

# The Well

## Wastewater treatment

Sewage is more than 99 per cent water which can be recycled and reused. It mainly comes from household sinks, showers, toilets and washing machines, and every year we manage and treat millions of litres of sewage helping keep South Australians and our environment healthy.

We operate 28 wastewater treatment plants across the state.

Our three major wastewater treatment plants at Bolivar, Glenelg and Christies Beach process more than 250 megalitres of sewage every day. That's about five full baths every second!

As well as household sewage, we manage trade waste, which is any used water and substances from commercial, industrial, business trade or manufacturing activities. Some trade waste is suitable to add to the digesters at wastewater treatment plants where it can increase the production of biogas which helps power the treatment plant.

### The process

#### Primary treatment

##### Screens

Screens are used to remove large objects that make their way into the sewer. This can include plastic, food scraps, packaging and plant debris.

##### Grit removal

The sewage passes through two grit vortexes where the grit is removed. The grit is washed and taken away to landfill.

##### Primary sedimentation tanks

By this stage, all large solids are removed leaving water which has some small solid particles. The water moves to the primary sedimentation tanks where the remaining solid particles sink to the bottom. These solids are known as raw or primary sludge.

#### Secondary treatment

##### Activated sludge reactors

The water from the primary settling tanks is mixed with microorganisms (mainly bacteria) and aerated. The microorganisms grow and reproduce as they feed on the organic pollutants and nutrients in the water. The mass of microorganisms is called a biomass or activated sludge.

##### Secondary sedimentation tanks

Here the biomass settles to the bottom of the tank leaving the water on the top. Some of the sludge is reused back in the aeration tanks. The clarified water goes into stabilisation lagoons.

##### Stabilisation lagoons

The water from secondary sedimentation tank stays in the stabilisation lagoons for about 20 to 30 days to further improve the quality.

##### Return to ocean

After treatment the water is suitable for release into the ocean.

##### Filtration and disinfection

A portion of the water from the stabilisation lagoons is then filtered and chlorinated before it is reused.

##### Advanced water recycling plant

A portion of the water going through to stabilisation lagoons is treated further in an advanced water recycling plant before it is reused in agriculture.

##### Managed aquifer storage

During winter, when demand is much lower, the recycled water is stored underground (and above ground) ready to be used when the weather is warmer and drier, providing a climate independent supply of recycled water.



### Reuse – homes and open spaces

South Australia is one of the nation's leaders when it comes to using recycling water. The water is treated to an appropriate standard for reuse before it is supplied to some customers for use on gardens, washing cars and flushing toilets. Recycled water is also used to irrigate open spaces and sports grounds including the Adelaide Park Lands. In 2018-19, we supplied more than 32 million litres of recycled water to residents and businesses.

### Reuse – agriculture

Recycled water from Bolivar Wastewater Treatment Plant is supplied to growers in the Virginia area north of Bolivar to irrigate market gardens and greenhouses which grow high value commercial food crops.

## Making biosolids and biogas

### Sludge thickeners

The raw sludge from primary and the secondary sedimentation tanks is thickened to reduce water content before feeding it into the digestion tanks.

### Digestion tanks

Here the thickened sludge is heated and mixed to speed up the natural breakdown of organic matter. The bacteria in these tanks live happily without oxygen and feed on the sludge producing gases including methane which is used to power the site's energy requirements.

### High strength trade waste

Waste from industrial sources is much more concentrated than sewage. This waste, which is mostly from the food and beverage industries, can be added to digestion tanks where it helps to produce additional gas.

### Drying lagoons

After digestion, the sludge is sent to drying lagoons where it is air dried for about one to two years to create biosolids, which looks and smells like compost.

### Centrifuge

A portion of the digested sludge is diverted to centrifuges where it is mechanically dewatered to speed up drying process to create biosolids.

### Reuse – biosolids

Biosolids are treated sludge so they are safe to handle. They are used by farmers to improve soil health and crop growth. South Australian farmers have been using biosolids from Bolivar Wastewater Treatment Plant since the 1960s. At Bolivar more than 35,000 tonnes of biosolids are produced every year, and this is not enough to meet demand!

### Reuse – biogas

The gases produced from the process in the digesters are captured and converted to electricity helping to power the treatment plant. When there is excess electricity produced, it is exported to the electricity grid.

## Did you know?

- With 380 kilometres of pipe networks and 6,935 connections, we have the longest recycled water mains network in Australia.
- We recycle more than 30 per cent of our wastewater, the second highest percentage of all large utilities in Australia.
- The bamboo that feeds Adelaide Zoo's pandas Wang Wang and Fu Ni is grown using recycled water.
- On average, humans produce 128 grams of poo a day. The population of Adelaide is currently just over 1.36 million people...
- ...that means there are just over 170 tonnes of poo produced in Adelaide every day, that's roughly equal to the weight 32 male Asian elephants.
- Poo is 75 per cent water and 25 per cent solid material. Of the solid material, around 85 per cent is organic material, like carbohydrates, or undigested plant matter, protein and fats. It also includes lots of bacteria and viruses. The rest of the solid material is inorganic materials, like calcium and iron phosphate.

# Sewage treatment plants

Statewide (as at August 2019)

