Service delivery

Sewerage

Key Achievements

- Completed the Northern Sewerage Project six months ahead of schedule and under budget to reduce sewage overflows to Merri and Moonee Ponds creeks
- Completed the Melbourne Main Sewer Replacement on time and under budget
- Met all compliance obligations for effluent discharged from our sewage treatment plants
- Completed the Western Treatment Plant (WTP) wet weather capacity upgrade and used this during several rainfall events
- A major upgrade of the Eastern Treatment Plant (ETP), which will benefit the marine environment at Boags Rocks and increase opportunities for recycled water, is on track to be completed by the end of 2012
- Developed an alternative strategy to building an expensive new sewer at Ringwood South to improve the health of Dandenong Creek
- Completed a Biosolids Strategy and identified commercial/research proposals for the beneficial use of biosolids

Disappointments

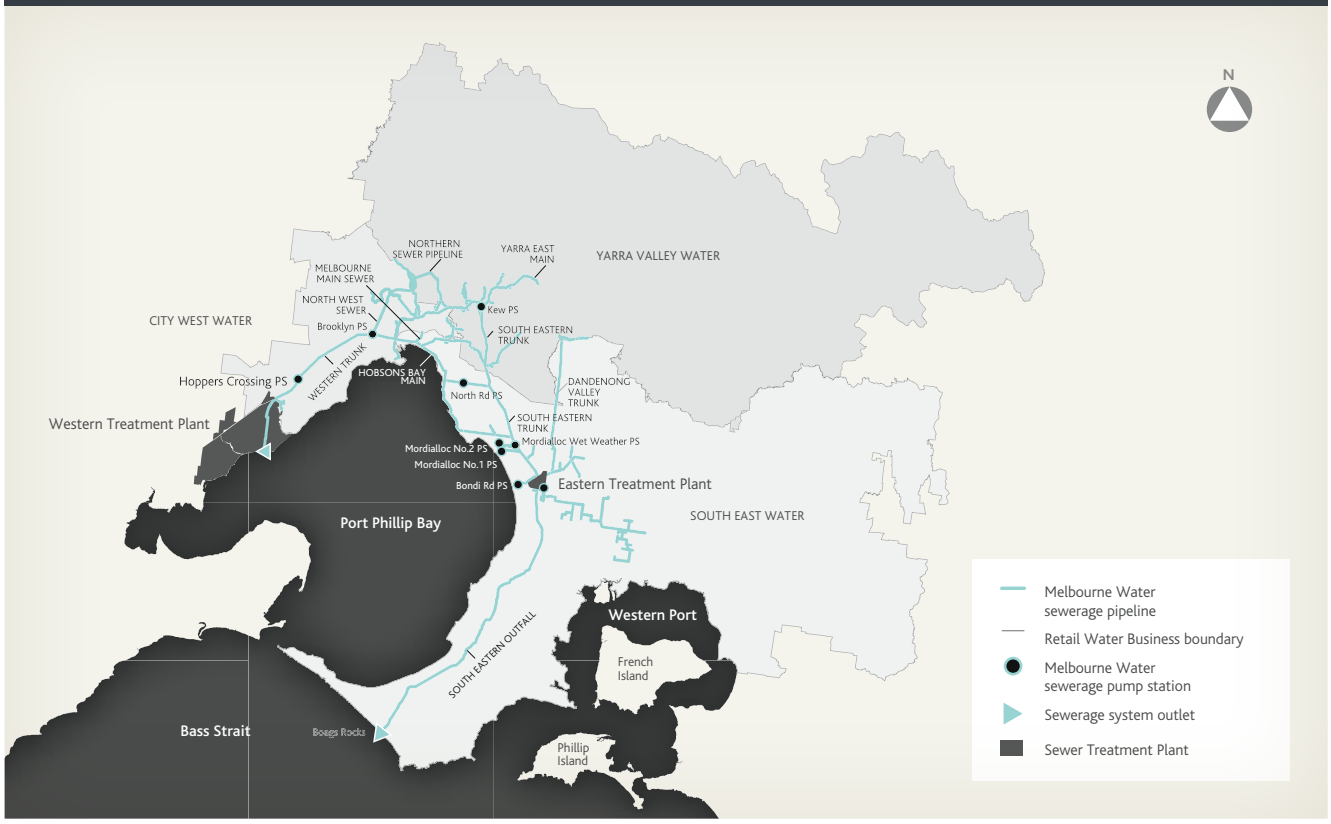
- Failed odour complaints target
- Delayed completion of new aeration tanks at ETP (to meet population-based load growth and support ammonia reduction) due to substantial defects requiring rectification

Challenges

- Managing a significant number of wet weather sewage overflows
- Rehabilitating the Eastern Drop Structure on Hobsons Bay Main Sewer in a 'live' sewer environment to facilitate the construction of an air treatment facility
- Reviewing our Odour and Corrosion Strategy to account for issues including the impacts of reduced sewer flows on odour-causing compounds
- Ensuring we are positioned to take advantage of new markets for resources produced from sewage and biosolids

Sewerage

Melbourne Water's Recycling Schemes



Our sewerage system

Melbourne Water's sewerage system consists of:

- **402 kilometres of sewers**
- **9 sewage pumping stations**
- **ETP at Bangholme and WTP at Werribee**
- **9 air treatment facilities.**

Melbourne Water treated a total of 320,067 million litres of sewage at ETP and WTP in 2011–12. This was similar to 2010–11 flows (325,308 million litres) due primarily to ongoing above average rainfall.

About 44% of this sewage was treated at ETP and 56% was treated at WTP.

Eastern Treatment Plant

A major upgrade of ETP in Melbourne's south-east is nearing completion. Built in 1975, the plant will be transformed into one of the most sophisticated large-scale sewage treatment facilities in the world.

The project will deliver significant environmental benefits by improving the quality of the treated effluent discharged at Boags Rocks and raising the standard of recycled water produced at the plant.

Once completed, the plant will treat more than 100 billion litres of wastewater to Class A recycled water standard each year using advanced tertiary treatment processes including biological media filtration, and disinfection using ozone, ultraviolet light and chlorine.

The project is being delivered by the Eastern Tertiary Alliance – a partnership between Baulderstone, UGL Infrastructure, Black & Veatch, KBR and Melbourne Water.

Commissioning will occur in the second half of 2012, and the project remains on track to be fully operational by the end of the year.

Powering the plant

The introduction of tertiary treatment at ETP requires additional power at the site to complement on-site generation from biogas harvesting. A second high-voltage feeder was constructed and commissioned in 2011 to supply this power. The second feeder also provides an important backup to ensure that critical plant operations can continue if the supply from one feeder is lost.

Treating waste solids and renewable energy

Suspended solids in raw sewage entering ETP are allowed to settle in large tanks to form a layer of primary sludge in a process called sedimentation. The sewage then undergoes secondary treatment involving a biological process to break down organic material and remove nutrients. Waste-activated sludge is generated from this process.

The primary sludge and the thickened waste-activated sludge are pumped to eight large tanks (8 million litres each) called digesters where around 45% of the solids are converted into biogas (predominantly methane). The biogas is used on site to generate renewable energy.

Increases in Melbourne's population have resulted in higher levels of solids requiring treatment in the digesters and a need for increased digestion capacity. A primary sludge thickening facility was commissioned in late 2011 which has freed up volume in the digesters equivalent to an additional two digesters.

Aeration tank works

A contract was awarded for the construction of four additional aeration tanks in February 2007 to support the successful conversion of existing aeration tanks to an ammonia reduction process, and provide for ongoing population-based load growth to ETP.

A number of defects relating to the construction of the concrete aeration tanks are now evident. The rectification of these defects has caused delays to the project. Construction of the four additional aeration tanks was due to be completed by January 2009. The project is now scheduled for completion by September 2013. The increased costs and time delays are being addressed with the project manager, designer and constructor.

Reliability program

A targeted reliability program is underway at ETP. This program identifies repetitive failures with mechanical and electrical equipment and then undertakes root cause analysis. The root cause analysis provides an action plan that reduces future breakdowns. This program reduces maintenance costs and ensures the plant's ongoing reliability.

Western Treatment Plant

Wet weather capacity upgrade

Major sewage channel duplication work to accommodate increases in peak sewage flows following significant rainfall events was completed at WTP in late 2011.

The increased sewage inflow capacity has been used on several occasions since completion, with peak flows reaching 1,773 million litres a day.

The wet weather treatment capacity has increased to 2,500 million litres a day.

Renewable energy

Lagoon covers are being progressively replaced at WTP to capture more biogas for the generation of renewable energy and to help reduce odour. The 115 East Lagoon cover reached the end of its service life and was removed in early 2012. This work also included dredging of a significant amount of surface sludge that had accumulated under the covers.

Works to replace and double the existing area covered across the 55 East Lagoon have started with two segments of the new cover installed. The new cover will be four times the size of the MCG and is expected to be completed in 2013. It forms part of an overall plan to increase biogas capture and production of renewable energy at the plant.

These works will enable the plant to be nearly self-sufficient in its power needs and to export any excess electricity to other Melbourne Water sites, reducing system-wide power costs and greenhouse gas emissions.

Sewerage

Recycled water pump station and pipeline

Construction of a new recycled water pump station and pipeline was completed in 2012. The project improves reliability in the delivery of both Class A and Class C recycled water to customers.

Transfer system

Sewerage transfer capacity has been improved by the recently completed Melbourne Main Sewer Replacement and the Northern Sewerage Project which will help reduce sewage spills into waterways during wet weather.

Melbourne Main Sewer Replacement

The replacement of a section of a century-old sewer main from Port Melbourne to Docklands was completed in June 2012, on time and under budget.

Marking the culmination of four years of tunnelling and construction, the new sewer main replaces a 2.3 kilometre section of Melbourne's original brick-lined sewer built in the 1890s. The new Melbourne Main Sewer will triple sewerage capacity and cater for inner-city growth for the next century.

A 100-metre long boring machine was used to construct the tunnel under the CBD and build the new main up to 12 metres underground. A major component of the project was a 140 metre pipeline under the Yarra River that took specialist divers and engineers two years to build.

An additional 1.9 kilometres of smaller branch and reticulation sewers were also constructed, connecting Port Melbourne residents into the new system.

Northern Sewerage Project

The Northern Sewerage Project was completed in November 2011, six months ahead of schedule and under budget.

The project involved the construction of 12.5 kilometres of new sewer tunnels in Melbourne's densely-populated northern suburbs. Commencing in August 2007, works took place 24 hours a day, six days per week.

Delivered jointly by Melbourne Water (Stage one) and Yarra Valley Water (Stage two), the new sewers provide additional capacity for Melbourne's fast-growing northern suburbs including Epping and Craigieburn and will protect the downstream health of the Yarra River and Port Phillip Bay from sewer overflows following rainfall events.

The 8 kilometre long deep-tunnelled sewer on Stage one connects into the existing sewerage system near the Merri Creek at Coburg and the Moonee Ponds Creek in Pascoe Vale.

The 4.5 kilometre long, deep-tunnelled sewer on Stage two runs from Carr Street, Coburg North to L.E. Cotchin Reserve in Reservoir, receiving sewage flows from the existing sewerage system in Fawkner.

Ringwood Sewer Strategy to improve Dandenong Creek

An alternative strategy is being implemented for the Ringwood South Sewer site at Dandenong Creek to provide a more cost-effective approach for improving the local environment and to avoid building an expensive new sewer.

Given that a new sewer would cost an estimated $100M, other options to improve the overall health of Dandenong Creek were examined.

An ecological health study conducted in consultation with EPA Victoria, South East Water and Yarra Valley Water revealed wet weather sewage overflows did not have a significant impact on the creek's health but other sources of pollution, such as runoff from industrial areas, did have an impact. These pollutants will be the focus of a program to improve the health of the waterway.

Several environmental improvements were also identified to offset any impacts on the creek of further overflows from the sewer system during high rainfall events.

Up to $12M has been set aside for capital works to deliver pollution abatement and amenity and ecology improvements for Dandenong Creek as part of the first stage of the strategy.

The project has been formalised in a Memorandum of Understanding between EPA Victoria and Melbourne Water and will result in a better financial and environmental outcome than the traditional 'big sewer' approach.

Large pump assessments

Melbourne Water relies on large pumps to successfully transfer sewage and water around its extensive distribution network.

Due to the critical nature of sewerage system pumps at Hoppers Crossing, Brooklyn and ETP, and water pumps at Yering Gorge, a condition assessment strategy was implemented to maximise the life of the assets.

It was concluded these assets are robust and can have an extremely long operational life with minimal changes to existing maintenance regimes. Nominal operating life of the pumps, based on empirical evidence drawn from analysis of other similar large assets, was 100 years. A $5.5M capital investment is expected to be required to address renewals over a period of 10 years across all four sites.

Managing corrosion and odour

Melbourne Water received 14 odour complaints related to the sewerage transfer system this year. This was two less than in 2010–11, but more than our target of 10.

These odour complaints were due to a range of reasons, predominantly manhole covers being dislodged by traffic or grass cutting activities as well as normal discharge of sewer gases from vent stacks or ventilation associated with works being undertaken in the sewer network.

An enhanced proactive maintenance program and implementation of improvement actions from our Odour and Corrosion Strategy will reduce the likelihood of future odour complaints.

Works to address sewer corrosion and odour from the Eastern Drop Structure (EDS) manhole on the Hobsons Bay Main Sewer are continuing. The EDS allows sewage from the city fringe and bayside areas to drop down and flow beneath the Yarra River. The EDS handles about 175 million litres of sewage a day and is the main crossing point for sewage on the way to WTP.

To address odour complaints from neighbouring development, the ventilation fan used to extract foul air from the EDS was turned off for 12 hours a day in 2002. This reduction in ventilation resulted in significant corrosion impacts within the drop structure.

The replacement of a section of a century-old sewer main from Port Melbourne to Docklands was completed in June 2012, on time and under budget.

From 2007, projects have been progressively implemented to rehabilitate the EDS. These works, on a live sewer, are very challenging and have to be undertaken in stages to ensure they are completed safely.

About $8M has been spent on restoring the EDS to date. Works are nearing completion to remove corroded elements, install an overflow weir to reduce the release of corrosive gases, and fit an access platform for penstock maintenance. Other planned works include provision of an Air Treatment Facility at an estimated cost of $20M, followed by rehabilitation of other civil structures within the EDS, costing about $3M.

Managing biosolids

Melbourne Water updated its Biosolids Strategy in 2011–12. The strategy recommends identifying beneficial uses for biosolids from ETP given the significant impacts of continued stockpiling at that site.

Two private sector proponents have been identified as potential beneficial users of biosolids from ETP. These proponents will commence feasibility studies in early 2012–13. Melbourne Water aims to achieve annual beneficial use of 28,000 dry tonnes of biosolids (approximately 100% of ETP annual production) by 2018.

The strategy also recommends continued research into the impacts of stockpiling at WTP and continued support for emerging biosolids beneficial use technologies.

Biosolids reuse target

Melbourne Water has a target to reuse 90,000 tonnes of 'clay rich' biosolids from ETP by 2013. Due to the clay composition of these biosolids, they are particularly suited for use as a structural fill material.

Although there was no reuse of these biosolids in 2011–12, Melbourne Water is continuing to work with Victorian Government agencies and private sector construction companies to identify opportunities for the use of this material.

Sewer mining

In 2009, the Melbourne Metropolitan Sewerage Review identified the need for a modelling tool capable of analysing the system-wide effects (energy consumption, greenhouse gas emissions, nutrient and water flows) of sewer mining and localised sewage treatment.

Since 2009, Melbourne Water has updated its hydraulic model to include recent urban growth and sewage quality analysis.

During 2011–12, these initiatives were consolidated into the Strategic Sewerage Assessment Tool. This tool will be used to support the development of integrated water cycle strategies in Melbourne.