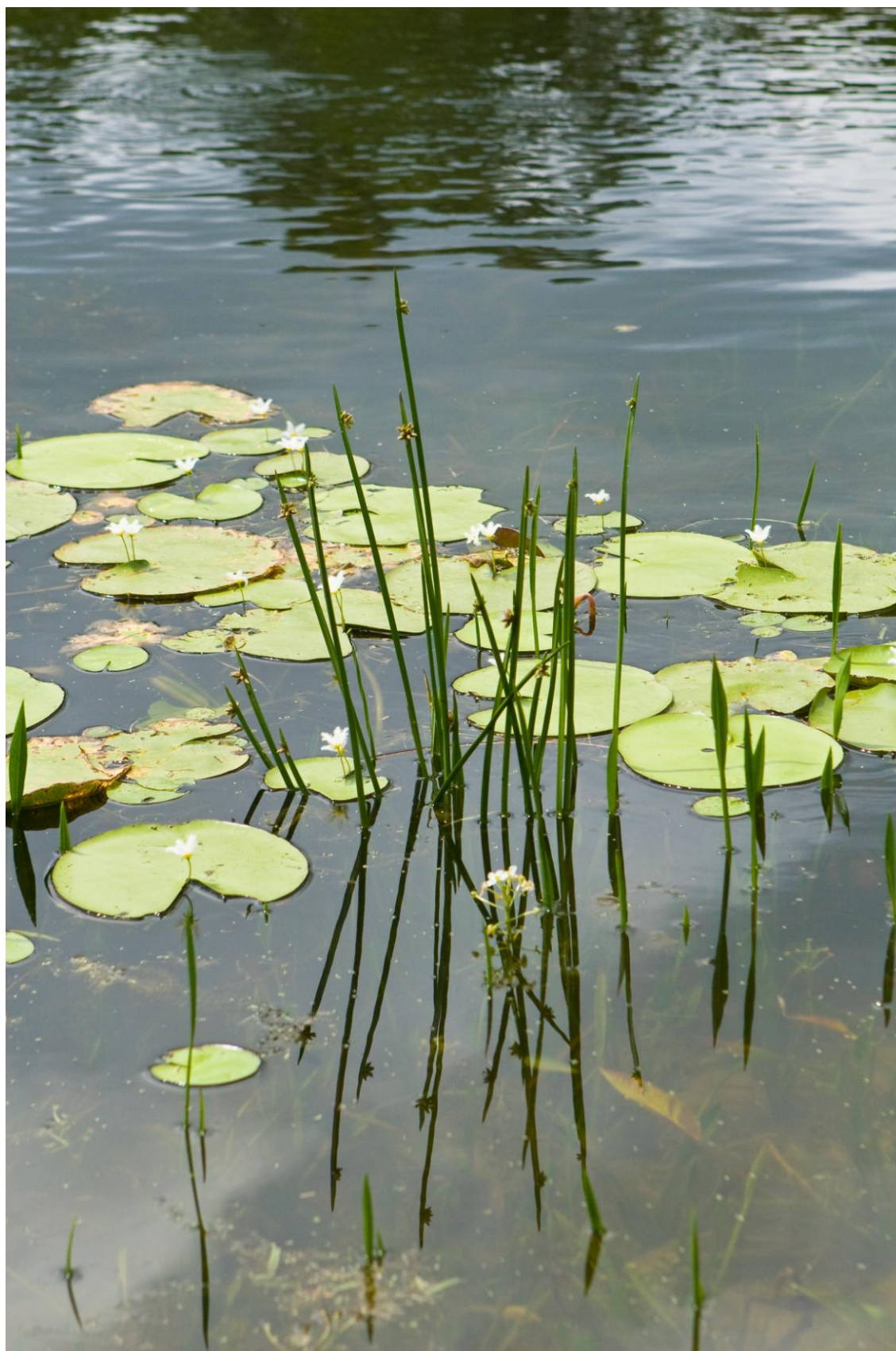


Treating South East Qld's drinking water



Securing South East Qld's water Supply

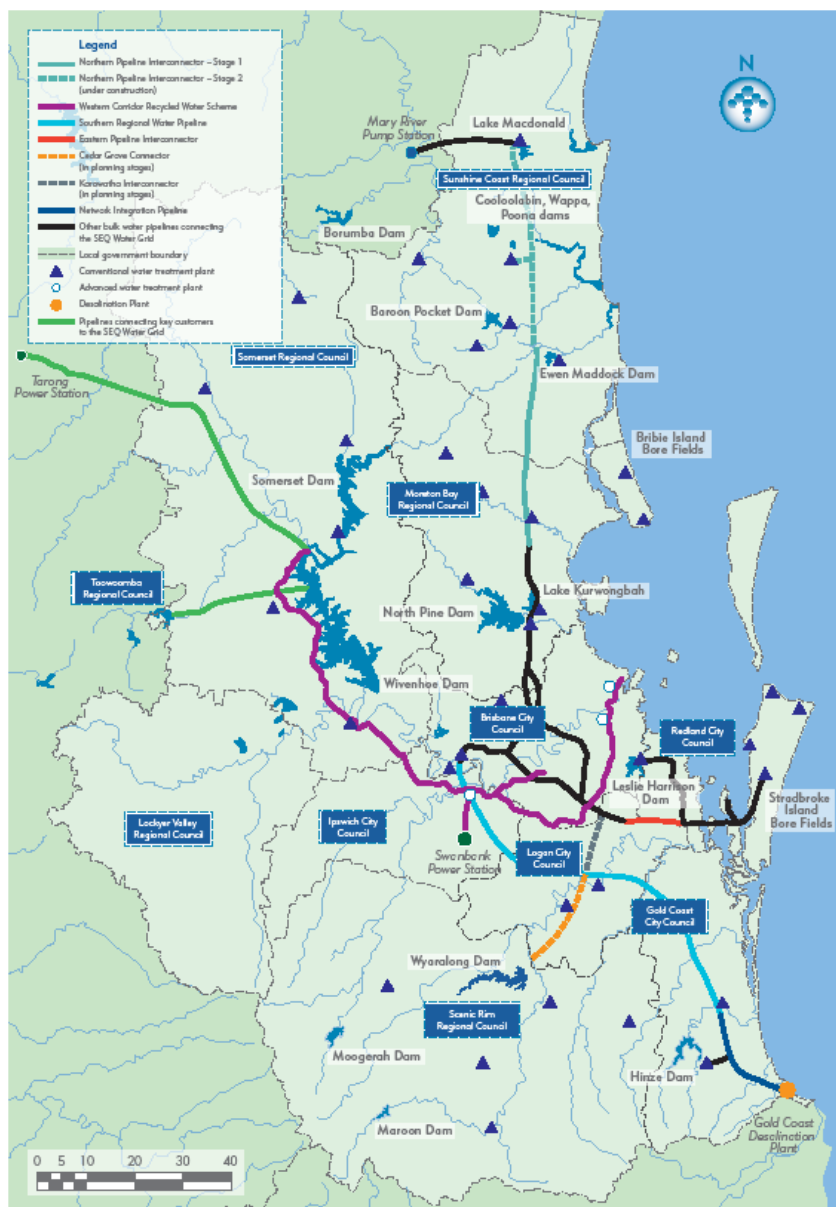
With limited and highly variable rainfall in the catchments of the South East, and a growing population, the community can no longer rely solely on dam water storages.

To increase water supply the **South East Qld Water Grid** was created to provide the region with more water sources both climate dependant(Dams and rainfall) and climate resilient(desalination and recycled water), managed more efficiently with a strong conservation focus.

This Water Grid includes **Seqwater** as the bulk water supplier , **Linkwater** the bulkwater transport authority and **3 regional retail entities, Urban water utilities, All Connex and Unity Water.**

- 12 connected dams
- 10 connected drinking water treatment plants
- 3 advanced water treatment plants producing purified recycled water
- 1 desalination plant
- 28 water reservoirs
- 22 bulk water pump station
- 535 kilometres of potable bulk water mains

This brochure explains how water from the dam storages is treated at water treatment plants to become high quality drinking water and how it is distributed to homes and businesses.



Why do we need water treatment plants ?

The SEQ Water Grid supplies and moves over 600 megalitres of drinking water to a population of 2.4 million homes and business every day. The South east corner of Qld covers an area of over 22 000 square kilometres and over 1 million hectares of catchment.

There are many factors in these catchments that impinge upon water quality including farming methods, erosion, fire, weeds and pollutants . Protection and careful management of our Drinking Water Catchments is one of our most important tasks.

Seqwater owned water treatment plants receive raw water from dams and aquifers and treat it to drinking water quality before sending it to customers taps via Linkwater pipes and retail water authorities.

Where does the raw water come from?

Raw water supplies come from 25 dams across the South East as well as 14 groundwater bore fields and aquifers. Seqwater protects the drinking water catchments and maintains water quality in the raw water supplies as well as treating the water at 46 operational water treatment plant facilities.

Raw Water to drinking Water.

Raw water is filtered and treated at the 46 conventional and advanced water treatment plants from Noosa in the north to the Gold Coast in the south.

The 5 largest treatment plants are located at Mt Crosby near Ipswich, North Pine in North Brisbane, Landers Shute on the Sunshine Coast and Molendinar and Mudgeeraba on the Gold Coast.

Combined water treatment capacity from The Mt Crosby plants can provide 1000 megalitres per day if required.

Organic matter, sediment and minerals such as manganese and iron are removed . The water is disinfected with chlorine and fluoride is added as required by law, to prevent tooth decay.

The treated water is then pumped around the Linkwater and local council reticulation systems including the water grid 28 water reservoirs, 22 bulk water pump stations and many 1000's of kilometres of pipes and numerous council reservoirs that bring water to homes and business.

Drinking water is tested at every stage of the process-in the catchment, at the raw water storages before and after treatment, within the distribution pipes and at customers taps. We test for taste, colour, odour, microorganisms and chemical content.

All this testing ensures that the water meets the strict Australian Drinking Water Guidelines, amongst the strictest in the world.



Water Treatment Case Study

How is water treated at Mt Crosby Water Treatment Plant?

Water stored in Wivenhoe Dam is released as required into the Brisbane River where it makes its way to the Mt Crosby Weir to begin treatment at our water treatment plants to become drinking water.



Pumping and screening

There are two pumping systems at the Westbank Treatment Plant. The first system lifts the untreated water after it flows through a trash screen that is made up of 25mm mesh from the river to the treatment plant.

Three pumps are located in **pump wells** 34 metres deep, each with a capacity to pump 125 million litres per day. This water is pumped in from the same level as the bottom of the Brisbane River. Only two of these pumps operate at one time with a third being a back-up pump.

The second pumping system lifts the treated water from the Westbank plant to large 90 megalitre pure water storages at Cameron's Hill after treatment has taken place.



Coagulation

All raw water contains suspended particles which need to be removed.

The first process after the water is pumped from the Brisbane River involves adding alum (aluminium sulphate) to the water. Flash mixers mix the alum into the water for approximately 20 – 30 seconds, to destabilize the particles.

Water enters with a PH level of between 7.7-8.2. Alum lowers the PH to 6.8-7.2 where it causes **flocculation** in the water to occur.



Flocculation

Flocculation is the clumping together of the suspended particles that have been destabilised, to form heavier visible particles called "floc". The "floc" remains in suspension as the water is flowing at high velocity through the flocculators.

Slaked lime and small quantities of sodium may also be added to promote coagulation and flocculation.



Sedimentation

Sedimentation is the oldest known method of water purification and has been used over thousands of years. The water flows slowly into two large **settling sedimentation tanks that resemble swimming pools. These pools can hold 6.5 million litres of water and are 4.5 metres deep.**

As "the floc" particles bind together, they sink to the bottom of the tank to form sludge. The sludge is regularly vacuumed out and travels to a waste sludge pool.



Dissolved Air Flotation

The Westbank Treatment Plant uses the **Dissolved Air Filtration (DAF)** process.

As **chemically flocculated water** enters the **filtration chambers**, a pressurized stream of water saturated with air is injected, causing the large formation of very fine bubbles to rise up from the floor. These bubbles become attached to "the floc" particles and float them to the surface. The air-floc particles accumulate to form a **floating sludge blanket** that is removed at regular intervals.

Clarified water is then passed through rapid gravity sand filter beds of finely graded silica sand and pebble layers. The remaining suspended particles are removed at this stage.



Sludge removal

All accumulated sludge that has been collected is processed via a centrifuge that removes the heavy particles and returns the water to a lagoon where it can be treated. The waste sludge is removed and used as landfill. It can also be used for the making of bricks.



Chemical disinfection

Large chemical silos contain the necessary chemicals for the treatment process. Each silo holds 340,000 litres of chemicals. The Lime silo holds 78 tonnes of lime which is mixed with the water as it flows into the storage reservoirs.

As a result of the filtration process, the water appears as clean as it does from our taps at home. It now has to undergo PH correction and disinfection.

Any water leaving the purification works is disinfected with chlorine to kill micro-organisms, bacteria and any viruses that may be present in the water.

Lime is also added to correct the PH for human consumption and ensure that it is not too acidic.

The water is then pumped to reservoirs at Cameron's Hill. Fluoride is also added at Holt's Hill as a protective dental health measure as mandated by the Queensland Governments \$35 million program to provide fluoride all eligible Queensland water supplies by 2013.

Although chlorine is an excellent disinfectant it does not remain active for much longer than 6 to 8 hours. As the water finally leaves Cameron's Hill Reservoir, **chlorine and ammonia** are added to form chloramine, a long lasting disinfectant, which ensures that any harmful micro-organisms are destroyed.

