

Wivenhoe Dam

Lake Wivenhoe is located on the Brisbane River in the Somerset Regional Council. Storage capacity for water supply (full supply level) is 1,165,000 megalitres, with a further capacity of 1,450,000 megalitres above full supply level (flood storage), for the temporary storage of flood waters.

Wivenhoe Dam is an earth and rock fill dam, with a centrally located, steel gated, concrete spillway. Lake Wivenhoe, which is the body of water formed by the dam, is also the lower storage for a 500 megawatt hydro-electric power station, owned by Tarong Energy Corporation. A mini-hydro electric generating plant was built by Stanwell Corporation, and generation commenced in late March 2003.



Water Quality

As part of the SEQ Water Grid, Seqwater's dams, collect the annual water yield for south east Queensland. Collection and delivery of water involves the sources, creeks, streams, rivers and catchment areas of south east Queensland.

A major objective of our management of the dams is to maintain and improve the quality of the water so that water treated can be delivered without incurring excessive treatment costs.



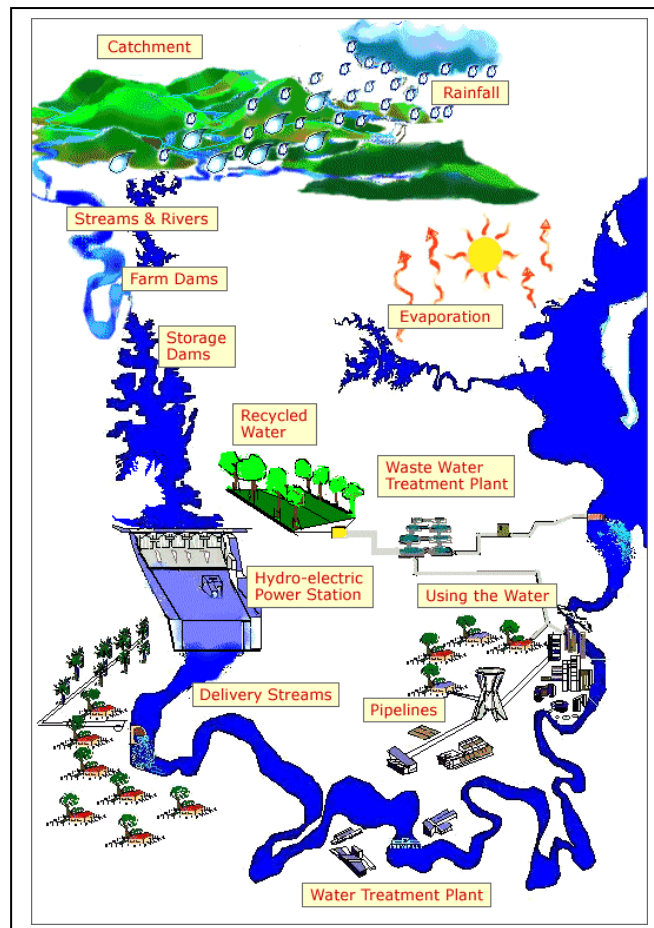
The catchments for the dams support active and growing communities plus important industrial and rural activities. This creates a challenge for Seqwater to manage the quality of water entering, and contained within the dams.

Seqwater is undertaking initiatives to manage water quality risks through interaction with landholders, catchment care and local groups, State regulatory authorities and Local Governments. We are committed to working with these groups to understand and reduce the risks that may impact upon the quality of water.

The Water Cycle

Water is essential for the maintenance and nourishment of life on the planet. In today's modern world we take for granted the simple process of turning a tap and enjoying the bounty, but the process of delivering quality water to your home or business is an interesting journey. Let us share the process with you.

The chart below illustrates the water cycle, where water falls from the sky, runs off the land, is collected in water storages (dams), then released, treated and distributed to the public and industry.



Seqwater as part of the SEQ Water Grid is responsible for the critical components of water sources and catchment and, collection, storage, treatment plants and water supply to our customers. We maintain the storages so there is sufficient water during dry years, to minimise impact on the environment, and maintain and improve the quality of the water. We also manage flood events to minimize flood damage downstream from the dams.

Wivenhoe Dam Water Supply

Wivenhoe Dam was designed and built as a multifunctional facility. Its primary function is to provide a safe water supply to the people of Brisbane and adjacent Local Authorities.

The dam has been built across the Brisbane River about 80 kilometres by road from the centre of Brisbane. At full supply level the dam will hold 1.16 million megalitres, or about 2000 times the daily water consumption of Brisbane.

The construction of Wivenhoe Dam, when added to the existing water supply from other parts of the Water Grid, including Somerset and North Pine Dams is expected to meet water demand for the Brisbane area well into the future..

Technical Data

Wivenhoe Dam consists of an earth and rock embankment 2.3 kilometres long and 50 metres high, measured from the lowest foundation to the crest, with a concrete spillway section on which five steel crest gates are installed. These gates, 12 metres wide and 16.6 metres high, are amongst the largest of their type in the world.

The dam has a total storage capacity of 2.61 million megalitres, of which 1.16 million megalitres is used for urban water storage. Some 200 separate properties were acquired to provide the 33,750 hectares of land required for the dam. The catchment area of the dam is 5554 square kilometres.

The construction of the dam involved the placement of around 4 million cubic metres of earth and rock fill, and around 140,000 cubic metres of concrete in the spillway section. Excavation of 2 million cubic metres of earth and rock was necessary to construct the spillway.

The Brisbane Valley Highway was relocated to pass over the dam wall, while 65 kilometres of roads and a number of new bridges were required following construction of the dam. An auxiliary spillway was also built to act as a giant pressure valve in the event of a 1 in 100 000 year rain and flood event to protect the dam wall and the downstream population.

Hydro-Electric Power

Lake Wivenhoe is also the lower storage in a pumped-storage, hydro-electric generating facility.

The Wivenhoe Power Station is situated between Splityard Creek Dam and Lake Wivenhoe, which is around 100 metres below the Splityard Creek Dam.

During the pumping phase in the operating cycle the generator will operate as an electric motor driving the pump to lift water from Lake Wivenhoe to the upper storage of Splityard Creek Dam. When peak electricity demand occurs the flow of water is reversed, flowing from the upper to the lower storage and driving the turbine generator to generate electricity. The pumped storage power station consists of two circular concrete silos, each of about 32 metres internal diameter. Each of the silos houses a 250MW turbine generator and pump set.

The power station is unmanned and is controlled remotely from the central operating centre for the Queensland power grid system. All aspects of the operation are monitored by computers within the centre. Twin 275KV transmission lines connect the power station to the State's grid system.



Flood Mitigation

During a flood situation the dam is designed to hold back a further 1.45 million megalitres as well as its normal storage capacity of 1.16 million megalitres.

If, for example, Wivenhoe Dam were half full and holding around 550,000 megalitres when flood rains fell on the catchment area, the dam would be capable of taking up around 2 million megalitres. This facility is evidence of the immense value of Wivenhoe to the Brisbane and Ipswich areas in flood control alone.

The original dam was engineered with a full supply level of approx 1.16 million megalitres and a flood storage capacity above that of approx 1.45 million megalitres.

On a reappraisal, done by meteorologists and hydrologists after flood events in 1999-2001 it was decided to engineer and build the auxiliary spillway in preparation for a 1 in 100 000 flood event. 1974 floods were a 1 in 100 year event. This spillway was completed in 2005 and provided extra emergency flood storage capacity in the case of a catastrophic flood event.

This facility would provide additional capacity in the flood storage component .

This basically means that if the dam is full to supply level 1.16 million megalitres , 1.45million megalitres could be held back before the emergency auxiliary spillway use could be considered.

That being said though the auxiliary spillway would operate only once with the wall of it slowly giving way over a period of time to protect the remainder of the dam wall. In effect this allows the auxiliary spillway to act as a huge safety valve.

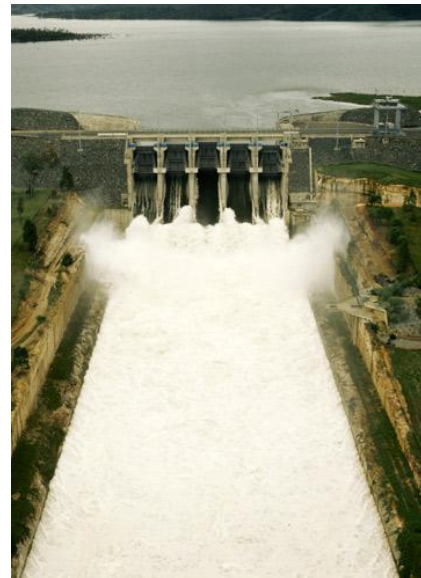
In context this means that as water flows into Wivenhoe there are releases to keep water levels at the appropriate levels as the dam was engineered. The auxiliary spillway emergency capacity would only need to be used in the "Noah style event"

Floods will still occur in Ipswich and Brisbane but they will be rarer in occurrence. The large flood storage incorporated in the Wivenhoe Dam, together with the existing flood mitigation effect of Somerset Dam, will substantially reduce the heights of relatively small floods.

It is anticipated that, during a large flood similar in magnitude to that experienced in 1974, by using mitigation facility with the Wivenhoe Dam, flood levels will be reduced downstream by an estimated 2 metres.



Wivenhoe Auxiliary Spillway



SOURCE STORE TREAT SUPPLY

