

WATER

STRATEGIC GOALS

- > Provide high quality and reliable drinking water
- > Protect Melbourne's existing water resources through sustainable catchment management practices
- > Secure water supplies for current and future generations by developing new, alternative and diverse water resources
- > Increase water resource efficiency
- > Improve environmental outcomes from all aspects of the business
- > Listen to and engage the community to seek support for our projects and priorities
- > Conserve and improve biodiversity and ecosystems
- > Invest prudently and efficiently, taking account of environmental, social and financial considerations, whole-of-life costs, risks and service needs
- > Operate and maintain our assets efficiently, in accordance with sustainability principles

KEY ACHIEVEMENTS

- > Completed our construction works ahead of schedule which will enable desalinated water to be received from the Victorian Government's desalinated water plant being built at Wonthaggi
- > Development of a collaborative approach with stakeholders to assess the desalination water order volumes using innovative optimisation techniques
- > Protected water quality at Greenvale Reservoir by collaborating with various agencies to coordinate urban development
- > Increased accuracy of determining bushfire risks in our catchments through research and the latest technology
- > Continued work with key stakeholders and climate researchers to improve business understanding of climate change and variability, including completion of a Climate Change Management Framework

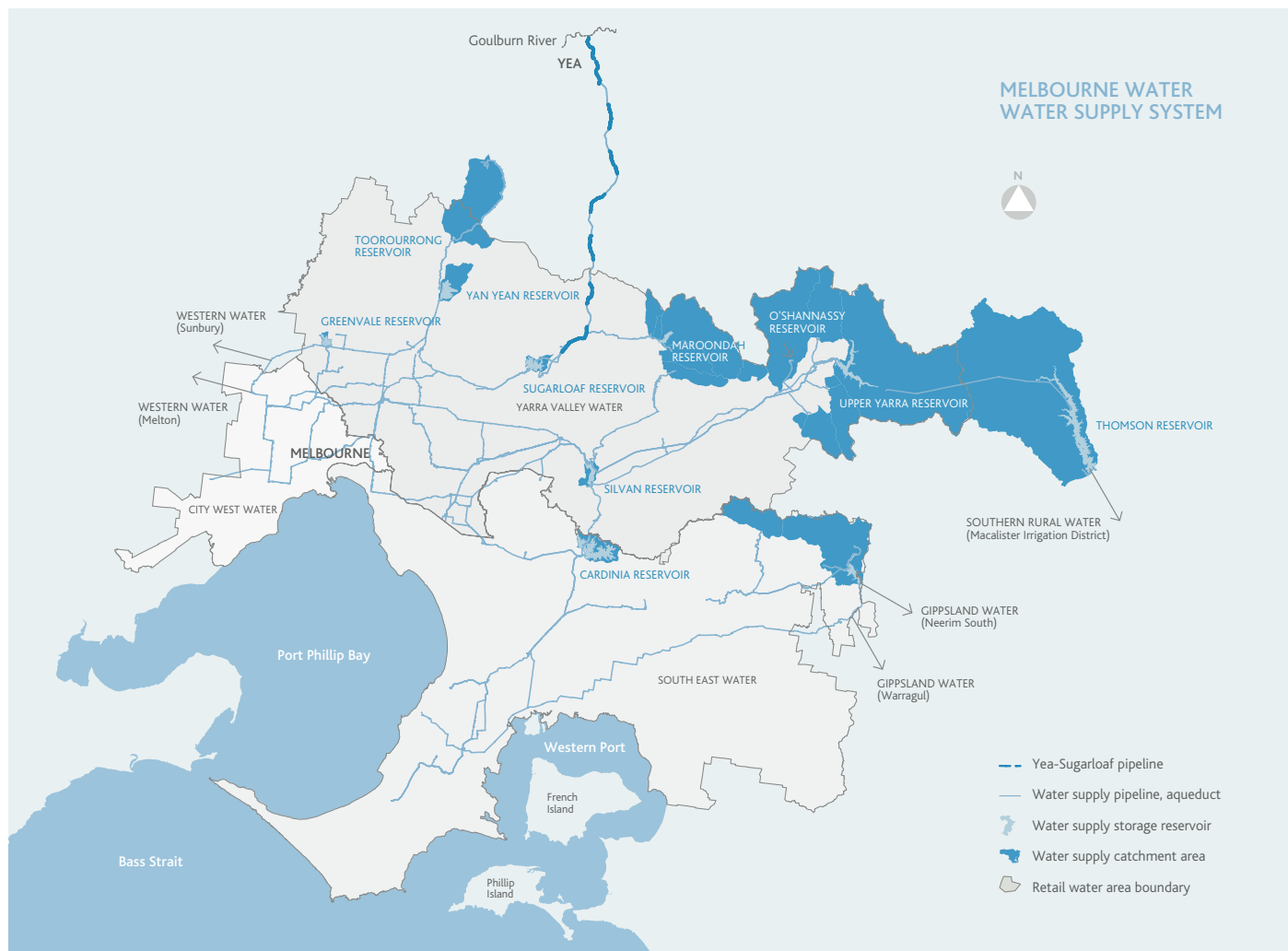
DISAPPOINTMENTS

- > Failed to meet one annual water quality target due to *E.coli* being detected twice at the Yan Yean clear water storage tank. However there was no impact on customer supplies. In both cases, the problem was identified and the water re-chlorinated before entering the distribution system
- > Failed to meet our target of less than 1% for measurable transfer losses of total water delivered (recording 1.41%), mainly due to higher than average harvesting flows through the aqueduct system

CHALLENGES

- > Integrating desalinated water into Melbourne's water supply system to ensure customers continue to receive high quality and reliable drinking water
- > Maximising the water from traditional catchments and dams while continuing to develop opportunities from other sources including stormwater and recycled water
- > Working with retail water businesses, local councils and the development industry to generate integrated water management solutions
- > Supporting the Government in delivering its vision of Living Melbourne Living Victoria by working with the retail water businesses to develop a long-term metropolitan *Water Supply Demand Strategy*
- > Working with Government and retail water businesses to review water restriction schedules and to build on lessons learned during the recent long drought to develop appropriate management frameworks for responding to future drought periods
- > Monitoring research into climate patterns and building Melbourne's water supply resilience by diversifying our sources

Total reservoir storage level at 30 June 2011 was the highest since 19 January 2006



OUR WATER SUPPLY SYSTEM

Melbourne Water's supply system comprises:

- 157,000 hectares of protected catchments in the Yarra Ranges
- 10 reservoirs with a total capacity of 1,812 billion litres
- 37 water treatment plants
- 1,062 kilometres of water mains
- 214 kilometres of aqueducts
- 65 service reservoirs

MANAGING DEMAND AND SUPPLY

Storages rising

As a result of higher rainfall, our water storages recorded their best year in terms of recovery since the drought began in 1997. Rainfall in the major catchments in 2010/11 was 15% to 41% above average and 14% more than 2009/10.

Rainfall and streamflow in Melbourne's catchments are heavily influenced by climatic variations. During 2010/11, climate conditions were favourable to rainfall over the catchments due to warm tropical waters around northern Australia and the strong La Niña pattern on the Pacific Ocean.

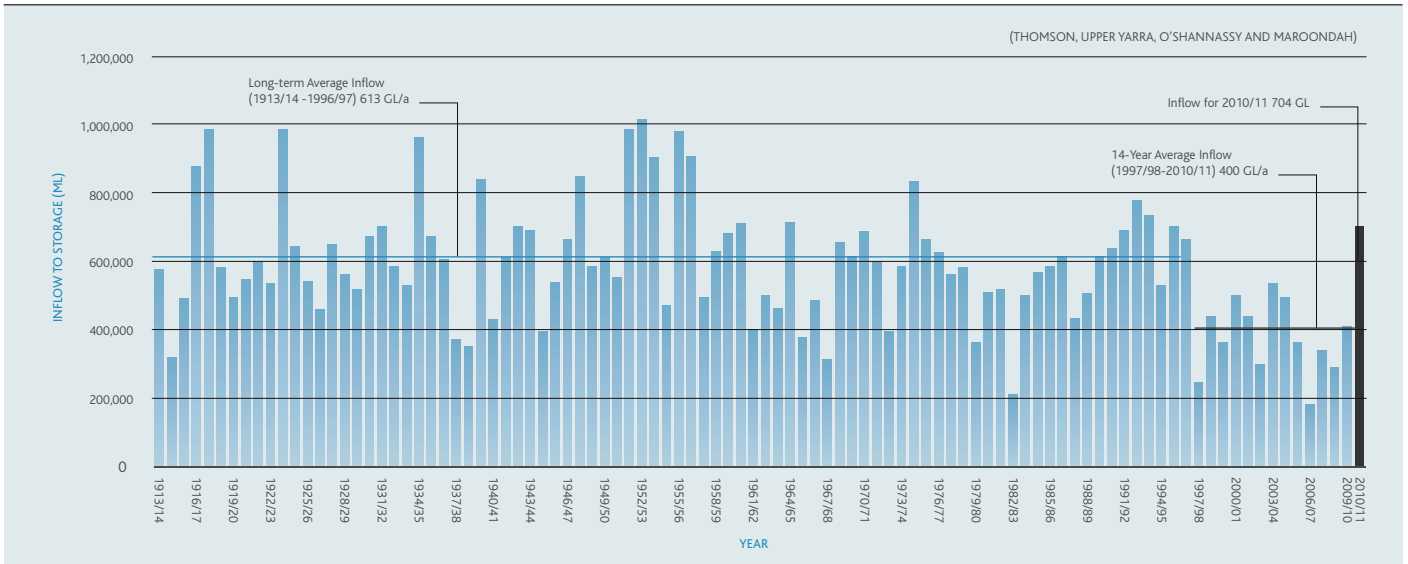
Due to the increased rainfall and wetter catchments, streamflow into the major harvesting reservoirs was 43.1% above the long term average (71% higher than 2009/10) and the highest since 1993/94.

Higher rainfall and streamflow saw storages increase over the 2010/11 summer for the first time since completion of the Thomson Reservoir in 1984. Over the first six months of 2011, storage volumes increased by 2.8% (or 49.2 billion litres) compared to the long-term average for these six months of a decrease of 8.7%, or 156.5 billion litres.

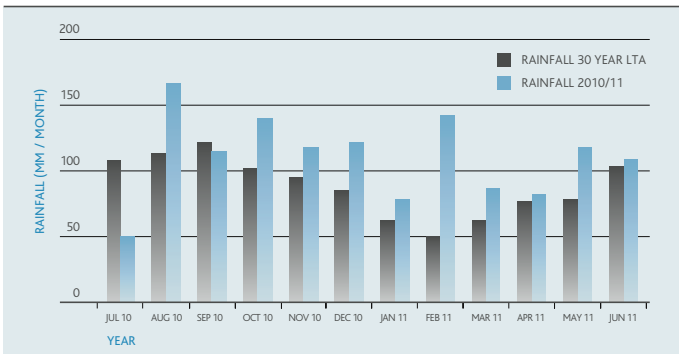
At 30 June 2011, the total reservoir storage level was 55.7% or 1,010.2 billion litres, increasing from 33.7% or 611.4 billion litres at 1 July 2010. Storage levels at 30 June 2011 were the highest since 19 January 2006. The O'Shannassy and Maroondah reservoirs reached capacity for more than 300 days across the financial year.

However, while storages recovered significantly over the past year, total storage volumes are still recovering from years of below average inflows and major droughts in 1997 and 2006.

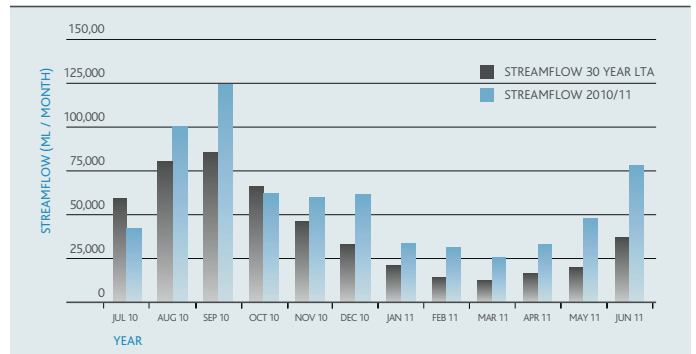
ANNUAL STREAMFLOW AT MELBOURNE'S MAJOR HARVESTING RESERVOIRS



MONTHLY AVERAGE RAINFALL AT MELBOURNE'S MAJOR HARVESTING RESERVOIRS



MONTHLY AVERAGE STREAMFLOW AT MELBOURNE'S MAJOR HARVESTING RESERVOIRS



The Thomson Reservoir, which represents about 60% of the total storage capacity available to Melbourne, is the main drought reserve. At the end of the 2010/11 year, Thomson Reservoir was only 41.2% full (440 billion litres). The ability to cope with further severe droughts will depend on the extent of recovery of this reservoir.

As climate variability and change have a significant influence on Melbourne's storage volumes, Melbourne Water supports an active research program to improve our understanding of climate risks.

Water restrictions

The increase in water supply reserves during the winter/spring of 2010 led to the Government easing Melbourne's water restrictions. From 1 September 2010, restrictions moved from Stage 3 to Stage 2. This included an increase in the times gardens could be watered and irrigation of all council sporting grounds.

Increased water storages and the easing of restrictions resulted in the full reinstatement of environmental flows for the Yarra and Thomson rivers from October 2010. This equated to annual average increases of 20 billion litres of flows for the Yarra River and 4 billion litres for the Thomson. This was in addition to an estimated 10 billion litres per year of environmental flows that were returned to the Yarra River in July 2010. Environmental entitlements in these rivers had been progressively reduced since March 2007 as part of Melbourne's drought contingency response to declining reservoir levels.

Consumption at low levels

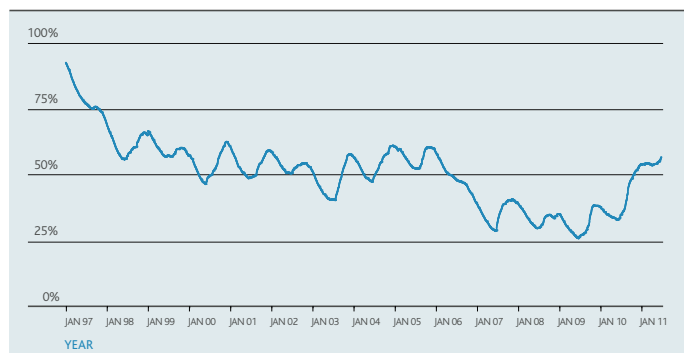
Even with an easing of restrictions, Melburnians continued to conserve water in 2010/11, with average daily consumption of 963 million litres per day (compared to 989 million litres in 2009/10). Water conservation was aided by the wetter summer. Total rainfall for summer was 306 millimetres, almost double the average summer rainfall of 154.9 millimetres.

Residential daily per capita water consumption for Melbourne in 2010/11 was 140 litres compared to 148 litres in 2009/10.

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WATER IN STORAGE - MELBOURNE



During one week in April 2011, Melbourne households broke a water-saving record, using just 120 litres per person per day.

Preparing for desalination

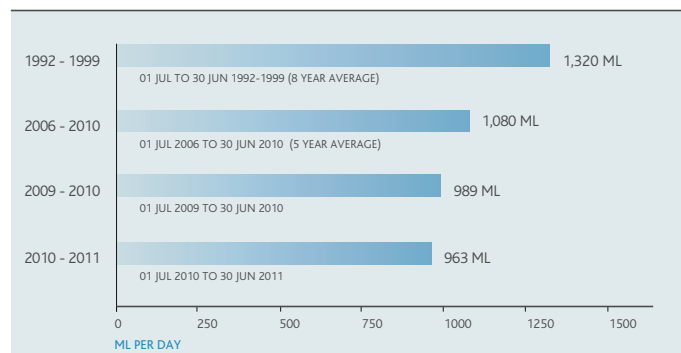
To receive and redistribute desalinated water from the Victorian Government's new desalination plant being built at Wonthaggi, significant works within Melbourne Water's supply network had to be carried out.

These works involved an upgrade to existing water mains, and a new inlet water main and chute to enable desalinated water to be delivered to Cardinia Reservoir for subsequent redistribution to Melbourne's southern suburbs,

Mornington Peninsula and Pakenham areas. A new pump station at Cardinia Reservoir was also constructed to further improve flexibility and security in transferring water throughout Melbourne's water supply network.

The Victorian Government is developing the desalination plant in conjunction with the AquaSure consortium. In June 2011, construction of the plant, pipeline and power supply was 60% complete.

AVERAGE DAILY WATER USE FOR MELBOURNE



The desalination project will enable three regional water authorities to be connected to the Melbourne water supply system. Barwon Water, South Gippsland Water and Westernport Water will be able to increase the security of their supply by accessing the Melbourne system when required. They join Melbourne Water's existing urban customers of City West Water, South East Water, Yarra Valley Water, Western Water and Gippsland Water.

This means that integrating the desalination project into the Melbourne headworks system involves building new institutional arrangements as well as physical assets.

Above: Cardinia Reservoir

Melbourne Water is working with the retail and regional water businesses and the Department of Sustainability and Environment to develop the arrangements needed to support the Government's annual desalinated water order decision.

This process will require sophisticated modelling and analysis to optimise the operation of Melbourne's water supply system.

ENVIRONMENTAL SUSTAINABILITY

SUSTAINABLE WATER USE

Melbourne Water is working with the Ministerial Advisory Council for Living Victoria, which is developing a detailed implementation plan on a roadmap for a more sustainable Melbourne.

We support the Government's desire to ensure that water is used more than once wherever possible. Increased utilisation of recycled water and other alternative water sources is vital to achieving a more sustainable city (see Alternative Water Sources chapter, pages 20-24 for detailed information on water recycling initiatives).

WATER CONSERVATION

System losses and repairing leaks

Melbourne Water's target is that measurable transfer losses are less than 1% of total water delivered. This year we failed to meet the target (recording 1.41%), mainly due to a significant increase in losses from the aqueduct system.

Losses from aqueducts increased by about 38% compared to the average of the past three years, mainly due to higher than average harvesting flows.

Conversely, 3,348 million litres of water this year was saved as a result of upgrades and maintenance works completed on the aqueduct systems since 2001/02.

A small proportion of the water losses across the Melbourne Water system were due to flushing the Winneke-Preston main and major water main renewal works, which placed operational constraints on the transfer system. Our pipe repair crews based at Olinda and Healesville fixed 73 leaks on our water mains.

We are continuing to work with Government, the retail water businesses and the broader industry to support water conservation initiatives and have been participating on the Joint Water Conservation Committee and the Water Services Association of Australia (WSAA) Water Conservation Network.

Renewing infrastructure

Melbourne Water invested a total of \$45.3M this year in renewing water mains and other water supply assets in the metropolitan area. This included:

- Renewal of the Preston-North Essendon main, which will be completed in August 2011
- Renewal of the North Essendon-Footscray main, which began in February 2011.

Asset management research

Melbourne Water is involved in collaborative research projects with the Water Services Association of Australia, Monash University and other organisations to study and develop materials and technologies that will help extend the life of our water mains, reduce the impact of leaks and optimise the timing of asset renewal.

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WATER SUPPLY DEMAND STRATEGY

The *Water Supply Demand Strategy (WSDS)* is a 50-year strategy to balance the supply of water to meet Melbourne's consumption and environmental, industrial and agricultural water needs.

Initiatives undertaken by Melbourne Water during 2010/11 to achieve the objectives of the current WSDS include:

- Securing Existing River Supplies - The full allocation of environmental flows were progressively returned to the Yarra River and some other rivers (see environmental flows, page 17)
- Reducing Water Leaks and Wastage - An independent review revealed that leakage within the Melbourne Water system is outstandingly low and is better than any other state capital
- Increasing the Use of Local Water Supplies - Melbourne Water has been working with the retail water businesses and local councils to explore more ways of utilising alternative water supplies. For example, Melbourne Water has been working with Yarra Valley Water and Moreland City Council to treat stormwater from two existing drains for use in Coburg.

Melbourne Water has also been collaborating with the retail water businesses to develop a new WSDS taking account of lessons learned since the last strategy was completed in 2006. The new strategy is due to be delivered in early 2012.

SUSTAINABLE WATER STRATEGIES

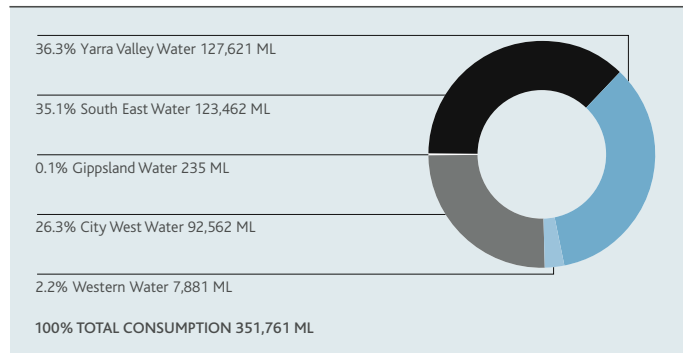
Sustainable water strategies set out to secure water supplies for consumption and environmental purposes over a 50-year period. The *Central Region Sustainable Water Strategy (CRSWS) 2006* set out a series of actions to 2055 to deliver sustainable water use and management objectives.

Melbourne Water has several key and supporting roles and responsibilities that contributed to these objectives during 2010/11, for example, the full allocation of environmental flows to the Yarra, Bunyip and Tarago rivers.

Melbourne Water is exploring local water source opportunities with other metropolitan water authorities and councils. For example, we are investigating the use of aquifers to store alternative sources such as stormwater and recycled water.

This year we supplied 351,761 million litres of drinking water to the retail water businesses. This compares with 361,362 million litres in 2009/10 and 371,170 million litres in 2008/09

2010/2011 RETAIL WATER CONSUMPTION



The objectives of the *Central Region Sustainable Water Strategy* are addressed through the *Water Supply and Demand Strategy* and the *Healthy Waterways Strategy*. The CRSWS is planned to be reviewed in 2012. For further information on Melbourne Water's role in balancing consumption and environmental needs, see the *Alternative Water Sources* chapter pages 20-24; and the *Waterways* chapter pages 15-19.

NEW APPROACH TO TREATING RESIDUALS

In October 2010, we commissioned the Winneke Centrifuge Plant upgrade, beginning a new approach to water treatment residuals management in Melbourne.

The Winneke Water Treatment Plant no longer discharges solid waste to sewer, cutting trade waste discharge, solids load on the Eastern Treatment Plant, biosolids production and water loss throughout the Winneke water treatment process. It also enables Melbourne Water to beneficially reuse inert water treatment solids.

The completion of the project is a culmination of several years of work that represents a holistic approach to the water cycle, factoring in the impacts and needs of water supply, sewage transfer and trade waste, wastewater treatment and biosolids management.

SUPPLYING HIGH QUALITY WATER

Melbourne Water works closely with the retail water businesses to consistently meet stringent requirements in the distribution of safe, high quality water.

The water supply system is managed according to Hazard Analysis and Critical Control Point (HACCP) principles, which uses audits and accreditation to ensure quality management from collection, treatment and distribution to customers.

This year we supplied 351,761 million litres of drinking water to the retail water businesses. This compares with 361,362 million litres in 2009/10 and 371,170 million litres in 2008/09. The continued reduction is due to the impact of climate conditions (rain, temperature), water restrictions and other conservation initiatives.

Performance against water quality targets

Melbourne Water met requirements for turbidity, aluminium and disinfection by-products.

The annual target for *E.coli* was not met due to one site having *E.coli* detected in samples twice during the year, however there was no impact on customer supplies. An isolation valve was found to be leaking a small amount of untreated water into the clear water storage tank from Yan Yean Reservoir. This flow was reversed to prevent water coming from the reservoir, the valve was overhauled and the tank cleaned and spot dosed. Operation of the tank has been altered to lower detention time and the tank spot dosed regularly. The Department of Health was notified in accordance with the *Safe Drinking Water Act* on both occasions. No *E.coli* was detected by the retail water business in zones supplied from this source at these times.

Protecting Greenvale Reservoir from inappropriate development

Melbourne Water has worked closely with developers, local councils and the Growth Areas Authority to coordinate urban development north of Greenvale Reservoir.

The reservoir is located in the Hume Growth Area. By undertaking quantitative risk assessments, Melbourne Water has been able to facilitate development without compromising water quality in the reservoir, which supplies drinking water to about 300,000 people.

The efforts of all stakeholders were recognised in the successful amendment of the planning scheme to include a precinct structure plan that incorporates significant controls to protect the reservoir.

PROTECTING OUR CATCHMENTS FROM BUSHFIRE

Melbourne Water undertakes research to protect our catchments from bushfire and to ensure that we meet legislative requirements to manage fire hazards on our land.

We use the latest technology to map the type and height of vegetation in our catchments to accurately determine bushfire risks.

Aerial photo imagery, together with LiDAR technology (that uses high-speed laser pulses to generate three-dimensional structural data about terrain), create fuel hazard classifications. These classifications are applied to calculate bushfire hazards, and the results are then verified in the field.

The primary study area was the Sugarloaf catchment and the methodology has since been successfully used on Melbourne Water owned land in Cardinia, Silvan and Kangaroo Ground.

This approach replaces the traditional, time consuming and expensive visual interpretation of aerial photos and also considerably reduces time spent in the field on fuel assessments.

OFFICE WATER USE

We met our office water use target this year at our 100 Wellington Parade office with consumption of 6,900 litres per full time equivalent employee per year, compared to our target of 7,700 litres per full time equivalent employee per year and last year's result of 7,500 litres per full time equivalent employee per year.

This data includes water used by this building, particularly for air-conditioning cooling towers. In terms of office space, corporate water use equates to 435.62 litres per square metre.