

# Subiaco Wastewater Treatment Plant

## Odour management

A major odour improvement project, included the covering of odorous areas of the plant and the extraction and treatment of odorous gases, was completed in early 2004.

Odorous gases are collected from the covered tanks and treatment buildings and extracted to four chemical scrubbing towers for treatment. These chemical scrubbers remove the ammonia and hydrogen sulphide from the extracted air and release the treated air, with their low levels residual of odours, to the atmosphere via a 50 metre high stack. The height of the stack ensures very good dispersal of the residual odours.

## Wastewater disposal

The final treated wastewater discharged through the Swanbourne Ocean Outfall 1 kilometre offshore contains higher levels of nutrients (mainly nitrogen and phosphorus) than the surrounding coastal waters.

The impacts of the secondary treated wastewater discharge on the marine environment are monitored by the PLOOM (Perth Long term Ocean Outlet Monitoring) program.

Monitoring at Swanbourne and surrounding beaches has shown that the areas are not affected by the wastewater outlet and are safe for swimming.

For more information on the PLOOM program, visit: [www.watercorporation.com.au](http://www.watercorporation.com.au) (see the Wastewater section under 'Ocean Outfall').

## History of the plant

The Subiaco plant was commissioned as a treatment works in 1927 as part of the Subiaco Sewerage Scheme.

The plant then consisted of two septic tanks, with the treated wastewater being carried in a tunnel to the ocean and discharged out to sea through a 100 metre ocean outlet.

In 1961 the plant was upgraded to include secondary treatment, heated sludge digestion and an ocean outlet.

In 1981 the plant was again redeveloped and expanded to provide a modern treatment process capable of serving more than 300,000 people. The ocean outlet was extended to its current 1.1 kilometre length.

A plant upgrade to the plant completed in 2004, was aimed primarily to provide a very high level of odour control. The upgrade incorporated a new screenings system and grit washing unit, upgraded and additional aeration tanks, fibreglass covers for the primary and aeration tanks, an odour extraction and scrubbing system and the capability to deliver recycled water for irrigation.

The plant is designed to treat up to 61.4 million litres a day, enough water for a population of 350,000 people.

Studies are being conducted to increase plant capacity to 75 million litres a day.



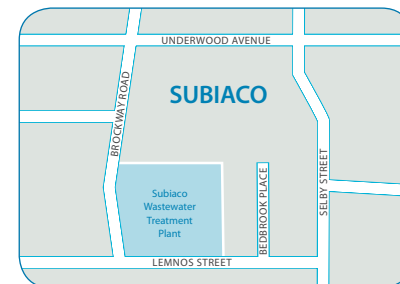
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**The Subiaco Wastewater Treatment Plant treats domestic wastewater mainly collected from the Perth central metropolitan area. The sewerage catchment extends to Perth's eastern suburbs. The plant is designed to treat up to 61.4 million litres a day, enough water for a population of 350,000 people. The treatment process minimises environmental, public health and community impacts.**

The wastewater is predominantly from household kitchens, bathrooms, toilets and laundries. Wastewater entering the plant is more than 99 per cent water.

Along with all wastewater treatment plants across the state, the Subiaco plant is subject to regulation and licensing by the Department of Environment and Conservation.

Most of the treated wastewater from the Water Corporation's metropolitan wastewater treatment plants is discharged to the ocean, but our preference is to use this valuable resource. In the longer term, the Water Corporation believes that most of Perth's wastewater can be recycled. By 2030 it is estimated that water recycling in Perth will exceed 30 per cent.

The Water Corporation believes that major advances in water recycling can be made through large-scale recycling schemes such as:

- Groundwater replenishment, where high quality recycled water is stored in groundwater for use in drinking water supplies;
- Recycling to industry; and
- Providing recycled water to irrigate public parks, garden and for horticulture.

In the Spring / Summer period, some of the treated wastewater from Subiaco Wastewater Treatment Plant is passed through sand filters,

chlorinated and used for irrigation purposes at the McGillivray Sports Park and the treatment plant grounds and gardens. This is Perth's first large-scale public recreation irrigation scheme using recycled water.

## Wastewater treatment process

### Preliminary treatment

Raw wastewater enters the plant via four main sewers that combine at the site into one inlet channel. The raw wastewater entering the plant through the inlet channel flows through one of two 6 millimetre step screens that remove large material, such as rags and plastics, from the inflow. The removed material, called 'screenings', is then washed and compacted ready for disposal to an approved landfill site.

After screening, the wastewater flows through grit removal tanks to allow inorganic material (grit) to settle while the organic material remains in suspension.

Water is drained from the settled grit by a dewatering screw conveyor, washed and sent to an approved landfill site, together with the screenings.

### Primary treatment

Following preliminary treatment, the flow enters the primary treatment process consisting of four circular primary sedimentation tanks and a raw sludge pumping system.

The wastewater remains in the tank long enough for 90 per cent of the settleable solids to settle out on to the floor of the tanks. Mechanical scrapers remove the settled solids and this raw sludge is pumped to sludge blending tanks for further processing. The primary treated wastewater flows to the secondary treatment process.

### Secondary treatment

The Subiaco treatment plant is an advanced secondary treatment process incorporating a conventional activated sludge process with biological nutrient removal. The primary treated wastewater is blended with the microbiological biomass, to form 'mixed liquor' in 11 reinforced concrete aeration tanks.

Mechanical blowers provide the air which is diffused into each of the tanks through a series of fine bubble membrane diffusers on the floor of each of the tanks. This diffused air satisfies the oxygen requirements for the microbial action needed to break down the organic compounds in the primary treated wastewater.

The mixed liquor from the aeration tanks flows into one of 12 circular sedimentation tanks. The sludge that settles in these tanks is continuously removed and returned to the aeration tanks to sustain the microbiological population in the aeration tanks. A portion of this settled sludge (excess activated sludge) is pumped to one of two Dissolved Air Flotation Thickeners (DAFT) before being pumped to the sludge blending tanks prior to further treatment.

The overflow from the sedimentation tanks is the final wastewater, suitable for ocean discharge. It is pumped from the plant through the Swanbourne Ocean Outlet where it is discharged 1 kilometre offshore from Swanbourne Beach, 10 metres below the surface of the ocean.

### Sludge treatment process

The combined raw sludge and thickened excess activated sludge is pumped to centrifuges where it is partly dewatered, producing a biosolids cake. Lime is then mixed with the cake to increase the pH of the material to destroy pathogens. The resulting product is referred to as Lime Amended Biosolids (LAB).

The LAB is stored in large vertical storage bins that are loaded on to trucks and transported to agricultural areas where it is applied, under strict guidelines, to paddocks for use as soil amendment. For more information on the Water Corporation's Biosolids Re-use Program, visit [www.watercorporation.com.au](http://www.watercorporation.com.au) (see the Wastewater section, under 'Biosolids').

