How LMWQCC works

Icon Water owns and operates water and wastewater services to the Australian Capital Territory (ACT). The Lower Molonglo Water Quality Control Centre (LMWQCC) is the ACT's main wastewater treatment plant. The plant uses physical, chemical and biological treatment processes.

Protecting our environment

LMWQCC's treatment process ensures that water discharged into the Molonglo River will not affect the environment. Treated water from LMWQCC plays an important role in keeping local rivers flowing and supporting aquatic life—especially during dry periods—and reducing algae growth. During dry periods, treated water from LMWQCC can provide up to 100 per cent of the total flow of the Molonglo and Murrumbidgee Rivers. Due to this significant contribution to local river systems, maintaining water quality and the effectiveness of the treatment processes is a high priority.

Licensing

LMWQCC operates subject to an Environmental Authorisation issued by the ACT Environmental Protection Authority (EPA) under the *ACT Environment Protection Act 1997 (ACT)*. Performance results are reported to the EPA monthly.

Recycling

Treated water is recycled on-site for process cleaning, cooling, scrubbing and irrigation. It is also supplied off-site to a local golf course.

Treated sewage solids such as sludge, screenings and grit are incinerated to make an ash.

This ash is used as a soil conditioner called Agri-Ash. As it contains a large amount of lime, Agri-Ash can be applied to land in NSW as a liming material under the *Resource Recovery Order* issued by the NSW EPA under the *Protection of the Environment Operations (Waste) Regulation 2014*.

Effluent discharge targets

LMWQCC meets the following effluent discharge targets to ensure that treated water will not be harmful to the environment. Treated water leaving the plant contains less than:

- 550mg of total dissolved solids per litre
- 0.4mg of total phosphorus per litre
- 2,100 kilograms per day total nitrogen average daily load limit
- 10mg of suspended solids per litre
- 1.6–7.4mg of ammonia per litre, depending on the season
- 0.2mg total chlorine per litre
- 200 thermotolerant coliforms per 100 millilitres.

Did you know...

LMWQCC was built in the 1970s and cost $50 million to build at the time. It would cost $600 million to build a similar treatment plant today.

The storage dam can hold up to 147 million litres of wastewater.

Each day the plant:

- treats 80 to 90 million litres of wastewater
- recycles an average of 10 million litres of wastewater
- removes approximately 1 million litres of sludge from the process for dewatering and incineration
- produces approximately 16 tonnes of Agri-Ash.

To find out more visit iconwater.com.au/LMWQCC

Lower Molonglo Water Quality Control Centre (LMWQCC)

Canberra's main wastewater treatment facility

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LMWQCC treatment process

1 Sewage or wastewater enters LMWQCC from homes and businesses across the ACT via two sewer mains. The sewage entering the plant is regulated to maintain a constant flow, normally 1000–1300 litres per second.

2 Sewage entering the plant first passes through fine screens to remove all objects greater than 3 mm (millimetres) in diameter. These objects, called screenings are then macerated, or softened.

3 The screened sewage then moves to the flocculation and grit removal tanks. Flocculation is a chemical process where smaller particles in the sewage aggregate together into larger lumps, called sewage sludge which is easier to remove. This process also allows the grit—made up of heavy particles such as sand—to sink to the bottom where it is removed. Flocculation also removes chemicals like phosphorus. This is crucial as phosphorous largely contributes to the growth of toxic algae in waterways.

4 Sewage then moves to the primary sedimentations tanks where the sewage sludge settles to the bottom of the tank and oils and grease float to the surface. The sludge, oils and grease are then collected and removed.

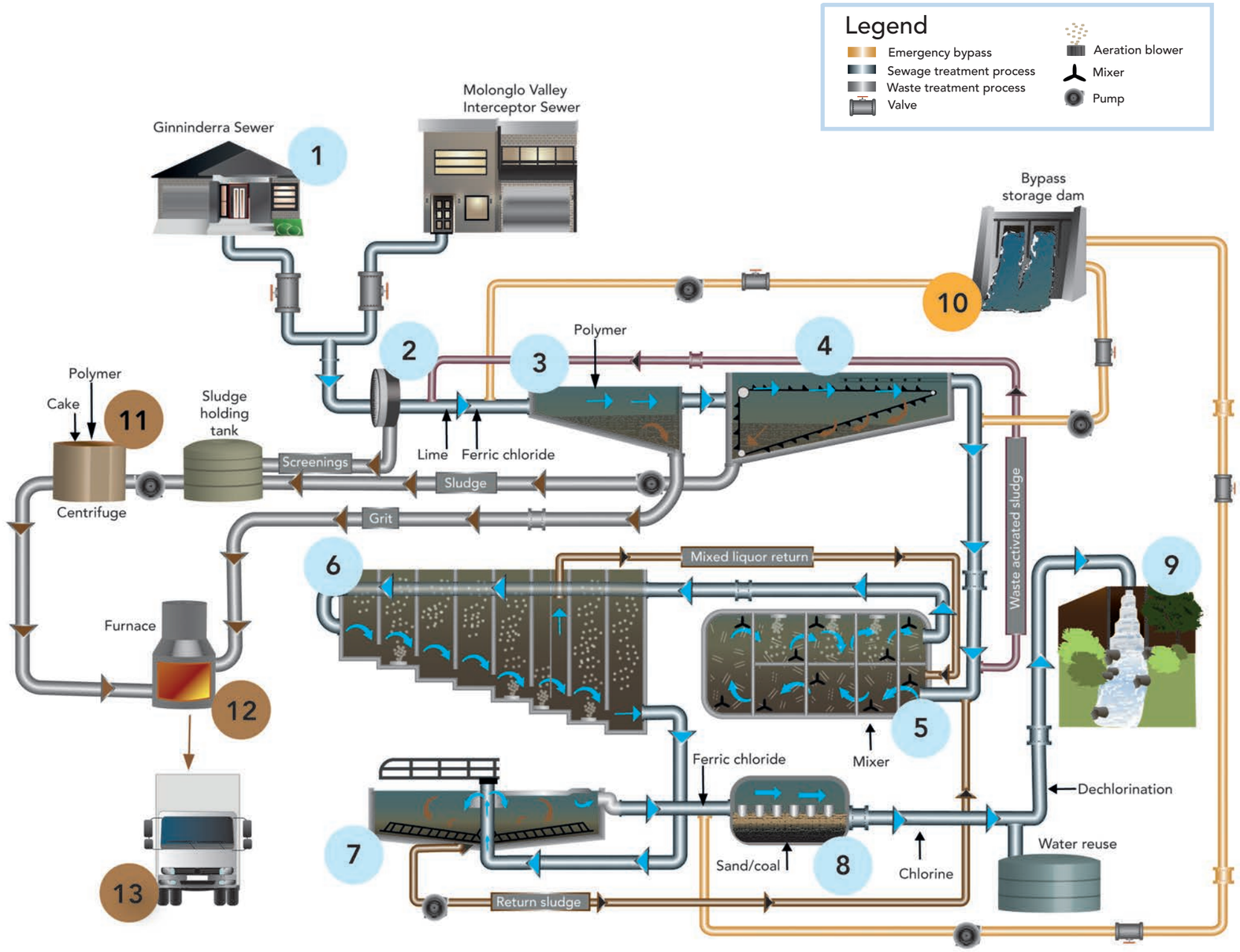
5 The sewage moves to the anoxic (meaning without oxygen) biological reactor tanks where micro-organisms naturally remove nitrate, releasing it into the atmosphere as nitrogen gas. Removing nitrogen and phosphorus is important as they can be harmful to river ecosystems.

6 Sewage then moves to the biological reactor tanks where air is mixed with the returned sludge that now contains microorganisms—called activated sludge. The pumped air provides oxygen to the microorganisms which naturally oxidise ammonia to nitrate.

7 The next step in the process is secondary clarification. This separation process removes solids, including the microorganisms in the sludge. A portion of these micro-organisms are returned back to Step 5 to be reused. The excess activated sludge is returned to the start of Step 3 to be removed with the sewage sludge.

8 Another chemical treatment removes most of the remaining traces of phosphorus, and then the sewage is passed through a set of filters, consisting of one metre of finely crushed coal and half a metre of sand. This filtering process removes solids that remain in the sewage, leaving a clear effluent (or liquid waste).

9 Chlorine disinfection is then used to kill any remaining microbiological pathogens. The effluent is then treated with sulphur dioxide gas to remove excess chlorine as too much chlorine can be harmful to a river's ecosystem. The effluent is then ready for discharge into the river. Chlorinated water can also be re-used within the plant or for other non-drinking purposes.



10 Screened sewage can be moved to the bypass storage dam which is used to control the inflow of wastewater to the plant and avoid hydraulic overloading.

11 The sludge, scum and screenings that have been removed through the treatment process are dewatered by being spun in a centrifuge to form a thick, muddy substance called cake.

12 The cake is sent to the furnace where it is incinerated along with the grit at 750–1000°C to produce an ash.

13 Ash is collected by a contractor who distributes it to farmers for agricultural use.