



# Tertiary treatment and Class A recycled water

June 2020

This information sheet outlines our research into the feasibility of installing a tertiary treatment facility and the production of Class A recycled water at the Warrnambool Sewage Treatment Plant.

## Introduction

We're upgrading our Warrnambool Sewage Treatment Plant (STP) in a \$40 million project that will enable us to support growth in south-west Victoria through to 2040.

The upgrade will increase the capacity of the plant by around 50 per cent and enable maintenance of treatment standards critical for environmental protection at the ocean outfall.

The project will:

- Improve solids removal with the inclusion of a new inlet screening system as well as tertiary effluent screening
- Expand existing secondary treatment, including nutrient removal, to manage environmental and public health risks
- Include a foul air collection and treatment system.

This capacity upgrade is the first step as part of a long term strategy and will enable future improvements at the site, such as enhanced nutrient removal, tertiary treatment and/or the production of recycled water for commercial reuse when the timing is right.

The Warrnambool STP currently provides treatment of sewage and industrial wastewater by removing physical, chemical and biological contaminants. The aim is to produce treated effluent that is suitable for discharge to the ocean in accordance with our Environment Protection Authority (EPA) licence and State Environment Protection Policy (SEPP) requirements.

Each year the STP also produces around 60 million litres of recycled water of a quality suitable for reuse within the plant for process water e.g. equipment cleaning and hoses.

The capital cost of building a treatment facility that would produce high quality recycled water for toilet flushing, garden watering etc (Class A) is estimated to be more than \$1 million per million litres of wastewater treated. For 2040 flows through the Warrnambool STP, this equates to an estimated \$30 to 40 million on top of the \$40 million already committed for the current upgrade.

In addition to the capital cost, the annual operating cost to run a tertiary treatment facility is expensive and would need to be shared by Wannon Water's domestic and industrial customers on an ongoing basis each year resulting in higher bills. Our customers tell us that maintaining bill affordability is important.

We've previously commissioned investigations into possible large-scale reuse applications, and sought expressions of interest from third parties for recycled water. However, these processes have not identified any feasible applications, meaning there is currently no driver to produce recycled water.

Another key constraint is the high salt content originating from major industries in the region. The current salt concentration in the Warrnambool STP effluent is too high for sustainable irrigation systems or for residential reuse schemes without the use of a desalination process to reduce the level to a more suitable concentration.

The inclusion of a salt reduction plant would further increase the capital and operating cost of a Class A plant at the Warrnambool STP, while significantly increasing the STP's environmental footprint through electricity consumption and waste by-products.



## What are the different types of wastewater treatment?

**Preliminary treatment** involves the initial screening of sewage and industrial wastewater to remove solids and non-biodegradable items followed by grit removal.

**Primary treatment** consists of temporarily holding the sewage in a basin or clarifier where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid is transferred to the next stage of treatment.

**Secondary treatment** removes dissolved and suspended biological matter. Secondary treatment is typically performed by water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment.

**Tertiary treatment** allows further disinfection either chemically or physically to remove additional compounds prior to discharge or reuse. These compounds include biological (pathogens), chemicals (such as nutrients) or physical (such as solids and colour).

## What is recycled water?

According to the EPA, recycled water is water that has been derived from sewerage systems or industry processes that has been treated to a standard appropriate for its intended use

**Class A** is the highest quality of recycled water with the widest range of uses including those which involve direct human contact. These include non-drinking purposes (such as toilet flushing, garden watering and car washing) where dedicated dual pipework systems have been installed in new housing developments. It can also be used for large irrigation schemes that produce edible crops intended for raw or unprocessed consumption. Class A reuse schemes require EPA approval and the Department of Health's endorsement, and the treatment process must be validated to manage the health and wellbeing of the community. The EPA has advised that Class A is not a requirement for discharge to the environment, nor is it really an appropriate standard for environmental discharge.

**Class B** recycled water can be used to irrigate sports fields, golf courses and dairy grazing land. It can also be used for industrial wash-down, but has restrictions around human contact.

**Class C** is suitable for uses including for cooked or processed human food crops such as wine grapes and olives. It can also be used for livestock grazing and fodder, and for human food crops grown more than a metre above the ground and eaten raw such as apples, pears, table grapes and cherries. It can be used for other specific purposes but there are restrictions around human contact.

**Class D** has received the least amount of treatment of all four classes of recycled water and can be only used for non-food crops such as instant turf, wood lots and flowers.

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## Why consider tertiary treatment at the Warrnambool STP?

The illegal dumping of pre-production plastic pellets through the Warrnambool STP in November 2017 highlighted the global problem of plastic pollution on beaches.

Locally, there has been an increased community focus on protecting the coastal environment and a number of people have become concerned about the impact of sewage outfalls on the marine environment.

We initially assessed 11 options for the capacity upgrade including the construction of a new treatment plant on a greenfield site outside Warrnambool, treated wastewater disposal routes and opportunities for reuse. Expansion of the existing STP, along with continued ocean outfall discharge, was the preferred option. This was based on balancing capital and operational costs, technical considerations, and environmental and social impacts using a weighted criteria system. This decision was made by the Wannon Water Board following extensive engagement within Wannon Water and with the community.

However, we are committed to enhancing our environmental performance through climate change mitigation and adaptation and will continue to investigate opportunities for reuse applications and additional treatment in the future. The capacity upgrade is a necessary project irrespective of any future decisions regarding Class A treatment or other tertiary treatment processes.

## How much would a Class A tertiary treatment facility cost?

Tertiary treatment facilities vary significantly depending on the secondary treatment process and the required level of tertiary treatment or the end use.

The steps to produce Class A water typically involve membrane filtration, desalination, UV disinfection and chlorination.

The capital cost of building a Class A tertiary treatment facility for the Warrnambool STP is estimated to be more than \$1 million per megalitre of wastewater treated.

For 2040 flows through the Warrnambool STP, this equates to an estimated \$30 to 40 million on top of the \$40 million already committed for the current capacity upgrade.

## Is there a market near Warrnambool for recycled water?

We've previously commissioned investigations into possible large-scale reuse applications, and sought expressions of interest from third parties for recycled water. However, these processes have not identified any feasible applications, meaning there is currently no driver to produce recycled water.

Some of the barriers to commercial use of recycled water from the STP include:





- Urban drinking water supply is secure so there is no incentive for business or industry to consider using alternative sources
- Readily available alternative groundwater sources are also plentiful for open space watering or agricultural uses.
- The cost to produce recycled water at the Warrnambool STP would be much higher than the cost of water produced from other sources such as the urban drinking water supply or a groundwater bore.
- There is no regulatory requirement for dual pipe in new housing developments
- Recycled water as a drinking water supply is not permitted in Victoria.

Another key constraint for the Warrnambool STP is the high salt content originating from major industries in the region. The current salt concentration in the Warrnambool STP effluent is too high for sustainable irrigation systems or for residential dual pipe schemes without the use of a desalination process to reduce the level to a more suitable concentration.

The inclusion of a salt reduction plant would further increase the capital and operating cost of a Class A plant at the Warrnambool STP. Significant increases in the STP's environmental footprint would occur through increased electricity consumption, production of Greenhouse Gasses and a concentrated brine by-product.

## Could you produce Class A water for discharge to the ocean?

A report prepared by the Clean Ocean Foundation in 2019 recommended that every ocean outfall in Australia should be upgraded to tertiary treatment by 2030. The foundation is an Australian environmental charity which aims to preserve the marine environment by stopping all forms of ocean pollution.

The report identifies the Warrnambool STP as one of the worst prospects in Victoria for accommodating a tertiary treatment upgrade based on the net benefits versus costs over a 30-year timeline with net benefits being lower than the costs.

## What does the future hold?

A recycled water reuse system would require recycled water storage, an extensive pipe network and large pump stations to carry the water to its end use. The annual operating and maintenance costs to run a tertiary treatment facility plus the delivery infrastructure is expensive. This would be partially recovered by selling recycled water but any remaining costs would increase the bills of Warrnambool Water's domestic and industrial customers.

We acknowledge that community perception and industry requirements change with time and we've been working on an adaptive strategy to assist with planning of future upgrades for the Warrnambool STP.

A tertiary treatment facility at Warrnambool is possible in future where broad community support exists for a sound recycled water investment which minimises the prospect of bill increases.