



Onsite Wastewater Management Plan 2025-2030





Contents

01	Introduction	6
1.1	Background	7
1.1.1	Challenges	7
1.2	Purpose	8
02	Policy and Legislative Framework	9
2.1	Victorian State Legislation	10
2.2	Subordinate legislation, Policy, Codes, Strategies and Guides	10
2.3	National Standards	11
2.4	Wyndham City Strategic Plans and Policy	11
03	Roles and Responsibilities	12
3.1	Environment Protection Authority (EPA)	13
3.2	Wyndham City Council (WCC)	13
3.3	Land Capability Assessors	13
3.4	Landowners and occupiers	14
3.5	OWMS Installers (Plumbers) and Maintenance Providers	14
3.6	Standards Australia and JAS-ANZ	15
04	Wyndham Situation Assessment	17
4.1	Municipal Profile	18
4.2	Onsite Wastewater Management Profile	19
05	Risk Assessment	21
5.1	Risk Criteria	22
5.1.1	Associated Risks	22
5.2	Risk Identification	25
5.2.1	Determination of sub-catchments	27
5.2.2	Risk assessment results	28
5.2.3	Risk Categorisation	32
5.2.4	Risk Evaluation	32



06 Wastewater Policy	33
6.1 Reticulated Sewage	34
6.2 Design and installation	34
6.3 Land Capability Assessments (LCA)	34
6.3.1 System selection	35
6.3.2. Deemed to comply installations.	36
6.4 Commercial development in unsewered areas	36
6.5 Small Allotments	37
6.6 OWMS setback requirements	37
6.7 Regulation and Enforcement	38
07 Action Plan	39
08 Glossary	42
09 Appendices	46
9.1 Threats from Domestic Wastewater	47
9.1.1 Microbiological contamination	47
9.1.2 Nutrients	49
9.1.3 Salinity	50
9.1.4 Flooding	50
9.1.5 Soils	50
9.2 Locality boundaries within WCC	51
9.3 Risk assessment area data boundaries	52
9.3.1 Werribee South	52
9.3.2 Hoppers Crossing	54
9.3.3 Tarneit/Truganina	55
9.3.4 Mount Cottrell	58
9.3.5 Laverton North	59
9.3.6 Little River	61



Tables

Table 1 – Estimated percentage of primary vs secondary systems	19
Table 2 – Risk summary	22
Table 3 – Contamination types	23
Table 4 – Wastewater risks and impacts:	24
Table 5 – Identified receiving environments within WCC	25
Table 6 – Risk analysis influencing data	28
Table 7 – Risk Assessment results	29
Table 8 – Summary of risk assessment results	31
Table 9 – Risk Matrix	32
Table 10 – Specific areas identified as greater than low risk	32
Table 11 – LCA and OWMS selection and risk guidance	35
Table 12 – Deemed to comply installations requirements	36
Table 13 – Microbial Pathogens in Wastewater	47
Table 14 – Typical characteristic of untreated wastewater	49
Table 15 – Typical concentration of nutrients in treated effluent	49

Figures

Figure 1 – Urban Water Authorities	15
Figure 2 – Southern Rural Water Boundaries	16
Figure 3 – WCC municipal boundaries	18
Figure 4 – Map of locality and ward boundaries within WCC	51
Figure 5 – Werribee South	52
Figure 6 – Werribee South bores and proximity to watercourses	53
Figure 7 – Hoppers Crossing	54
Figure 8 – Hoppers Crossing bores and proximity to watercourses	55
Figure 9 – Tarniet and parts of Truganina	56
Figure 10 – Tarniet (north section) bores and proximity to watercourses	56
Figure 11 – Tarniet (southwest section) bores and proximity to watercourses	57
Figure 12 – Mount Cottrell	58
Figure 13 – Mount Cottrell bores and proximity to watercourses	58
Figure 14 – Laverton North	59
Figure 15 – Laverton North bores and proximity to watercourses	60
Figure 16 – Little River	61
Figure 17 – Little River bores and proximity to watercourses	62



01

Introduction



“Effective treatment and management of domestic wastewater – principally consisting of water, sewage and other human-derived wastewater – is integral to managing risks to human health and the environment. Onsite wastewater management systems (OWMS) that perform poorly can have a range of negative environmental, human health and amenity related impacts. This can involve discharging nutrients and pathogens into local drainage systems, waters and creeks, causing boggy lawns and offensive odours, and risk of illness following contact with effluent. Councils play an instrumental role in understanding and managing these risks.” **EPA 2023**

Wyndham City Council (WCC) developed its initial Domestic Wastewater Management Plan (DWMP) in 2005, following a Victorian Government initiative to action sustainable management for wastewater. A DWMP is now referred to as an Onsite Wastewater Management Plan (OWMP), and this version has been updated using the Onsite wastewater management plans: *Risk Assessment Guidance Final Report v4.0* and *EPA Onsite Wastewater Management Plans: Guidelines for developing, reviewing and updating*.

This document also directly incorporates previous work prepared as part of the actions of the previous OWMPs, in particular the *City of Wyndham Domestic Wastewater Management Plan Land Capability Assessment Methodology*.

1.1

Background

Septic tanks have been extensively used since the 1930s, when they were an approved method of sewage disposal for domestic properties. In 1973, a planning directive from the then Melbourne and Metropolitan Board of Works required all new subdivisions and developments to contain their waste on-site or connect to sewer. There are some 1300 to 1500 OWMS currently in use within the municipality. Most are over 20 years old and it is expected they are poorly maintained and possibly not operating within the required parameters.

Septic tanks and other onsite wastewater disposal systems are an acceptable wastewater disposal solution provided they are maintained, and the wastewater is fully contained and treated on-site. If untreated wastewater is able to leave the property, it can pollute surrounding soils, waterways or groundwater, exposing the community to environmental, health and amenity risks.

Local government, under the broad guidance of the Environment Protection Authority (EPA), is responsible for regulating the installation and maintenance of onsite wastewater disposal systems.

1.1.1

Challenges

Wyndham City Council have a number of ongoing obstacles to improving wastewater:

- **Data Management:** Many OWMS lack accurate records of the location, age and condition of current OWMS;
- **Use of Technology:** Council’s Geographic Information System (GIS) could be utilised to map and monitor OWMS, in particular geolocation of OWMS;
- **Connection to sewer:** Where a reticulated sewage system has been made available, a proportion of property owners fail to connect, with no system to determine connection status.
- **Legacy systems:** Historic property developments on overly small lot sizes, leading to potential and actual discharge of untreated effluents offsite. Improved collaboration with Water Authorities is needed for sewer expansions and risk management.

1.2

Purpose

The purpose of Council's Onsite Wastewater Management Plan is to allow the widely varying risks associated with on-site wastewater disposal to be identified and corresponding management strategies developed, implemented and monitored. The plan provides a framework to:


- Plan for the future by prioritising and developing long-term solutions for managing onsite wastewater systems.
- Guide decisions about individual wastewater systems, including policies for enforcement and compliance.
- Provide a framework for costing and funding wastewater management within the municipality.
- Work with the community, water authorities, and other organisations to improve wastewater management.
- Protect public health, the environment, and local areas by improving how wastewater is managed in un-sewered parts of the municipality.
- Create a sustainable environment for the whole community.



02

**Policy and Legislative
Framework**





There is a comprehensive and detailed policy and legislative framework around domestic onsite wastewater management. This includes several State Acts and subordinate legislation, along with guidelines, Codes, Australian Standards and local policies.

The Environment Protection Act 2017 is the overarching legislation. The centre of the Act and key strategy for responsibility and compliance is the General Environmental Duty (GED):



"A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable."

The State Environment Protection Policy (Waters), requires that councils manage Onsite Wastewater Management Systems (OWMS) within its municipality and are required to develop an Onsite Wastewater Management Plan (OWMP).

In addition, the function of Council as defined in the *Public Health and Well Being Act 2008* states that Council is to seek to protect, improve and promote public health and wellbeing within the municipal district.

This Plan forms part of a range of management activities undertaken by council in addressing domestic wastewater in the municipality. Further, it allows the widely varying risks associated with domestic wastewater to be identified and appropriate management strategies developed.

2.1

Victorian State Legislation

- Environment Protection Act 2017
- Public Health and Wellbeing Act 2008
- Water Act 1989
- Local Government Act 1989 and 2020
- Planning and Environment Act 1987

2.2

Subordinate legislation, Policy, Codes, Strategies and Guides

- Environment Protection Regulations 2021
- EPA Publication 1976: Guidance for owners and occupiers of land with an OWMS equal to or greater than 5,000 litres on any day (including septic tank systems) (*EPA Vic*)
- EPA Publication 1974: Regulating on-site wastewater management systems (local government toolkit) (*EPA Vic*)
- Guideline for Onsite Wastewater Effluent Dispersal and Recycling Systems (EDRS Guideline) 2024
- Guideline for onsite wastewater management (GOWM) 2024

- Onsite wastewater management plans Risk Assessment Guidance Final Report (v4.0) (DELWP)
- Onsite wastewater management plans: Guidelines for developing, reviewing and updating (EPA Vic)
- Victorian Land Capability Assessment Framework (January 2014) (EPA Vic)
- Environment Protection Authority 'Permission Scheme Policy' (Publication 1799.2)
- GG2021S245 Environment Reference Standard (ERS)
 - Publication 1992 Explanation guide to GG2021S245
- Government Gazette (GG2018S499) State Environment Protection Policy (Waters)
- The Port Philip Bay Environmental Management Plan 2017-2027

2.3

National Standards

- Australian/New Zealand Standards 1547:2012, 1546.1, 1546.2, 1546.3, 1546.4
- JAS-ANZ Certification

2.4

Wyndham City Strategic Plans and Policy

- Wyndham City Council Planning Scheme
- Wyndham City Council Plan (incorporating the Municipal Health and Wellbeing Plan) 2025-2029
- Wyndham 2040 vision
- City of Wyndham Domestic Wastewater Management Plan Land Capability Assessment Methodology for Hoppers Crossing, Tarneit/Mount Cottrell, Little River and Werribee South, Sept 2016.
- Wyndham City Council Little River Drainage and Domestic Wastewater Treatment Strategy, March 2019.
- Wyndham City Council Onsite Wastewater Management Plan 2016-2020: Action Plan (Draft).
- Wyndham City Council Onsite Wastewater Management Plan 2016-2020: Background Paper (Draft).
- Wyndham City Council Drainage Design Guidelines, October 2020.
- Wyndham City Council Municipal City Forest and Habitat Strategy, August 2020.
- Wyndham City Council Municipal Environment and Sustainability Strategy 2016 – 2040.



03

Roles and Responsibilities

The management of onsite wastewater is the responsibility of variety of government organisations, private industry, and individuals at the state and local level.

3.1

Environment Protection Authority (EPA)

The Environment Protection Authority (EPA) is responsible for the protection of the Victorian environment by developing policies and guidelines, encouraging best practice environmental management and maintaining complaints register. EPA also performs a regulatory and enforcement role to protect the quality of the environment.

The EPA's responsibilities in relation to the management of domestic wastewater disposal are as follows:

- Developing policies and legislation in relation to domestic wastewater disposal.
- Developing and reviewing the Code of Practice – Onsite Wastewater Management and other relevant publications.
- Approving the type of domestic wastewater treatment systems that can be installed in Victoria via the Australian Standards Certificate of Conformance process.
- Providing advice to local Councils where required.
- Approval of systems discharging more than 5,000 litres on any day

3.2

Wyndham City Council (WCC)

Under the Environment Protection Act 2017, Environment Protection Regulations 2021 and through the EPA Code of Practice - Onsite Wastewater Management (or as replaced by the GOWM and EDRS), Council is responsible for:

- Providing educational information and advice regarding onsite wastewater management to the community;
- Ensuring new residential subdivisions in unsewered areas are provided with reticulated sewerage - or that the allotments are capable of treating and containing all domestic wastewater on site;
- Issuing permits to install or alter onsite wastewater management and issuing a certificate to use the OWMS;
- Refusing to issue a permit if the system does not hold a current Certificate of Conformance or if the site is unsuitable and/or the area available for the treatment and disposal of effluent is not sufficient;
- Ensuring that OWMS are operating correctly and that property owners comply with conditions on OWMS permits and certificates; and
- Submitting an annual report to the EPA on OWMS activity.

3.3

Land Capability Assessors

- Assess the capability of a site to sustainably manage wastewater within allotment boundaries or recommend if sewer is a viable option in preference to onsite wastewater management.
- Provide the assessment report, specifically aligned with the relevant legislations, standards and guidance.
- Identify a management program that should be in place to minimise the health and environmental impacts of ongoing onsite wastewater management.

3.4

Landowners and occupiers

A landowner's wastewater responsibilities consist of the following:

- Connecting to the mains sewerage system where it is available (in a declared sewer area) and the existing WTS does not meet EPA standards at the time the sewer (connection point) became available;
- In unsewered areas, obtaining a permit to install or alter an OWMS before a building permit is issued and any OWMS installation or alteration works commence; and
- Obtaining a certificate to use the system once installation has been completed and approved.

With regard to the on-going maintenance of a OWMS, it is the land occupier's responsibility to ensure that:

- The maintenance requirements of the OWMS are implemented, including de-sludging (timing dependent on the system loading), and any specified monitoring conditions under the existing permits (such as annual sampling);
- If the system type is a secondary treatment plant – it undergoes maintenance checks every 3 months by an accredited maintenance provider;
- The effluent disposal area remains clear from development, impermeable surfaces and unsuitable vegetation; and
- Copies of all maintenance, based on the type of system in use, is provided to Council in accordance with permit conditions.

3.5

OWMS Installers (Plumbers) and Maintenance Providers

OWMS Installers are responsible for:

- Ensuring that any plumbing work is either undertaken by a licensed plumber, or under the direct supervision of a licensed plumber;
- Only installing OWMS approved for installation in Victoria (with a current JAS-ANZ Certificate of Conformance); and
- Ensuring that the plumbing work complies with the Plumbing Regulations 2018 the Plumbing Code of Australia (Volume 3 of the National Construction Code) and any referenced Australian Standards relevant to the plumbing work undertaken; and issuing a compliance certificate for any plumbing work valued at \$750 or more.

Compliance certificates must be issued by licensed plumbers for specific plumbing work carried out in Victoria. A compliance certificate signed by a licensed plumber is a certification that their work complies with the prescribed plumbing standards.

A licensed plumber is not able to issue a certificate for plumbing work that has been carried out by someone else, except in limited circumstances.

OWMS Maintenance Providers are responsible for:

- Ensuring that they are an accredited maintenance service provider;
- Ensuring that any maintenance plumbing work requiring a compliance certificate is either undertaken by a licensed Plumber, or under the direct supervision of a licensed Plumber; and
- Ensuring that any wastewater pumped out of a OWMS as part of a maintenance service is only disposed of at a licensed facility.

3.6

Standards Australia and JAS-ANZ

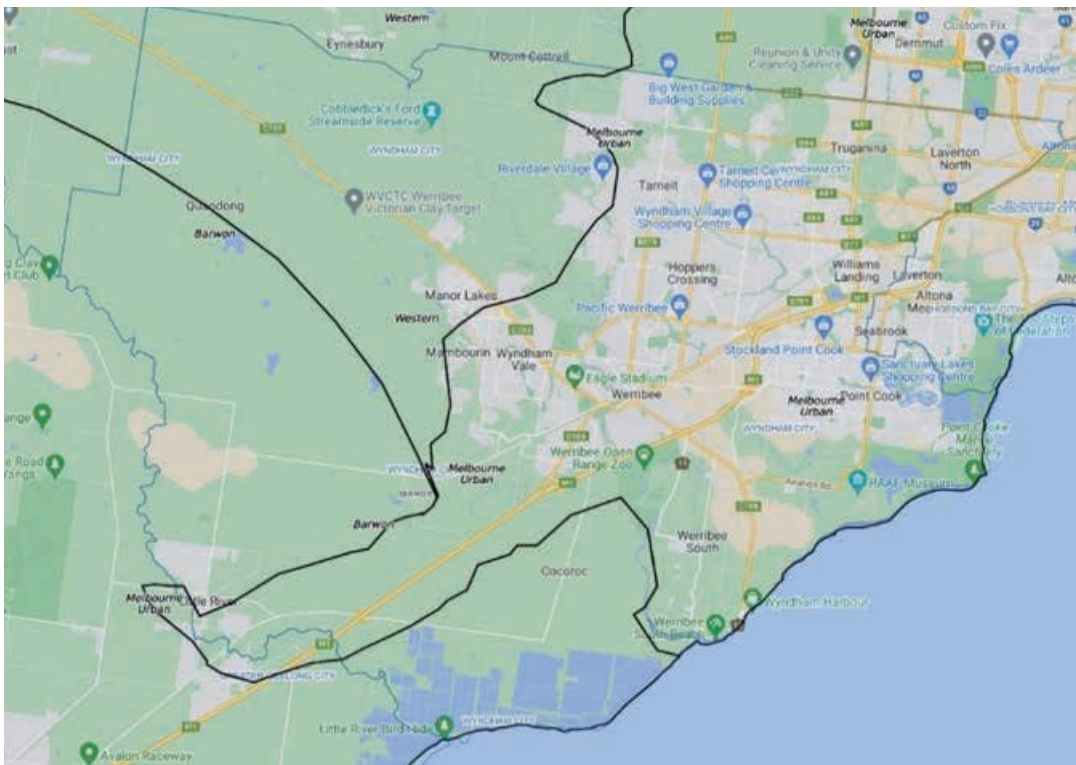
Standards Australia develops internationally aligned Australian standards (AS) and participates in standards-related activities that deliver benefit nationally. Standards Australia and Standards New Zealand also work together to develop joint standards (AS/NZS).

Although Standards Australia develops and publishes different national standards they are not responsible for enforcing, regulating or certifying compliance with those standards. The responsibility for system assessment and the evaluation of minimum performance requirements for OWMS sits exclusively with the accreditation authority JAS-ANZ (Joint Accreditation System of Australia and New Zealand) and is carried out by the accredited certification body; Global Certification Pty Ltd (GC) under the GC Domestic Wastewater Treatment Units (Septic Tanks) certification scheme. OWMS that pass the certification scheme are provided with a Certificate of Conformance. Only systems with a valid Certificate of Conformance can be installed in Victoria.

JAS-ANZ utilise the published joint Australian/New Zealand Standards for on-site domestic wastewater as the basis for the majority of the performance criteria applied to their certification scheme (for OWMS). For example, the current certification scheme for secondary treatment systems requires the different manufactured systems to have completed and passed a comprehensive testing program by 2020 based upon the requirements of AS/NZS 1546.3:2017 On-site domestic wastewater treatment units: Part 3: Aerated wastewater treatment systems to receive a Certificate of Conformance post 2020.

Water Authorities - Melbourne Water (MW), Barwon Water (BW), Greater Western Water (GWW)

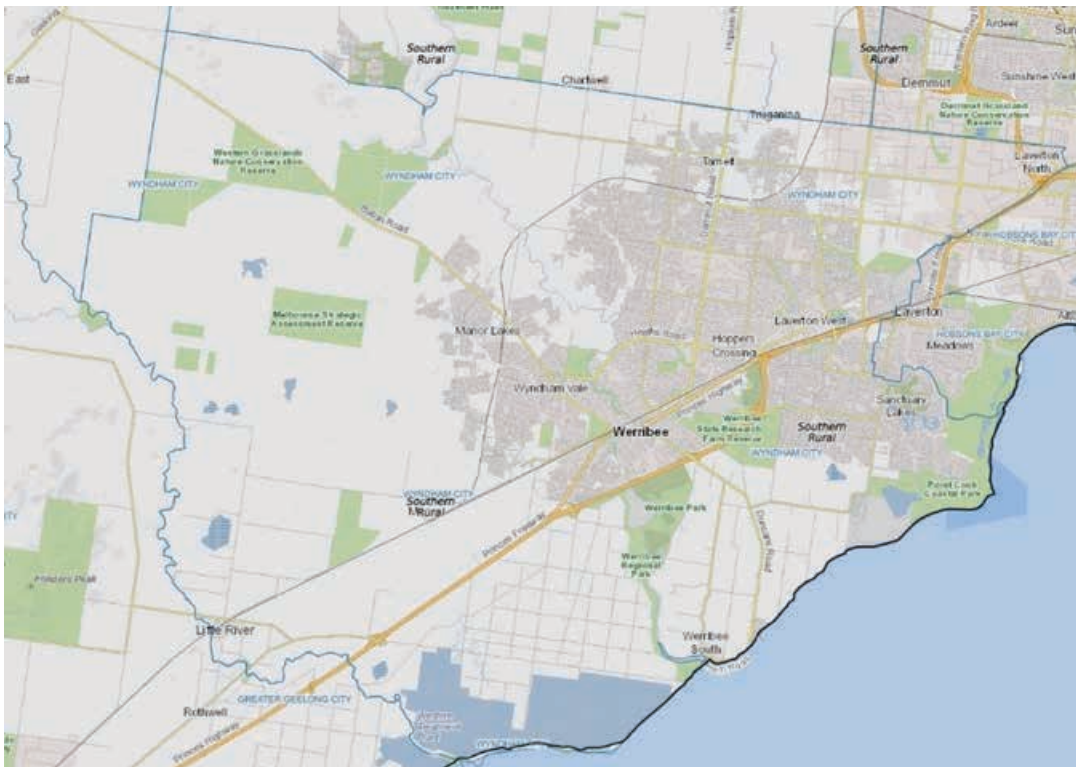
Figure 1 – Urban water authorities



The water authorities work in partnership with WCC and other local councils in planning and implementing appropriate infrastructure developments; determining which properties are unable to contain wastewater within their boundaries and to recommend priorities for the provision of sewerage services. They are the key primary authorities in setting the scope and direction of the extension of mains sewerage infrastructure.

Southern Rural Water (SRW)

Figure 2 – Southern Rural Water boundaries



Southern rural water supply irrigation water for Macalister, Werribee and Bacchus Marsh irrigators, and licensed river and groundwater diverters.

Department of Environment, Energy and Climate Action (DEECA)/ Department of Environment, Land, Water and Planning (DELWP)

DEECA (formally known as DELWP) is responsible for the management of Victoria's natural resources (water, land, etc.). DEECA was also responsible for the management of the Country Towns Water Supply and Sewerage Program (CTWSSP). This State Government program was initiated in 2004 to:

- Introduce sewerage solutions to rural and regional towns that have critical public health and environment problems.
- Introduce new water supplies or upgrade existing water supplies.
- Identify sewerage needs to prevent future risks to public health and the environment.

A stylized, handwritten logo consisting of the letters 'O' and 'H' in a dark blue color. The 'O' is a simple oval shape, and the 'H' is formed by two vertical strokes connected by a horizontal crossbar.

Wyndham Situation Assessment



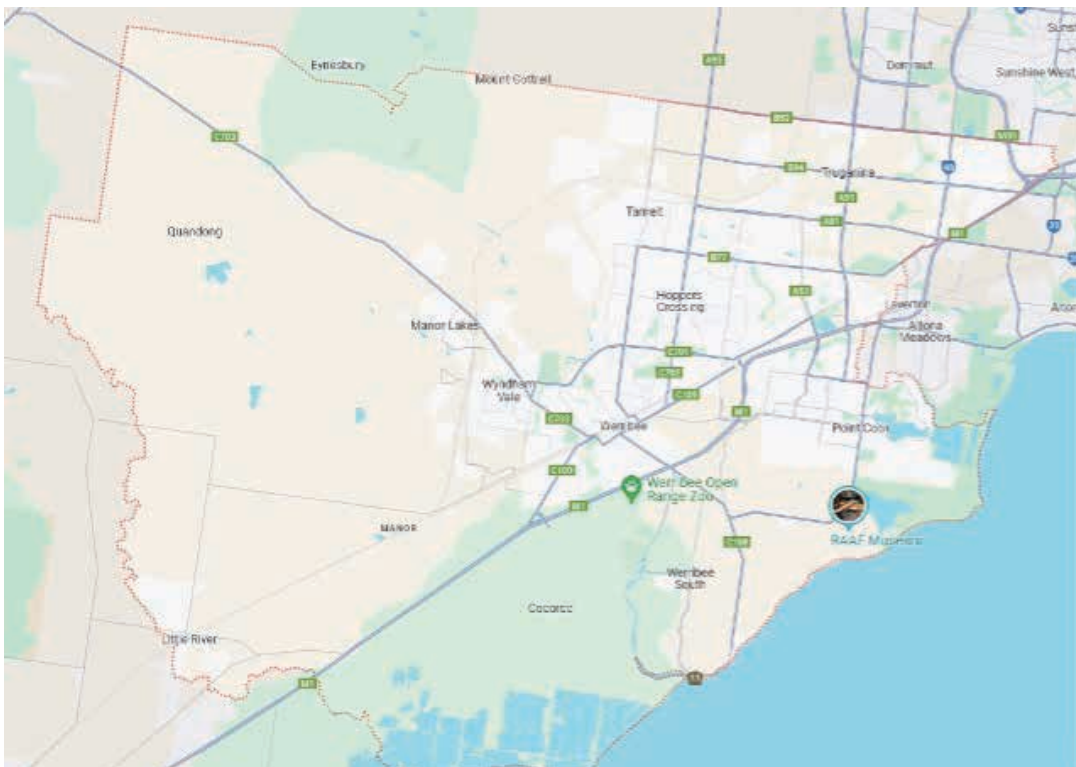
4.1

Municipal Profile

Wyndham City Council (Council) spans 542km² on a coastal plain on the western fringe of Melbourne, the City is home to a diversity of sectors: strong industrial and technology districts, retail precincts, intensive vegetable growing areas and grazing lands. Despite rapid urban growth, the City still includes a significant green wedge, the large market garden area in Werribee South and significant numbers of rural or low density housing.

A significant amount of this area is unsewered, requiring onsite treatment systems. Although, rapid expansion in the last 10 years has reduced the number of OWMS, the majority of OWMS have been used to service the lower density and larger rural properties. The notable exceptions to this are the Little River Township and the Bindowan Drive/Kingston Boulevard/Sayers Rd area in Hoppers Crossing, where higher density smaller lot sizes have been approved, increasing the potential for cumulative adverse offsite effects.

Figure 3 –WCC municipality boundaries



4.2

Onsite Wastewater Management Profile

Across Wyndham Onsite wastewater disposal is concentrated in a number of locations within the Municipality.

The two most common methods of wastewater treatment are primary treatment septic tank systems and secondary treatment systems via an aerated wastewater treatment systems (AWTS).

Aerated Wastewater Treatment Systems (AWTS) only gained wider popularity in the early 2000's, indicating the vast majority of systems pre-2000 will be conventional septic tanks with absorption trench disposal (or much older split systems with offsite greywater discharge). This helps us estimate the percentage of systems that are likely to be primary or secondary.

There are a lot of Councils records that are incomplete and out of date, especially any record prior to the 2000s.

Table 1 – Estimated OWMS from database, as a percentage of primary vs secondary systems

Estimations	Little River	Hoppers Crossing	Werribee South/Werribee	Tarnet	Truganina	Mount Cottrell	Laverton North	Point Cook	Dummy Property	TOTALS
Prim, Treatment (Septic)	13	6	19	4	0	3	0	2		47
Number of Unknowns potentially Primary	15	12	14	7	0	2	0	5	0	55
Unknowns PRE 2000's*	228	309	345	105	44	75	89	27	491	1713
Total Primary Systems	256	327	378	116	44	80	89	34	491	1815
Unknown minus Unknown Pre 2000's	51	43	38	12	7	8	5	5	0	169
Number of Unknowns potentially Secondary	36	31	24	5	7	6	5	0	0	114
Sec. Treatment	31	16	32	3	3	8	5	0		98
Total Secondary Treatment	67	47	56	8	10	14	10	0	0	212
Total	323	374	434	124	54	94	99	34	491	2027
Percentage Primary Treatment	79%	87%	87%	93%	81%	85%	90%	100%	100%	90%
Percentage Secondary Treatment	21%	13%	13%	7%	19%	15%	10%	0%	0%	10%

There has been significant development over the last decade and large areas of the municipality have been sub-divided, re-developed and have had sewer installed. As part of this OWMP, the areas were 'manually counted' via recent aerial photography (Nearmap, May 2024). A more accurate estimation based on the manual count is:

	Little River	Hoppers Crossing	Werribee South	Tarnet & Truganina	Laverton North	Mount Cottrell	TOTALS	Others (in areas not specifically counted)
Manual Count	255	305	537	75	40	95	1307	~200
Prim. Treatment	202	266	468	70	36	81	1124	
Sec. Treatment	53	39	69	5	4	14	183	

The notable difference is that Councils database suggests that there are around 3700 OWMS still in operation within the Municipality, whereas counting the properties that are not connected to sewer and accounting for the new suburb subdivisions, gives us a number under half that, around 1500 OWMS.

The existing data suggests approximately 90% of the systems are primary treatment systems and only 10% or less are Secondary treatments systems. Improved data management would assist in clarification.

Of primary treatment systems, most are Conventional Septic Tanks systems with absorption trench. Some of the legacy systems are 'split systems' (where grey water goes to separate trench and the black water to a small tanks and short trench system).

It is estimated that around 85% of systems are more than 15 years old.





Risk Assessment



Domestic wastewater generated by household activities contain microbial contaminants, organic matter and chemicals capable of causing illness and impacting on the environment. When OWMS are not operating as intended the wastewater can leak out of systems into the local environment and waterways.

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

- Onsite wastewater systems 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. (OWMPG).*

This approach is designed to be consistent with AS/NZS 1547:2012 and ISO 31000:2018 and includes risk identification, analysis, evaluation and treatment.

5.1

Risk Criteria

5.1.1

Associated Risks

All wastewater generation and/or discharge is seen to be a risk with potential harm to health or damage to the environment. Wastewater risks that need to be considered, their cause and key impacts are described in the following tables.

Table 2 – Risk summary

Risk Area	Potential Risk Summary	
Manual Count	Drinking water (SWSC)	<ul style="list-style-type: none"> • Illness if people ingest contaminated water
	Recreational water	<ul style="list-style-type: none"> • Illness if people come into contact with contaminated water used for recreational purposes
Environmental	<ul style="list-style-type: none"> • High rates of nitrogen and phosphorous to water catchments • Direct bacterial contamination of the environment • Loss of flora and fauna • Loss of amenity 	
Economic	<ul style="list-style-type: none"> • Loss of income associated with usage (tourism, fishing, local businesses, exports etc.) • Costs of clean ups • Costs of education, warnings, closures, supervision etc. • Claims for damages 	
Legal	<ul style="list-style-type: none"> • Failure to meet statutory duties • Failure to exercise enforcement powers • Failure to meet duty of care 	
Social	<ul style="list-style-type: none"> • Loss of faith in Council/loss of community support 	

Table 3 – Contamination types

Contamination Type	Most common contaminations	Effects
Microbiological	<ul style="list-style-type: none"> Faecal coliforms (E.coli), salmonella, giardia, shigella, viruses (particularly norovirus), Parasitic protozoa, Helminths 	<p>Pathogenic to humans and/or wildlife.</p> <p>Various illnesses.</p>
Organics	<ul style="list-style-type: none"> Mostly in the form of Suspended Solids 	<p>Increase oxygen demand in the water and thus increase possibility of eutrophication.</p> <p>Potential to cause death of aquatic organisms etc.</p>
Nutrients	<ul style="list-style-type: none"> Particularly: Nitrogen & Phosphorus 	<p>Increase nutrients provide for growth of certain organisms, particularly algae. Some plants and animals are not tolerant of high nitrate or phosphate levels.</p> <p>May cause loss of certain aquatic plants and animals.</p> <p>May lead to eutrophication.</p>
Salinity	<ul style="list-style-type: none"> Salt 	<p>Many plants and animals not tolerant to salinity changes.</p> <p>May cause death in aquatic wildlife and flora.</p>



Table 4 – Wastewater risks and impacts:

Risk	Source	Potential Impact(s)
Failed systems with offsite discharge	<ul style="list-style-type: none"> • Damaged effluent disposal drains/trenches • Increased loading from extensions to dwellings • Design criteria not complied with • Faulty installation • New works & activities impacting on disposal area Age of the system • Septic tank full • Poor maintenance 	<ul style="list-style-type: none"> • Nutrients • Pathogens • Odour • Visual amenity • Oxygen depleting material • Local land degradation • Pollution of water courses • Pooling of effluent causing mosquito breeding
Treated on-site effluent discharge	<ul style="list-style-type: none"> • Permitted system 	<ul style="list-style-type: none"> • Local visual amenity • Pollution of groundwater
Untreated off-site sullage (grey water) discharge	<ul style="list-style-type: none"> • Poorly maintained system with sand filter not functioning • Sand filter bypassed to stormwater • Septic tank full • Permitted system 	<ul style="list-style-type: none"> • Nutrients • Pathogens • Odour • Visual amenity • Oxygen depleting material • Local land degradation • Pollution of water courses • Demand on Council drainage infrastructure
Ineffective regulation	<ul style="list-style-type: none"> • Failure to comply with permit conditions • Ineffective database • Non-connection to sewer • Unclear regulatory responsibilities 	<ul style="list-style-type: none"> • Liability • Increased incidence of preventable pollution and environmental degradation • Increased risk to public health
Re-use of waste water	<ul style="list-style-type: none"> • Allowed re-use • Low water supply • Poor management by individual residents 	<ul style="list-style-type: none"> • Pathogens • Odours

5.2

Risk Identification

The risk assessment framework focusses on proximity to water supply offtakes and special water supply catchments (SWSC). Wyndham has no SWSC's.

Table 5 – Identified receiving environments within WCC

Location	Sources of wastewater threat
<p>Werribee River</p>	<ul style="list-style-type: none"> • The Werribee River has its origins in the Wombat National Park and then flows through several towns including Werribee and Werribee South in Wyndham. It terminates in Werribee South after entering Port Phillip Bay. • The majority of the catchment has been cleared for agriculture with only 25% of the original forests remain and 5% of the catchment is being urbanised . • Arriving in Wyndham the river is influenced by urbanisation and intensive agriculture. Nutrient levels are a concern with algal blooms and general eutrophication occurring. • The environmental condition of the river is rated as "poor" or "very poor" for lower and upper reaches and the main issues for the catchment are: <ul style="list-style-type: none"> – Low rainfall the closest testing point receives only 535mm average per year – Low river flow due to low rainfall and controlled environmental flows. – Stormwater pollution entering the river carrying pollutants, nutrients and pathogens. – Urbanisation – The loss of riparian vegetation • The river has environmental values such as: <ul style="list-style-type: none"> – Recreation – fishing, canoeing and swimming – Irrigation waters for agriculture – Abundant flora and fauna – fish, platypus and birdlife – Aboriginal cultural features – Food resource for some cultural groups. • The influence of onsite wastewater systems on nutrient levels in the river would be small however the possibility of pathogens from offsite discharge does pose a risk to the health of end users of the river.
<p>Port Phillip Bay</p>	<ul style="list-style-type: none"> • All of the water sources in Wyndham drain into Port Phillip Bay. • The Port Philip Bay Environmental Management Plan 2017-2027 • "Healthy coasts, marine areas and waterways are vital to the prosperity and wellbeing of all Victorians. Healthy waterways and marine areas are vital to business and the state economy, and provide incalculable benefits to all the people who use them for recreation and tourism."

Location	Sources of wastewater threat
Little River	<ul style="list-style-type: none"> • The Little River begins in the Brisbane Ranges National Park and travels through towns Balliang and Little River prior to entering Port Phillip Bay at the Western Treatment Plant. • There are systems in Little River that discharge greywater into stormwater drains which eventually make its way to the river. • The river has environmental values such as: <ul style="list-style-type: none"> – Recreation – fishing – Abundant Flora and Fauna – River Red Gums, Frog Species – Growling Grass Frog, Fish species – Spotted Galaxia. – The river supports important ecological values – grass lands, grassy woodlands and scattered riparian vegetation. • The environmental condition of Little River is rated “poor” or “very poor” in all reaches.
Deutgam Water Supply Protection Area (WSPA)	<ul style="list-style-type: none"> • To protect against saline intrusion into the aquifer from the estuarine reaches of the Werribee River and Port Phillip Bay, groundwater levels must remain well above sea level (0 mAHD) at the coast and at the tidal extent of the river. • Rising water levels and saline intrusion would have negative effects on OWMS. • Rising water table could potentially become contaminated via OWMS (especially in an area like Werribee South that has a high density of OWMS and many “old” systems.
Skeleton Creek	<ul style="list-style-type: none"> • Skeleton Creek originates near Mt Cottrell it then passes through urbanised areas before terminating in Port Phillip Bay. • Receives stormwater drainage from many sources as it heads south through Tarneit and Truganina. • Given the age of many of the OWMS, it is likely it receives some wastewater discharge. • Skeleton Creek environmental values are: <ul style="list-style-type: none"> – Important aboriginal spiritual significance – Popular for recreation – Has natural vegetation and form • The environmental condition of Skeleton Creek is considered “poor” upstream of Sanctuary Lakes.

Location	Sources of wastewater threat
Davis Creek/Dry Creek	<ul style="list-style-type: none"> • Similar to Skeleton Creek. • Both Creeks pass through Mount Cottrell and Tarneit. Davis Creek joins Werribee River (near Hogans Road). The condition of the Creek has a direct influence on the condition of Werribee River. • Dry Creek joins Skeleton Creek near the municipal boundary at Derrimut Road and Dohertys Road. • Only some parts remain in the natural form. • Both have shorter catchments, however both have significant numbers of properties with OWMS bordering the Creeks. • Man made drainage basins (swales and wetlands) have been installed in parts to help control stormwater flows and improve stormwater quality. • Like Skeleton Creek, environmental conditions are considered "poor"
Sayers Drain, Dohertys Drain, Forsyth Road Drain and other unnamed drains	<ul style="list-style-type: none"> • Receives stormwater from various residential, rural and semi rural catchments. • Water either runs into the Werribee River or collects to drain into Port Phillip Bay. • Many or most parts of these drains are no longer natural. • Man made drainage basins (swales and wetlands) have been installed in parts to help control stormwater flows and improve stormwater quality. • Environmental conditions are generally poor or very poor.
Local drainage basins and catchments	<ul style="list-style-type: none"> • Collect local stormwater, ground water and/or irrigation water. • Drain into the local drains or Creeks, then either run into the Werribee River or collect to drain into Port Phillip Bay.
Irrigation channels	<ul style="list-style-type: none"> • Provide water for use with irrigation in Werribee South. • Water quality is initially based on the state Southern Rural Water supply. • Infiltration may occur from various stormwater and groundwater sources along the network. • It is still possible that water used in some rural properties for domestic applications (washing, showering etc.)

5.2.1

Determination of sub-catchments

The catchments for this OWMP are defined in part by the water courses and the geographical areas. The identified sub catchments for detailed risk assessment are:

- Little River
- Werribee South
- Hoppers Crossing
- Tarneit/Truganina
- Mount Cottrell
- Laverton North

The core influencing data from the risk analysis is below:

Table 6 – Risk analysis influencing data

	Little River	Hoppers Crossing	Mount Cottrell	Werribee South	Laverton North	Tarneit/Truganina
Area (m²)	9,626,291	18,390,811	22,751,057	32,650,468	30,041,401	56,669,768
No. OWMS	255	305	95	537	40	75
Primary	202	266	81	468	35	70
Secondary	53	39	14	69	5	5
Median lot size	0.4	0.41	4.4	1.5	1.4	4.4
Number of lots < 0.4 ha	62	24	2	2	2	3
OWMS in proximity to Wastewater	10	19	10	4	2	10
OWMS in close proximity to Wastewater	7	24	3	5	2	4
OWMS in proximity bores	68	76	31	136	7	19
OWMS in close proximity bores	17	25	21	223	3	14

5.2.2

Risk assessment results

There are a number of risk factor metrics that are used to describe the level of risk onsite wastewater treatment poses to the endpoints, including:

- Ongoing performance of systems (type and age of systems)
- Number of onsite systems
- Lot size
- Topography
- Soil type
- Proximity of onsite systems to watercourse,
- Proximity of onsite systems to potable water supply offtake in Special Water Supply Catchments,
- Proximity to flood plains
- Proximity to / density of groundwater bores
- Groundwater depth and quality
- Weather conditions (rainfall)

The collated data from the risk factor metrics is shown in the results table below:

Table 7 – Risk Assessment results

Risk	Risk component	Little River	Hoppers Crossing	Mount Cottrell	Werribee South	Laverton North	Tarneit/Truganina
Risk of contamination of nearest watercourse	Likelihood - treatment failure	Likely	Likely	Likely	Likely	Likely	Almost certain
	Likelihood - transfer offsite	Possible	Possible	Possible	Possible	Possible	Possible
	Likelihood - offsite to end point	Unlikely	Possible	Unlikely	Unlikely	Unlikely	Unlikely
Review Likelihood - Any other qualitative factors that could increase the likelihood?	Likelihood - contamination of water course	Possible	Possible	Possible	Possible	Possible	Possible
	Consequence (Human health)	Moderate	Minor	Minor	Minor	Minor	Minor
	Consequence (Environment)	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
	Risk (Human health)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Risk (Environment)	Low	Low	Low	Low	Low	Low
	Cumulative - likelihood	Possible					
Note: if recreation does not occur, this risk does not need to be considered.	Cumulative - consequence (health)	Moderate					
Only consider sub catchments that impact endpoint	Cumulative - consequence (environment)	Insignificant					
Cumulative risk	Human Health (recreation)	Moderate					
	Environment (sensitive end point)	Moderate					

Risk	Risk component	Little River	Hoppers Crossing	Mount Cottrell	Werribee South	Laverton North	Tarneit/Truganina
Risk of contamination of SWSC potable water offtake	Likelihood - treatment failure	n/a	n/a	n/a	n/a	n/a	n/a
From surface water; groundwater risk assessed below	Likelihood - transfer offsite	n/a	n/a	n/a	n/a	n/a	n/a
	Likelihood - offsite to end point	n/a	n/a	n/a	n/a	n/a	n/a
Review Likelihood - Any other qualitative factors that could increase the likelihood?	Likelihood - contamination of water course	n/a	n/a	n/a	n/a	n/a	n/a
	Consequence (Human health)	n/a	n/a	n/a	n/a	n/a	n/a
	Risk (Human health)	n/a	n/a	n/a	n/a	n/a	n/a
	Cumulative - likelihood	n/a					
Only consider sub catchments that impact endpoint	Cumulative - consequence (health)	n/a					
Cumulative risk	Risk (Human health)	n/a					
Risk of groundwater contamination	Likelihood - treatment failure	Likely	Likely	Likely	Likely	Likely	Almost certain
May included potable water supply	Likelihood - groundwater contamination from infiltration	Rare	Rare	Rare	Rare	Rare	Rare
	Likelihood - groundwater contamination from bore ingress (runoff)	Rare	Rare	Unlikely	Unlikely	Rare	Unlikely
Review Likelihood - Any other qualitative factors that could increase the likelihood?	Likelihood - groundwater contamination	Unlikely	Unlikely	Possible	Possible	Unlikely	Possible
	Consequence (Human health)	Moderate	Minor	Minor	Minor	Minor	Minor
	Consequence (Environment)	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant

Risk	Risk component	Little River	Hoppers Crossing	Mount Cottrell	Werribee South	Laverton North	Tarneit/Truganina
	Risk (Human health)	Moderate	Low	Moderate	Moderate	Low	Moderate
	Risk (Environment)	Low	Low	Low	Low	Low	Low
Risk of catastrophic failure (Flooding)	Likelihood - flooding	Rare	Rare	Rare	Rare	Rare	Rare
	Consequence (Human health)	Moderate	Minor	Minor	Minor	Minor	Minor
	Consequence (Environment)	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
	Risk (Human health)	Low	Low	Low	Low	Low	Low
	Risk (Environment)	Low	Low	Low	Low	Low	Low

Table 8 – Summary of risk assessment results

Risk	Risk component	Little River	Hoppers Crossing	Mount Cottrell	Werribee South	Laverton North	Tarneit/Truganina
Risk of contamination of nearest watercourse	Risk (Human health)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Risk (Environment)	Low	Low	Low	Low	Low	Low
Cumulative risk	Human Health (recreation)	Moderate					
	Environment (sensitive end point)	Moderate					
Risk of contamination of SWSC potable water offtake	Risk (Human health)	n/a	n/a	n/a	n/a	n/a	n/a
Cumulative risk	Risk (Human health)	n/a					
Risk of groundwater contamination	Risk (Human health)	Moderate	Low	Moderate	Moderate	Low	Moderate
	Risk (Environment)	Low	Low	Low	Low	Low	Low
Risk of catastrophic failure (Flooding)	Risk (Human health)	Low	Low	Low	Low	Low	Low
	Risk (Environment)	Low	Low	Low	Low	Low	Low

5.2.3

Risk Categorisation

Risk categorisation was determined using the following matrix.

Table 9 – Risk Matrix

		Consequence			
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

5.2.4

Risk Evaluation

The majority of risks identified are low or moderate:

- Low risk items require maintenance of existing controls
- Moderate requires some additional controls, the moderate risk areas are highlighted on the table below

Table 10 – Specific areas identified as greater than low risk

Risk	Risk component	Little River	Hoppers Crossing	Mount Cottrell	Werribee South	Laverton North	Tarneit/Truganina
Risk of contamination of nearest watercourse	Risk (Human health)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Risk (Environment)	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Cumulative risk	Human Health (recreation)	Moderate					
	Environment (sensitive end point)	Moderate					
Risk of groundwater contamination	Risk (Human health)	Moderate	Low	Moderate	Moderate	Low	Moderate
	Risk (Environment)	Low	Low	Low	Low	Low	Low

Moderate	<p>Risk mitigation actions should be planned and implemented to reduce the level of risk.</p> <p>Timelines may be longer term.</p> <p>Existing controls must be maintained and monitored appropriately.</p>
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06

Wastewater Policy



The wastewater policy outlines the application requirements for managing wastewater within our community. It takes into account the type of development, the results of the risk assessment, and the measures needed to address moderate risks effectively.

6.1

Reticulated Sewage

Reticulated sewerage is the preferred method of effluent disposal across the municipality

- New developments in sewer areas must connect to sewer.
- Wyndham City Council will advocate for the provision of sewerage to high-risk areas.
- Sewer is significantly more sustainable and poses significant less risk to human health and the environment.
- The cost of sewer is significantly less over the long term (15-20 years or more). As OWMS require maintenance and/or periodic replacement.
- An OWMS permit may not be issued when sewer is available to the property.

6.2

Design and installation

The design, installation and maintenance of an OWMS must be conducted by suitably qualified individuals and comply with all Victorian legislative requirements:

- Guideline for Onsite Wastewater Effluent Dispersal and Recycling Systems (EDRS Guideline) 2024
- Guideline for onsite wastewater management (GOWM) 2024
- National Standards
 - Australian/New Zealand Standards 1547:2012, 1546.1, 1546.2, 1546.3, 1546.4 & JAS-ANZ Certification
- Victorian Land Capability Assessment Framework (January 2014) (*EPA Vic*)

All proposed OWMS within the municipality will be of a type that treats and retains all wastewater within lot boundaries. No off-site discharge of effluent is permitted.

6.3

Land Capability Assessments (LCA)

An LCA is required with applications for the following:

- On all allotments of 2000m² or less.
- For all commercial developments (officer discretion for smaller home-based commercial)
- Larger domestic lots, where the development proposes to use significant land area for infrastructure (Large houses, drives, sheds, pools, tennis courts, drainage basins etc.)

Table 11 – LCA and OWMS selection and risk guidance

Issue	High	Moderate	Low
Lot Size	2000m ² or less	2001 – 4000m ²	>4000m ²
Distance to Waterway or Open Stormwater Drain (does not include irrigation channels in Werribee South)	<100	100-300	>300
Distance to Waterway with ESO	<300		>300
Proximity to higher density properties	0-50m	50-100m	>100m
Flood Prone Areas (1 in 100 year or greater)	Yes		no
Change of use for existing property (commercial)	Yes		no
LCA requirements	Connection to sewer if available. If not available a site specific LCA must be undertaken.	Officer's discretion if LCA or sewer connection is required. If LCA not required, deemed to comply installations are acceptable. (refer 6.3.2)	No specific LCA required. Deemed to comply installations are acceptable (refer 6.3.2).

6.3.1

System selection

Low Risk Areas. In low-risk areas, onsite systems may include septic effluent (primary treated effluent) disposed via trench and bed (or similar) or Secondary Treated Effluent with effluent disposed via approved Land Application Method.

Moderate Risk Areas. In medium risk areas, disposal of primary effluent via trench is not appropriate. Instead, onsite wastewater systems should include Secondary Treatment System with effluent disposed via pressure compensated subsurface irrigation or another approved Land Application Method from the GOWM/EDRS.

High Risk Areas. In high risk areas disposal of primary effluent via trench is not suitable. Acceptable onsite systems for these areas may include a Secondary Treatment System with effluent disposed via pressure compensated subsurface irrigation or approved Land Application Method from the GOWM/EDRS.

6.3.2.

Deemed to comply installations.

Where an LCA is not deemed necessary for a residential development, the following deemed to comply installations may be used for secondary treatment to pressure compensated subsurface irrigation.

Table 12 – Deemed to Comply installations.

Area	Design Irrigation Rate	Bedrooms	Design Flow	Irrigation Area
Hoppers Crossing Mount Cottrell Tarneit Truganina	1.7mm/day	3	600	350
		4	750	440
		5	900	530
		6	1050	620
Little River	1.8mm/day	3	600	340
		4	750	430
		5	900	510
		6	1050	590
Werribee South	2.5mm/day	3	600	240
		4	750	300
		5	900	360
		6	1050	420

Soil Amelioration:

- Limiting clays to be ripped to a depth of at least 600mm. (All areas except Werribee South)
- Gypsum to be broadcast at a rate of at least 2.5kg/m² (All areas except Werribee South).
In Werribee South gypsum to be broadcast at a rate of at least 1.0kg/m²
- Possible requirement for importation of topsoil (All areas except Werribee South)

6.4

Commercial development in unsewered areas

Connection to sewer of all existing commercial and industrial premises is encouraged and advocated in all circumstances.

Council will take a staged and risk-based approach to the connection of sites to sewerage based on:

- the availability and cost of sewerage
- the type, age and performance of the existing septic system
- the maximum daily wastewater flow
- the risk to human health and the environment.

Proposed commercial and industrial developments, including the expansion of existing developments, may not be supported unless a suitable OWMS can be installed and appropriately operated.

6.5

Small Allotments

New developments on small allotments (<2000 m²) must either be connected to sewer or demonstrate compliance with a Land Capability Assessment.

Redevelopment of existing small lots fit into 2 criteria:

- Rebuilding after a fire or other disaster. The rebuilding must be like for like in potential occupancy (i.e. 2 bedroom home rebuilt to another 2 bedroom home. In this case consideration is given to systems that do not meet Tier 1 setback requirements from the GOWM. Where this is the case, then Advanced Secondary Treatment with Nutrient Reduction is required. Consideration will be given to innovative land application methods.
- Re-development: Wyndham has some very small rural allotments that are highly unlikely to be large enough for redevelopment with an OWMS. A detailed LCA and scaled plans are required to demonstrate the site can contain and treat all wastewater onsite.

6.6

OWMS setback requirements

The EPA Guideline for Onsite Wastewater Systems (GOWM) has a two tier approach for setback distances for OWMS.

All OWMS will be required to comply with Tier 1 setback distances. These setback distances are a conservative minimum that may be varied if sufficiently justified by the applicant and approved by the council.

In some limited situations, the adoption of one or more setback distances may not be practicable for the site. Wastewater consultants and assessors may decide to seek alternative setback distances (Tier 2) through demonstration of appropriate protections and controls. When this occurs, a risk and performance-based approach can be used to determine alternative setback distances.

In most circumstances wastewater treatment systems that meet the criteria for Advanced Secondary Treatment with Nutrient Reduction, will be required for Wyndham City Council to consider Tier 2 Setback reductions.

There is a relevant ESO over Werribee River, Skeleton Creek, Lollypop Creek and Little River. These locations have increased setbacks compared to other waterways.

An open stormwater drain is considered major or trunk drain, not the standard roadside spoon drains. There are a significant number of both unnamed and named open stormwater drains.

6.7

Regulation and Enforcement

Council has a statutory responsibility to regulate and enforce activities related to wastewater issues and non-compliances that present an immediate risk to the environment or public health.

The introduction of the Environment Protection Act 2017 and Environment Protection Regulations 2021 empowers Council to enforce the maintenance of OWMS through various measures including issuing infringements, notices and if necessary pursuing prosecution. Council's regulatory and enforcement activities are guided by the *EPA Publication 1974: Regulating onsite wastewater management systems: local government toolkit*, which outlines the legislative requirements for OWMS owners and operators under the General Environmental Duty (GED), as well as the investigative and enforcement processes to follow.

There will always be a requirement for Council to undertake regulation or enforcement activities in relation to wastewater issues. Council's policy prioritises education and cooperation as the primary approaches to resolving compliance issues. Enforcement measures are generally seen as a last resort, except in cases where a wastewater non-compliance poses an unacceptable and immediate threat to human health and safety, necessitating immediate action.





Action Plan



The action plan has been set across a 5 year time-scale, to allow enough time for the objectives to be properly resourced and implemented. The actions are divided across 5 key areas:

1. Information and Data Management:
2. Education and Awareness
3. System improvements
4. Regulations and Controls
5. Future Planning

Key Area 1: Information and Data Management

Objective	Action
All wastewater data is complete and readily accessible in a single database	<ol style="list-style-type: none"> 1. Conduct onsite inspections to determine if OWMS in use or the property has connected to sewer 2. Review all existing permit files to update Council database 3. Digitise all historical permits where the OWMS is still in use 4. Finalise any incomplete wastewater application with property owner 5. Update process mapping for all aspects of onsite wastewater
Maintain accurate database of properties sewered by Greater Western Water	<ol style="list-style-type: none"> 1. Create GIS overlay for OWMS 2. Regularly update and upload property connection data obtained from Greater Western Water to GIS
Improve onsite wastewater management by assessing gaps and improving data collection	<ol style="list-style-type: none"> 1. Assess any property in an onsite wastewater containment area where Council does not have data. Utilise technology to pin point system 2. Collaborate with stakeholders on results of water data from receiving environments 3. Review documentation from maintenance providers to identify permit and system maintenance requirements

Key Area 2: Education and Awareness

Objective	Action
Improve awareness to new home owners with OWMS	<ol style="list-style-type: none"> 1. Develop and provide education information to new residents in unsewered areas 2. Provide information to prospective buyers via Section 32 Sale of Land Act
Improve education and awareness on wastewater management responsibilities	<ol style="list-style-type: none"> 1. Revise current resident information and explore additional communication and education for homeowners 2. Review documentation from maintenance providers to determine education programs in high risk localities

Key Area 3: System Improvements

Objective	Action
Enhance process efficiency and improve IT capabilities	<ol style="list-style-type: none">1. Develop standard operating procedures for onsite wastewater inspections associated with permit applications2. Update permit to install and certificate approving use documents to include any GOWM/EDRS and OWMP changes.3. Develop IT capabilities within the Tech one upgrade to enable the implementation of a maintenance program

Key Area 4: Regulation and controls

Objective	Action
Encourage property owners to connect to sewer (in declared areas)	<ol style="list-style-type: none">1. Utilise internal building and planning referral process to encourage system upgrades where required2. Properties provided sewer in Laverton North to be encouraged to connect through notification to the water authority.
Ensure OWMS are operated and maintained in a way that minimises risks to human health and the environment	<ol style="list-style-type: none">1. Develop standard operating procedures for onsite wastewater inspections associated with complaints and systems without permits.2. Regulate OWMS in accordance with the Environment Protection Regulations 2021, utilising the regulating <i>Onsite Wastewater Systems: Local Government Toolkit (publication 1974, May 2021)</i>

Key Area 5: Future Planning

Objective	Action
Advocacy for sewer programs	<ol style="list-style-type: none">1. Advocate for sewer provision in Little River Township, as per recommendations in the Wyndham City Council Little River Drainage and Domestic Wastewater Treatment Strategy, March 2019.2. Request water authority to develop sewer management plan, to indicate when sewer will be made available to high risk locations including Little River and Hoppers Crossing.3. Advocate for all properties within the UGB to have access to reticulated sewer.



08

Glossary

Absorption	Uptake of effluent into the soil by infiltration and capillary action. The process by which a solid material takes in a liquid, for example, the uptake of wastewater into the soil.
Absorption trench or bed	The process by which a substance binds other substances onto its surfaces, for example, soil particles bind molecules to their surface.
AWTS, Aerated Wastewater Treatment System, Treatment Plant, Package Treatment Plant	A mechanical system that uses aeration and clarification to aid biological treatment of effluent. Effectively, air bubbled through wastewater in a tank provides oxygen to microorganisms to facilitate aerobic biological digestion of the organic matter in the wastewater.
Aerobic	Organisms and processes that require oxygen (i.e., microbiological digestion and assimilation of organic matter using oxygen).
Anaerobic	Living or occurring without oxygen (i.e., microbiological digestion and assimilation of organic matter in the absence of oxygen).
All-waste	A combination of blackwater and greywater from a premise generating wastewater
Blackwater	Wastes from the human body discharged directly into a toilet
Design area	Horizontal plan area of a land application system to which effluent is distributed
Design irrigation rate (DIR)	The loading rate that applies to the distribution of effluent to an irrigation land application system (subsurface irrigation)
Desludging, pump-out	Removal of accumulated sludge or scum from septic tank or treatment plant
Discharge	Wastewater flowing from where it should be confined
Domestic Wastewater	Wastewater from a domestic origin
<i>E. coli</i> (Escherichia coli)	A faecal coliform indicative of faecal contamination. A species of bacteria in the faecal coliform group found in large numbers in the intestines of animals and humans. Its presence in freshwater indicates recent faecal contamination and is measured in 'colony-forming units' (cfu) per 100 mL of water.
Effluent	Liquid discharged from an onsite wastewater system
Effluent dispersal system	An engineered system designed to enable controlled distribution of treated effluent into or onto the land for water and nutrient uptake and filtration, sorption and further biological degradation.
Effluent recycling system	A system designed to enable beneficial reuse of appropriately treated effluent from a greywater treatment plant for either indoor or outdoor use.
Emerging contaminants	Emerging contaminants are compounds that are newly introduced into the environment (e.g. pharmaceutical, industrial or agricultural compounds that have only recently been developed) or that, although possibly around for longer times, have only recently been detected in the environment due to advances in detection technologies (e.g. PFAS). They present a new regulatory challenge, as their prevalence and concentrations, and their potential risks, are not generally well understood.
Evapotranspiration	Transfer of water from the soil to the atmosphere through evaporation and plant transpiration.

Greywater	Domestic waste from a bath, shower, basin, laundry and kitchen which excludes faecal and urinal wastes
Groundwater	The point in soil where all particles become saturated with water. If it is present at all times it represents true groundwater
Holding Tank	A tank used for holding wastewater which is then pumped from
Irrigation	The distribution of secondary treated effluent to subsurface piping for absorption or evaporation
Land Application Area	The area treated effluent is disposed of
Land application system	System where effluent is disposed into the soil after treatment
Land capability assessment	An assessment of the risks of harm to human health and the environment of the proposed or existing OWMS at the site, taking into account the proposed or existing use of the system.
Maintenance	The inspection of an onsite wastewater system to determine operational effectiveness and maintenance
Onsite wastewater management system (OWMS)	An onsite wastewater treatment plant 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 system	Also: septic system, domestic wastewater system, septic, system, wastewater system, AWT (Aerated Wastewater Treatment System), Package Treatment Plant. Plus many and various proprietary treatment systems Onsite wastewater management system that receives, treats and applies wastewater to a land application system or a holding tank
Onsite wastewater treatment plant	A treatment plant for the bacterial, biological, chemical or physical treatment of sewage generated on site. For example, a septic tank system, a wet or dry composting toilet, aerobic treatment and sand filter.
Primary Treatment	The separation of suspended material from wastewater in a septic prior to discharge to a secondary treatment system or a land application
Reasonably practicable	Put in proportionate controls to mitigate or minimise the risk of harm. Proportionate means the greater the risk of harm, the greater the expectation for you to manage it. Refer also to EPA Publication 1856
Secondary Treatment	Aerobic biological processing, settling or filtering of effluent received from a primary treatment system

Septic tank	Single or multi-chambered tank that wastewater flows through slowly allowing suspended solids to settle and be decomposed by anaerobic bacteria
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).
Sludge	Settled liquids/solids in a septic tank
Sodic	A soil condition where the sodium content is high enough to cause clay dispersivity, decreased soil structure stability and decreased soil permeability
Soil permeability	The value that represents the rate a head of liquid infiltrates a soil sample. Measured m/d and referred to as Ksat
State of knowledge	All the information you should reasonably know about risks your business may pose to human health and the environment and steps you should take to eliminate or reduce those risks. This includes information from EPA and other sources.
Wastewater	Discharge from sanitary fixtures and appliances. Waste principally consisting of water and includes any of the following: <ul style="list-style-type: none"> • 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.
Watercourse, receiving environment, waterway	An eroded channel that has a visible bed and bank which is fed from a source other than surface runoff
Water table	The upper surface of groundwater
adapted and modified from AS/NZS 1547:12, <i>Onsite Domestic Wastewater Management and EPA GOWM</i>	



Appendices

9.1

Threats from Domestic Wastewater

There is a range of threats to receiving environments from domestic wastewater. These threats and the values they impact upon are summarised below.

9.1.1

Microbiological contamination

There are established links between human wastewater and disease¹. Pathogenic organisms can exist in wastewater and receiving environments such as waterways. Pathogens are usually shed into the faeces of infected individuals creating the presence of the organism in wastewater.

Microbiological contamination, namely bacteria, viruses and other pathogens, pose a significant threat to human health, recreational activity and water supply. Microbiological contamination can enter waterways via on-site sewage systems discharges in unsewered residential areas. Infiltration of contaminated wastewater to groundwater aquifers can threaten values associated with groundwater.

Pathogens that can be found in wastewater are listed in table 1. Table 1 outlines the concentration of the pathogen released from an infected individual to wastewater and the infectious dose required to infect an individual².

Table 13 – Microbial Pathogens in Wastewater

Examples of Microbial Pathogens that can be Found in Wastewater			
Microbial type	Major diseases	Concentration in wastewater	Infectious dose**
Viruses			
Enterovirus		Medium to high	Low
Enterovirus	Gastroenteritis	Medium to high	Low
Echovirus	anomalies, meningitis.	Medium to high	Low
Coxsackievirus		Medium to high	Low
Hepatitis A virus	Hepatitis	Medium to high	Low
Adenovirus	Respiratory disease, conjunctivitis	Medium to high	Low
Reovirus	Not established	Medium to high	Low
Calicivirus		Medium to high	Low
Norwalk agent	Gastroenteritis, diarrhoea,	Medium to high	Low
SSRV	Vomiting, fever.	Medium to high	Low

1 Pengilly, Warren, "The Wallis Lake Oyster Litigation: Appellate Proceedings in Relation to Gallimaufry of Product Liability Claims" [2003] JCU Law Review 8; (2003) 10 James Cook University Law Review 143. <http://www.austlii.edu.au/au/journals/JCULawRw/2003/8.html>

2 Modified from CSIRO, Simon Toze, Microbial Pathogens in Wastewater: Literature Review for Urban Water Systems Multi-divisional Research Program, Technical Report No 1/97, June 1997. <http://www.clw.csiro.au/publications/technical97/tr1-97.pdf>

Examples of Microbial Pathogens that can be Found in Wastewater

Rotavirus	Gastroenteritis	Medium to high	Low
Astrovirus	Gastroenteritis	Medium to high	Low
Bacteria			
Vibrio cholerae	Cholera	Medium to high	High
Salmonella typhi	Typhoid, Salmonellosis	Medium to high	High
Enteropathogenic E.coli	Gastroenteritis	Medium to high	High
Campylobacter jejuni	Gastroenteritis	Medium to high	High
Shigella dysinterae	Dysentery	Medium to high	Low
Yersinia enterocolitica	Yersiniosis	Medium to high	High
Protozoa			
Giardia intestinalis	Giardiasis	Low to medium	Low
Cryptosporidium parvum	Diarhoea, fever	Low to medium	Low
Entamoeba histolytica	Amoebic dysentery	Low to medium	Low
Helminths			
Ascaris lumbricoides (round worm)	Ascariasis	Low	Low
Ancylostoma spp. (Hook worm)		Low	Low
Trichuris trichiura (whip worm)	Trichuriasis	Low	Low
Strongiloides stercoralis	Strongyloidasis	Low	Low

9.1.2

Nutrients

The concentration of phosphorus is highly elevated in domestic wastewater. As indicated phosphorus binds to soil and sediment particles and can enter stormwater via on-site sewage systems which can contribute significant nutrient loads to receiving waterways causing algal and plant growth which create eutrophic conditions that can threaten aquatic ecosystem values. Excessive algal and plant growth also threatens other values by increasing the cost of water treatment and restricting recreational activity. The development of toxic blue-green algal blooms can threaten stock and human health.

Table 14 – Typical characteristic of untreated wastewater

Parameter	Loading	Greywater	Blackwater
Biochemical Oxygen demand	200 - 300 mg/L	35%	65%
Suspended solids	200 - 300 mg/L	40%	60%
Total Nitrogen	20 - 100 mg/L	20 - 40%	60 - 80%
Total phosphorous	10 - 25 mg/L	50 - 70%	30 - 50%
Faecal coliforms	10 ³ - 10 ¹⁰ cfu/100ml	medium - high	high

Nutrient contamination of receiving environments is largely agricultural based however the nutrient load of grey water and black water is quite high and adds to the cumulative effect of nutrients present in waterways³. As discussed, excessive nutrients in receiving environments lead to the growth of nuisance plant species and algae and possibly eutrophication.

Typical concentrations from treated effluent are likely to be similar to Table 15 – Typical concentration of nutrients in treated effluent:

Table 15 – Typical concentration of nutrients in treated effluent characteristic of untreated wastewater

Nutrient	Concentration in treated domestic effluent (mg/l)
Total nitrogen (TN)	15-75
Ammonia (NH ₃)	negligible
Nitrites and nitrates (NO ₂ and NO ₃)	15 - 45
Total phosphorus (P)	4 - 10

The nutrient objectives for coastal plains waterways, including the rivers of Wyndham, are 600ug/l (0.6mg/l) for total Nitrogen and 45ug/l (0.045mg/l) for total Phosphorus⁴. The nutrient load of wastewater, grey, black and treated, would indicate that wastewater from faulty or failing systems or greywater discharge is likely to have an impact of the waterway.

³ EPA Victoria Publication 905, Policy Impact Assessment – State Environmental Protection Policy (Waters of Victoria). <http://www.epa.vic.gov.au/-/media/Publications/905.pdf> Accessed 20/05/2016

⁴ EPA Victoria Publication 792.1, Nutrient Objectives for Rivers and Streams, 2003 <http://www.epa.vic.gov.au/-/media/Publications/792%201.pdf>

9.1.3

Salinity

Generally, salinity is a symptom of a rising water table. The primary area of concern is the Deutgam Water Supply Protection Area, although concerns are normally in relation to a falling water table (due to high extraction rates). This is in particular a significant risk in the market garden area of Werribee South, where there is constant irrigation and there are over 250 registered bores. However, the aquifer is managed by Southern Rural Water under the *Deutgam WSPA Local Management Plan, April 2023*.

Whilst onsite wastewater has the potential to add to salinity, there are no specifically identified issues within the Wyndham Municipality currently.

9.1.4

Flooding

Parts of Little River in the south of the Municipality are affected by flooding (1-5%AEP). Investigations and recommendations have been made in the *Little River: Drainage and Domestic Wastewater Treatment Strategy, March 2019*. The recommendations are:

- Upgrade the drainage system
- Upgrade onsite wastewater treatment in all properties to comply with Code of practice – onsite wastewater management (now the GOWM)
- OR Construct a reticulated sewer treatment system

9.1.5

Soils

Soil types are an important factor when considering the disposal method of treated effluent. If soils are too permeable there is a risk of ground water contamination if they are not permeable enough there is a risk of surface pooling. The soils in Wyndham have very low permeability and this means water does not readily move through the soils.

The soils in Wyndham are predominantly clays which derive from the original basaltic rocks of the underlying volcanic plain. These soils form the majority of soils in Wyndham and are poorly drained and have limited permeability. This means that out of necessity, any onsite disposal area must be fairly large to ensure effluent is absorbed, evaporated and/or transpired.

The Basaltic clays tend to be sodic and dispersive. This means they do not accept effluents well and will degrade and clog soil pores, reducing the permeability of the soil.

Soils of the Hoppers Crossing, Tarneit/Mount Cottrell and Little River areas consist of silty topsoil overlying residual clays of high plasticity underlain by basalt rock. Much of the Hoppers Crossing area has a relatively thin (but mappable) aeolian silt deposit overlying the residual profile. Soils of Werribee South consist of silty topsoil overlying silty clay deltaic deposits.⁵

⁵ Paul Williams and Associates Pty Ltd, City of Wyndham Domestic Wastewater Management Plan: Land Capability Assessment Methodology for Hoppers Crossing, Tarneit/Mount Cottrell, Little River and Werribee South

Due to the predominant soil types in the municipality, septic systems can be subject to pooling of effluent if blocked or overloaded. Standard practice is to encourage the use of soil improvement with the liberal use of gypsum. Soil used for back filling and top dressing trenches must be sandy loam.

The majority of the soil in Wyndham is the highest risk as it is defined as category 6 because of its high clay content and poor permeability.

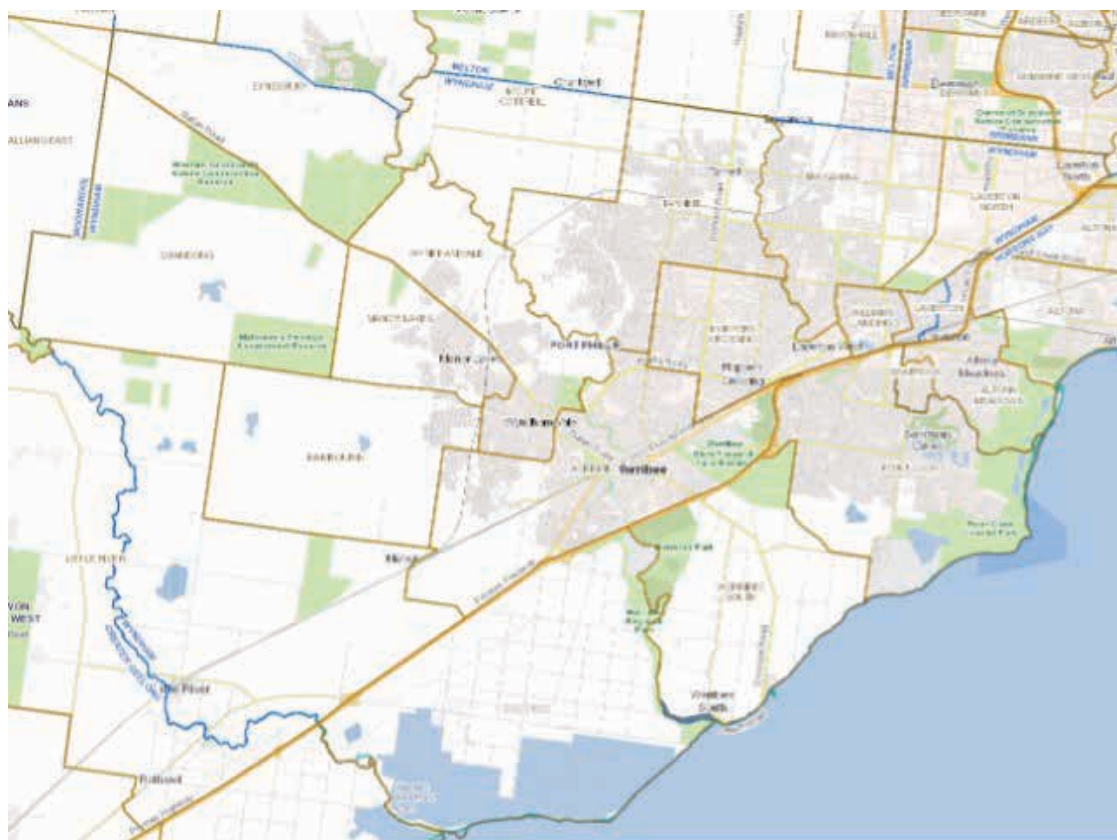
An assessment of soil/land properties was undertaken by Paul Willams and Associated Pty Ltd. The assessment is to assist in the development of a simplified land capability assessment methodology for the Hoppers Crossing, Tarneit/Mount Cottrell, Little River and Werribee South areas. That assessment forms part of this OWMP. The full details are contained in *City of Wyndham Domestic Wastewater Management Plan: Land Capability Assessment Methodology for Hoppers Crossing, Tarneit/Mount Cottrell, Little Rive and Werribee South*.

Although carried out under the previous Code of Practice for Onsite Wastewater Management (EPA doc 891.4), the methodology has not been superseded by the *EPA GOWM* or *EPA EDRS* (the replacement documents for 891.4).

9.2

Locality boundaries within WCC

Figure 4 – Map of locality and ward boundaries within WCC



9.3

Risk assessment area data boundaries

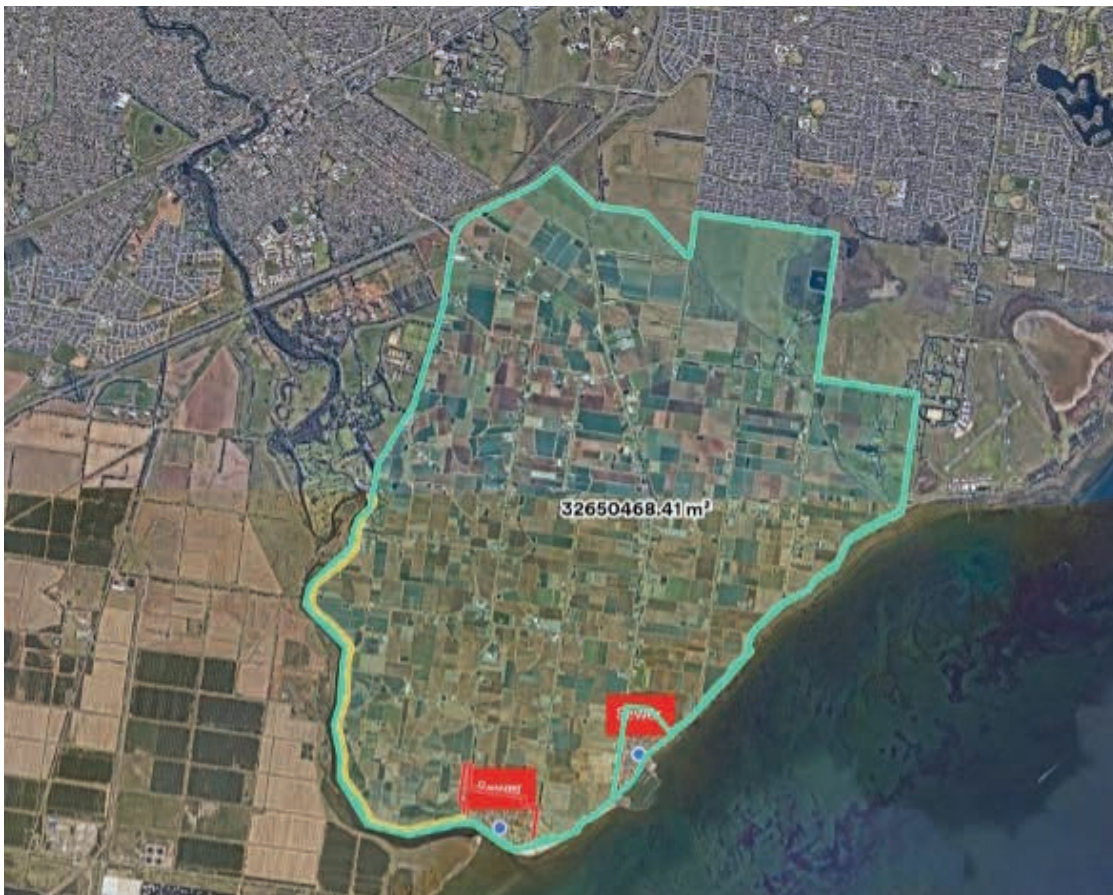
The following show the boundaries and setbacks used for the collection of the data used in the risk assessment.

9.3.1

Werribee South

Werribee south. There are two small sewered areas in the south.

Figure 5 – Werribee South



For watercourses: there are two yellow lines (at 60m and 100m from the watercourse)

For Bores: For each bore there are two circles (100m diameter and 250m diameter). Note these are only the registered bores sourced from Visualising Victorian Groundwater, additional bores may be present and some may no longer be in operation.

Figure 6 – Werribee South bores and proximity to watercourses

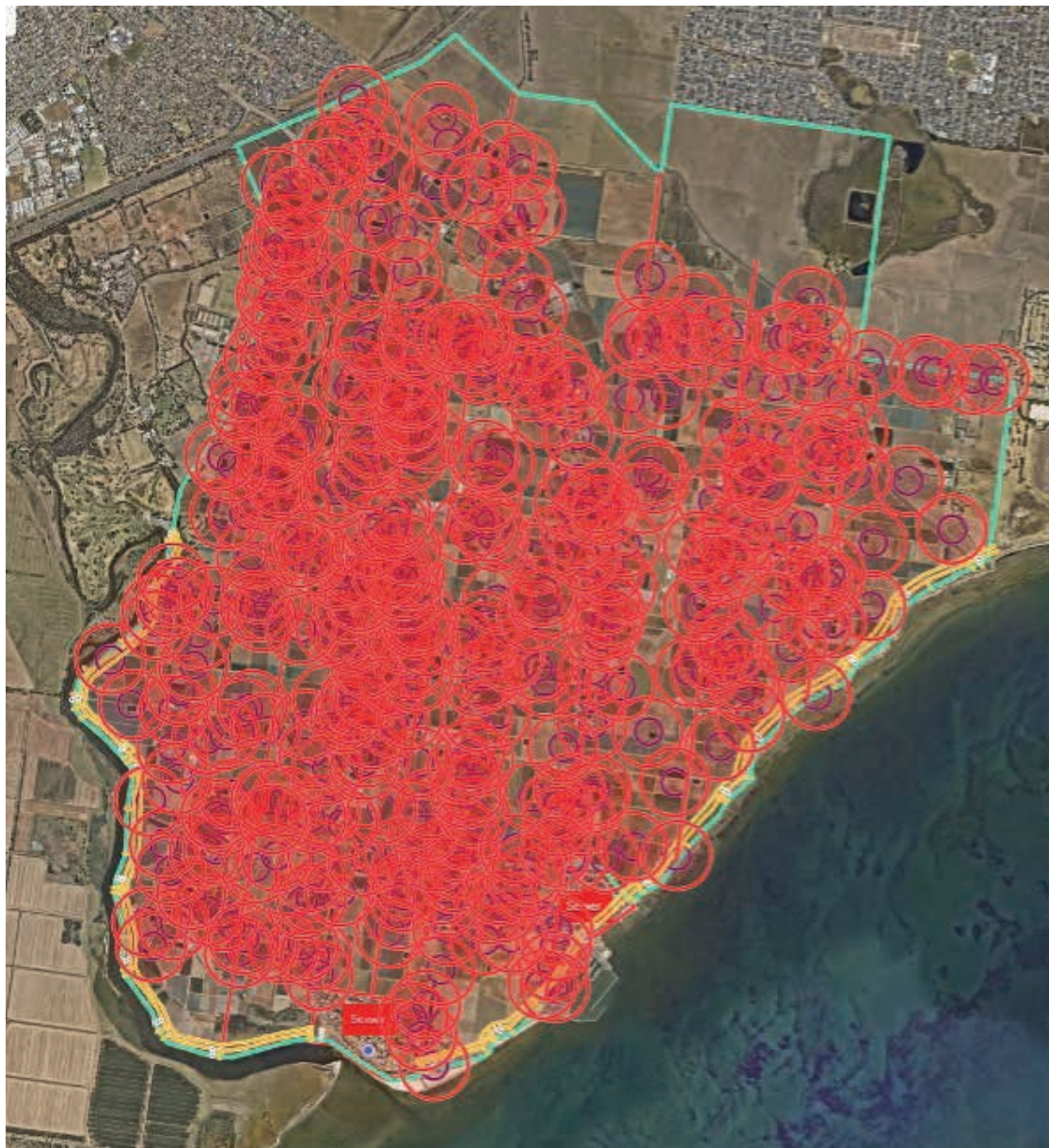


Figure 8 – Hoppers Crossing bores and proximity to watercourses



9.3.3

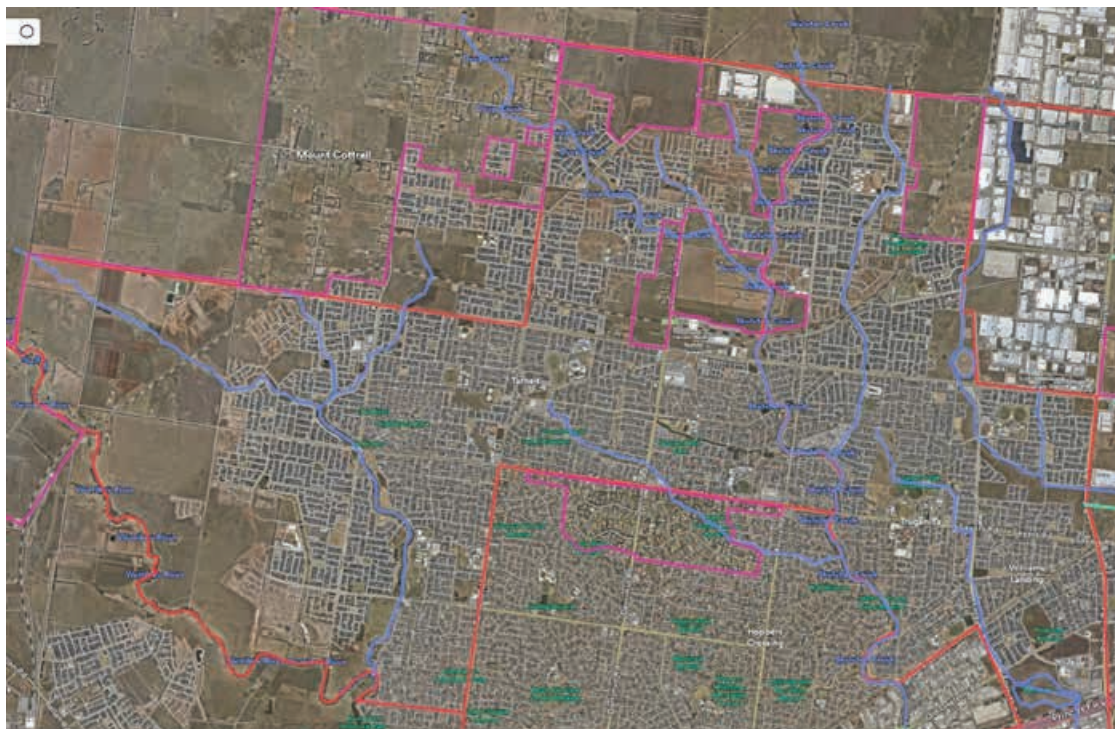
Tarneit/Truganina

The majority of Truganina is sewered except for a few small sections between Laverton North and Tarneit, so these were included in the risk assessment for Tarneit area.

Tarneit has two sections that are unsewered or partially unsewered. The north section is rapidly achieving sewer infill by developer led subdivisions. These areas outlined in pink are what currently remains unsewered. These consist of large lifestyle farming allotments (mostly over 4 Ha) and some smaller rural living allotments.

The West/Southwest remains unsewered and is mostly larger farmland allotment, it is also slowly achieving sewer infill via developer installed sewer.

Figure 9 – Tarneit and parts of Truganina



For watercourses: there are two yellow lines (at 60m and 100m from the watercourse)

For Bores: For each bore there are two circles (100m diameter and 250m diameter). Note these are only the registered bores sourced from Visualising Victorian Groundwater, additional bores may be present and some may no longer be in operation.

Figure 10 – Tarneit (north section) bores and proximity to watercourses

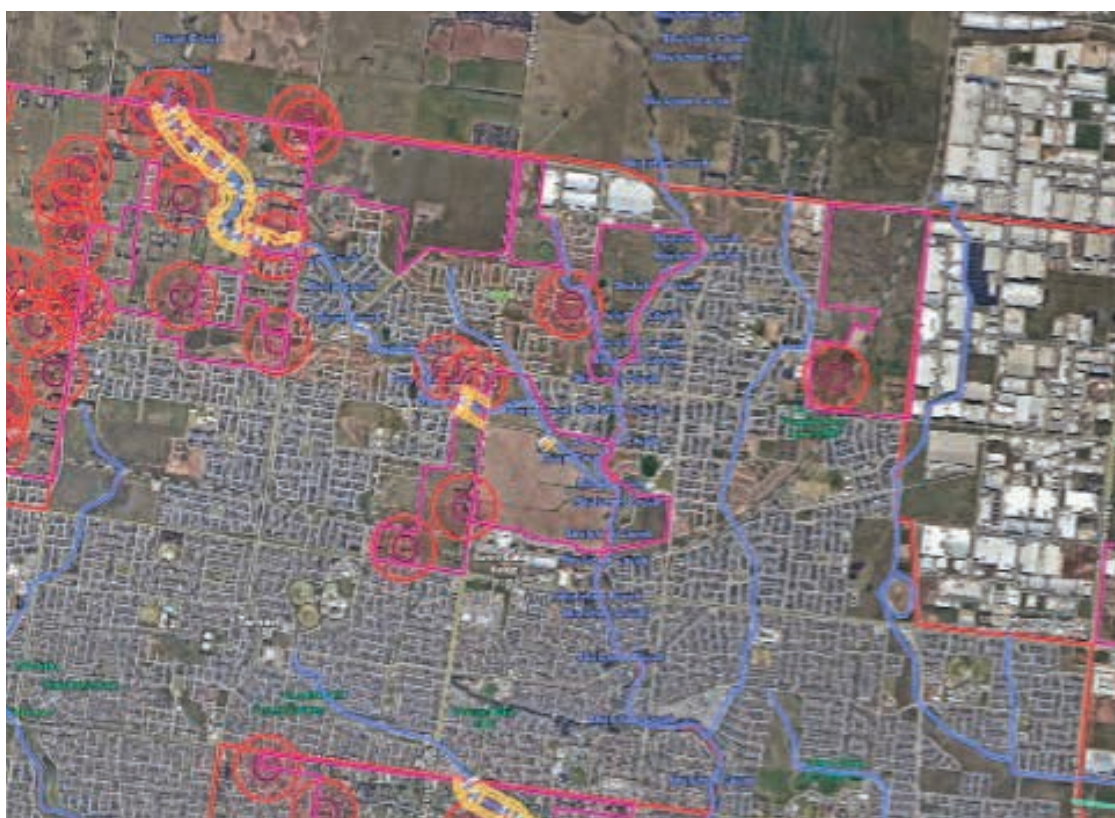


Figure 11 – Tarneit (southwest section) bores and proximity to watercourses



9.3.4

Mount Cottrell

The east of Mount Cottrell has a significant number of large lifestyle allotments that remain unsewered. Parts of the east are have been subdivided and developer led sewer installation has been occurring. Like Tarneit, the median lot size is around 4 Ha.

Figure 12 – Mount Cottrell

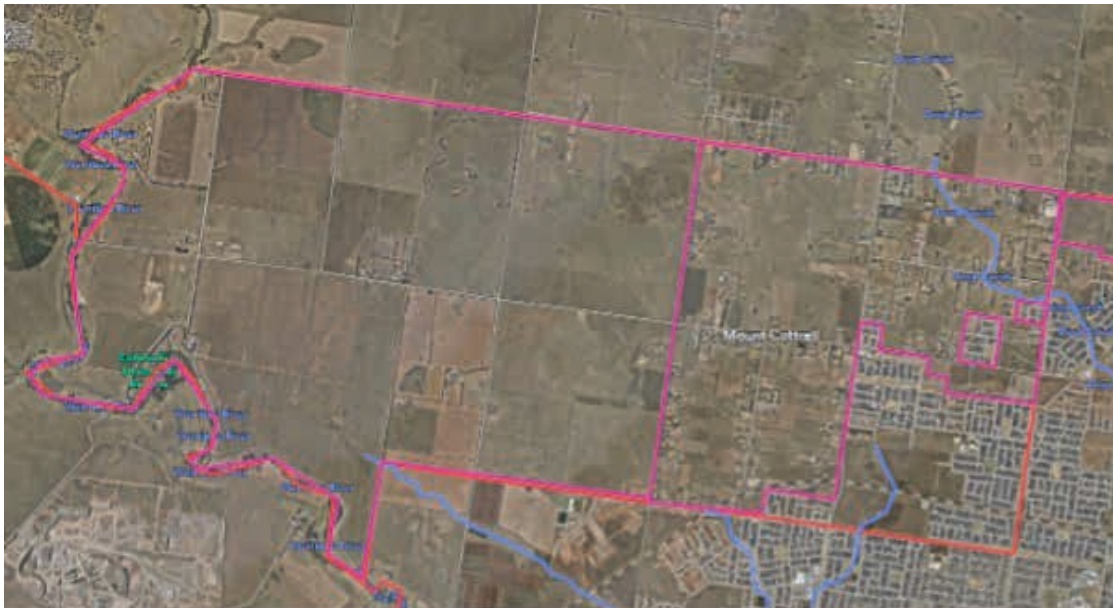
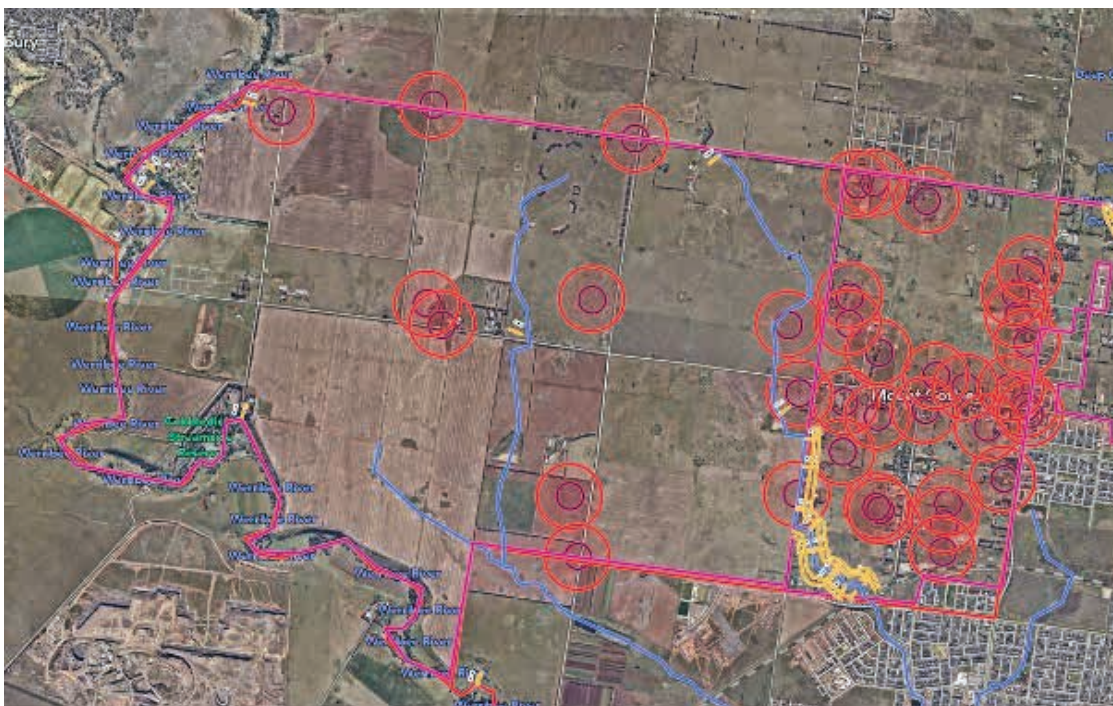


Figure 13 – Mount Cottrell bores and proximity to watercourses



9.3.5

Laverton North

There are only a small number of streets and locations that remain unsewered in Laverton North, the areas outlined in pink. (green is sewer line).

Figure 14 – Laverton North

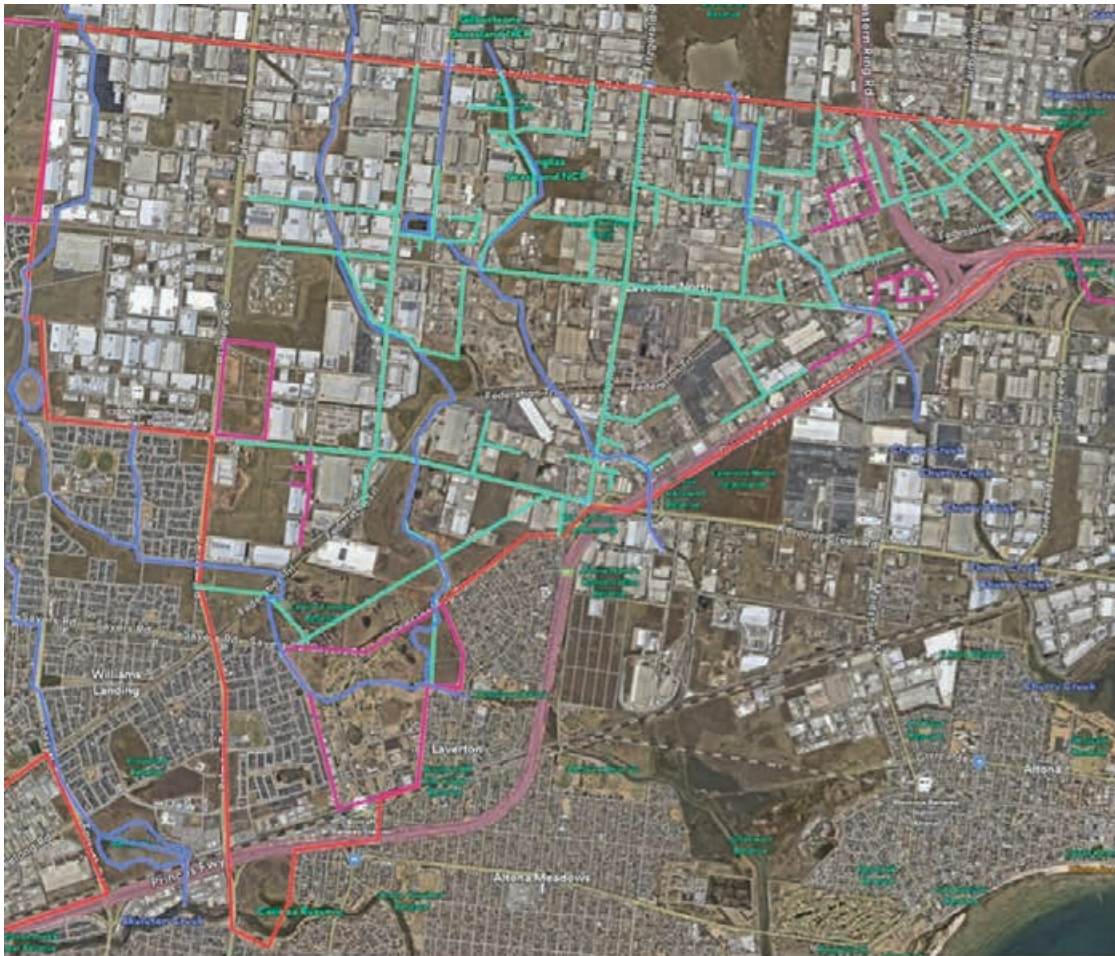


Figure 15 – Laverton North bores and proximity to watercourses



9.3.6

Little River

The township of Little River is not sewered. It consists of some 255 allotments. Many of which are small allotments (in terms of wastewater disposal).

Figure 16 – Little River

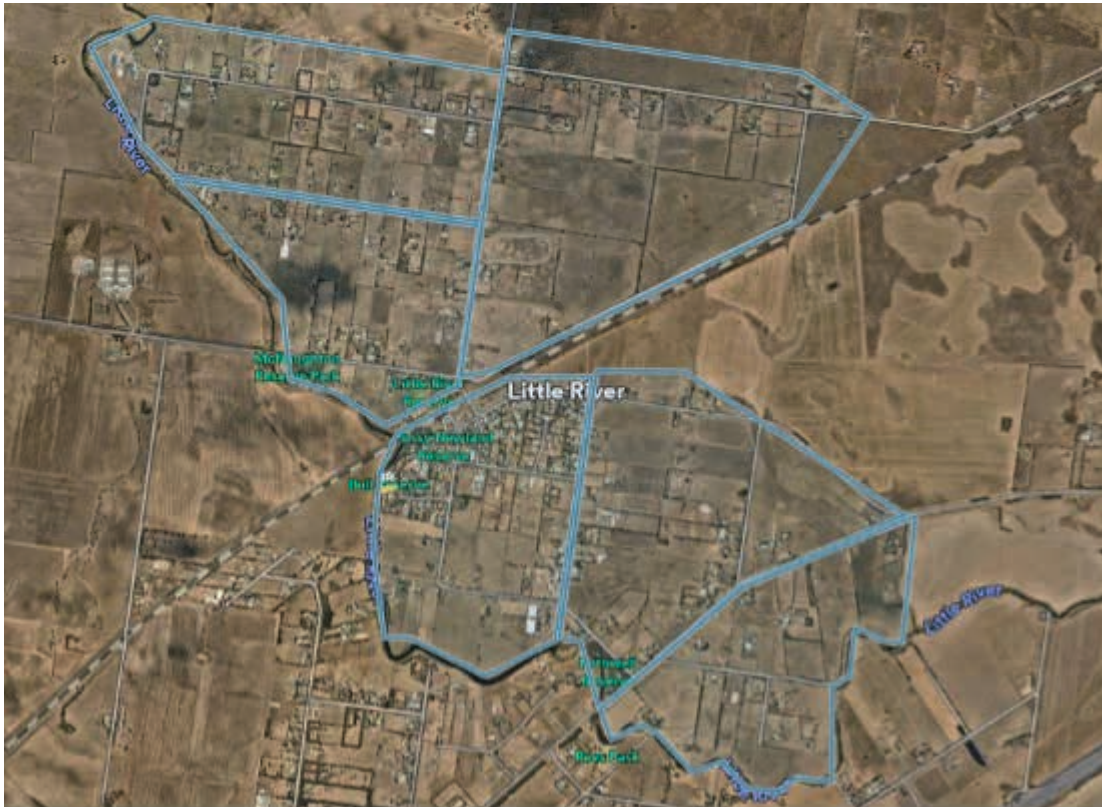
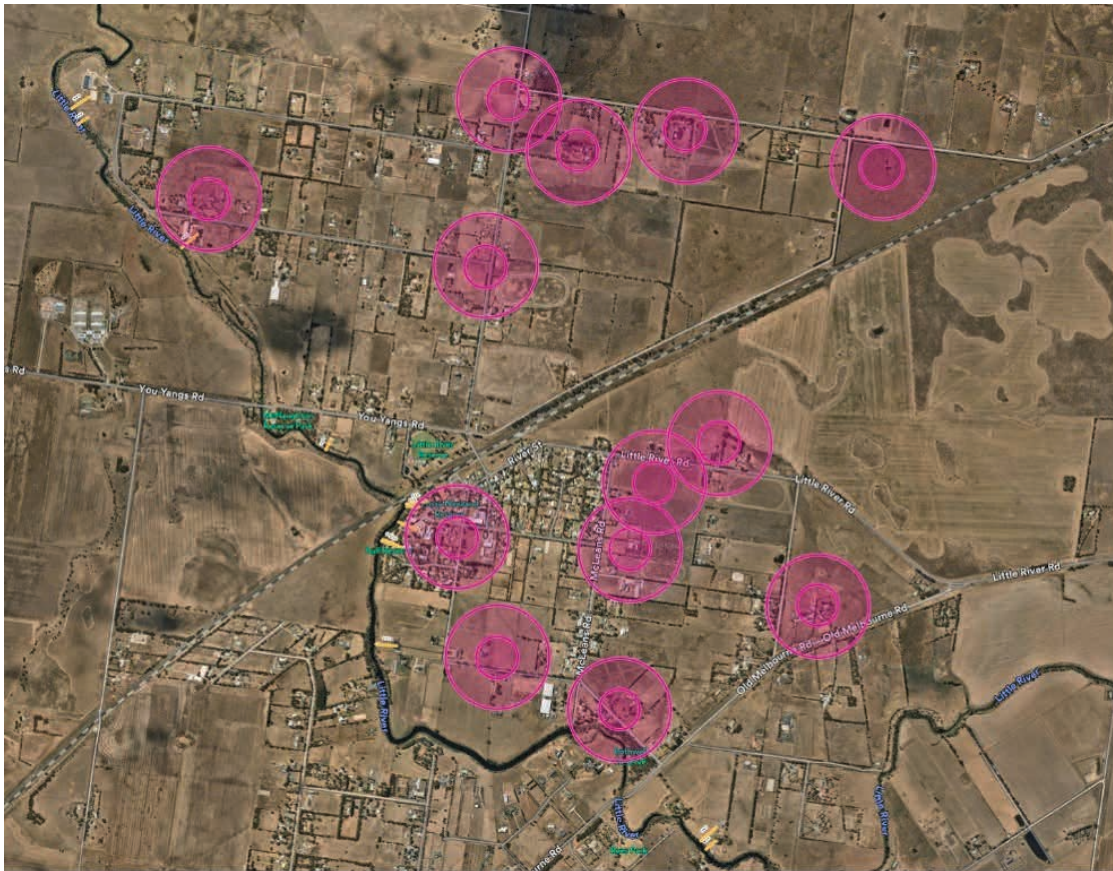


Figure 17 – Little River bores and proximity to watercourses





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