

Environment & Public Health 2000

*Improving environmental & public health
performance at Melbourne Water*



**Melbourne
Water**

Vision

To be leaders in urban water cycle management

Core Business Objectives

- Protect public health*
- Operate as a successful commercial business*
- Manage Melbourne's water resources and the environment in a sustainable manner*
- Provide excellent service and maintain the trust and respect of the community*

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Foreword

A city of more than three million people has many impacts on the environment. Melbourne Water has an important role in Melbourne's urban water cycle through managing the water supply catchments, waterways and protecting bays and oceans.

Environment and Public Health 2000 is a new way for Melbourne Water to communicate its plans and priorities for further improvements to the city's water management. It includes detailed programs, targets, timelines and measures of success. It also describes how Melbourne Water will be held accountable for this work.

Melbourne Water has a strong commitment to maintaining an open and accountable relationship with the community. We aim to provide information that is accessible to a wide range of stakeholders and to ensure there is opportunity for community involvement in our decision making. Feedback, comments and suggestions on the content of this improvement plan are welcome.

Managing Melbourne's water resources and the environment in a sustainable manner and protecting public health are two of Melbourne Water's key objectives. Environment and Public Health 2000 provides a basis for the community to see how we live up to those objectives. It is also a benchmark for future reporting.



Brian Bayley
Managing Director

Melbourne Water's role in the urban water cycle

Melbourne's urban water cycle starts with the rain that feeds the city's reservoirs. It ends with the discharge of stormwater and treated effluent into Port Phillip Bay, Western Port and Bass Strait.

In addition to the water that is harnessed through the water supply and sewerage systems, there is the rain that falls on rural and urban catchments and flows into creeks and rivers.

Melbourne Water plays an active role in managing all this water.

Our responsibilities start with protecting the forested catchments in the headwaters of the Yarra and Thomson Rivers from human contamination. We manage the major reservoirs where water from the catchments is collected and stored.

We release some water from the reservoirs to maintain healthy environmental conditions in rivers and creeks downstream, but most of it is provided to the retail water companies, City West Water, South East Water and Yarra Valley Water. They provide water to households and businesses. Water is also provided to some other retail companies and Southern Rural Water.

The retail water companies collect sewage from households and businesses. Most of it is carried to Melbourne Water's Eastern Treatment Plant at Carrum and Western Treatment Plant at Werribee. After treatment, it is discharged under Environment Protection Authority (EPA) licences to Bass Strait and Port Phillip Bay respectively.

Much of the rain that falls in and around the city flows into pipes and drains leading into streams and creeks. Eventually, it reaches the Yarra, Maribyrnong and other rivers before flowing into Port Phillip Bay and Western Port. Some rainfall doesn't enter the pipes and drains and percolates into the soil as groundwater to recharge underground aquifers or to flow straight into creeks or rivers.

Melbourne Water works with local councils, the EPA, the land development industry, the Catchment and Land Protection Board and local communities to improve the quality of Melbourne's waterways. Councils collect stormwater from local catchments which flows into regional drainage systems managed by Melbourne Water.

Managing Melbourne's water resources sustainably is one of Melbourne Water's principal objectives and it achieves this by being a leader in urban water cycle management.

Environmental and public health management

In a city the size of Melbourne, there are always risks associated with the provision of water, sewerage and stormwater management. Melbourne Water has a risk management policy to ensure risk is managed consistently throughout the organisation. The policy is based on risk focus areas, including the environment and public health. The policy is based on the Australian risk management standard.

Management systems have been developed for each of the risk focus areas. These systems involve:



- Identifying impacts and regulatory obligations
- Establishing policies to guide what we do
- Ensuring day to day management is satisfactory
- Developing improvement plans where required
- Reporting internally and externally so that information is available for decision making
- Involving the community in appropriate ways, and
- Auditing and reviewing activities to make sure they are meeting stated objectives.

Melbourne Water takes its environmental and public health responsibilities seriously. We actively manage them to make sure we comply with all relevant legislation. Where there are no statutory requirements, we adopt the most appropriate guideline. An example is the use of relevant parameters from the Australian Drinking Water Guidelines.

Melbourne Water has corporate policies for environment and public health. In some cases it has developed specific policies to manage particular issues. Examples are the “No Sewage Spills” and “Community Relations” policies.

Reporting on progress

Melbourne Water has a number of reporting processes to make sure it complies with statutory and other requirements. These include:

- Monthly and quarterly reporting to our Board of Directors
- Annual reporting to regulatory bodies
- Annual reporting of performance to the general public through publications and community representative committees.

Environment and Public Health 2000 is a new publication providing additional detail on environmental and public health performance and improvement plans.

Environmental and public health improvement plans

Melbourne Water has a comprehensive range of plans to improve its performance on important environmental and public health issues. These plans are discussed in the following pages.

The plans all have clear objectives related to Melbourne Water’s strategic directions. Each plan provides background information, a description of issues and a list of activities with timelines to address the issues. Managers responsible for each plan are identified by their title.

1. Drinking water quality guidelines

Background

Melbourne is one of the few cities in the world that is served by protected wilderness catchments. It enjoys a consistently high standard of drinking water due largely to the quality of the catchments and natural purification in large storage reservoirs. Only minimal treatment and disinfection are normally required to provide high quality water.

Some 90 per cent of Melbourne's water is harvested from the protected catchments and so does not normally require more than minimal treatment. There are two main plants to treat the supplies from Yan Yean and Sugarloaf reservoirs, and the Healesville and Yarra Glen supplies have full treatment. All supplies are disinfected to comply with health requirements. Chlorination is the preferred method of disinfection for microbiological quality control that ensures water is safe. The Melbourne water supply is fluoridated in accordance with statutory requirements.

Melbourne Water and the retail water companies servicing the greater metropolitan area have mostly operated under the Guidelines for Drinking Water Quality in Australia (1987).

Issues

In late 1996 the National Health and Medical Research Council of Australia and the Agricultural and Resource Management Council of Australia and New Zealand produced revised Australian Drinking Water Guidelines (ADWG 1996).

The Victorian Government has been reviewing these guidelines to determine how they should be adapted to provide drinking water standards for Melbourne given its special situation where the majority of its water comes from pristine sources in fully protected catchments. The costs and commensurate health benefits are matters that are taken into account.

The new guidelines generally introduce tighter standards and the implications for Melbourne Water's system will vary depending on the specific standards adopted by the Government.

Potential issues for Melbourne Water include:

- Higher levels of chlorination may be required throughout the system to meet new total coliform guidelines.
- Water supplied to distant areas may require rechlorination to ensure effective disinfection. This could affect the taste and smell, and mean higher levels of disinfection by-products.

Plan objective

- To ensure Melbourne Water meets the appropriate drinking water standards and retains public confidence in the water supply system.

Strategic directions

- Provide a reliable supply of safe, high quality drinking water that consistently meets regulatory standards
- Increase water quality standards only where there are demonstrated health benefits

Actions/time frame

To address the major issues, Melbourne Water is conducting a series of projects in conjunction with various research and health organisations. These include:

- Investigation of options for achieving more effective chlorination throughout Melbourne's water supply system and the associated costs and benefits.
- Supporting the Department of Human Services proposal for the introduction of the Colilert coliform test method from July 2000 and undertake a 12 month monitoring program to determine impacts from the change of method
- The Water Quality Study – a major field trial that compares the incidence of gastroenteritis among people drinking filtered and non-filtered water supplies. The results of the study were announced in April 2000 and a final paper is due in October 2000
- A Case Control Study on the link between gastro-intestinal illness, Cryptosporidium and drinking water. The final report is due in November 2000, and
- Developing a strategy, by June 2001, that will meet drinking water regulatory requirements established by the Department of Human Services in relation to the adoption of Australian Drinking Water Guidelines 1996.

Measures of success

- Agreement with the Department of Human Services and the retail water companies on the adoption of guidelines for drinking water quality.

Responsible person

General Manager, Water

2. Microbiological quality of drinking water

Background

In Melbourne the microbiological safety of the water supply is achieved through a series of barriers to the entry and transmission of pathogens throughout the system. These are:

- Protected wilderness catchments for the harvesting of water
- Long retention times in major catchment reservoirs
- Additional retention time in seasonal storage systems
- Conventional treatment or microfiltration of water which is not harvested from protected catchments (approximately 10 per cent of water requires full treatment)
- Disinfection of the water before it enters the distribution system (chlorination is predominantly used), and
- Closed distribution systems to avoid any possible recontamination.

As a result the greater metropolitan area enjoys a consistently high standard of drinking water.

Issues

Melbourne Water strives for continuous improvement in the condition and management of its water supply system assets. Issues that have been targeted for improvement include:

- Enhanced reliability of disinfection plants
- The impact of storms on water quality in catchment areas
- The potential for algae growth in, and airborne contamination of, open reservoirs
- Managing the transfer of water in open conduits for non-drinking uses, mostly in agriculture and industry, and
- The reliability of electricity supplies at disinfection plants, particularly in remote areas and areas prone to thunderstorms

In any year there are a number of incidents related to the water supply system, mostly related to power supply and the reliability of disinfection plants.

Plan objective

- Compliance with statutory requirements, drinking water guidelines, supply agreements with the retail water companies and corporate performance targets for treatment plants.

Strategic directions

- Provide a reliable supply of safe, high quality drinking water that consistently meets regulatory standards
- Increase water quality standards only where there are demonstrated health benefits.

Actions/time frame

A range of projects is under way to enhance the reliability of water quality and supply. They include:

- Duplication of the Cardinia-Pearcedale pipeline by December 2000 to allow abandonment of the Devilbend Reservoir which has an unprotected catchment
- Lining and covering of reservoirs at Garfield (February 2001) and Dromana (December 2002)
- Replacement of reservoirs at Johns Hill Emerald (December 2001), Frankston (December 2002) and Mornington (December 2002) with closed tanks
- Investigations within the water supply system to improve understanding of the need for supplementary disinfection and the impact of this on water quality and aesthetics
- Installation of back-up emergency power generators at disinfection plants by June 2001
- Upgrading disinfection plants at Frankston, Cardinia and Launching Place by July 2001
- Refinement of water harvesting procedures for Yarra tributaries during and after storms, and
- Implementation of a “Reliability Centred Maintenance” program at 30 disinfection plant sites over a five-year period with the aim of improving plant reliability.

Measures of success

- Compliance with statutory requirements, drinking water guidelines, and bulk supply agreements with the retail water companies, and
- Achievement, on schedule, of activities within the program to enhance water quality and supply.

Responsible person

General Manager, Water

3. Drinking water quality management systems

Background

Our water quality management systems are designed to minimise the risk to human health from pathogens in the water supply system and ensure continuity of supply of good quality water. These systems are based on barriers to the entry and transmission of pathogens throughout the system (see the background to the earlier plan on Microbiological quality of drinking water for a full description of the barriers).

End-point sampling of indicator organisms such as total coliforms and faecal coliforms is used to assess the effectiveness of these barriers. Monitoring for specific pathogens is carried out on a routine basis and for specific investigations. Melbourne Water also has a series of management systems aimed at maintaining a consistently high standard of drinking water. These include a Public Health Policy, Drinking Water Quality Management System certified to the Hazard Analysis Critical Control Point system, standard operating procedures and protocols and contingency plans for dealing with incidents.

Issues

The minimisation of risk cannot be achieved by end-point monitoring alone. Other procedures are needed to adequately protect against pathogens such as the protozoans *Cryptosporidium* and *Giardia*.

Plan objective

- To ensure Melbourne Water meets the appropriate water quality guidelines and retains public confidence in the water supply system.

Strategic directions

- Provide a reliable supply of safe, high quality drinking water that consistently meets regulatory standards
- Increase water quality standards only where there are demonstrated health benefits

Actions/time frame

Melbourne Water will continue to assess water quality risks in its water supply system, from the catchments to the contract interface points with the retail water companies. This involves:

- Confirming where Melbourne Water has best practice in place and identifying areas of potential improvement to Melbourne Water's drinking water quality assurance system
- Maintaining certification of the Drinking Water Quality Management System to the Hazard Analysis Critical Control Point method and
- Achieving certification of the Drinking Water Quality Management System to ISO 9000 by June 2001.

Measures of success

- Adoption and implementation of recommendations from the risk assessment in accordance with program schedules
- Achievement of certification of the Drinking Water Quality Management System by June 2001, and
- High level of public confidence in the water supply system maintained.

Responsible person

General Manager, Water

4. Managing flows in Melbourne's rivers

Background

Melbourne Water plays a major role in the management of river flows.

It is responsible for:

- Intercepting flows in rivers and storing water behind dams for the city's use
- Ensuring the rivers receive enough water in 'passing flows' to maintain environmental conditions below interception points
- Managing the pumping of water from rivers for agricultural and horticultural purposes
- Modelling the impacts of floods and protecting floodplains, and
- Providing information on potential flooding in the major waterways to the Bureau of Meteorology.

Managing these responsibilities in an integrated manner produces the best results. Melbourne Water is one of the parties consulted when Government establishes the bulk entitlements for regulated streams (those with dams/weirs) and is developing streamflow management plans for unregulated streams.

Issues

Issues in managing stream flows include:

- Government defined entitlements to water from Melbourne Water's catchments including environmental flow requirements
- Melbourne's water supply requirements and the irrigation needs of 'diverters' in the Yarra and Maribyrnong catchments
- Security of supply for times of drought
- Seasonal variations in flows needed for environmental requirements
- Determining the importance of adequate stream flows to a stream's health, and
- Being able to measure the ecological benefits of environmental flows.

Plan objective

- To ensure that an appropriate balance is achieved between the value of water supply to the community and the need for adequate flows to maintain stream ecology.

Strategic directions

- Protect and improve the quality of Melbourne's waterways and the marine environment

Actions/time frame

- Producing Streamflow Management Plans for the following streams:
 - > Hoddles Creek by August 2000 in draft format
 - > Diamond Creek by November 2000 in draft format
 - > Plenty River by end June 2001
- Monitoring flows below regulating structures and managing water supply abstraction to ensure passing flows are met
- Monitoring the flow in major streams to provide a flood warning system, and
- Contributing to establishing bulk entitlements for the Thomson, Yarra and Tarago catchments

Measures of success

- Meeting all minimum stream flow requirements at designated locations
- Completion of streamflow management plans as planned
- Compliance of diverters with drought response plans, and
- Provision of information on potential flooding to the Bureau of Meteorology to enable effective public warnings about major flood events.

Responsible person

General Manager, Water (releases below reservoirs)

General Manager, Waterways and Drainage (management of streams below reservoirs)

5. Stormwater quality management

Background

Melbourne Water is responsible for managing waterways in the greater Melbourne area. A major component of stream health is the quality of water – its physical, chemical and biological conditions. Over the years community interest in the condition of Melbourne's streams has steadily increased. The EPA has established long-term objectives for water quality. A total catchment approach is required to move closer to meeting these objectives.

Melbourne Water monitors stream water quality and regularly publishes the results. More recently we have sought to influence people and organisations whose activities affect water quality. They include the development industry, local government and individual community members.

Melbourne Water has established the Healthy Bay Initiative that includes the construction of wetlands aimed at improving stormwater quality. Wetlands slow stormwater down allowing sediments to settle out and enable time and sunlight to help purify the water.

Issues

The issues addressed by this improvement plan include:

- The diffuse nature of stormwater pollution with inputs from the catchment by many different activities and individuals
- The large number of people who can have an impact on stormwater quality
- The need to reinforce community awareness that litter and other pollutants going down drains will be carried through stormwater pipes into high value waterways and the bays
- The significant impact of road runoff and motor vehicles on stormwater quality
- The incomplete understanding of water quality pollutant sources and the means of pollutant transmission, and
- The likely growth in pollutant loads due to urban growth.

Plan objective

- To work with others to protect and maintain the quality of stormwater so that, in the long term, State environment protection policy objectives in receiving waters are met.

Strategic directions

- Protect and improve the quality of Melbourne's waterways and the marine environment
- Minimise potential health risks associated with urban and rural stormwater runoff

Actions/time frame

- Working with the land development industry to protect stormwater quality from new urban developments
- Retro-fitting water quality treatment systems in existing urban areas
- Working with local councils in the development of four more Stormwater Management Plans by June 2001 and achieving complete coverage by June 2003
- Promoting the Best Practice Environmental Management Guidelines for Urban Stormwater Management to the development industry and local government
- Completing the Healthy Bay Wetland project in the south east growth corridor by June 2003
- Developing a strategy for achieving a 500 tonne reduction in nitrogen transported to Port Phillip Bay by stormwater by June 2001
- Fostering the development of water sensitive urban design in new areas
- Using water quality data to direct resources towards streams where improvement is most needed, and
- Improving understanding of impacts on stormwater quality from urbanisation in the Yarra catchment through research undertaken by the Cooperative Research Centres for Freshwater Ecology and Catchment Hydrology.

Measures of success

- In collaboration with others, to at least maintain existing water quality up to June 2009 despite the urban growth that will occur in the greater Melbourne area, and
- All councils in the greater Melbourne area have completed Stormwater Management Plans by June 2003

Responsible person

General Manager, Waterways and Drainage

6. Stream condition and health

Background

Melbourne Water's responsibility for stream management includes ensuring the best possible conditions for plants and animals that live in and around each stream's environment as well as protecting private and public assets from damage or loss due to bed or bank failure.

Environmental flow requirements are met through bulk entitlement agreements and stream flow management plans. The quality of water in streams and the stability and quality of the beds and banks are managed through a range of programs. Improving stream ecology requires working in partnership with adjoining landholders and all those who live in the catchment.

Issues

As urban and agricultural development in and around Melbourne has occurred, streams and the plants and animals that depend upon their ecology have suffered. Stream management used to be based on managing flows to prevent flooding. Over the years this has changed to a more integrated approach which recognises the importance to the community of a stream's ecological and landscape values.

Many people believe that waterways contribute significantly to the living environment in Melbourne. Since 1998 the Index of Stream Condition has been used to describe the condition of Melbourne's streams.

Plan objective

- To improve the health of streams in the greater Melbourne area so that habitat conditions are able to sustainably support an increased biodiversity of plants and animals.

Strategic directions

- Protect and improve the quality of Melbourne's waterways and the marine environment

Actions/time frame

Actions include:

- Providing assistance to landowners through the stream frontage management program
- Provision, where possible, of 'fish ladders' and 'fishways' so fish can pass instream obstructions
- Biological and toxicant monitoring programs to indicate stream health
- Supporting research into platypus in urban waterways
- Applying the Index of Stream Condition to all streams on a 5 year rolling basis to assist with the prioritisation of stream management works
- Achieving full coverage with Waterway Management Plans by the end of 2002 and revising these on a five year rolling basis, and
- Undertaking waterway rehabilitation and stabilisation projects.

Measures of success

- Continued existence of healthy platypus populations in waterways
- Existence of migratory species of fish above stream fishways
- Planting of 50,000 plants and building of 25 kilometres of fencing each year under the Stream Frontage Protection program, and
- Assessment of all waterways using the Victorian Index of Stream Condition every five years.

Responsible person

General Manager, Waterways and Drainage

7. Management of sewage biosolids

Background

Melbourne Water's sewage treatment plants produce more than 40,000 tonnes of dry biosolids equivalent each year.

At the Eastern Treatment Plant, approximately 25 per cent of the biosolids are sold as soil conditioner. The rest is stored on site. At the Western Treatment Plant, all biosolids are retained on site.

The management of biosolids is becoming increasingly complex due to changing factors including:

- Regulatory requirements to maximise the reuse of biosolids
- An evolving regulatory environment governing the reuse of biosolids
- Treatment plant process changes
- The requirement to achieve improved odour performance from the Western Treatment Plant, including at the sludge handling areas
- Limitations on biosolids storage facilities and the requirement for periodic rehabilitation of the sludge drying pans at the Eastern Treatment Plant, and
- Changes to dewatering, dewatering, storage, reuse, and disposal practices and their impact on a long-term strategy for overall biosolids management.

Issues

There is a range of issues relating to the management of biosolids. They include:

- Technical matters relating to the dewatering and treatment of sludge and the drying of biosolids
- The effect of trade waste and domestic sewage on the quality characteristics of the final biosolids products
- Acceptance of sludge or biosolids from other waste treaters
- Regulations and guidelines for the reuse of biosolids
- Product liability and potential land contamination associated with biosolids reuse
- Community and stakeholder acceptance of biosolids reuse, and
- The cost of treatment, disposal and reuse of biosolids.

Plan objective

- Compliance with EPA licence conditions and relevant policies and statutory obligations.

Strategic directions

- Achieve best practice standards for the disposal of treated sewage & sewage by-products

Actions/time frame

- Implement recommendations in the strategic position paper on biosolids management with the long-term aim of re-using all biosolids produced at Eastern and Western Treatment Plants, and
- Work with the retail water companies to manage sewage quality and any potential risks of regulatory non-compliance or limitations on the cost-effective disposal of sewage biosolids, including by maintaining and progressively improving agreed sewage quality management systems.

Measures of success

- 100 per cent compliance with regulatory requirements for the management and reuse of biosolids, and
- Establishment of a medium to long term strategy for the cost-effective management and reuse of biosolids by June 2000.

Responsible person

General Manager, Sewerage

8. Reducing environmental impacts at Boags Rocks

Background

The Eastern Treatment Plant at Carrum receives approximately 40 per cent of the sewage generated in metropolitan Melbourne. Most of the treated effluent is discharged to Bass Strait at Boags Rocks near Cape Schanck on the Mornington Peninsula. The shoreline discharge is next to the Gunnamatta surf beach. A small amount of the effluent is used for agricultural purposes or irrigation of public areas and golf courses in accordance with EPA guidelines. The Eastern Treatment Plant operates under a licence issued by the EPA. Compliance with licence standards is 100 per cent. The licence required Melbourne Water to carry out an investigation and consultation program to evaluate treatment, reuse and outfall extension options to improve environmental performance.

In mid 1997, Melbourne Water commissioned the CSIRO to undertake an effluent management study on the impact of the discharge at Boags Rocks and the opportunities for reduced discharge and greater use of recycled water. Other research tasks were undertaken at the same time.

In summary the overall study included:

- Environmental impact assessment of the discharge on the marine environment
- Review of land and marine effluent disposal options
- Microbiological health risk assessment at Gunnamatta Beach
- Treatment improvement options at the plant itself
- Outfall extension concepts and options, and
- A community consultation program.

In the meantime, a program to enhance treatment plant processes and functions has been implemented to improve operational and environmental performance and reduce operating costs.

Issues

The three broad issues related to the outfall at Boags Rocks are:

- The nature and magnitude of the impact of the discharge on the local marine ecology
- The possible health effects of the outfall on surfers and swimmers, and
- Minimisation of the ocean discharge and its potential impact on the environment (for example, by the maximum use of recycled water)

Plan objective

- Compliance with EPA licence conditions and relevant policies and statutory obligations.

Strategic directions

- Achieve best practice standards for the disposal of treated sewage and sewage by-products
- Protect and improve the quality of Melbourne's waterways and the marine environment

Actions/time frame

A wide range of actions are improving performance at Eastern Treatment Plant. Melbourne Water will be:

- Completing a major feasibility study to establish the viability of developing major reuse schemes in the vicinity of Eastern Treatment Plant by September 2000
- Conducting research and a major field trial into improved aeration efficiency and nitrogen removal performance by December 2001
- Completing a major upgrade of the outfall pumping station and sludge gas utilisation system by February 2003
- Upgrading works for the enhanced removal and handling of grit and screenings by December 2000
- Upgrading primary treatment by December 2000, and
- Undertaking further studies as required by the EPA to finalise the effluent management strategy including continuing impact assessments of the discharge through a 12-month microbiological program commencing in March 2000 and the development of an effective long term monitoring program by December 2000.

Measures of success

- Development of a cost-effective strategy to address the effluent management study outcomes within the time frame specified by the EPA
- Delivery of the expected benefits from each of the process improvement projects including overall annual cost savings by 2002 of at least \$1.5 million, and reduced environmental impacts at Boags Rocks
- Completion of the major reuse feasibility study and, if viable, commitment to implementation by December 2000, and
- 100 per cent compliance with EPA licence and other statutory requirements

Responsible person

General Manager, Sewerage

9. Reducing environmental impacts on Port Phillip Bay

Background

Treated effluent from the Western Treatment Plant discharges to the western side of Port Phillip Bay at four points between the Werribee River and Point Wilson. Streams and stormwater drains collect agricultural and urban stormwater run-off from the Yarra, Maribyrnong, Werribee, Moorabool and part of the Bunyip River Basins.

These impose sediment, nutrient and other pollutant loads on the Bay which need to be matched with its assimilative capacity to accept them. At the same time, natural flows have been modified by water harvesting and agricultural and urban development.

In 1992 the CSIRO was commissioned to design and manage a major environmental study of the Bay. The study was the most comprehensive and integrated environmental audit undertaken on a coastal ecosystem in Australia.

The aims of the study were to assess the health of the Bay, given the sediment, nutrient and other toxicant loads imposed on the Bay. Particular objectives included identifying the factors having an environmental impact on it and determining how best to manage the Bay in the long term. Sixteen main recommendations resulted from the study. These dealt principally with toxicants, nutrients and the ecology of the Bay.

Issues

The major issues for Melbourne Water identified in the Port Phillip Bay Environmental Study are:

- A long term target for reducing the annual average load of nitrogen to the Bay by 1,000 tonnes
- A reduction in the impact of nitrogen and sediment from storm loads and urban run-off
- Improvement in the nitrogen removal processes at the Western Treatment Plant, especially during winter
- Protection of the aesthetic and conservation values of the coastal and intertidal zones
- Reduction in toxicant inputs to waterways and drains leading to the Bay and
- Development of catchment models that can be integrated with models of the Bay and of the entire water cycle

Plan objective

- Compliance with EPA licence conditions and relevant policies and statutory obligations.

Strategic directions

- Protect and improve the quality of Melbourne's waterways and the marine environment
- Achieve best practice standards for the disposal of treated sewage and sewage by-products

Actions/time frame

Major works are being undertaken to reduce environmental impacts of the Western Treatment Plant by enhancing treatment processes to cut nitrogen loads and to improve effluent quality, particularly with respect to ammonia, BOD (a measure of the oxygen depleting potential of a waste stream) and suspended solids.

These will ensure that new EPA licence obligations to take effect in 2001 and 2005 are met. The works/actions are:

- Retro-fitting of enhanced lagoon technology to an existing major lagoon system by March 2001
- Reviewing the performance and cost effectiveness of the initial enhanced lagoon system by October 2001 and retro-fitting enhanced lagoon technology to another major lagoon system by March 2003
- Identification, and the construction, of any further works required to meet EPA licence conditions which come into effect in 2005, and
- Upgrading the pre-1980s lagoon systems by December 2005

Other activities to reduce the impact of stormwater run off on the Bay are included in the Stormwater Quality Improvement Plan.

Measures of success

- Achievement of construction and upgrade programs and activities on schedule
- 100 per cent compliance with EPA licence and other statutory requirements, and
- Reduction of an aggregate 500 tonne per annum nitrogen load to Port Phillip Bay by 2006 compared with a specified EPA baseline including achievement of an average 3500 tonne per annum target by December 2001.

Responsible person

General Manager, Sewerage

10. Sustainable water resource management

Background

As Melbourne continues to grow, the community has become more concerned about limits to water resources. Melbourne Water recognises the need to maximise the use of recycled water to meet new or existing water demands and to defer the potential need for major new water storages.

The current drought has emphasised the importance of ensuring Melbourne's water supply can cope with varying climatic conditions. The value of water can only increase over time and establishing sustainable resource management will help avoid the need for a new dam.

Melbourne Water wants to reduce the volume of effluent it discharges to the marine environment. At present, about one per cent of the effluent from the Eastern Treatment Plant is used by agriculture and sporting facilities close to the plant or the outfall pipeline.

Issues

The recycling of treated effluent has environmental and public health implications, although the community generally accepts appropriate recycling. Issues that need to be managed include:

- The level of treatment and consistency of effluent quality from the sewage treatment plants
- The types of reuse proposed and the management required to address environmental and public health concerns
- Financial arrangements to provide the infrastructure needed to recycle more effluent
- The discharge of treated effluent that cannot be recycled because there is not enough demand for it, and
- The availability and the cost of existing water supplies.

Other issues exist regarding the community's concern over the potential future need for additional water storage dams in sensitive environments.

Plan objective

- To achieve sustainable water resource management.

Strategic directions

- Protect and improve the quality of Melbourne's waterways and the marine environment
- Achieve best practice standards for the disposal of treated sewage and sewage by-products
- Minimise the requirement for new dams or major water supply augmentation for Melbourne

Actions/time frame

- Developing a Water Resources Strategy to ensure adequate security of water supply to the community and satisfactory environmental flows to rivers by July 2001
- Adopting a whole of government and industry approach in the development of innovative recycled water schemes
- Completing the effluent recycle and distribution system at the Western Treatment Plant by December 2002
- Completing a feasibility study into a tree plantation at Western Treatment Plant by June 2001, and
- Ensuring sewage quality does not unreasonably compromise Melbourne Water's capacity to recycle effluent.

Other actions to increase effluent recycling at Eastern Treatment Plant are in the Reducing Environmental Impacts at Boags Rocks improvement plan.

Measures of success

- Completion of the Water Resources Strategy, and
- Achieving an annual average effluent reuse target of 20 % by 2010.

Responsible person

General Manager, Sewerage (Effluent recycling)

General Manager, Water (Water Resources Strategy)

11. Odour management

Background

Odour can be generated in transporting sewage in pipes, treating sewage, digesting and drying sludges and in the use of chlorine. Decomposing algal growth in lagoons and waterways can also produce odours.

Melbourne Water's EPA discharge licences require us to confine odours from sewage treatment plants within the plant boundaries. We aim to reduce the incidence of offensive odours and act to stop those that do occur as quickly as possible.

Issues

It is not always possible to stop the generation of odours. It is important therefore to minimise the impact of odours on the general public, including neighbours and people passing by Melbourne Water assets. Issues related to odours include:

- Adequately characterising odours and understanding how they are generated
- Being able to determine sources of odours
- Responding promptly to odour complaints from the general public, and
- Taking a long-term view, especially for Melbourne Water's neighbours and on adjacent development proposals.

Plan objective

- To contain any persistent objectionable odours within the boundaries of Melbourne Water's property.

Strategic directions

- Achieve best practice standards for the disposal of treated sewage and sewage by-products

Actions/time frame

Melbourne Water will be:

- Reviewing odour control strategies at the Eastern and Western Treatment Plants and for the sewage transfer system and developing a strategic action plan by September 2000
- Providing odour reduction works as part of the Western Treatment Plant Environment Improvement Project including covering of anaerobic sections of lagoons, stopping the direct application of raw sewage to land and closing the West Sedimentation Tanks, progressively by 2005
- Undertaking a community odour survey at the Western Treatment Plant by June 2000 and undertaking ongoing odour modelling work as required by the EPA to assess performance improvements, and
- Implementing odour improvement works in Melbourne Water's sewerage system in line with outcomes of the strategic action plan.

Measures of success

- Odour management strategic action plan developed by September 2000
- No complaints of persistent offensive odours and a falling number of intermittent odours attributable to any particular Melbourne Water source, and
- Acceptance based upon a community survey that the works associated with the Western Treatment Plant Environment Improvement Project have reduced odours.

Responsible person

General Manager, Sewerage

12. Containing sewage spills

Background

Sewerage systems are designed to transport sewage flows based on catchment size. Flows coming from illegal stormwater connections and inflows from groundwater infiltration can lead to a sewer's capacity being exceeded.

Sewers are not designed to carry 100 per cent of all flows. If they were, the pipes would be extremely large and uneconomic. Overflow points are located at strategic points in the system to minimise the effect of spills to the environment and risks to public health. These also allow overflows from sewer blockages to be relieved at the most appropriate point.

As Melbourne has grown, some of the sewers built over the past 100 years have been replaced or augmented to cope with an increasing volume of sewage. At the same time the community's concern with raw sewage spilling to the environment has risen. Melbourne Water has responded to these concerns by implementing the No Sewage Spills Policy.

The EPA's policy requires sewerage systems to progressively have the capacity to convey without spilling all sewage generated in a catchment up to and including a one in five year rainfall event.

Issues

Melbourne's sewerage system has pipes that are up to 100 years old. To meet the plan's objective for sewage containment, attention needs to be given to:

- Monitoring the condition of existing sewers
- Maintaining an awareness of population growth to enable management of changing flow patterns
- Recording weather conditions to identify one-in-five-year rainfall events and monitoring flows in the sewerage system at critical points
- Enhancing and maintaining a hydraulic model of the sewerage system that can be used to prioritise works to augment the sewerage system's capacity, and
- Operating the sewerage system to optimise acceptance of flows and reduce overflows.

Plan objective

- To progressively augment the sewerage system to contain all sewage resulting from a one-in-five-year rainfall event under average catchment conditions.

Strategic directions

- Protect and improve the quality of Melbourne's waterways and the marine environment

Actions/time frame

Actions under this plan include:

- Monitoring and assessing the condition of all sewers to ensure any necessary rehabilitation works are undertaken in a timely manner and their structural integrity is maintained
- Managing flows in the sewerage system to avoid sewage spills due to operational failures and during dry weather
- Maintenance and continual enhancement of an hydraulic model to effectively assess hydraulic performance of the sewerage system
- Operation and maintenance of flow monitoring equipment to manage flows and to plan for timely and adequate augmentation of system capacity to meet service standards, and
- Regularly removing sediments from sewers to maintain capacity.

Measures of success

- Zero spills from operational failures which have the potential to cause an environmental impact, and
- Progressive reduction in spills for all rainfall events below one-in-five-year frequency under average catchment conditions.

Responsible person

General Manager, Sewerage

13. Land contamination

Background

Melbourne Water sells surplus land and purchases land needed for new projects. Soil contamination is an issue that needs to be investigated and understood before property transactions are finalised. On selling land, we need to know if the soil is contaminated and should be decontaminated before sale and when buying land we need to know if land is contaminated before we buy it.

We have to avoid contaminating land so that its value is not reduced. Activities that can lead to contamination include sewage treatment, sludge storage, pipe scouring, sediment removal from streams and sediment traps and disposal of contaminated soils from construction sites.

Issues

The critical issues related to land contamination include:

- The status of contamination in land being sold or bought
- Recognising the current market value of land held and being used for Melbourne Water activities
- Emerging land contamination criteria in government policies and guidelines, and
- Liabilities that Melbourne Water has through the ownership and use of land.

Plan objective

- To ensure that surplus land sold by Melbourne Water reflects its market value, and
- To minimise the liability to Melbourne Water from the disposal and acquisition of land.

Strategic directions

- Manage risk recognising community expectations and maximising shareholder value

Actions/time frame

Melbourne Water aims to:

- Develop a policy to minimise contamination of land from current activities by December 2000
- Assess the contamination status of any land that Melbourne Water buys or sells
- Assess and manage any known contaminated land owned or managed by Melbourne Water in accordance with relevant statutory and corporate requirements
- Manage the contaminated land at the former Dandenong Treatment Plant according to the EPA Pollution Abatement Notice
- Prepare risk assessments specific to Western Treatment Plant sites that are surplus to needs by December 2000
- Phase out the discharge of untreated sewage to land at Western Treatment Plant by December 2005, and
- Implement a remediation program at the disused Dandenong Treatment Plant by June 2003.

Measures of success

- Land Contamination Policy completed by December 2000
- Provide an annual report to the EPA for the former Dandenong Treatment plant
- Cease the application of raw sewage to land for treatment at Western Treatment Plant by 2005
- Meeting relevant statutory and corporate requirements.

Responsible person

Chief Financial Officer
General Manager, Sewerage

14. Energy use and greenhouse gas production

Background

Melbourne Water uses a significant amount of energy. It is used to operate electric pumps, treat water and sewage, run offices and transport people. Energy accounted for approximately eight per cent of Melbourne Water's 1998/99 budget expenditure.

A coordinating Energy Management Team has been established to explore how we can reduce the amount and cost of energy we use and emissions of greenhouse gases to the environment.

Australia has agreed to limit the increase of greenhouse gas emissions to no more than 1.08 times 1990 levels. Contributions towards achieving this target may be used in developing greenhouse gas trading markets.

Issues

A supply of reliable energy is critical to Melbourne Water. There is the potential for Melbourne Water to generate energy through hydroelectricity and from the collection and combustion of gases produced during sewage treatment processes. Critical issues include:

- Balancing the use of energy with the need to meet Melbourne Water's service objectives
- The relative costs and payback periods for energy recovery facilities
- Government targets for greenhouse gas emission reductions, and
- Retail electricity suppliers' desire for sources of renewable energy.

Plan objective

- To reduce the cost and the environmental impact due to Melbourne Water's use of energy.

Strategic directions

- Be an efficient product and service provider

Actions/time frame

Melbourne Water plans to:

- Determine Melbourne Water's 1995 baseline of greenhouse gas emissions by June 2000
- Establish a power generation scheme for the 25W and 55E lagoons at the Western Treatment Plant by March 2001
- Develop initiatives to reduce the amount of greenhouse gases Melbourne Water emits and the total cost of Melbourne Water's energy usage by December 2001, and
- Develop energy performance indicators that are based on the unit cost of providing Melbourne Water services.

Measures of success

- Measurement and reporting in Melbourne Water's Environment and Public Health reports of the change to greenhouse gas emissions against the 1995 baseline of greenhouse gas emission
- Develop targets for reducing energy and greenhouse gas emissions by December 2001, and
- Reduction in the cost per unit of Melbourne Water services.

Responsible person

Chief Financial Officer (cost of energy)

Science and Technology Manager (greenhouse emissions)



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