.3 Important considerations*

Our authorised officers are responsible for assessing and making decisions related to OWMS. Common decision-making scenarios include:

- Assessing applications for subdivision
- Reviewing proposals for new, altered or replacement OWMS.
- Investigating community complaints regarding OWMS performance or impacts

**Public health risks:** Poorly managed or failing OWMS can pose serious health risks due to exposure to untreated sewage, which may contain:

- Pathogens such as bacteria, viruses, protozoa, intestinal worms, and airborne moulds and fungi
- Disease risks including gastroenteritis, cholera, dysentery, and hepatitis
- Septic overflow leading to organic pooling, increased mosquito breeding, and direct sewage exposure.

**Environmental impacts:** OWMS failure or mismanagement can result in significant environmental degradation:

- Groundwater contamination by nitrate, ammonia, and faecal pathogens
- Raised groundwater tables contributing to soil salinity.
- Surface runoff introducing nitrogen and phosphorus into catchments, promoting algal blooms, weed growth, and erosion.
- Effluent containing suspended solids, ammonia, and organic matter can disrupt aquatic ecosystems.
- Polluted effluent may enter rivers, lakes, or wetlands, causing broader waterway contamination.

**Economic considerations:** OWMS decisions can have substantial financial implications for property owners and businesses:

- High costs associated with system replacement or connection to reticulated sewerage.
- Poor OWMS performance can reduce land amenity and property value.
- Registered premises (e.g. food businesses, accommodation providers) may require system upgrades if operational practices or capacity change.

## 7.3 OWMS operating beyond its design life.

All OWMS have a lifespan, and in time systems will become less effective in controlling the risks associated with wastewater management. Although it is the responsibility of all property owners to ensure that their OWMS are working effectively, Cardinia Shire Council has an important role in ensuring that these risks are managed, such as:

- providing education to the community about good management practices to avoid system failures.
- investigating community complaints relating to alleged system failures, such as wastewater discharges or odour, and when these occur ensuring compliance is achieved; and
- assisting applicants where new OWMS are to be installed or systems require alteration.

Council will develop an audit schedule to assess compliance of active systems. This audit schedule will prioritise high risk localities, and at-risk properties such as high OWMS density or proximity to potable water source. It is intended that the audit program will provide meaningful data on the compliance of OWMS in use within the municipality and provide opportunities for compliance to be achieved should non-compliance be identified.

## 7.4 Existing OWMS in declared sewer districts

Council does not have any power under the Water Act 1989 to direct existing properties with OWMS that fall within an extension to the sewer district to connect to sewer once it becomes available. Water authorities have the specific powers under the Water Act 1989 to manage existing infrastructure, plan for new services, and enforce connections to sewer systems. This is the responsibility of the water authority managing the sewer connection in the north of the shire that would be Yarra Valley Water, everywhere else in the Shire would fall under South East Water.

Council will recommend to the applicant at the time of a planning application for a proposed new housing estate that abuts a sewer district; to investigate connection to sewer, as reticulated sewer is the best option for managing wastewater in higher density housing estates. In some instances, a planning overlay may require connection to sewerage.

For existing dwellings that have an existing OWMS within a sewer district, Councils approach is that property owners will not be required to connect to sewer unless:

- the property owner cannot manage the risks associated with the OWMS as detailed in their GED obligations,
- Possibly if the property owner is altering/renovating a home, or;
- where it is feasible to connect to new sewer infrastructure provided in growing housing development areas.

For any new dwellings inside a declared sewer district, connection to the reticulated sewer network is a mandatory requirement.

Council's role is to advocate and work collaboratively with the water authorities and property owners in this process of transitioning to reticulated sewer connection if feasible.

## 7.5 Existing OWMS with offsite discharge

Properties that were permitted at the time of development to discharge greywater offsite will not be required to upgrade their system once this OWMP is adopted, unless one of the following applies:

- the owner proposes to undertake an extension to the existing dwelling or structure or install a new structure (for example a shed or pool); and/or
- the existing OWS is no longer functioning efficiently.

Council, in consultation with the landowner and Land Capability Assessor, will review options to ensure all wastewater is treated and disposed of within the property boundary that complies with the current Guideline for onsite wastewater management and Guideline for onsite wastewater effluent dispersal and recycling systems.

# 8. Risk framework

A core component of the OWMP is the locality risk assessment, which is informed by the ISO 31000 risk management process and the Onsite wastewater Management Plan Risk Assessment Guidelines Final Report – June 2022. The locality risk assessment allows Council to evaluate the level of risk for each locality within the Shire into low, medium and high-risk categories.

The locality risk assessment serves as a strategic guide for decision-makers, highlighting key considerations when planning, approving, or regulating OWMS. It supports:

- Long-term infrastructure planning
- Targeted compliance and enforcement strategies
- Prioritisation of upgrades or sewerage connections
- Community engagement and education efforts

While the locality risk profile may inform decisions related to individual properties, it does not replace site-specific assessments. For any application or compliance matter, Council officers will conduct a new risk assessment based on the unique characteristics and circumstances of the land in question.

The goal of conducting a risk assessment is to identify the risks posed by OWMS across the municipality to ensure:

- OWMS and their effluent are appropriately located and managed, and;
- Human health and environmental risks are minimised.
- The EPA set out the expected requirements for risk assessment in two separate documents:
- Onsite wastewater management plans Risk Assessment Guidance Final Report (v4.0) (RAGFR)

Draft - Onsite wastewater management plans: Guidelines for developing, reviewing and updating. (OWMP). This approach is designed to be consistent with AS/NZS 1547:2012 and ISO 31000:2018 and includes risk identification, analysis, evaluation and treatment.

## 8.1 Cardinia Shire Council's risk assessment considerations

The risk assessment considered the following risk factors:

### *8.1.1 Land characteristics*

#### Lot size

Lot size links to the likelihood of inadequately treated wastewater discharging offsite leading to contamination of water bodies (surface water and groundwater). For the purposes of the risk assessment, the median lot size per locality was the primary source of data.

Properties or lots under 0.4 hectares increase the risk profile of a locality, for any new applications for small lots will be critically assessed, and if approved, more stringent requirements and conditions will be applied to ensure the land is capable of treating wastewater onsite. The assessment excludes crown land.

| Risk factor bands relating to lot size (Risk identification method was GIS mapping) | | |
|---|---|---|
| Low | Medium | High |
| Greater than 1 hectare | 0.4 – 1 hectare | Less than 0.4 hectare |

### Topography

Topography considers the landscape of the area, including mountains, valleys or surface rivers. Topography relates to the likelihood of overland runoff transferring contaminants offsite.

The slope of a site/area greatly impacts the ease with which effluent can transfer offsite in both dry and wet conditions and therefore the risk posed by an onsite system. Site topography can influence the likelihood of untreated OWMS run-off entering water bodies (primarily watercourse and potable water offtakes).

| Risk factor bands relating to topography | | | |
|---|---|---|---|
| Dispersal Method | Low | Medium | High |
| Surface irrigation | less than 6% | 6 – 10% | >10% |
| Absorption systems | less than 6% | 6-15% | >15% |
| Pressure compensating subsurface irrigation | less than 10% | 10-30% | >30% |

The risk identification method was the use of GIS mapping and officer experience of the local areas.

### Soil type

Soil types are an essential indicator for determining appropriate OWMS types. Examples of soil types include:

- Gravels and sands – soil category 1
- Clay loams – 4a, 4b and 4c
- Sandy loams – 2a and 2b
- Light clays – 5a, 5b and 5c
- Loams – 3a, 3b
- Medium to heavy clays – 6a, 6b and 6c

Effluent discharge to soils with low permeability are more likely to travel further with a higher pathogenic/nutrient load and contaminate nearby waterways.

Council receives soil types for a given property in the Land Capability Assessment (LCA), and it is through a review of LCA's that soil types have been assessed for the purpose of the locality risk assessment. Council acknowledges more data is required relating to soil types across the Shire and has included this as an action item.

| Risk factor bands relating to soil type | | | |
|---|---|---|---|
| | Low | Medium | High |
| Surface water | 1,2,3,4 | 5 | 6 |
| Ground water | 3,4,5,6 | 2 | 1 |

### Groundwater depth and quality

A shallow groundwater depth increases the likelihood of contamination of groundwater. Council has applied the depth from disposal site to highest seasonal water table, and use submitted Land Capability Assessments and the Visualising Victoria's Groundwater mapping tools, which is shown below.

| Risk factor bands | | |
|---|---|---|
| Low | Medium | High |
| >10m or confined aquifer | 5-10 meters | <5 meters |

For the purpose of this risk assessment, all localities will be assessed as low risk, however, will be assessed on a property-by-property basis.

### Proximity to water source and potable water supply offtake

Proximity to a potable water supply offtake impacts the likelihood of contamination occurring from onsite treatment system failure in conjunction with risk factor parameters that impact the receptor pathways.

This information was obtained via a GIS assessment of water sources and potable water supply offtakes and the Environmental Significance Overlay.

| Risk factor bands relating to proximity to potable water supply offtake | | |
|---|---|---|
| Low | Medium | High |
| Greater than 2KM | 500 meters -2KM | less than 500 meters |

Risk identification methods: GIS mapping, Visualising Victoria's Groundwater and Land Capability Assessment data.

### Proximity to flood plains

Proximity of OWMS to flood plains is a threat to groundwater, surface water and potable water offtakes through inundation of systems and transport of contaminants. The higher the AEP rating the more likely that a flood will occur on the system site and the system will fail.

Data was obtained by assessing the Land Subject to Inundation Overlay.

| Risk factor bands relating to proximity to a flood plain | | |
|---|---|---|
| Low | Medium | High |
| <1% AEP | 1 – 5% AEP | >5% AEP |

Risk identification methods: GIS mapping, Council Planning Scheme Overlays, such as land subject to inundation overlays and Vic Plan mapping tool, which is publicly available via mapshare.vic.gov.au.
"Half the shire is in a land inundation overlay"- *Environmental Health Officer during OWMP consultation*

### *8.1.2 Develop density and land use*

**Number of onsite systems in the population centre**

Increasing number of onsite systems in a population centre increases the likelihood that contaminants will reach an endpoint. This risk factor is an indicator of density and assumes increased likelihood of contamination in a highly dense area. Calculations of cumulative load is covered through the number of onsite systems and other consequence risk factors.

Council applies proactive consideration of the cumulative risk of existing and future OWMS on water quality that can arise from increased dwelling density.

| Risk factor bands relating to OWMS density | | |
|---|---|---|
| Low | Medium | High |
| <10 | 10 – 200 | >200 |

Risk identification methods: GIS mapping and Council data relating to active systems (certificate to use).

Council acknowledges that there are historical OWMS that are not on Councils records. An opportunity to audit the number of actual systems within the Shire has been included as an action item (action 2.1).

### *8.1.3 Permit status*

Permit status is an important risk factor, as it provides meaningful information and data to Council, including:

- Age of system
- Type of system
- Exact location of the system, and distribution fields
- Compliance information
- Recent audit dates

| Risk factor bands | | |
|---|---|---|
| Low | Medium | High |
| Greater than 75% of properties with a permit | 50 – 75% of properties with a permit | Less than 50% of properties with a permit |

## 8.2 Applying the risk assessment

It is important to highlight that within each locality there may be localised areas that pose a higher or lower risk than determined risk rating and Cardinia Shire Council would like to reinforce that all applications or cases being reviewed will always have an authorised officer assessment irrespective of the risk rating.

The following risk weightings were applied during the risk assessment. These weightings will assist in ensuring the highest risk areas are prioritised.

| | | L | M | H | VH | Weighting |
|---|---|---|---|---|---|---|
| Likelihood of treatment failure/under designed | Age of System | 0.2 | 0.5 | 0.9 | | 10 |
| Likelihood of effluent leaving the lot | Lot size | 0.2 | 0.5 | 0.9 | 1 | 7 |
| | Topography (slope) | 0.2 | 0.5 | 0.9 | | 9 |
| Likelihood of effluent travelling to the endpoint factor | Proximity to SWSC offtakes | 0.2 | 0.5 | 1 | | 5 |
| Likelihood risk of catastrophic failure | Proximity to flood plains | 0.2 | 0.4 | 0.6 | | |

| Likelihood Descriptor Ratings | | |
|---|---|---|
| Rare | Endpoint contamination may occur only in exceptional circumstances | 0-0.3 |
| Unlikely | Endpoint contamination could occur at some time | 0.3-0.5 |
| Possible | Endpoint contamination should occur at some time | 0.5-0.7 |
| Likely | Endpoint contamination will probably occur some of the time | 0.7-0.9 |
| Almost certain | Endpoint contamination is expected to occur most of the time | 0.9-1.0 |

### *8.2.1 Our risk assessment findings and prioritisation*

Our risk assessment findings were completed during the OWMP development. These findings will guide our focus areas and advocacy efforts over the next four years, ensuring that resources are directed toward the highest-priority risks and opportunities for improvement.

| Likelihood | Insignificant | Minor | Moderate | Major | Catastrophic |
|---|---|---|---|---|---|
| *Rare* | Low | Low | Low | Moderate | **High** |
| *Unlikely* | Low | Low | Moderate | **High** | **High** |
| *Possible* | Low | Moderate | Moderate | **High** | Very High |
| *Likely* | Low | Moderate | **High** | **High** | **Very High** |
| *Almost Certain* | Low | Moderate | **High** | **Very High** | **Very High** |

| Region | Township | Consequence | Likelihood of treatment failure/under designed | Likelihood of effluent leaving the lot | Likelihood of effluent travelling to the endpoint factor | Likelihood risk of catastrophic failure |
|---|---|---|---|---|---|---|
| CENTRAL | Beaconsfield | Minor | Likely | Unlikely | Unlikely | Rare |
| CENTRAL | Officer | Minor | Likely | Unlikely | Rare | Rare |
| CENTRAL | Pakenham | Minor | Likely | Unlikely | Unlikely | Rare |
| FLATS | Bayles | Minor | Likely | Unlikely | Rare | Unlikely |
| FLATS | Bunyip | Minor | Likely | Unlikely | Rare | Rare |
| FLATS | Cardinia | Minor | Likely | Unlikely | Rare | Unlikely |
| FLATS | Catani | Minor | Likely | Unlikely | Rare | Unlikely |
| FLATS | Cora Lynn | Moderate | Likely | Rare | Rare | Unlikely |
| FLATS | Dalmore | Insignificant | Likely | Rare | Rare | Unlikely |
| FLATS | Garfield | Insignificant | Likely | Unlikely | Rare | Rare |
| FLATS | Heath Hill | Major | Almost certain | Rare | Rare | Rare |
| FLATS | Iona | Minor | Likely | Rare | Rare | Unlikely |
| FLATS | Koo Wee Rup | Moderate | Likely | Unlikely | Rare | Unlikely |
| FLATS | Koo Wee Rup North | Minor | Almost certain | Unlikely | Rare | Unlikely |
| FLATS | Lang Lang | Minor | Likely | Unlikely | Rare | Rare |
| FLATS | Modella | Major | Almost certain | Unlikely | Rare | Unlikely |
| FLATS | Monomeith | Minor | Almost certain | Unlikely | Rare | Unlikely |
| FLATS | Nar Nar Goon | Minor | Likely | Unlikely | Rare | Unlikely |
| FLATS | Nyora | Major | Almost certain | Rare | Rare | Rare |
| FLATS | Officer South | Major | Almost certain | Unlikely | Rare | Unlikely |
| FLATS | Pakenham South | Minor | Likely | Rare | Rare | Unlikely |
| FLATS | Rythdale | Major | Almost certain | Rare | Rare | Unlikely |
| FLATS | Tooradin | Major | Almost certain | Unlikely | Rare | Unlikely |
| FLATS | Tynong | Minor | Likely | Unlikely | Unlikely | Unlikely |
| FLATS | Vervale | Minor | Likely | Rare | Rare | Unlikely |
| FLATS | Yannathan | Moderate | Almost certain | Rare | Rare | Unlikely |
| HILLS | Avonsleigh | Major | Likely | Possible | Unlikely | Rare |
| HILLS | Beaconsfield Upper | Minor | Likely | Possible | Unlikely | Rare |
| HILLS | Bunyip North | Minor | Almost certain | Unlikely | Possible | Rare |
| HILLS | Clematis | Moderate | Likely | Possible | Unlikely | Rare |
| HILLS | Cockatoo | Major | Likely | Possible | Unlikely | Rare |
| HILLS | Dewhurst | Major | Almost certain | Unlikely | Possible | Rare |
| HILLS | Emerald | Minor | Likely | Possible | Unlikely | Rare |
| HILLS | Garfield North | Moderate | Almost certain | Unlikely | Possible | Rare |
| HILLS | Gembrook | Moderate | Likely | Possible | Unlikely | Rare |
| HILLS | Guys Hill | Minor | Likely | Possible | Unlikely | Rare |
| HILLS | Maryknoll | Moderate | Likely | Possible | Unlikely | Rare |
| HILLS | Menzies Creek | Major | Likely | Possible | Possible | Rare |
| HILLS | Mount Burnett | Minor | Likely | Unlikely | Possible | Rare |

| | | | | | | |
|---|---|---|---|---|---|---|
| HILLS | Nangana | Major | Almost certain | Unlikely | Possible | Rare |
| HILLS | Nar Nar Goon North | Moderate | Likely | Unlikely | Possible | Rare |
| HILLS | Pakenham Upper | Moderate | Likely | Possible | Possible | Rare |
| HILLS | Tonimbuk | Major | Likely | Unlikely | Possible | Rare |
| HILLS | Tynong North | Moderate | Likely | Possible | Possible | Rare |

### *8.2.2 Risk assessment priority areas*

Application of the RAF methodology resulted in the following priority townships:

| Shire area | Township name | |
|---|---|---|
| | Highest Priority | Priority |
| Flats | Officer South<br>Rythdale<br>Tooradin | Cora Lynn<br>Koo Wee Rup |
| Hills | Dewhurst<br>Monomeith | Avonsleigh<br>Clematis<br>Cockatoo<br>Gembrook<br>Maryknoll<br>Nar Nar Goon North<br>Tonimbuk<br>Tynong North |

Border townships also identified as priority townships:

| Shire area | Township | Border municipal boundaries |
|---|---|---|
| | Priority | Township split between Councils |
| Flats | Heath Hill<br>Lang Lang<br>Modella<br>Nyora | Half of in South Gippsland<br>Half in Bass Coast, small amount in South Gippsland<br>Half in Baw Baw<br>Mostly in South Gippsland, small amount in Baw Baw |
| Central | Beaconsfield | Small amount in Casey |
| Hills | Emerald<br>Menzies Creek | Small amount in Yarra Ranges<br>Half in Yarra Ranges |

*Please note – these townships will need to be monitored in consultation with neighbouring municipal Councils.

A wide variety of risks exist in each township, requiring action to remove or reduce them. The magnitude of risk posed by threats is dependent on the individual characteristics of each township. These include, the size of the threats, significance of the local environment, quality of the storm water infrastructure, exposure of threats to the public and availability of threat reduction measures.

To enable Council to gain a better understanding of the impacts and risk, Council would need to focused audit program in these areas to identify the following:

- confirm properties less than 1000 square metres (with very low or high soil percolation rates).
- investigate inadequate and failing wastewater infrastructure.
- steep grades prone to instability exacerbated by high rainfall, moving ground water springs and high wastewater loading.
- investigative sampling of storm water and/or ground waters may be used to monitor impacts of wastewater disposal in the area.

Information and data collation is a critical primary phase that must be completed before effective risk-based interventions can be undertaken. The quality and extent of the information Council hold for individual wastewater treatment systems (OWMS) directly influences the quality and extent to which subsequent actions can be conducted.

# 9. Land capability assessments

A Land Capability Assessment (LCA) assist applicants, Council and Water Authorities by providing specific and relevant information about the ability for wastewater to be contained on the property.

The table below provides the expected information to be provided within an LCA.

| LCA Topics | Examples |
|---|---|
| Background and proposal detail | • overview of the proposal<br>• limitations and assumptions |
| Land features | • topography and drainage<br>• soil characteristics, soil permeability and vegetation across the site with a focus on the land capability areas<br>• average rainfall, and flooding potential<br>• catchment area<br>• bores, dams and groundwater<br>• building envelope<br>• erosion potential<br>• local comate and aspect of the site |
| Site information | • property location<br>• property title<br>• zoning and overlays<br>• land use (past and present)<br>• use of surrounding areas |
| Infrastructure | • available services |
| Land capability | • land constraints<br>• soil percolation<br>• risk rating and summary<br>• management protocols |
| Recommendations | • recommended OWMS<br>• OWMS design and specifications<br>• disposal fields and reserve area allocations |
| Management and maintenance | • Ongoing management, maintenance, reporting and other requirements |
| Supporting data and mapping | • accurate mapping<br>• supporting soil classification test data |

Should an LCA be requested to support an OWMS application for a property, Council's Environmental Health Officer will refer to the below table to guide decision making and provide justifications to the applicant, e.g. if a lot size is assessed as high, an LCA will be required to be submitted.

| Feature | | | Low risk | Moderate risk | High risk |
|---|---|---|---|---|---|
| | | | Soil category and permeability test required | | |
| | | | LCA may be required after assessment. | Standard LCA will be required | Comprehensive LCA will be required |
| Public building/ infrastructure | Includes structures like public toilets | | Not Applicable | Yes | Dependent on proposal |
| Commercial use | Includes properties with combined residential and commercial usage | | Not Applicable | Yes | Dependent on proposal |
| Lot Size | Useable lot area can be affected by densely vegetated areas, excessive slope, shallow soils, size/number of buildings etc. | | >4000m$^2$ | 2501m$^2$ - 4000m$^2$ | <2500m$^2$ |
| Flood Risk | Properties covered by a Land Subject to Inundation Overlay (LSIO) | | OWMS within LSIO – dependent on AEP | | |
| | Annual Exceedance Probability (AEP) | | <1% AEP | 1% - 5% AEP | >5% AEP |
| Distance between available OWMS area to surface waters | Properties covered by an Environmental Significance Overlay (ESO) | distance to waterways | >100m | 100m – 50m | <50m |
| | | distance to dams, lakes, reservoirs | >300m | 300m – 150m | <150m |
| | Surface waters used as a source of water for drinking | distance to waterways | >100m | 100m – 50m | <50m |
| | | distance to dams, lakes, reservoirs | >300m | 300m – 150m | <150m |
| | Other surface waters | distance to waterways, dams, lakes, reservoirs | >60m | 30m – 60m if proposing primary treatment | <30m |
| Slope | Average slope on the lot | | <10% | 11% - 15% | >16% |
| Soil Type | Determined via Soil Test. Categories as per AS1547:2012 and EPAs 'Guideline for Onsite Wastewater Management' | | Category 3 and 4 Soils | Category 2 and 5 Soils | Category 1 and 6 Soils |

| Land Capability Assessment (LCA) Content Requirements | |
|---|---|
| All LCAs should meet all requirements of the 'Victorian Land Capability Assessment Framework' 2014 (VLCAF) and all elements outlined below. In addition, any factors identified in the table above must be considered in the LCA submitted to Council. | |
| **Comprehensive LCA** | In addition to all the requirements for a Standard LCA, a comprehensive LCA must address each High-Risk factor in detail. This may include additional wastewater loading calculations, specific soil amelioration measures or tree protection measures. |
| **Report Element** | Minimum Requirement for an LCA |
| **Introduction and Background** | • Overview of the proposal<br>• Current land use and development overview (including occupancy); single lot, increase in building entitlements (subdivision) or non-domestic development.<br>• Features identified in OWMP as triggers for requiring an LCA |
| **Land Capability** | Land Constraints & how they are going to be managed. May include:<br>• slope<br>• size of lot<br>• achievability of setback distances and justification for any reduction<br>• soil assessment undertaken and results |
| Site Plan | Overall site plan to show:<br>• site address, including lot number and street number<br>• Title boundaries<br>• Title constraints such as building envelopes and effluent/wastewater envelopes and easements<br>• Location of any groundwater bores<br>• All planning overlays and restrictions including<br>- Environmental Significance Overlay<br>- Land Subject to Inundation Overlay<br>- Vegetation Protection Overlay<br>- Tree Protection Zones<br>• Contour lines at maximum 10m intervals<br>• Location of soil test sites<br>• Location of surface waters e.g. dams, creeks, reservoirs and springs – both intermittent and permanent<br>• Vegetation cover<br>• Location and details of any existing OWMS<br>• Location of existing and proposed buildings, sheds, driveways, paths and any other improvements.<br>• Floor plans of any dwellings or buildings that contain wastewater producing fixtures<br>• Location of any onsite stormwater disposal areas/legal point of discharge<br>• Any site cuts, fill pads or retaining walls |

| | |
|---|---|
| OWMS Recommendation and Plan | Recommendation OWMS detail<br>• Maximum wastewater load as per Section 4.2 of the GOWM<br>• Calculations of required effluent dispersal area<br>• List of appropriate treatment system options<br>• List of appropriate effluent dispersal options<br><br>Plan of recommended OWMS to show<br>• Location of proposed treatment system (septic tank, AWTS etc)<br>• Location of proposed effluent dispersal area<br>• Location of proposed reserve area (if applicable)<br>• Relevant setback distances as per section 4.5 of the GOWM especially:<br>- Distance to any waterway, dam/lake/reservoir in an ESO including on neighbouring properties |

# 10. Compliance and monitoring

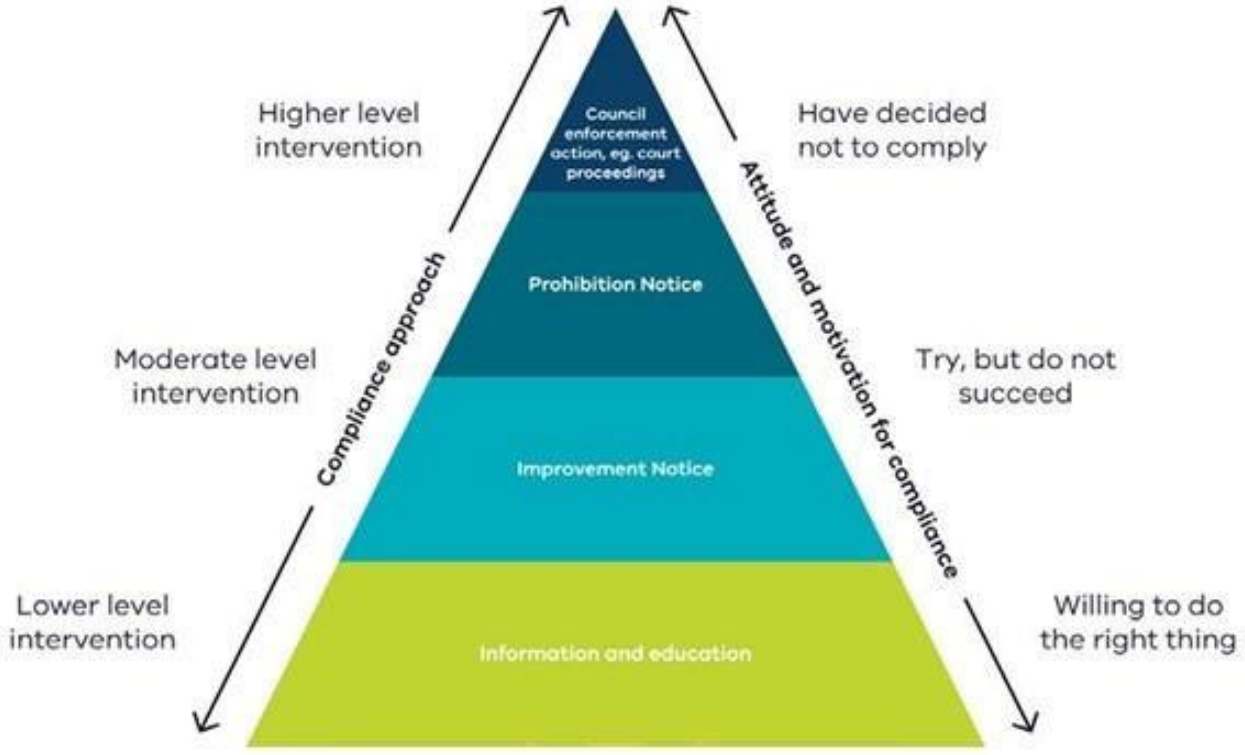
All OWMS have a lifespan, and in time systems will become less effective in controlling the risks associated with wastewater management systems. Although it is the responsibility of all property owners to ensure that their OWMS are working effectively, Cardinia Shire Council has an important role to play in ensuring that these risks are managed, such as:

- educating the community, and people responsible for an OWMS about good management practices
- investigating community complaints relating to alleged system failures, such as wastewater discharges or odour, and when these occur ensuring compliance is achieved.
- assessing applications, and land capability assessments before and during installation.

## 10.1 Council compliance monitoring program

Cardinia Shire Council is committed to fair and consistent application of legislation relating to OWMS.

To achieve this commitment, authorised officers will make compliance and enforcement decisions in-line with guidance published by the Environment Protection Authority – Regulating Onsite Wastewater Management Systems (November 2022).



Council is committed to developing education material that is consistent with resources prepared by Environment Protection Authority.

Following are examples of how Council may apply various education, compliance and enforcement options outlined in the Environment Protection Act:

| Compliance and enforcement tools | Scenario |
|---|---|
| Education | "I called the owner of the property and reminded them that the quarterly reports are required to be submitted." |
| Notice ordering maintenance | "After notification of an OWMS overflow a Notice ordering maintenance was issued providing a direction for desludging." |
| Official warning | "As the permit condition was breached, Council issued an Official Warning to the property owner." |
| Improvement notice | "As the permit condition was breached, Council issued an improvement notice on the property owner" |
| Prohibition notice | "Due to the public health risk, a prohibition notice has been issued. This means the OWMS cannot be used until compliance has been achieved." |
| Infringement notice | "Due to the owner of the property not complying with the improvement notice, Council issuing an infringement notice under the EP Regulation 163<br>(4) – comply with Council notice requiring maintenance." |
| Prosecution | "The occupier continued to use the OWMS after the prohibition notice has been issued. Council has decided to support a prosecution." |

## 10.2 Our approach to compliance and education

Cardinia Shire Council is committed to fair and consistent regulation. To achieve this commitment, Council has developed policy and procedure to align with EPA guidance.

To ensure this is effective, council policy must actively support and apply the educational framework outlined in the OWMP. This includes targeted outreach and resources for rural communities, where system performance and maintenance challenges may be more pronounced.

# 11. Existing OWMS in sewered areas

For properties within the Shire that already have an OWMS, Cardinia Shire Council's policy is that property owners are not required to connect to sewer unless:

- The OWMS fails and the associated risks, as outlined in the General Environmental Duty obligations are not managed; or
- The property is further developed (e.g. extension, outbuildings, dependant units, swimming pool)
- In the case of subdivision, all lots – including the existing property must be connected to the reticulated sewer system.

# 12. Implementing our OWMP

## 12.1 Where we have come from our last OWMP (previously called DWMP)

Council's last DWMP (Domestic Wastewater Management Plan) was developed in 2020 - 2025 and highlighted a number of key issues relating to domestic wastewater management within Cardina Shire. These included:

- Inconsistencies in relation to domestic wastewater data.
- A need to ensure ongoing strategic alliances with the water authority and ensuring the DWMP aligns with future Sewerage Management Plans developed by the authority.
- Decisions concerning domestic wastewater management at Cardinia are not supported by an over-arching wastewater operational management strategy or decision-making framework.
- The need for regional land capability mapping system to assist in the decision-making.
- process regarding individual septic tank installations.
- The number of failing wastewater systems in operation within the municipality is unknown.
- The need for referral processes for developments within unsewered areas within the municipality.
- The need to develop a wastewater community education program to assist in improving the community's knowledge of the risks associated with the poor maintenance of wastewater systems, and.
- The need for a greywater reuse policy and an associated community education program to ensure greywater is managed appropriately.

Council has undertaken a large amount of work in data cleansing and updating Council GIS platform to ensure that all old onsite wastewater management system data and new is in the one repository, so wastewater information is readily available to Council Officers community members and agencies.

## 12.2 What does the future look like?

This new OWMP forms part of Council's response to an integrated whole-of-Council approach to promoting the best environmental practice in domestic wastewater management. This approach is designed to assess and improve overall onsite wastewater management program performance and effectiveness with the aim of maintaining amenity and reducing risk to human health and the environment.

The focus area for Council's management of onsite wastewater is informed by several main factors, including Council's statutory duty and key stakeholder strategic priorities. Council's management strategies for wastewater continue to be informed by three factors:

1. Council's statutory duty
2. Council's capacity to undertake wastewater management services
3. The risks posed by ineffective OWMS systems

Given the diversity of wastewater management performance in our townships, the OWMP identifies the current challenges being experienced, the wastewater management designs or requirements, and any recommended system improvement options. This OWMP identifies four strategies for the management of wastewater systems within Cardinia Shire Council.

The capacity of council to undertake these activities and services requires a range of resources including:

- the collection of appropriate data at the point source through an ongoing monitoring program, development of a domestic wastewater information management system, and analysis of this information.
- review and development of operating policies and procedures,
- to ensure that the OWMP is strategically linked to other Council plans, and.
- the development of, and access to, a range of information by owners of onsite wastewater management systems and other stakeholders.
- the building and sustaining internal and external relationships are a fundamental element in improving the level of collaboration, consultation, information and resource sharing between agencies.
- this OWMP should be used as a tool for Council to advocate for the infrastructure and service investment needed to support population growth in their growing municipalities by partnering with higher levels of government and water authorities.

Council commits to implementing these strategies to improve the management of wastewater across the municipality. The success of this OWMP relies upon the active involvement of all stakeholders and Council. Actions identified will contribute to the implementation of these strategies and will be monitored annually and reviewed every three years.

# 13. Onsite wastewater management strategies

The following action plan outlines Council's wastewater management strategies for the 2026 – 2030 period.

| **Strategy 1: Healthy Environments - Promote sustainable wastewater practices and support community understanding**<br>To implement an efficient and comprehensive program of education, facilitation, and enforcement to ensure property owners fulfil their responsibilities for the maintenance of their on-site wastewater systems by the Council's Wastewater Management Policy to prevent risks to public health or the environment. | | | |
|---|---|---|---|
| **Action** | | **Outcomes** | **Timeframe** |
| 1.1 | Provide fair, accurate, and accessible information on good wastewater management principles, practices, and improvement options | • Develop a suite of education resources to assist developers, plumbers and property owners to understand and comply with their legal responsibilities for monitoring and maintenance of their wastewater systems, including:<br>○ website, factsheets<br>○ installation guide<br>○ approvals process<br>○ connect to sewer information<br>○ Provide information to prospective buyers via Section 32 Sale of Land Act 3<br>○ Introduce procedural fairness into regulatory management/enforcement | Year 1 |
| 1.2 | Develop a township risk prioritisation plan | • Focus on high priority townships identified in risk assessment<br>• Improved risk data for strategic planning and decision making<br>• Design standards can be developed for high-risk townships<br>• Improve onsite wastewater management by assessing gaps and improving data collection<br>• Assess any property in an onsite wastewater containment area where Council does not have data<br>• Collaborate with stakeholders on results of water data from receiving environments<br>• Review documentation from maintenance providers to identify permit and system maintenance requirements | Year 1 - 3 |

| | | | |
|---|---|---|---|
| 1.3 | Encourage property owners to connect to sewer (in declared areas | • Utilise internal building and planning referral process to encourage system upgrades where required<br>• Properties provided sewer in high density area's to be encouraged to connect through notification to the water authority. | Year 1 - 3 |

| Strategy 2: The protection of the public health and environment is at the centre of wastewater decisions.<br>Encourage community participation and partnerships with key stakeholders for greater involvement in wastewater issues | | | |
|---|---|---|---|
| **Action** | **Action** | **Outcomes** | **Timeframe** |
| 2.1 | Raise profile of wastewater system operation and maintenance requirements within the municipality and region | • Implement targeted education campaigns to property owners, occupiers and agents in high-risk areas at appropriate times.<br>• Provide readily accessible wastewater management information in other languages and in both hard copy and web-based formats. | Year 2 |
| 2.2 | Utilise a Risk Management Framework to identify townships and high-risk sites that require a review of their wastewater treatment and disposal options to enable long term sustainability and future growth of townships. | • Investigate innovative and sustainable community-scale or on-site wastewater treatment and water cycle management solutions in partnership with key stakeholders<br>• Regularly engage with relevant water authorities to discuss sustainable and future on-site wastewater disposal system needs for townships and high-risk sites that reduce environmental impacts<br>• Investigate health protection measures to address high-risk and accessible contaminated stormwater drains or groundwaters.<br>• Seek improved maintenance and development of stormwater drainage in priority townships in partnership with Council's Projects and Infrastructure departments. | Year 2 |
| 2.3 | Develop an environmental monitoring program in collaboration with other agencies. | • Implement a comprehensive environmental monitoring program including the collection of water samples from selected locations and arranging their analysis at a NATA-approved laboratory.<br>• Prepare an annual report outlining the results of the environmental monitoring program and any improvements that have been made. | Year 3 |

| Strategy 3: Regulatory Management<br>Ensure that Council policies and procedures to manage wastewater reflecting regulatory frameworks and utilising available tools to assist with clear, accountable, transparent decision-making and enforcement | | | |
|---|---|---|---|
| Action | Action | Outcomes | Timeframe |
| 3.1 | Our authorised officers will have the required skills and knowledge to make decisions fairly, consistently and proportionate to risk. | • Development of Council wastewater policy through evidence-based investigation, including enforcement protocols.<br>• Wastewater policy to include:<br>– Specify OWMS approvals process<br>– Transition from existing OWMS to upgrade and connection to sewer process<br>– Non-permit (e.g. older dwellings with no records) to permit process<br>– Enforcement (e.g. failing/aged/non-maintained systems) process<br>– Green energy home design and greywater reuse<br>– Authorised Officer training procedures (including induction)<br>• Annual policy review to ensure it is reflective of current legislation, organisational needs and best practice. | Year 1 - 4 |
| 3.2 | Explore alternative or innovative uses of existing legislative provisions to enhance wastewater management processes | • Develop and implement a OWMS inspection program (prioritised by risk, including age of system) to gather system details at property level.<br>• Influence and assist Government agencies and other stakeholders to improve the regulatory framework within which the Council operates. | Year 2 and 3 |
| 3.3 | Establish an audit and enforcement program to ensure that property owners and service technicians or agents adequately fulfil their respective responsibilities | • Advocate to government agencies and other stakeholders to improve the regulatory framework within which Council operates.<br>• Develop robust wastewater compliance processes including procedures for managing noncompliance.<br>• Introduce procedural fairness into regulatory management/enforcement. | Year 1-3 |

| Strategy 4: Collaboration<br>Strengthen partnerships with stakeholders to improve outcomes and share responsibility | | | |
|---|---|---|---|
| Action | Action | Outcomes | Timeframe |
| 4.1 | Identify, plan and advocate for the provision of sewerage infrastructure in growth areas | • Investigate alternative, community scale treatment systems for priority townships, and availability of funding in collaboration with water corporations.<br>• Liaise with appropriate departments to ensure that planning and infrastructure proposals adequately address wastewater management needs for townships | Year 1 - 4 |
| 4.2 | Develop an internal stakeholder group with key Council representatives being Environmental Health, Strategic Planning, Sustainability and Engineering to collaborate and advocate on wastewater priorities | • Meet quarterly to discuss wastewater priorities<br>• Share data and information to identify wastewater opportunities for townships.<br>• Promote and facilitate ongoing coordination of internal resources into wastewater management strategies and projects. | Year 1 - 4 |
| 4.3 | Develop and strengthen external stakeholder relationships and collaboration on wastewater management projects and programs. | • Identify shared water/ wastewater objectives and strategies with external water authorities and stakeholders. | Year 2 and 3 |
| 4.4 | Determine priorities for implementation and recommend to Council for consideration via the annual budget process as a result of the annual review. | • Annual review of the action plan and reporting to Council and stakeholders on progress, including results of inspection and monitoring program.<br>• A full review of the OWMP (including independent audit) four years after its adoption by Council. | Year 1 - 4<br>Year 3 |

## 13.1 Risk assessment expanded

| | Risk | Age | | | Lot Size | | | | Topography (Slope) | | | SWSC Proximity | | | Flood Plains | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | Low | Medium | High | Low | Medium | High | Very High | Low | Medium | High | Low | Medium | High | Low | Medium | High |
| | Moderator | 0.2 | 0.5 | 0.9 | 0.2 | 0.5 | 0.9 | 1 | 0.2 | 0.5 | 0.9 | 0.2 | 0.5 | 1 | 0.2 | 0.4 | 0.6 |
| | Weighting | 10 | | | 7 | | | | 9 | | | 5 | | | 1 | | |
| Central | Beaconsfield | 13 | 11 | 610 | 26 | 119 | 235 | 254 | 634 | | | 287 | 347 | | 634 | | |
| | Officer | 27 | 25 | 911 | 53 | 250 | 105 | 555 | 963 | | | 720 | 243 | | 867 | 96 | |
| | Pakenham | 40 | 90 | 1642 | 347 | 442 | 475 | 508 | 1772 | | | 955 | 817 | | 1597 | 175 | |
| Flats | Bayles | 11 | 45 | 392 | 142 | 189 | 39 | 78 | 448 | | | 448 | | | | 448 | |
| | Bunyip | 70 | 90 | 1142 | 68 | 112 | 663 | 459 | 1302 | | | 1065 | 237 | | 1270 | 32 | |
| | Cardinia | | 25 | 304 | 143 | 42 | 69 | 75 | 329 | | | 329 | | | | 329 | |
| | Catani | 3 | 12 | 190 | 79 | 76 | 16 | 34 | 205 | | | 205 | | | | 205 | |
| | Cora Lynn | | 19 | 168 | 125 | 16 | 24 | 22 | 187 | | | 187 | | | | 187 | |
| | Dalmore | 12 | 17 | 80 | 74 | 21 | 8 | 6 | 109 | | | 105 | 4 | | | 109 | |
| | Garfield | 34 | 24 | 578 | 113 | 207 | 173 | 143 | 636 | | | 552 | 84 | | 439 | 197 | |
| | Heath Hill | | | 60 | 31 | 19 | 8 | 2 | 60 | | | 60 | | | 54 | 6 | |
| | Iona | | 14 | 55 | 54 | 11 | 3 | 1 | 69 | | | 69 | | | | 69 | |
| | Koo Wee Rup | 6 | 20 | 921 | 360 | 301 | 148 | 138 | 947 | | | 942 | 5 | | | 947 | |
| | Koo Wee Rup North | | | 27 | 10 | 12 | 4 | 1 | 27 | | | 27 | | | | 27 | |
| | Lang Lang | 12 | 13 | 231 | 81 | 31 | 92 | 52 | 256 | | | 256 | | | 256 | | |
| | Modella | | | 23 | 12 | 4 | 5 | 2 | 23 | | | 23 | | | | 23 | |
| | Monomeith | | | 37 | 22 | 7 | 8 | | | 37 | | 37 | | | | 37 | |
| | Nar Nar Goon | 26 | 15 | 373 | 210 | 48 | 99 | 57 | 414 | | | 414 | | | 168 | 246 | |
| | Nyora | | | 15 | 11 | 2 | 2 | | 15 | | | 15 | | | 15 | | |
| | Officer South | | | 46 | 23 | 12 | 7 | 4 | 46 | | | 46 | | | 12 | 34 | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pakenham South | 10 | 7 | 206 | 148 | 29 | 41 | 5 | 223 | | | 223 | | | | 223 | |
| | Rythdale | | | 35 | 22 | 6 | 3 | 4 | 35 | | | 35 | | | | 35 | |
| | Tooradin | | | 4 | 1 | 3 | | | 4 | | | 4 | | | | 4 | |
| | Tynong | 13 | 4 | 143 | 62 | 45 | 19 | 34 | 160 | | | 108 | 52 | | 73 | 87 | |
| | Vervale | 7 | | 22 | 18 | 9 | 2 | | 29 | | | 29 | | | | 29 | |
| | Yannathan | | | 90 | 45 | 38 | 6 | 1 | 90 | | | 90 | | | 17 | 73 | |
| Hills | Avonsleigh | 8 | 4 | 358 | 70 | 110 | 118 | 72 | 12 | 358 | | 58 | 312 | | 370 | | |
| | Beaconsfield Upper | 68 | 52 | 1976 | 198 | 735 | 616 | 547 | 116 | 1980 | | 389 | 1707 | | 2096 | | |
| | Bunyip North | | | 51 | 31 | 8 | 9 | 3 | | 51 | | | 51 | | 51 | | |
| | Clematis | 34 | 10 | 307 | 25 | 57 | 52 | 217 | 44 | 307 | | 159 | 192 | | 351 | | |
| | Cockatoo | 4 | 8 | 1035 | 166 | 136 | 243 | 502 | 12 | 1035 | | 482 | 565 | | 1047 | | |
| | Dewhurst | | | 147 | 70 | 55 | 22 | | | 147 | | | 147 | | 147 | | |
| | Emerald | 356 | 74 | 2491 | 139 | 434 | 757 | 1591 | 422 | 2499 | | 1442 | 1479 | | 2921 | | |
| | Garfield North | | | 158 | 74 | 58 | 23 | 3 | | 158 | | | 158 | | 158 | | |
| | Gembrook | 29 | 68 | 1856 | 353 | 552 | 444 | 604 | 94 | 1859 | | 527 | 1426 | | 1940 | 13 | |
| | Guys Hill | 8 | 14 | 190 | 14 | 57 | 116 | 25 | 22 | 190 | | 19 | 193 | | 206 | 6 | |
| | Maryknoll | 13 | 8 | 513 | 35 | 53 | 438 | 8 | 21 | 513 | | 302 | 232 | | 527 | 7 | |
| | Menzies Creek | 10 | | 176 | 17 | 78 | 41 | 50 | 10 | 176 | | | 186 | | 186 | | |
| | Mount Burnett | 10 | 9 | 74 | 43 | 15 | 27 | 8 | 19 | 74 | | | 93 | | 88 | 5 | |
| | Nangana | | | 38 | 18 | 15 | 4 | 1 | | 38 | | | 38 | | 38 | | |
| | Nar Nar Goon North | | 12 | 458 | 248 | 141 | 71 | 10 | 12 | 458 | | 2 | 468 | | 463 | 7 | |
| | Pakenham Upper | 16 | 9 | 938 | 219 | 557 | 156 | 31 | 25 | 938 | | | 963 | | 930 | 33 | |
| | Tonimbuk | 11 | 6 | 106 | 86 | 18 | 15 | 4 | 11 | 112 | | 2 | 121 | | 119 | 4 | |
| | Tynong North | 7 | 8 | 327 | 103 | 123 | 99 | 17 | 15 | 327 | | | 342 | | 342 | | |

| | Risk | Age | | | Lot Size | | | | Topography (Slope) | | | SWSC Proximity | | | Flood Plains | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Band | Low | Medium | High | Low | Medium | High | Very High | Low | Medium | High | Low | Medium | High | Low | Medium | High |
| | Moderator | 0.2 | 0.5 | 0.9 | 0.2 | 0.5 | 0.9 | 1 | 0.2 | 0.5 | 0.9 | 0.2 | 0.5 | 1 | 0.2 | 0.4 | 0.6 |
| | Weighting | 10 | | | 7 | | | | 9 | | | 5 | | | 1 | | |
| Central | Beaconsfield | 2.6 | 5.5 | 549 | 5.2 | 59.5 | 211.5 | 254 | 126.8 | 0 | 0 | 57.4 | 173.5 | 0 | 126.8 | 0 | 0 |
| | Officer | 5.4 | 12.5 | 819.9 | 10.6 | 125 | 94.5 | 555 | 192.6 | 0 | 0 | 144 | 121.5 | 0 | 173.4 | 38.4 | 0 |
| | Pakenham | 8 | 45 | 1477.8 | 69.4 | 221 | 427.5 | 508 | 354.4 | 0 | 0 | 191 | 408.5 | 0 | 319.4 | 70 | 0 |
| Flats | Bayles | 2.2 | 22.5 | 352.8 | 28.4 | 94.5 | 35.1 | 78 | 89.6 | 0 | 0 | 89.6 | 0 | 0 | 0 | 179.2 | 0 |
| | Bunyip | 14 | 45 | 1027.8 | 13.6 | 56 | 596.7 | 459 | 260.4 | 0 | 0 | 213 | 118.5 | 0 | 254 | 12.8 | 0 |
| | Cardinia | 0 | 12.5 | 273.6 | 28.6 | 21 | 62.1 | 75 | 65.8 | 0 | 0 | 65.8 | 0 | 0 | 0 | 131.6 | 0 |
| | Catani | 0.6 | 6 | 171 | 15.8 | 38 | 14.4 | 34 | 41 | 0 | 0 | 41 | 0 | 0 | 0 | 82 | 0 |
| | Cora Lynn | 0 | 9.5 | 151.2 | 25 | 8 | 21.6 | 22 | 37.4 | 0 | 0 | 37.4 | 0 | 0 | 0 | 74.8 | 0 |
| | Dalmore | 2.4 | 8.5 | 72 | 14.8 | 10.5 | 7.2 | 6 | 21.8 | 0 | 0 | 21 | 2 | 0 | 0 | 43.6 | 0 |
| | Garfield | 6.8 | 12 | 520.2 | 22.6 | 103.5 | 155.7 | 143 | 127.2 | 0 | 0 | 110.4 | 42 | 0 | 87.8 | 78.8 | 0 |
| | Heath Hill | 0 | 0 | 54 | 6.2 | 9.5 | 7.2 | 2 | 12 | 0 | 0 | 12 | 0 | 0 | 10.8 | 2.4 | 0 |
| | Iona | 0 | 7 | 49.5 | 10.8 | 5.5 | 2.7 | 1 | 13.8 | 0 | 0 | 13.8 | 0 | 0 | 0 | 27.6 | 0 |
| | Koo Wee Rup | 1.2 | 10 | 828.9 | 72 | 150.5 | 133.2 | 138 | 189.4 | 0 | 0 | 188.4 | 2.5 | 0 | 0 | 378.8 | 0 |
| | Koo Wee Rup North | 0 | 0 | 24.3 | 2 | 6 | 3.6 | 1 | 5.4 | 0 | 0 | 5.4 | 0 | 0 | 0 | 10.8 | 0 |
| | Lang Lang | 2.4 | 6.5 | 207.9 | 16.2 | 15.5 | 82.8 | 52 | 51.2 | 0 | 0 | 51.2 | 0 | 0 | 51.2 | 0 | 0 |
| | Modella | 0 | 0 | 20.7 | 2.4 | 2 | 4.5 | 2 | 4.6 | 0 | 0 | 4.6 | 0 | 0 | 0 | 9.2 | 0 |
| | Monomeith | 0 | 0 | 33.3 | 4.4 | 3.5 | 7.2 | 0 | 7.4 | 0 | 0 | 7.4 | 0 | 0 | 0 | 14.8 | 0 |
| | Nar Nar Goon | 5.2 | 7.5 | 335.7 | 42 | 24 | 89.1 | 57 | 82.8 | 0 | 0 | 82.8 | 0 | 0 | 33.6 | 98.4 | 0 |
| | Nyora | 0 | 0 | 13.5 | 2.2 | 1 | 1.8 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 |
| | Officer South | 0 | 0 | 41.4 | 4.6 | 6 | 6.3 | 4 | 9.2 | 0 | 0 | 9.2 | 0 | 0 | 2.4 | 13.6 | 0 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pakenham South | 2 | 3.5 | 185.4 | 29.6 | 14.5 | 36.9 | 5 | 44.6 | 0 | 0 | 44.6 | 0 | 0 | 0 | 89.2 | 0 |
| | Rythdale | 0 | 0 | 31.5 | 4.4 | 3 | 2.7 | 4 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 14 | 0 |
| | Tooradin | 0 | 0 | 3.6 | 0.2 | 1.5 | 0 | 0 | 0.8 | 0 | 0 | 0.8 | 0 | 0 | 0 | 1.6 | 0 |
| | Tynong | 2.6 | 2 | 128.7 | 12.4 | 22.5 | 17.1 | 34 | 32 | 0 | 0 | 21.6 | 26 | 0 | 14.6 | 34.8 | 0 |
| | Vervale | 1.4 | 0 | 19.8 | 3.6 | 4.5 | 1.8 | 0 | 5.8 | 0 | 0 | 5.8 | 0 | 0 | 0 | 11.6 | 0 |
| | Yannathan | 0 | 0 | 81 | 9 | 19 | 5.4 | 1 | 18 | 0 | 0 | 18 | 0 | 0 | 3.4 | 29.2 | 0 |
| Hills | Avonsleigh | 1.6 | 2 | 322.2 | 14 | 55 | 106.2 | 72 | 2.4 | 179 | 0 | 11.6 | 156 | 0 | 74 | 0 | 0 |
| | Beaconsfield Upper | 13.6 | 26 | 1778.4 | 39.6 | 367.5 | 554.4 | 547 | 23.2 | 990 | 0 | 77.8 | 853.5 | 0 | 419.2 | 0 | 0 |
| | Bunyip North | 0 | 0 | 45.9 | 6.2 | 4 | 8.1 | 3 | 0 | 25.5 | 0 | 0 | 25.5 | 0 | 10.2 | 0 | 0 |
| | Clematis | 6.8 | 5 | 276.3 | 5 | 28.5 | 46.8 | 217 | 8.8 | 153.5 | 0 | 31.8 | 96 | 0 | 70.2 | 0 | 0 |
| | Cockatoo | 0.8 | 4 | 931.5 | 33.2 | 68 | 218.7 | 502 | 2.4 | 517.5 | 0 | 96.4 | 282.5 | 0 | 209.4 | 0 | 0 |
| | Dewhurst | 0 | 0 | 132.3 | 14 | 27.5 | 19.8 | 0 | 0 | 73.5 | 0 | 0 | 73.5 | 0 | 29.4 | 0 | 0 |
| | Emerald | 71.2 | 37 | 2241.9 | 27.8 | 217 | 681.3 | 1591 | 84.4 | 1249.5 | 0 | 288.4 | 739.5 | 0 | 584.2 | 0 | 0 |
| | Garfield North | 0 | 0 | 142.2 | 14.8 | 29 | 20.7 | 3 | 0 | 79 | 0 | 0 | 79 | 0 | 31.6 | 0 | 0 |
| | Gembrook | 5.8 | 34 | 1670.4 | 70.6 | 276 | 399.6 | 604 | 18.8 | 929.5 | 0 | 105.4 | 713 | 0 | 388 | 5.2 | 0 |
| | Guys Hill | 1.6 | 7 | 171 | 2.8 | 28.5 | 104.4 | 25 | 4.4 | 95 | 0 | 3.8 | 96.5 | 0 | 41.2 | 2.4 | 0 |
| | Maryknoll | 2.6 | 4 | 461.7 | 7 | 26.5 | 394.2 | 8 | 4.2 | 256.5 | 0 | 60.4 | 116 | 0 | 105.4 | 2.8 | 0 |
| | Menzies Creek | 2 | 0 | 158.4 | 3.4 | 39 | 36.9 | 50 | 2 | 88 | 0 | 0 | 93 | 0 | 37.2 | 0 | 0 |
| | Monomeith | 0 | 0 | 33.3 | 4.4 | 3.5 | 7.2 | 0 | 7.4 | 0 | 0 | 7.4 | 0 | 0 | 0 | 14.8 | 0 |
| | Mount Burnett | 2 | 4.5 | 66.6 | 8.6 | 7.5 | 24.3 | 8 | 3.8 | 37 | 0 | 0 | 46.5 | 0 | 17.6 | 2 | 0 |
| | Nangana | 0 | 0 | 34.2 | 3.6 | 7.5 | 3.6 | 1 | 0 | 19 | 0 | 0 | 19 | 0 | 7.6 | 0 | 0 |
| | Nar Nar Goon North | 0 | 6 | 412.2 | 49.6 | 70.5 | 63.9 | 10 | 2.4 | 229 | 0 | 0.4 | 234 | 0 | 92.6 | 2.8 | 0 |
| | Pakenham Upper | 3.2 | 4.5 | 844.2 | 43.8 | 278.5 | 140.4 | 31 | 5 | 469 | 0 | 0 | 481.5 | 0 | 186 | 13.2 | 0 |
| | Tonimbuk | 2.2 | 3 | 95.4 | 17.2 | 9 | 13.5 | 4 | 2.2 | 56 | 0 | 0.4 | 60.5 | 0 | 23.8 | 1.6 | 0 |
| | Tynong North | 1.4 | 4 | 294.3 | 20.6 | 61.5 | 89.1 | 17 | 3 | 163.5 | 0 | 0 | 171 | 0 | 68.4 | 0 | 0 |

| | | | Likelihood of | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | treatment failure/under designed | | effluent leaving the lot | | | | effluent travelling to the endpoint factor | | catastrophic failure | |
| | | | Age | | Lot Size | | Topography | | SWSC Proximity | | Flood Plains | |
| | | | 10 | | 7 | | 9 | | 5 | | 1 | |
| | Locality | Total Systems | Total Risk Bands | RF Likelihood | Total Risk Bands | RF Likelihood | Total Risk Bands | RF Likelihood | Total Risk Bands | RF Likelihood | Total Risk Bands | RF Likelihood |
| Central | Beaconsfield | 634 | 557.1 | 0.88 | 530.2 | 0.84 | 126.8 | 0.20 | 230.9 | 0.36 | 126.8 | 0.20 |
| | Officer | 963 | 837.8 | 0.87 | 785.1 | 0.82 | 192.6 | 0.20 | 265.5 | 0.28 | 211.8 | 0.22 |
| | Pakenham | 1772 | 1530.8 | 0.86 | 1225.9 | 0.69 | 354.4 | 0.20 | 599.5 | 0.34 | 389.4 | 0.22 |
| Flats | Bayles | 448 | 377.5 | 0.84 | 236 | 0.53 | 89.6 | 0.20 | 89.6 | 0.20 | 179.2 | 0.40 |
| | Bunyip | 1302 | 1086.8 | 0.83 | 1125.3 | 0.86 | 260.4 | 0.20 | 331.5 | 0.25 | 266.8 | 0.20 |
| | Cardinia | 329 | 286.1 | 0.87 | 186.7 | 0.57 | 65.8 | 0.20 | 65.8 | 0.20 | 131.6 | 0.40 |
| | Catani | 205 | 177.6 | 0.87 | 102.2 | 0.50 | 41 | 0.20 | 41 | 0.20 | 82 | 0.40 |
| | Cora Lynn | 187 | 160.7 | 0.86 | 76.6 | 0.41 | 37.4 | 0.20 | 37.4 | 0.20 | 74.8 | 0.40 |
| | Dalmore | 109 | 82.9 | 0.76 | 38.5 | 0.35 | 21.8 | 0.20 | 23 | 0.21 | 43.6 | 0.40 |
| | Garfield | 636 | 539 | 0.85 | 424.8 | 0.67 | 127.2 | 0.20 | 152.4 | 0.24 | 166.6 | 0.26 |
| | Heath Hill | 60 | 54 | 0.90 | 24.9 | 0.42 | 12 | 0.20 | 12 | 0.20 | 13.2 | 0.22 |
| | Iona | 69 | 56.5 | 0.82 | 20 | 0.29 | 13.8 | 0.20 | 13.8 | 0.20 | 27.6 | 0.40 |
| | Koo Wee Rup | 947 | 840.1 | 0.89 | 493.7 | 0.52 | 189.4 | 0.20 | 190.9 | 0.20 | 378.8 | 0.40 |
| | Koo Wee Rup North | 27 | 24.3 | 0.90 | 12.6 | 0.47 | 5.4 | 0.20 | 5.4 | 0.20 | 10.8 | 0.40 |
| | Lang Lang | 256 | 216.8 | 0.85 | 166.5 | 0.65 | 51.2 | 0.20 | 51.2 | 0.20 | 51.2 | 0.20 |
| | Modella | 23 | 20.7 | 0.90 | 10.9 | 0.47 | 4.6 | 0.20 | 4.6 | 0.20 | 9.2 | 0.40 |
| | Monomeith | 37 | 33.3 | 0.90 | 15.1 | 0.41 | 7.4 | 0.20 | 7.4 | 0.20 | 14.8 | 0.40 |
| | Nar Nar Goon | 414 | 348.4 | 0.84 | 212.1 | 0.51 | 82.8 | 0.20 | 82.8 | 0.20 | 132 | 0.32 |
| | Nyora | 15 | 13.5 | 0.90 | 5 | 0.33 | 3 | 0.20 | 3 | 0.20 | 3 | 0.20 |
| | Officer South | 46 | 41.4 | 0.90 | 20.9 | 0.45 | 9.2 | 0.20 | 9.2 | 0.20 | 16 | 0.35 |
| | Pakenham South | 223 | 190.9 | 0.86 | 86 | 0.39 | 44.6 | 0.20 | 44.6 | 0.20 | 89.2 | 0.40 |
| | Rythdale | 35 | 31.5 | 0.90 | 14.1 | 0.40 | 7 | 0.20 | 7 | 0.20 | 14 | 0.40 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tooradin | 4 | 3.6 | 0.90 | 1.7 | 0.43 | 0.8 | 0.20 | 0.8 | 0.20 | 1.6 | 0.40 |
| | Tynong | 160 | 133.3 | 0.83 | 86 | 0.54 | 32 | 0.20 | 47.6 | 0.30 | 49.4 | 0.31 |
| | Vervale | 29 | 21.2 | 0.73 | 9.9 | 0.34 | 5.8 | 0.20 | 5.8 | 0.20 | 11.6 | 0.40 |
| | Yannathan | 90 | 81 | 0.90 | 34.4 | 0.38 | 18 | 0.20 | 18 | 0.20 | 32.6 | 0.36 |
| Hills | Avonsleigh | 370 | 325.8 | 0.88 | 247.2 | 0.67 | 181.4 | 0.49 | 167.6 | 0.45 | 74 | 0.20 |
| | Beaconsfield Upper | 2096 | 1818 | 0.87 | 1508.5 | 0.72 | 1013.2 | 0.48 | 931.3 | 0.44 | 419.2 | 0.20 |
| | Bunyip North | 51 | 45.9 | 0.90 | 21.3 | 0.42 | 25.5 | 0.50 | 25.5 | 0.50 | 10.2 | 0.20 |
| | Clematis | 351 | 288.1 | 0.82 | 297.3 | 0.85 | 162.3 | 0.46 | 127.8 | 0.36 | 70.2 | 0.20 |
| | Cockatoo | 1047 | 936.3 | 0.89 | 821.9 | 0.79 | 519.9 | 0.50 | 378.9 | 0.36 | 209.4 | 0.20 |
| | Dewhurst | 147 | 132.3 | 0.90 | 61.3 | 0.42 | 73.5 | 0.50 | 73.5 | 0.50 | 29.4 | 0.20 |
| | Emerald | 2921 | 2350.1 | 0.80 | 2517.1 | 0.86 | 1333.9 | 0.46 | 1027.9 | 0.35 | 584.2 | 0.20 |
| | Garfield North | 158 | 142.2 | 0.90 | 67.5 | 0.43 | 79 | 0.50 | 79 | 0.50 | 31.6 | 0.20 |
| | Gembrook | 1953 | 1710.2 | 0.88 | 1350.2 | 0.69 | 948.3 | 0.49 | 818.4 | 0.42 | 393.2 | 0.20 |
| | Guys Hill | 212 | 179.6 | 0.85 | 160.7 | 0.76 | 99.4 | 0.47 | 100.3 | 0.47 | 43.6 | 0.21 |
| | Maryknoll | 534 | 468.3 | 0.88 | 435.7 | 0.82 | 260.7 | 0.49 | 176.4 | 0.33 | 108.2 | 0.20 |
| | Menzies Creek | 186 | 160.4 | 0.86 | 129.3 | 0.70 | 90 | 0.48 | 93 | 0.50 | 37.2 | 0.20 |
| | Mount Burnett | 93 | 73.1 | 0.79 | 48.4 | 0.52 | 40.8 | 0.44 | 46.5 | 0.50 | 19.6 | 0.21 |
| | Nangana | 38 | 34.2 | 0.90 | 15.7 | 0.41 | 19 | 0.50 | 19 | 0.50 | 7.6 | 0.20 |
| | Nar Nar Goon North | 470 | 418.2 | 0.89 | 194 | 0.41 | 231.4 | 0.49 | 234.4 | 0.50 | 95.4 | 0.20 |
| | Pakenham Upper | 963 | 851.9 | 0.88 | 493.7 | 0.51 | 474 | 0.49 | 481.5 | 0.50 | 199.2 | 0.21 |
| | Tonimbuk | 123 | 100.6 | 0.82 | 43.7 | 0.36 | 58.2 | 0.47 | 60.9 | 0.50 | 25.4 | 0.21 |
| | Tynong North | 342 | 299.7 | 0.88 | 188.2 | 0.55 | 166.5 | 0.49 | 171 | 0.50 | 68.4 | 0.20 |

| | | System Types | | | | | | Likelihood of treatment failure/under designed | | Likelihood of effluent leaving the lot | | Likelihood of effluent travelling to the endpoint factor | | Likelihood risk of catastrophic failure | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Primary | Secondary | Tertiary | TOTAL | Average | Consequence | RP Likelihood | Likelihood (Matrix) | RP Likelihood | Likelihood (Matrix) | RP Likelihood | Likelihood (Matrix) | RP Likelihood | Likelihood (Matrix) |
| Central | Beaconsfield | 159 | 23 | 3 | 185 | 2.84 | Minor | 0.88 | Likely | 0.48 | Unlikely | 0.36 | Unlikely | 0.20 | Rare |
| | Officer | 138 | 17 | | 155 | 2.89 | Minor | 0.87 | Likely | 0.47 | Unlikely | 0.28 | Rare | 0.22 | Rare |
| | Pakenham | 287 | 54 | 1 | 342 | 2.84 | Minor | 0.86 | Likely | 0.42 | Unlikely | 0.34 | Unlikely | 0.22 | Rare |
| Flats | Bayles | 79 | 16 | 1 | 96 | 2.81 | Minor | 0.84 | Likely | 0.34 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Bunyip | 307 | 54 | 3 | 364 | 2.84 | Minor | 0.83 | Likely | 0.49 | Unlikely | 0.25 | Rare | 0.20 | Rare |
| | Cardinia | 69 | 14 | | 83 | 2.83 | Minor | 0.87 | Likely | 0.36 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Catani | 57 | 8 | 1 | 66 | 2.85 | Minor | 0.87 | Likely | 0.33 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Cora Lynn | 45 | 5 | | 50 | 2.90 | Moderate | 0.86 | Likely | 0.29 | Rare | 0.20 | Rare | 0.40 | Unlikely |
| | Dalmore | 18 | 11 | | 29 | 2.62 | Insignificant | 0.76 | Likely | 0.27 | Rare | 0.21 | Rare | 0.40 | Unlikely |
| | Garfield | 133 | 24 | 2 | 159 | 2.82 | Insignificant | 0.85 | Likely | 0.40 | Unlikely | 0.24 | Rare | 0.26 | Rare |
| | Heath Hill | 21 | 1 | | 22 | 2.95 | Major | 0.90 | Almost certain | 0.29 | Rare | 0.20 | Rare | 0.22 | Rare |
| | Iona | 36 | 5 | | 41 | 2.88 | Minor | 0.82 | Likely | 0.24 | Rare | 0.20 | Rare | 0.40 | Unlikely |
| | Koo Wee Rup | 173 | 11 | | 184 | 2.94 | Moderate | 0.89 | Likely | 0.34 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Koo Wee Rup North | 8 | 1 | | 9 | 2.89 | Minor | 0.90 | Almost certain | 0.32 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Lang Lang | 103 | 20 | 1 | 124 | 2.82 | Minor | 0.85 | Likely | 0.40 | Unlikely | 0.20 | Rare | 0.20 | Rare |
| | Modella | 12 | | | 12 | 3.00 | Major | 0.90 | Almost certain | 0.32 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Monomeith | 8 | 1 | | 9 | 2.89 | Minor | 0.90 | Almost certain | 0.29 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Nar Nar Goon | 104 | 19 | | 123 | 2.85 | Minor | 0.84 | Likely | 0.34 | Unlikely | 0.20 | Rare | 0.32 | Unlikely |
| | Nyora | 5 | | | 5 | 3.00 | Major | 0.90 | Almost certain | 0.26 | Rare | 0.20 | Rare | 0.20 | Rare |
| | Officer South | 15 | | | 15 | 3.00 | Major | 0.90 | Almost certain | 0.31 | Unlikely | 0.20 | Rare | 0.35 | Unlikely |
| | Pakenham South | 41 | 6 | | 47 | 2.87 | Minor | 0.86 | Likely | 0.28 | Rare | 0.20 | Rare | 0.40 | Unlikely |
| | Rythdale | 6 | | | 6 | 3.00 | Major | 0.90 | Almost certain | 0.29 | Rare | 0.20 | Rare | 0.40 | Unlikely |
| | Tooradin | 1 | | | 1 | 3.00 | Major | 0.90 | Almost certain | 0.30 | Unlikely | 0.20 | Rare | 0.40 | Unlikely |
| | Tynong | 40 | 7 | | 47 | 2.85 | Minor | 0.83 | Likely | 0.35 | Unlikely | 0.30 | Unlikely | 0.31 | Unlikely |
| | Vervale | 7 | 1 | 1 | 9 | 2.67 | Minor | 0.73 | Likely | 0.26 | Rare | 0.20 | Rare | 0.40 | Unlikely |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yannathan | 39 | 3 | | 42 | 2.93 | Moderate | 0.90 | Almost certain | 0.28 | Rare | 0.20 | Rare | 0.36 | Unlikely |
| Hills | Avonsleigh | 71 | 3 | | 74 | 2.96 | Major | 0.88 | Likely | 0.57 | Possible | 0.45 | Unlikely | 0.20 | Rare |
| | Beaconsfield Upper | 482 | 75 | 8 | 565 | 2.84 | Minor | 0.87 | Likely | 0.59 | Possible | 0.44 | Unlikely | 0.20 | Rare |
| | Bunyip North | 17 | 2 | | 19 | 2.89 | Minor | 0.90 | Almost certain | 0.46 | Unlikely | 0.50 | Possible | 0.20 | Rare |
| | Clematis | 67 | 7 | | 74 | 2.91 | Moderate | 0.82 | Likely | 0.63 | Possible | 0.36 | Unlikely | 0.20 | Rare |
| | Cockatoo | 289 | 13 | 1 | 303 | 2.95 | Major | 0.89 | Likely | 0.62 | Possible | 0.36 | Unlikely | 0.20 | Rare |
| | Dewhurst | 42 | | | 42 | 3.00 | Major | 0.90 | Almost certain | 0.46 | Unlikely | 0.50 | Possible | 0.20 | Rare |
| | Emerald | 612 | 74 | 9 | 695 | 2.87 | Minor | 0.80 | Likely | 0.63 | Possible | 0.35 | Unlikely | 0.20 | Rare |
| | Garfield North | 59 | 4 | | 63 | 2.94 | Moderate | 0.90 | Almost certain | 0.47 | Unlikely | 0.50 | Possible | 0.20 | Rare |
| | Gembrook | 468 | 43 | | 511 | 2.92 | Moderate | 0.88 | Likely | 0.58 | Possible | 0.42 | Unlikely | 0.20 | Rare |
| | Guys Hill | 74 | 11 | 2 | 87 | 2.83 | Minor | 0.85 | Likely | 0.60 | Possible | 0.47 | Unlikely | 0.21 | Rare |
| | Maryknoll | 153 | 10 | 1 | 164 | 2.93 | Moderate | 0.88 | Likely | 0.63 | Possible | 0.33 | Unlikely | 0.20 | Rare |
| | Menzies Creek | 40 | 2 | | 42 | 2.95 | Major | 0.86 | Likely | 0.58 | Possible | 0.50 | Possible | 0.20 | Rare |
| | Mount Burnett | 24 | 4 | | 28 | 2.86 | Minor | 0.79 | Likely | 0.47 | Unlikely | 0.50 | Possible | 0.21 | Rare |
| | Nangana | 7 | | | 7 | 3.00 | Major | 0.90 | Almost certain | 0.46 | Unlikely | 0.50 | Possible | 0.20 | Rare |
| | Nar Nar Goon North | 165 | 16 | | 181 | 2.91 | Moderate | 0.89 | Likely | 0.46 | Unlikely | 0.50 | Possible | 0.20 | Rare |
| | Pakenham Upper | 255 | 16 | 2 | 273 | 2.93 | Moderate | 0.88 | Likely | 0.50 | Possible | 0.50 | Possible | 0.21 | Rare |
| | Tonimbuk | 53 | 1 | | 54 | 2.98 | Major | 0.82 | Likely | 0.42 | Unlikely | 0.50 | Possible | 0.21 | Rare |
| | Tynong North | 98 | 7 | 2 | 107 | 2.90 | Moderate | 0.88 | Likely | 0.51 | Possible | 0.50 | Possible | 0.20 | Rare |

# 14. Appendix

## 14.1 Risk band summary

| Risk factor | Parameter | | Bands | | |
|---|---|---|---|---|---|
| | | | Low | Medium | High |
| Number of onsite systems in the population centre | Number of onsite wastewater management systems in a population centre | | <10 | 10 - 200 | >200 |
| Ongoing performance of systems (type and age of systems | Treatment type and age - number of onsite systems in each band | Secondary and Tertiary Treatment | <5 years | 5 - 15 years | >15 years or poorly maintained |
| | | Primary Treatment | - | - | All systems |
| Lot size | Median lot size | | >10 ha | 2 - 10 ha | <2 ha |
| | Number of sites < 0.4 ha | | - | - | All sites attributed very high risk |
| Topography | Slope (%) - number of onsite systems in each band | Surface Irrigation | <6% | 6% - 10% | >10% |
| | | Absorption Systems | <6% | 6% - 15% | >15% |
| | | Subsurface Irrigation | <10% | 10% - 30% | >30% |
| Soil type | Soil category - number of onsite systems in each band | Surface Water | 1, 2, 3, 4 | 5 | 6 |
| | | Ground Water | 3, 4, 5, 6 | 2 | 1 |
| Proximity to watercourse | Distance to watercourse – number of onsite systems in each band | | >100m | 60m - 100m | <60m |

| | | | | |
|---|---|---|---|---|
| Proximity to potable water supply offtake in SWSC | Distance to potable water supply dam, lake, reservoir or offtake point – number of onsite systems in each band | >2km | 500m - 2km | <500m |
| Proximity to flood plains | Annual Exceedance Probability (AEP) - number of onsite systems in each band | <1% AEP | 1% - 5% AEP | >5% AEP |
| Proximity to / density of groundwater bores | Separation distance - onsite system to bore - number of onsite systems in each band | >250m | 100m - 250m | <100m |
| | Bore density (distance of bores to onsite systems) - number of bores within each risk band | >250m | 100m - 250m | <100m |
| Groundwater depth and quality | Depth from disposal site to highest seasonal water table – number of onsite systems in each band | >10 m or confined aquifer | 5m - 10m | <5m |
| Weather conditions (rainfall) | Rainfall - number of days (annual average) with rainfall above 10mm | <10 days | 10 - 40 days | >40 days |

| Optional Risk Factors | | | | | |
|---|---|---|---|---|---|
| Number of accommodation and commercial sites (indicator of the quantity of wastewater produced) | Number of rooms or sites - number of onsite systems in each band | Accommodation | <3 rooms/sites | 3 - 20 rooms/sites | >20 rooms/sites |
| | Capacity of wastewater system (L/day) - number of onsite systems in each band | Commercial | <600 | 600 - 2999 | 3000 - 5000 |

## 14.2 Community Resources

- **Requirements for owners and occupiers of land with an OWMS**
  https://www.epa.vic.gov.au/wastewater#wastewater-and-the-law

- **Guidance for owners and occupiers of land with an OWMS ≤ 5000 litres on any day (including septic tank systems).**

  The Environment Protection Act 2017 (EP Act) creates a GED that applies to all Victorians from 1 July 2021.The GED requires anyone conducting an activity that poses risks to human health and the environment from pollution and waste, to minimise those risks. If you own or use an onsite wastewater management system (OWMS), including septic tank systems and secondary treatment systems, the GED applies to you.

  It also applies to how you construct, install, alter, operate, and maintain the system, deal with faults or system failures, and manage your waste:
  https://www.epa.vic.gov.au/1976-guidance-owners-and-occupiers-land-owms-5000-litres-any-day-including-septic-tank-systems

- **Regulating onsite wastewater management systems: local government toolkit**
  Environment Protection Authority Victoria (EPA) has developed this toolkit to support local government (council) officers in Victoria to understand and enforce the laws under the Environment Protection Act 2017 (the Act) and the proposed Environment Protection Regulations 2021 (the Regulations).

  This toolkit sets out the new laws for on-site wastewater management systems (OWMS) with a daily design or actual flow rate of sewage capacity of 5000 litres (L) or less that councils can enforce.
  https://www.epa.vic.gov.au/regulating-onsite-wastewater-management-systems-local-government-toolkit

- **Planning Practice Note: 39: Using the Integrated Water Management Provisions of Clause 56**
  Residential Subdivision Clause 56 provides sustainable water management requirements that aim to integrate the use of all water resources – including rainwater, reused water, recycled water, and stormwater – and reduce the use of potable water.
  https://www.planning.vic.gov.au/guides-and-resources/guides/planning-practice-notes/using-the-integrated-water-management-provisions-of-clause-56-residential-subdivision

- **Standards for onsite wastewater treatment plants.**

  Appropriate standard is: An onsite wastewater treatment plant type must be assessed by a body accredited under the Joint Accreditation System of Australia and New Zealand or any other accreditation body approved by the Authority (assessment body).

  The assessment body must certify the treatment plant as conforming with the relevant Australian and New Zealand standards (appropriate standards)

  https://register.jasanz.org/certified-organisations

  The following standards are relevant to the design, construction, and installation of onsite wastewater management systems.
  - AS/NZS 1546.1:2008 - On-site domestic wastewater treatment units, Part 1: Septic tanks
  - AS/NZS 1546.2:2008 - On-site domestic wastewater treatment units, Part 2: Waterless composting toilets
  - AS 1546.3:2017 - On-site domestic wastewater treatment units, Part 3: Secondary treatment systems
  - AS 1546.4:2016 - On-site domestic wastewater treatment units, Part 4: Domestic greywater treatment systems
  - AS/NZS 1547:2012 - On-site domestic wastewater management
  - AS/NZS 1319:1994, REC:2018 - Safety signs for the occupational environment
  - AS/NZS 3500.1:2021 - Plumbing and drainage (Parts 0-4)
  - AS/NZS 4130:2018 - Polyethylene (PE) pipes for pressure applications