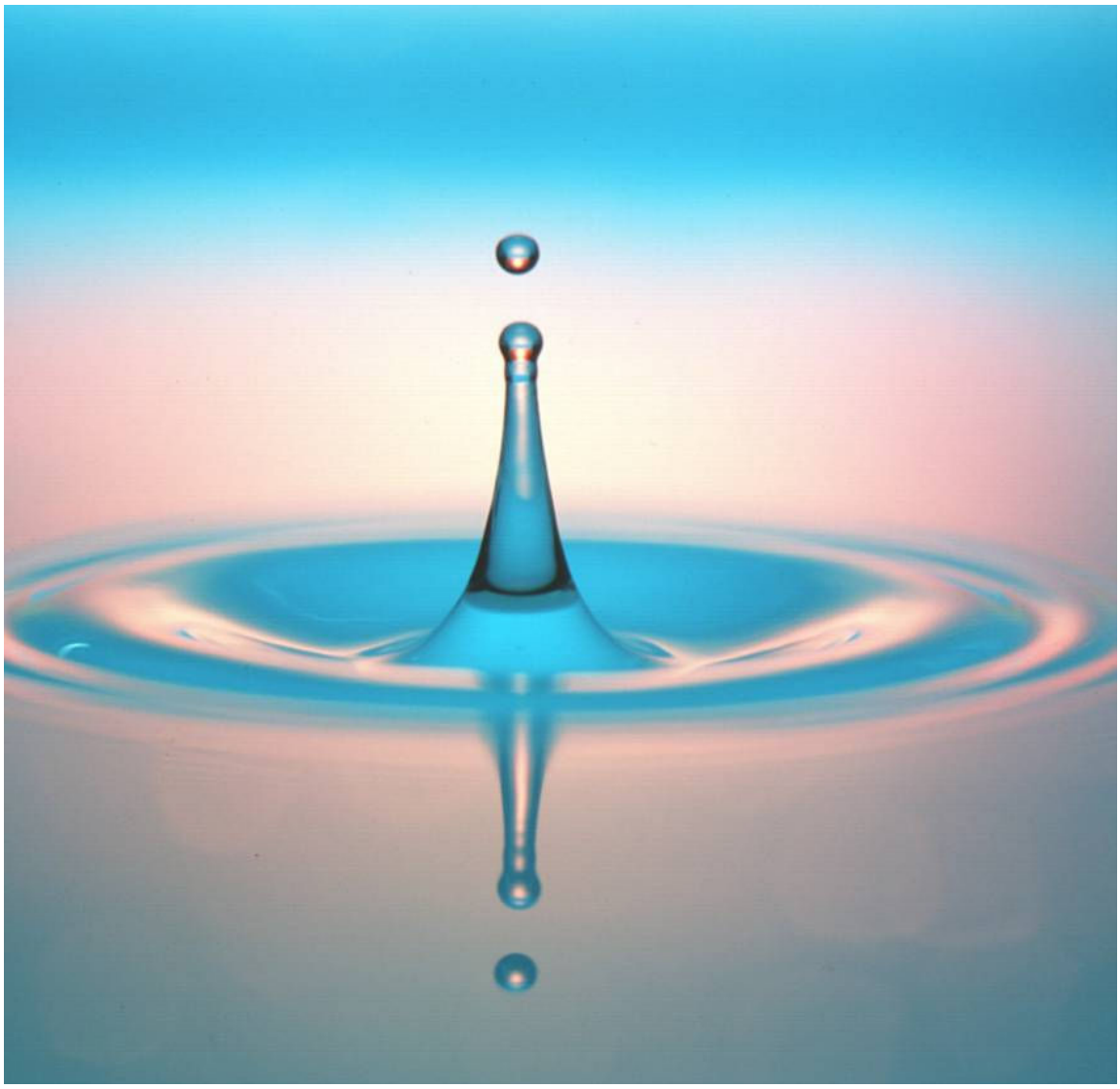

Towards a Water Smart City

Council's Sustainable Water Use Plan

Part A: Corporate Water Use & Conservation Measures

May 2008

GREATER DANDENONG
City of Opportunity

ACKNOWLEDGEMENTS

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Note:

1. The figures and data provided in this document are based on the best available information at the time of publication. There are limitations on some of the data, particularly relating to sector breakdowns of water use, where some assumptions have had to be made. Key initiatives outlined in this plan seek to address these data gaps to improve measurement and monitoring.

2. Throughout this document, water various water volume measures are used, explained as follows:

- 1000 litres = 1 kilotitre (1kL)
- 1,000,000 = 1 megalitre (1ML)
- 1,000,000,000 = 1 Gigalitre (1GL)

3. This plan was adopted by Council at its meeting dated 12 May 2008

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EXECUTIVE SUMMARY

The Challenge

Australia is the driest inhabited continent on earth, and yet we are one of the biggest consumers per capita of water in the world. In Melbourne, due to the planning and commitment shown by our forebears, we are fortunate to have protected catchments that are recognised as producing some of the best quality drinking water for a large city.

This regular water supply has enabled Melbourne to grow and prosper, however the last 10 years has seen reduced rainfall, with 2006/07 being a drought year of record proportions. Melbourne's households and businesses have reduced their water use considerably since the 1990's, but there is still significant further action required by all of our community, whether it be government, business or residents, to ensure our water supplies are secure.

While drought has been the primary cause of our current water scarcity problem, modelling indicates that it will be a long term issue for Melbourne. Planning for the future must consider projections for increasing demand for water and the reduced supply of water due to climate change.

Climate Change modelling indicates that southern Australia is likely to receive reduced rainfall and more periods of drought in the future. Melbourne's water demand is expected to exceed supply earlier than anticipated and this hastens the need to act to secure our supplies.

The severity of the current drought has raised questions about the impact climate change is having on our water resources. It is possible that Victoria is suffering a major long-term reduction in average rainfall – a step-change in water availability due to climate change.

Towards A Water Smart City

The City of Greater Dandenong is a large consumer of water, using on average over 200 Megalitres (ML) per annum for the last 3 years and with a peak of nearly 400ML during 1999/2000. As a large consumer of water, the City of Greater Dandenong realises that it has a dual role to play in the community. It needs to reduce its own water consumption so it sets a credible example to the local community, and it needs to actively promote the methods by which water can be conserved or safely re-used.

'*Towards a Water Smart City – Council's Sustainable Water Use Plan'* sets the strategic approach that council will take to reduce the amount of potable water used within its own facilities and operations. The target is for an overall reduction of 25% by 2018 from the 2004/05 – 2005/06 baseline average. This 25% reduction equates to a net reduction in water use of 66ML per annum.

The reduction will be achieved through the implementation of a comprehensive 60 point Action Plan developed as part of this report.

Measures outlined in the plan will also lead to long term efficiency gains and financial savings.

Fulfilling Council's Commitments

By implementing '*Towards a Water Smart City'*, Council will be reducing its impact as a large water consumer (200Ml+ p.a.) and will also be fulfilling its commitments to South East Water and ICLEI – Local Governments for Sustainability - Oceania (ICLEI Oceania) to develop such a plan.

Further work is still required in the area of community water use and water quality and this is expected to be commenced in 2008/09.

Achievements to Date

Council has already undertaken a range of actions that have had significant impacts on the amount of potable water used in its operations. Below is a list of some of the key actions completed or underway to date.

Playing Fields

- To date 31 sports fields (out of a total of 71) have been converted to warm season grasses reducing water use by up to 70% when compared with cool season grasses.
- All sprinklers have been changed over to more efficient sprinkler heads and inefficient systems have been redesigned.
- Check meters have been installed at each oval, to monitor actual water use on specific playing surfaces.
- 21 Tanks have been installed to allow irrigation of sports fields with recycled water.

Gardens

- Wachter Reserve wetland is now filled via storm water rather than potable water.
- Planting of annuals reduced by 40%.
- Garden transition program is underway with a key focus on drought tolerance of selected plants - 60% of garden beds have been converted already.

Street Trees

- The Leafy Legacy Street Tree Strategy implemented whereby drought tolerance is a key focus for tree selection.
- Street trees watered with Class C recycled water from the Eastern Treatment Plant (ETP). This has more recently been replaced by bore water, until a higher class of water becomes available from the ETP.

Swimming Pools

- Water saving devices installed in change rooms at Dandenong Oasis including automatic cut off devices for showers and push button taps for hand basins.

Buildings

- Trial of waterless urinals at Noble Park Reserve public toilet was successful and has now been extended to 10 other sites.
- A recycled water system installed for truck wash-downs at the Operations Centre.
- Rain water tanks installed at the Operations Centre and are connected to the toilet cisterns.
- Rain Water tanks installed at the refurbished Dandenong Basketball & Volleyball stadium.

Not withstanding the water saving achievements carried out to date by Council, and in particular leading the local government sector in sports field conversions, there are still significant improvements to be had and future achievements to look forward to.

A Plan for Improving What We Do & How We Do It

There is no single or easy solution to meet community needs, provide appropriate environmental flows and provide a buffer supply of water. Water conservation is considered the first and best action because it is usually cheaper and often quicker to save water than to increase the supply system and there are fewer environmental impacts.

Conservation of our potable (drinking) water can be achieved by following some basic principles:

- Firstly, avoid the use of potable water wherever possible.
- Where potable water has to be used, reduce its use by utilising appropriate design techniques, water efficient practices, fixtures and appliances and increasing public awareness and education.
- Use alternative sources of water such as rainwater, stormwater or recycled water where possible.

'*Towards a Water Smart City'* is a plan for Council to better manage its water use. It is based on the basic water conservation principles outlined above and achievement of the following key strategic objectives:

- To provide a solid footing with improved monitoring and data management relating to Council's use of water - good decisions flow from good data and good strategies.
- To broaden accountability and ownership for water conservation and efficiency actions across council.
- To respond to sound data, water audit outcomes and conservation strategies to facilitate improved costing and prioritisation of initiatives.
- To reduce water consumption through sustainable behaviour change.
- To facilitate a cultural change in the way Council manages its water use through integrating water conservation actions into council systems and processes.
- To increase rainwater harvesting, grey water reuse and recycled water use to replace potable water where appropriate.
- To assist Council prepare for an uncertain future in terms of restricted water supply and increasing water prices.
- To promote achievements.

A summary of the Action Plan is provided on the following pages. The detailed 60 point Action Plan (at end of document) provides additional detail, including an indication of the priority, costs and timelines for each of the proposed initiatives. It outlines responsibilities across council for these actions as well as performance reporting mechanisms.

The indicative cost for the initiatives is approximately $1.4 million spread over the life of the plan. Costs will be partially offset by external sources of funding and the financial savings generated by the water saved. Implementing the plan will also insulate Council against the impacts of projected water price increases.

Action Plan Summary

Objective	Rationale	Action	Outcome
Council Systems, Culture & Purchasing			
Water conservation integrated into Council operations Increase responsibility for & reporting of water conservation measures by responsible Council departments	Actions to lead in reducing potable water use across Council operations would generally be expected by the community. Water conservation in all things that we do is consistent with Council's Triple Bottom Line + 1 guiding principle	Actions incorporated into business plans with suitable targets & KPI's	Individual actions / initiatives incorporated into business planning of responsible departments Reporting of water use & conservation measures into OPRA
Improve planning, standards and information management	Integrating water conservation actions into council operations Standards provide additional 'spin-off' benefits to other operational areas, such as maintenance	Develop standard audit templates for water use & fixtures & appliances Improve monitoring & reporting	Consistent integrated approach and standards that lead to sustained water use reductions as well as other benefits such as reduced maintenance costs
Facilitate behavioural change across the organisation towards improved environmental performance	Improving environmental performance cannot be left to a few people – everybody has a role to play Behaviour change can be a low cost action to reduce water use.	Education of staff & Councillors on Sustainable Water Use Principles	Increased awareness of issues and approaches to water reduction across Council Staff actively participating in reducing Councils water use
Demonstrate Councils leadership position to the community	Council is a large user of water and needs to 'Walk the talk'	Promotion of '*Towards a Water Smart City*'	Awareness of Council's actions & leadership role in water conservation

Objective	Rationale	Action	Outcome
Infrastructure Planning & Works			
Increase the utilisation of recycled water from the Eastern Treatment Plant via a third pipeline	Reduce potable water use & increase utilisation of recycled water. Provide security of supply for irrigation of playing fields and for industry. Close proximity to Eastern Treatment Plant – consistent with State policy.	Undertake feasibility study with Dandenong Development Board into recycled water pipeline.	The provision of a pipeline to deliver recycled water from the Eastern Treatment Plant for community use and benefit
Reduce potable water used by works & the cleansing fleet	An operational area that uses significant amounts of potable water	Investigate & implement opportunities to reduce use of potable water through changes in practices & / or technology	Potable water use reduced or eliminated or alternative water source use increased
Incorporate improved environmental performance into design & construction of new / refurbished Council facilities	Climate change & rising utility costs Council facilities are designed to service the community for decades. Improved environmental performance will reduce Councils ecological footprint and operational costs into the future	Develop Water Sensitive Design Guidelines and standards for Council as part of broader Ecologically Sustainable Design (ESD) guidelines	Lower ecological footprint / operational costs Future proofing Council against increasing utility costs
Open Space			
Reduce potable water used on Council's playing fields while still providing the level of service expected by the community	Playing fields normally use +- 50% of water used by Council Warm season grasses use up to 70% less water per playing field	Continue with program to convert playing fields to warm season grasses	Continued provision of high quality playing surface whilst also achieving a considerable reduction in water use
Reduce potable water used in the provision of garden beds / open space	High quality open space areas can be provided that utilise minimal potable water	Efficient water use through practices such as irrigation systems, plant selection & mulch	Quality open space areas that are more sustainable

Objective	Rationale	Action	Outcome
Open Space (Cont….)			
Utilise alternatives to potable water – including increasing recycled water use where appropriate	Playing fields a community asset Irrigation currently limited to only 25% of ovals. Using recycled water increases the number of playing fields available. Recycled water provides supply security	Utilise tanks for rainwater / recycled water Monitor and investigate use of alternative sources to irrigate playing fields and open space areas	Reduced potable water use Increased use of alternative water sources Limit impacts of restrictions / increased security of supply.
Increase rainwater harvesting at Tatterson Park to irrigate ovals	Large roof area available at Springers to harvest water Dams on site for storage	Install pipes to harvest & store rainwater from Springers Leisure Centre	Reduced potable water use Increased security / diversity of supply
Buildings			
Ability to evaluate and prioritise actions based on sound data	Current metering inadequate - often numerous facilities are on same meter	Improve metering of facilities	Efficient use of resources Charging of users where appropriate
Assess and evaluate water use within facilities to determine appropriate water saving initiatives	Buildings utilise around 50% of Councils water use. Targeting high water use facilities such as Dandenong Oasis for higher cost / higher water saving actions. General facilities water audits to identify lower cost initiatives	Audit Council facilities & develop water conservation plans, targeting high use facilities as well as rolling general facilities audits Audits to conducted both in house & through consultants	Increased understanding of water use across and within Council facilities that will enable prioritisation of actions
Reduce water use across existing Council facilities	Implement actions to reduce water use in existing council facilities Reduce operational costs Promotional / educational opportunity	Implement initiatives that focus on shorter payback periods, high water savings and educational / behavioural change opportunities	Reduced water use across council facilities through targeted actions

BACKGROUND & POLICY CONTEXT

The importance of conserving water resources has been recognised in international agreements, legislation at the Commonwealth and State levels, and a variety of strategies and programs at all levels of government. '*Towards a Water Smart City - Council's Sustainable Water Use Plan'* recognises and supports these initiatives, and seeks to work within the strategic frameworks already established. The following outlines the broader policy context which informs this strategy.

Victorian Government

21st Century Melbourne: A WaterSmart City - 2002

This report set out a blueprint for water resources for the next 50 years to ensure a safe and reliable supply of water is delivered to Melbourne in an environmentally sustainable way and at a cost that is acceptable to the community. The strategy stated that 'no new dams or diversion weirs should be built in the next 50 years' and sets out 23 recommendations to decrease water consumption. A key recommendation is for retail water companies and Melbourne Water to prepare integrated Water Management Plans with local governments within an agreed two year timetable.

In response to this report, Greater Dandenong, along with a number of other Councils, committed to developing its own Sustainable Water Use Plan.

Metropolitan Strategy 2030 - 2002

The objective of Melbourne 2030 in terms of water management is to ensure 'water use efficiency will be managed so that existing storages can reliably meet water demand beyond 2030'. The policy sets out initiatives to achieve this, including the promotion of water efficient practices; the preparation of guidelines to encourage the use of alternative water resources such as rainwater tanks, stormwater and recycled water; planning provisions to protect water supply and treatments; and the promotion of business opportunities related to wastewater treatment.

Securing Our Water Future Together – White Paper 2004

This report sets out new initiatives for water conservation aimed at every sector of the community to ensure there is an adequate supply of water to sustain growth over the next 50 years. It examined a range of issues including household use, industrial and agricultural use, environmental impacts, population increases, climate change and pricing.

The plan's proposals include:

- Restoring rivers and groundwater systems – the natural source of all our fresh water – by giving them legal water rights and conducting restoration works.
- Pricing water to encourage people to use it more wisely.
- Permanently saving water in our towns and cities, through common sense water saving and recycling measures.
- Securing water for farms through water allocation and trading systems.

Central Region Sustainable Water Strategy 2006

The Central Region Sustainable Water Strategy is a plan to secure water supplies for homes, business, industry, agriculture and the environment for the next 50 years. It is an integrated approach to water resource planning and considers all water sources including rivers, reservoirs, aquifers, as well as recycled water, storm water and seawater. The Central Region covers an area that includes Melbourne, Geelong, Ballarat and West Gippsland.

The strategy contains actions to improve river health and that respond to the challenges Melbourne faces from climate change and an increasing population. It also outlines initiatives in the event that the low inflows to reservoirs experienced over the last 10 years continue.

The Key Actions in the Strategy include:

- Water Conservation and efficiency including installation of water saving showerheads and requiring customers using more than 10Ml developing plans to cut use (known as the 'WaterMaps' program.
- Local recycling projects.
- Investigate large scale augmentation for Melbourne including desalination and eastern treatment plant recycling project.
- Upgrading water systems.
- Investing in healthier rivers and aquifers.

Our Water Our Future - The Next Stage of the Government's Plan 2007

The next stage of the Government's Our Water Our Future plan provides long-term solutions to secure our water supplies. Over the next five years, around $4.9 billion will be spent on major infrastructure projects to manage the risk of a drier future.

The Water Plan balances traditional water sources with new rainfall-independent sources of water. This includes:

- A desalination plant for Melbourne.
- Modernising infrastructure for the irrigation scheme in the Goulburn Valley.
- Expanding Victoria's water grid.
- Increasing water recycling, particularly from the Eastern Treatment Plant.
- Support new and existing water conservation programs.

The City of Greater Dandenong

Council Plan 2006-10

The Council Plan is the primary strategic planning document that outlines the vision for the City of Greater Dandenong. The strategic focus of the plan is guided by the Triple Bottom Line +1 principles. This includes:

- Sustainable economic growth for the community.
- Actively pursuing environmental stewardship.

The Council's Annual Plan does not specifically address water conservation measures.

Environmental Strategy 2005

The Environmental Strategy sets out the direction, vision, actions and objectives required to achieve Council's environmental goals. The conservation of water and improvement of water quality is one of the 5 key environmental priorities in the strategy. The 2003 resolution by Council to participate in the ICLEI Oceania - Water Campaign™ provides the framework for improvements in Councils management of water.

ICLEI Oceania - Water Campaign

Council is a member of ICLEI – Local Governments for Sustainability – Oceania (formerly known as the **I**nternational **C**ouncil for **L**ocal **E**nvironmental **I**nitiatives or ICLEI). More than 500 cities, towns, counties, and their associations worldwide, as well as 254 in Australia

and New Zealand, are now involved in ICLEI Oceania campaigns. ICLEI Oceania works with these cities to improve environmental performance and outcomes from a local perspective. The basic premise is that locally designed initiatives can provide an effective and cost-efficient way to achieve local, national, and global sustainability objectives.

Greater Dandenong is committed to both the ICLEI Oceania 'Cities for Climate Protection' and the 'Water Campaign™' and has already achieved milestone 1 (out of 5) in the Water Campaign™.

The Water Campaign™ was introduced into Australia in 2002 and is delivered in Victoria in collaboration with the Australian Government, City West Water South East Water, and Yarra Valley Water.

The aim of the Water Campaign™ is to improve water quality and promote water conservation. It is based on a framework of five performance based milestones. The milestones are:

1. Inventory of water consumption and water quality management.
2. Setting goals for water conservation and water quality.
3. Development and measurement of the Local Water Action Plan.
4. Implementation and measurement of the Local Water Action Plan.
5. Monitor, review and report on implementation.

'*Towards a Water Smart City*', will in part fulfil Council's commitment to achieve milestones 2 and 3 for Council's own water use.

Further work is still required for Council to fully complete Milestones 2 & 3 of the Water Campaign™ which includes development of a plan to improve water quality and reduce community water use. This work is planned to be addressed in 2008/09.

MELBOURNE'S WATER SUPPLY & DEMAND ISSUES

Water Supply

Across Australia, rainfall varies considerably in its frequency and intensity. Sydney, with average rainfall of 1107 mm, has 40% higher average rainfall than Melbourne (655mm). Even across Melbourne there is considerable variation. For instance Mitcham, in the east, has averaged 827 mm over the last 20 years compared to 542 mm in the west at Keilor. There can also be considerable variation in rainfall from year to year.[1]

Melbourne's reliable supply of high quality water is a legacy of enlightened planning by previous generations, with the need for a reliable supply of water identified early in the City's history. This resulted in the formation of The Board of Commissionaires of Sewers and Water Supply in 1853.[2]. This has led to Melbourne being only one of five cities in the world with protected catchments.[3]

Most of the City's water comes from protected catchments to the east of Melbourne, with over 157,000 hectares of forests closed to human activity to protect water quality and public health.[4] The supply of water to Melbourne has been based on the principle that:

> *"it is better to start with the highest quality of water than having to treat it to reach required standards".*[5]

Water Use

While two thirds of all the people on earth use less than 60 litres of water a day, the average Australian uses more than 120L during a single shower. In fact, Australia is the driest inhabited continent and Australian's are among the biggest consumers of water in the world, especially around the home.

In Melbourne, total per capita water use has reduced to about 331 litres per day since the 1990's (See Fig.1), but there is still significantly more work to be done, particularly in light of the current drought and projected impacts from climate change. By way of contrast, many European cities use as little as 100-150L per person per day[6].

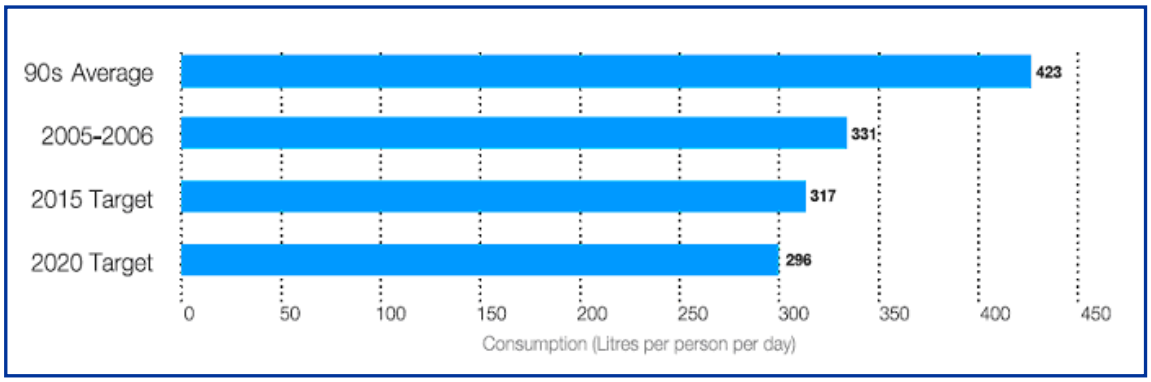

Figure 1. Per capita water consumption in Melbourne[2]

[1] Melbourne Water. Essential Facts: living with drought
[2] Fact Sheet: History of Melbourne's water system, Our Water Our Future
[3] Melbourne Water. Essential Facts: living with drought
[4] Melbourne Water. Essential Facts: living with drought
[5] Melbourne Water. Essential Facts: living with drought
[6] p.40 Sustainable Water Strategy, Central Region

The Need for Water Conservation

Water is a critical component for life on earth and, unlike other scarce resources, such as oil, water cannot be substituted and nor can its use be deferred.

Water conservation is critical for the security of Melbourne's water supply. It is cheaper and often quicker to save water than to increase the supply system and there are less environmental impacts[7]. There are a number of key factors that are driving the need for water conservation measures to be undertaken by all sectors of our society. These factors are as follows:

- Drought
- El Nino
- Southern Annular Mode
- Climate Change
- Forecast Demand Vs Supply
- Increasing Cost of Water

Drought

"I love a sunburnt country,
A land of sweeping plains,
Of ragged mountain ranges,
Of droughts and flooding rains…."
'My Country' by Dorothea Mackellar (1885 - 1968)

Living with drought is embedded in Australia's psyche. Regardless of the potential impact of Climate Change, Australia has always had a highly variable climate and this means that periods of drought are inevitable. These drought periods may last for a few months or many years. The severity of the impacts of droughts is influenced by the amount of previous years' rainfall and the amount of water stored in our dams.

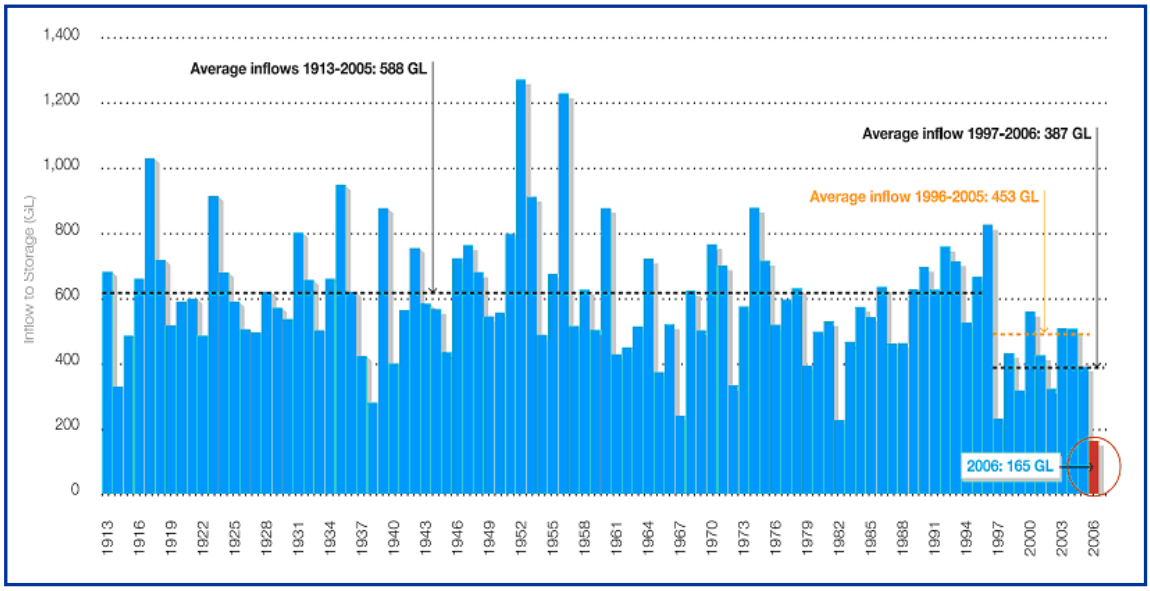

Figure 2. Melbourne storage inflows 1913 – 2006[8]
In 2006 inflows to Melbourne's water storages were the worst in recorded history.

[7] Our Water Our Future The next stage of the Government's Plan 2007
[8] Graph Source: Our Water Our Future The next stage of the Government's Plan 2007, p.20

> *"Over the 100 years until the mid-1990s Melbourne and surrounding centres had relatively reliable rain that provided the basis for confident planning of future water supplies".*[9]

It is clearly evident from Figure 2. that for Melbourne, this situation has changed due to the sustained drought. Over the past 10 years, inflows have been down by 35% from the pre-1997 average, with inflows in 2006 the worst in recorded history[10].

> "*The current drought has highlighted the importance of water to the economy, community and environment. For more than 10 years, a large part of the State has struggled with rainfall significantly below the long-term average. Its severity has been unprecedented, and its impact has been widespread across the State. Many regional towns have been on strict water restrictions for years and irrigators have received reduced allocations of water. Our rivers and streams have suffered due to the combined effect of water extraction and low flows over an extended period. …..In a period of reduced rainfall, surface water run-off is the first casualty. Less rain means even less water for our rivers and dams….. With increasing temperatures and reduced soil moisture, catchments become less efficient at producing run-off."*[11]

El Nino

In Australia, the main known cause of droughts that affect large parts of eastern and northern Australia is El-Nino – where a major shift in the weather patterns across the Pacific is caused by the extensive warming of the central and eastern Pacific Ocean. However, not all droughts can be predicted this way and not all droughts occur in El Nino years[12]. Research indicates that El-Nino events have become more frequent since the mid 1970's[13] and this is related to a decline in rainfall in Eastern New South Wales and Queensland, but the cause is not certain[14].

Southern Annular Mode

Less well known than El Nino are 'Annular Modes', which are large scale patterns of climate variability that owe their existence to atmospheric dynamics in the middle latitudes. These are the most important patterns that drive climate variability in the Northern and Southern Hemisphere middle and high latitudes (eg Southern Australia and Victoria). There are two Annular Modes, the Northern Annular Mode and the Southern Annular Mode (SAM)[15].

The main visible feature of the current SAM phase has been the tendency for rain bearing cold fronts, traditionally a significant source of southern Australia's rainfall, to contract to the south, where rain then falls over the ocean instead of the land.

Southwest Western Australia (SWWA), in particular has seen a significant reduction in winter rainfall. A recent study using climate change modelling has shown:

> *"that there is a statistically significant relationship between the SAM and SWWA rainfall in winter…… One of the most consistent results from the climate models is that as CO2 continues to increase, SWWA rainfall will continue to decrease"*[16]

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[9] P20. Our Water Our Future The next stage of the Government's Plan 2007

[10] Our Water Our Future The next stage of the Government's Plan 2007

[11] Our Water Our Future The next stage of the Government's Plan 2007

[12] Melbourne Water. Essential Facts: living with drought

[13] Pers. Comm Kevin Hennessy, Senior Research Scientist, CSIRO Atmospheric Research

[14] Kevin Hennessy, Life without rain: Victoria in 2020? The Speakers Briefings on Science

[15] A Brief Introduction to Annular Modes and Annular Mode Research, David W.J. Thompson, 17th March 2007, Annular Mode Website

[16] SAM and regional rainfall in IPCC AR4 models: Can anthropogenic forcing account for southwest Western Australian winter rainfall reduction? Wenju Cai and Tim Cowan, Geophysical Research Letters, VOL.33, L24708, 2006

Links are also apparent between the SAM and rainfall in Tasmania, Victoria and South Australia[17]. A reduction in April to July rainfall in Victoria since the early 1970's has been linked to the SAM.[18] and Victoria's reduction in rain has become even more pronounced since 1996[19].

Due to the increased greenhouse gases that cause Climate Change, it is possible that the SAM is undergoing a sustained trend over a number of decades[20]. This has long term implications for rainfall in the southern parts of Australia.

Climate Change

Climate Change modelling published in 2005 indicated that in the future, southern Australia is likely to receive reduced rainfall and more periods of drought. The CSIRO was commissioned by Melbourne Water to undertake a study on the implications of potential climate change for Melbourne's water resources. The study found that:

> "*Results of the "mid range" climate change scenario project an 8% reduction in the average annual volume of water able to be supplied by the system in 2020 rising to 20% by 2050."* [21]

The projection for 2050 under a severe scenario was for a 35% reduction. The study also identified that there will be an increased risk of bushfires due to climate change conditions and therefore an increased risk to the quality and quantity of water supplied from our catchments[22].

The severity of the drought over the past 10 years, and during 2006 in particular, has raised questions about the impact climate change is having on our water resources. It is possible that Victoria is suffering a major long-term reduction in average rainfall – a step-change in water availability due to climate change[23]. This step-change would be in contrast to the gradual decline projected in previous climate change studies such as the CSIRO report discussed previously. A stepped change has already been experienced by Perth and its water supply, which have seen a significant 64% decrease between 1974 and 2004[24].

Decreasing Supply versus Increasing Demand

Melbourne faces a challenge in regard to its future water supply and its ability to meet demands that are likely to increase. It is not possible to know exactly what the future holds, so forecasts using models have been prepared for state government authorities to provide an indication of the future and assist with the planning for a range of possibilities.

While drought has caused the current water scarcity problem, modelling indicates that water scarcity will continue to be an issue in the medium to longer term for Melbourne (see Figure 3).

There are 3 key issues affecting the water supply and demand equation, as follows:

- Melbourne's population is forecast to increase significantly over the next 20 years, so even if per capita water use decreases, there is still likely to be increased demand for water.

[17] Professor Mathew England, Water-Mass variability in the Southern Ocean: Separating natural fluctuations from long term change, Final Report

[18] Pers. Comm. Kevin Hennessy Senior Research Scientist, CSIRO Atmospheric Research

[19] Kevin Hennessy, Life without rain: Victoria in 2020? The Speakers Briefings on Science

[20] Professor Mathew England, Water-Mass variability in the Southern Ocean: Separating natural fluctuations from long term change, Final Report

[21] *Implications of Potential Climate Change for Melbourne's Water Resources 2005 p.v MW, CSIRO & CIG*

[22] *Implications of Potential Climate Change for Melbourne's Water Resources 2005 p.iv MW, CSIRO & CIG*

[23] Our Water Our Future The next stage of the Government's Plan 2007

[24] "Securing our Water Future in a Drying Climate" by Dr Jim Gill, Presentation to National Water Commission, Chief Executive Water Corporation May 2006)

- Inflows into Melbourne's water storages are likely to decrease due to climate change according to CSIRO climate change modelling. Low, median and high climate change scenarios were used for this modelling.
- Actual observed inflows into Melbourne's storages are tracking significantly below the median climate change modelling forecasts. This could represent a permanent step-change of inflows which are closer to the severe climate change modelling scenarios rather than the median used for most forecasting. Of course, the observed reduction of inflows could also be the result of a harsh drought as part of normal climate variability.

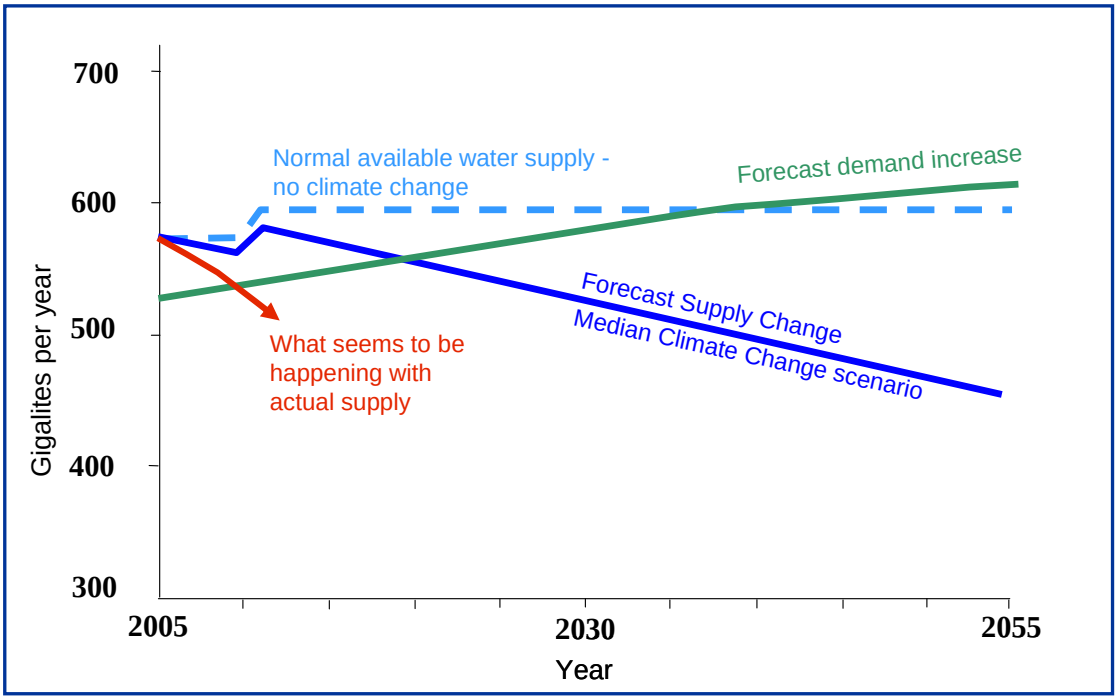

Figure 3. Forecast Water Supply & Demand for Melbourne without intervention
(Adapted from the Draft Central Region Sustainable Water Strategy, p, 77)

In order to meet existing and future community needs, provide appropriate environmental flows for rivers and provide a buffer supply of water, there is no single action or easy solution. Water conservation is considered the first and best action because it is generally less costly than other initiatives and has a positive impact on greenhouse gas emissions[25].

[25] Central Region Sustainable Water Strategy

Water Conservation Principles

Conservation of potable water can be undertaken by following a number of basic principles. These principles, and some examples for Council's operations, are as follows:

Avoid Water Use

This principle requires consideration of whether there are alternatives that can eliminate the need to utilise potable water in Council operations. For example:

- Synthetic playing surfaces.
- Reducing irrigated garden beds.
- Allowing lawn areas to 'brown off' over summer months.

Reduce Water Use

This principle requires consideration of actions that can reduce the amount of potable water across Council operations:

- Efficient building and garden design, such as the selection of appropriate plant species.
- The installation of water efficient devices, such as dual flush toilets, low flow taps, washing machines and dishwashers.
- The adoption of 'Water Conservation Management Practices' that encourage and educate staff, facility users and residents to reduce their water use through behavioural change.

Use Alternative Water Sources

This principle requires consideration of actions, as well as availability of appropriate infrastructure, to enable use of water from alternative sources, such as:

- Rainwater from roofs - eg. installation of tanks for plumbing into building or irrigation.
- Stormwater – utilising water sensitive urban design (WSUD) principles to harvest stormwater for landscape irrigation and to improve water quality.
- Recycled water from treatment plants and sewer mining for irrigation and internal building applications such as toilets.

Feedback and Adaptive Management

Continuous feedback on Council's implementation of water conservation initiatives will enable improved practices over time, that is 'adaptive management'.

Monitoring and reporting on the progress of '*Towards a Water Smart City'* will incorporate an assessment of the Key Performance Indicators and a review of the performance of the action plan on a regular basis.

THE INCREASING COST OF WATER

In July 2007, The State Government released a report '*Our Water Our Future - The Next Stage of the Government's Plan'*. This report states that over the next five years, around $4.9 billion will be spent on major water infrastructure projects. The State Government has also stated that water prices are expected to double over the next five years to pay for this investment in infrastructure.

Implications for Council's Operations

Increased Costs

For Council, the 2006/07 total water bill, for metered sites paid for by council, was over $170,000. This figure was down considerably on past years (nearly a $60,000 reduction on 2005/06) due mainly to the impact of water restrictions. This total does not include the cost of water for Council facilities where the tenant pays for water and other utilities. For example, the Dandenong Oasis water bill for 2006/07 was $77,181. The total water costs for Dandenong Oasis, Noble Park Pool, Springers Recreation Centre and the Dandenong Basketball Stadium in 2006/07 was $98,310.

If Council continues with a business as usual approach to water use, and continues to use around the same amount of water as in 2006/07 (a drought year), in 5 years, due to the projected increased water price, Council's water costs are likely to double. Even if we use less water, our costs are likely to still rise significantly. (See Figure 4 below)

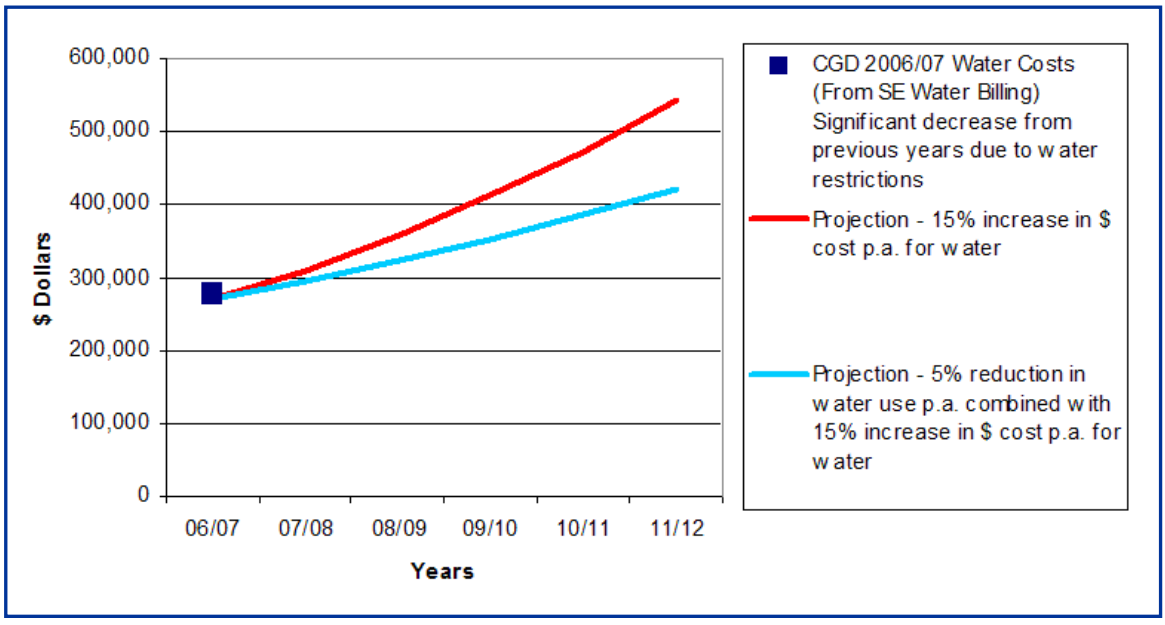

Figure 4. Projections for Increased Water Costs

The projections in figure 4 are based on 06/07 water use costs, and do not consider a change in restrictions. If water restrictions were to be lifted, water use and therefore costs would most likely rise. If water restrictions were tightened, potable water use and therefore costs could decrease significantly, however this reduction would most likely need to be offset by an increase in recycled water usage and costs.

Additionally, the projections are based on a flat 15% increase in water costs per annum and are provided as an indication of impacts of price rises only. The pricing mechanisms are currently under review and therefore the actual impact of increases to the cost of water is unknown.

The Action Plan (see end of document) that has been developed as part of this Sustainable Water Use Plan identifies actions to reduce Council's potable water use, and therefore minimise the impact of increasing water prices.

Water Restrictions

The stage 3a water restrictions experienced in 2007 have had a significant impact on Council operations and its ability to provide the services normally expected by the community. The major impact to date is limiting irrigation with potable water to 25% of playing fields. This has caused some difficulties for local sporting clubs, due to such issues as:

- Disruptions to normal training schedules due Council imposed restrictions on access to playing fields
- The determination of which 25% of playing fields are to be irrigated and the impacts on those playing fields not irrigated

The State Government has announced that Stage 3a restrictions will remain at least until June 2008. Although our dams have received better inflows than in 2006, the 2007 winter/spring inflows were not sufficient to eliminate the possibility of moving to Stage 4 restrictions after June 2008. Under the current stated stage 4 restrictions, all outdoor watering is banned. Therefore no playing fields would be able to be irrigated with potable water. Council has prepared well for this scenario through the installation of over twenty 45kL tanks to receive & store recycled water for irrigating playing fields.

Other council operations have generally not been affected by the current water restrictions. However, if the restrictions are strengthened to Stage 4, other areas of Council's operations might also be affected, depending on the exact nature of the restrictions introduced at that time.

WATER CONSUMPTION IN GREATER DANDENONG

The City of Greater Dandenong's Water Use.

The City of Greater Dandenong is a large user of water, normally using in the order of 250ML+ per annum (See figure 5 below), with a peak of nearly 400ML being used during 1999/2000. To put this into context, the much publicised top 200 water users (individual industrial sites) in Melbourne use 50ML or more. One Council facility, Dandenong Oasis uses on average around 46ML per annum.

As a large consumer of water, the City of Greater Dandenong realises that it has a dual role to play in the community. It needs to reduce its own water consumption so it sets a credible example to the local community, and it needs to actively promote the methods by which water can be conserved or safely re-used.

Financial Year	98/99	99/00	04/05	05/06	06/07
Megalitres of Potable Water Used (1998/99 being ICLEI baseline year)	302	394	258	277	181

Figure 5. CGD Water Consumption 1998/99 – 2006/07

Figure 5 provides Councils water use figures for years where accurate figures have been obtained. Council's use of potable water has shown considerable variation during these years. Council's water consumption for the 2006/07 year is significantly lower than the baseline year for the ICLEI Oceania Milestone 1 inventory of 1998/99. The variation over this time is a result of many factors. These include:

- Council water saving initiatives over the period.
- Numerous changes with regard to Council facilities over that time – for example: closures, refurbishments and new developments.
- An increase by about 10% in the number of playing fields irrigated since 1998.
- Seasonal variation - Increased supplementary irrigation because of continued drought conditions.
- Water restrictions being introduced since 2002. The stage 3 and 3a restrictions introduced during 2007 have had the most significant impacts on Council's operations, by requiring that only 25% of Councils playing fields permitted to be irrigated with mains water.

Council's water use for the years 1998/99, 1999/00 and 2004/05 to 2006/07 is illustrated in Figure 6 on the following page. The timing of the introduction of various water restriction stages is also indicated.

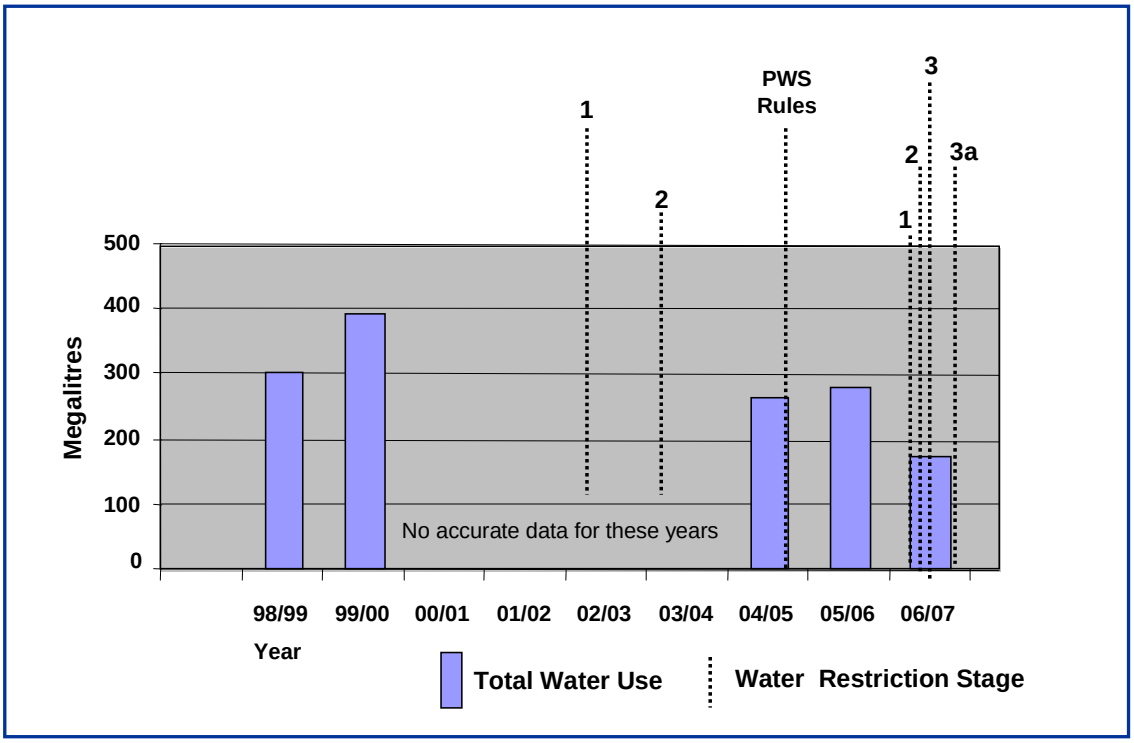

Figure 6. CGD total water use and the introduction of water restrictions

Greater Dandenong manages over 150 water accounts for various sites within the municipality. These have been broken down into property types, based on the ICLEI Oceania property type descriptions. Figure 7 shows the sectors that are the highest water consumers within Council are playing fields, followed by swimming pools and then open space areas.

Traditionally playing fields are major consumers of water in all local governments across Australia. Playing fields are by far the main areas watered within the municipality and therefore will be a high priority in the water reduction actions specified as part of this Sustainable Water Use Plan.

The breakdown of water use across councils operations in 2006/07 (figure 8 following page) shows clearly that the irrigation of playing fields, even with the impacts of water restrictions, at 46%, is clearly the biggest user of water. Swimming pools come in second, using around 28% of the Council's total water use last year. Open space (parkland other than sports fields) comes a distant 3rd at just over 3%. As can be seen, all other areas of Council's operations use 3% or less. However, when combined, these areas still used 23% of Council's total water used.

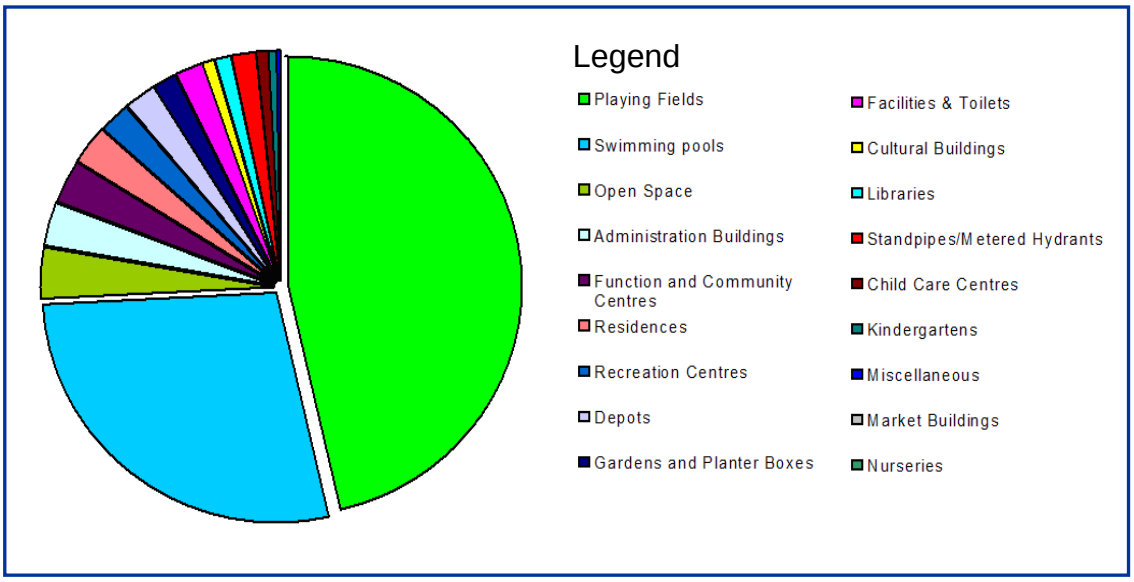

Figure 7. **CGD Corporate Water Use 2006/07**
(Based on ICLEI Oceania property type descriptions)

When comparing Council's three largest water using areas for the three years to 2006/07 (See Figure 8 below), the irrigated sites potable water use has decreased dramatically. This is mainly due to water restrictions. In comparison, the water used at the Council's swimming pools has remained relatively stable, due to it not being affected by restrictions.

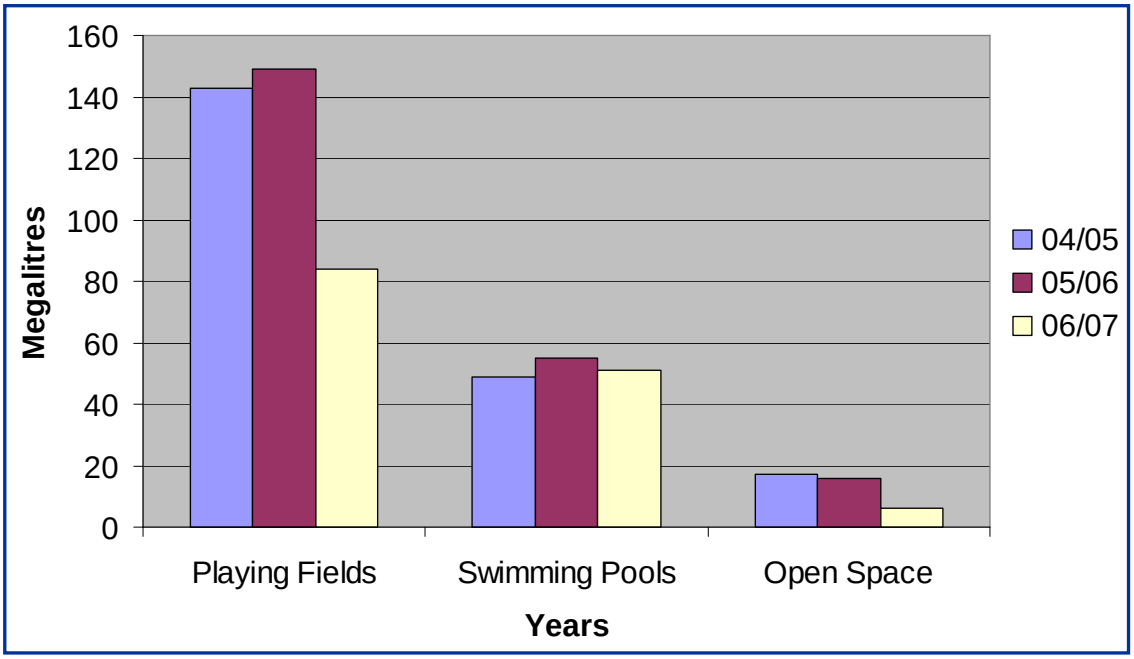

Figure 8. **CGD's largest potable water using sectors for the last 3 years**

Playing Fields

Playing fields in 2006/07 consumed approximately 84ML, or approximately 46% of Council's total water use. This is a significant reduction from the average of 04/05 – 05/06 years which stood at 147ML as shown in the above graph.

This reduction has been driven by 2 key factors:

1. The continuing conversion of playing fields to warm season grasses
2. The introduction of significant water restrictions

It is likely that if restrictions were not in force and that if the conversion of sports fields to warm season grasses had not taken place, water use on playing fields in 06/7 would have been the same if not more than 2005/06.

These conversions have been a major initiative of Council's Parks department to reduce potable water use. It has involved the programmed replacement of cool season grasses (eg. Rye, Fescue), the dominant grass type on Melbourne's sporting fields, with warm season grasses (eg. Kikuyu & Couch). This has been undertaken because warm season grasses require only about 30% of the watering that cool season grasses need.

There are many other opportunities to reduce potable water demand on playing fields. However many initiatives need substantial investment and will be dependant on available funding to implement. Financing for such initiatives can only be achieved gradually, which is why goals have been set over a 10 year time frame.

Swimming Pools

This sector includes the Oasis Pool and Gymnasium and the Noble Park Pool. These centres are large consumers of water, using approximately 51ML in 2006/07, or 28% of Council's total water use.

Dandenong Oasis is by far the highest water user out of these two facilities, last year using over 45ML. During the winter of 2003 the Dandenong Oasis completed a partial upgrade to its facilities at a cost of $60,000. Part of this upgrade was to install 'water saving' devices throughout the change rooms including new 'state of the art' showers and 'push button' hand basin taps. While there are still significant savings to be made at the swimming centres, this was a positive beginning.

Open Space

Open space is defined for the purposes of this study as passive parks and reserves and excludes dedicated playing fields. Apart from Dandenong Park, none of Council's main passive park lawn areas would be irrigated under normal condition (i.e. no water restrictions). Instead, irrigated garden beds usually account for the bulk of the water used in these reserves. However in some cases, other facilities, such as drinking fountains and toilet blocks, kindergartens and tennis courts etc may constitute a component of these reserves water use.

Unless the metering allows these facilities to be separated, then they have been included as part of Open Space. This is one area where Council's metering and data management could be improved and this is addressed in the Action Plan at the conclusion of this document.

Council's Use of Recycled Water

General

The Greater Dandenong Parks Unit has been using Class C recycled water from the Eastern Treatment Plant (ETP) to water street trees since 2003. More recently, primarily due to OH&S reasons, Council has been utilising Class A recycled water (which is of a higher quality and safe for surface irrigation but not of drinking quality). Some bore water is also being used to supplement this supply.

A lack of supply of Class A recycled water from the ETP necessitated Class A water to be carted from the Werribee Treatment Plant at significant cost. Nearly 3ML of recycled water was utilised by Council between January and May in 2007.

Due to the current water restrictions and the possibility of stronger restrictions in 2008, council is rolling out an initiative to increase its use of recycled water for the irrigation of playing fields. Twenty one 45kL tanks have been installed at playing fields across the municipality. These tanks are now being supplied with Class A recycled water from the TopAq facility, a privately run business which adjoins the ETP. The ETP itself is scheduled to be upgraded to produce large volumes of Class A water, but this will not be until 2012.

The Potential of Piped Recycled Water Supply

Cartage of recycled water to irrigate playing fields is a short term solution, but it is not sustainable over the longer term. Piped Class A recycled water is an alternative that has considerable merit, particularly when considering the close proximity of Dandenong to the ETP. This is also consistent with policy announcements from the state government - Our Water Our Future - The Next Stage of the Government's Plan, released in 2007, which states on page 5 that:

> *"Around half of Melbourne's wastewater is treated at the Eastern Treatment Plant (ETP). Recycled water from this plant is able to be delivered to sites nearby for a range of potential uses."*

On page 12 of the plan it is stated that:

> *"The upgrade will treat all water at the ETP to tertiary standard, producing between 110-130 GL of recycled water annually. This includes 15 GL committed to existing recycled water projects such as the Eastern Irrigation Scheme. This leaves up to 95-115 GL per annum available for the continued expansion of residential, industrial and open space recycled water use."*

Opportunities to provide recycled water infrastructure for the benefit of Council, residents and industry are currently being explored in conjunction with other agencies. If restrictions on the watering of playing fields continues into the future, then for community well-being, securing pipelines for recycled water could become an imperative. Even if restrictions are relaxed in the medium term, and potable supplies become more available, access to a secure supply of recycled water should become an important component of the City's and the region's water supply mix.

Council has been lobbying strongly for a recycled water pipeline but the provision of the required infrastructure is not Councils core role. As significant parcels of green-field sites are about to be developed in Dandenong's south for residential and industrial developments, this opportunity to secure access to recycled water should not be missed and requires leadership from the state government.

Forecasting Future Water Usage

The impact of the current drought and the subsequent water restrictions make it difficult to forecast future water consumption, particularly because irrigation of playing fields is such a large component of Council's water use (around 50%). If water restrictions were to be lifted, then water consumption would undoubtedly bounce back towards the levels of previous (non-restricted) years. Conversely, if water restrictions were to tighten, then potable water use would decrease significantly.

The potential future expansion of Council operations and services to respond to economic and population growth in the city will also place additional pressures on Council's water use. However, through wise planning and continuing the current direction to consolidate and create more flexible / multi-use facilities the impacts will be minimised. Indeed, utilising best practice water use principles should see water consumption reduced, even though service expansion is occurring.

WATER CONSERVATION TARGETS

Purpose of Water Conservation Targets

The setting of water conservation targets is a necessary component of this plan to ensure the whole organisation works towards reduced water consumption. The water targets are designed to be both large enough to be meaningful, but also eminently achievable over the life of this plan.

The conservation targets shall be Council endorsed, public statements of Council's approach and intent toward water conservation.

Factors influencing the Targets that are to be set.

Water restrictions have had a significant impact on Council's actual potable water use during 2006/07, as illustrated in Figure 10. If all restrictions were lifted, then it is likely that water use would rise near to the levels of the past few years

This is due to the relatively high proportion of water used in irrigated areas (playing fields, open space and garden beds), which averaged 63% of Council's total water for the years 2004/05 & 2005/06.

With the introduction of Stage 3 & 3a water restrictions in 2007 (which primarily restricted irrigation) this proportion was reduced to 52% of Council's total water use. If stage 4 water restrictions were to be implemented (resulting in a ban on external irrigation), this proportion would reduce even further.

Water restrictions have had less impact on Council's other operations and this is reflected in the relatively stable water use patterns, compared to open space areas, as shown in the graph below (Figure 9).

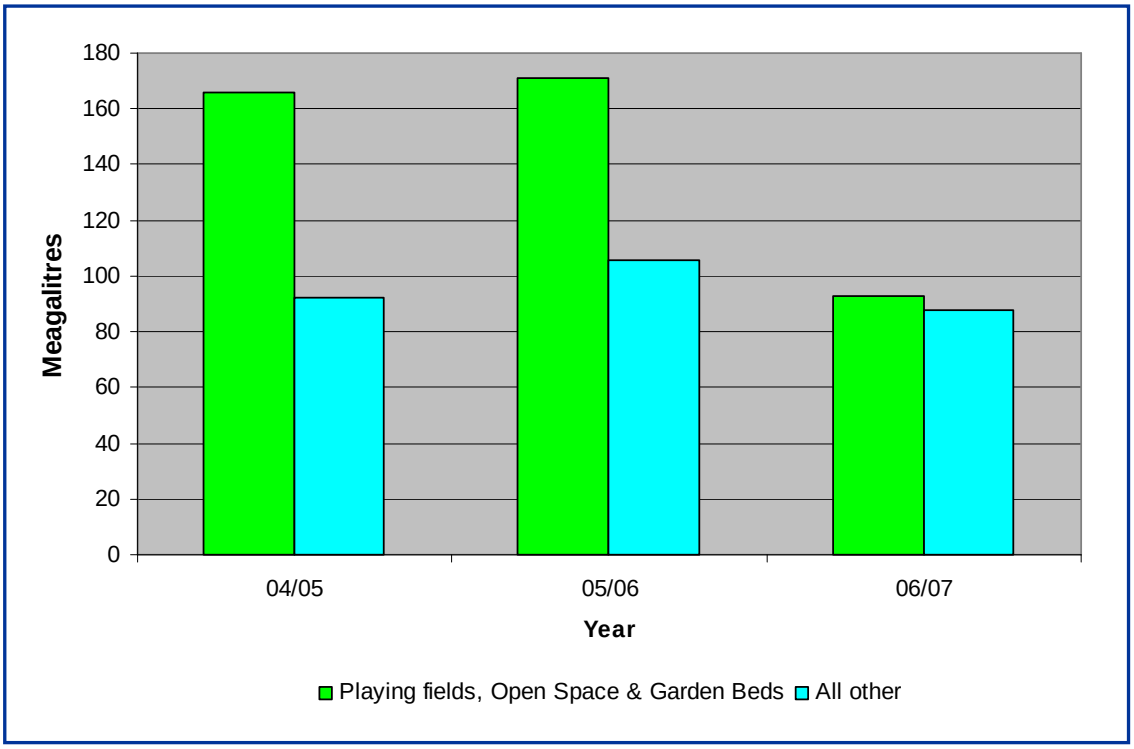

Figure 9. CGD Water Use – Comparison of irrigated sites vs. all others

The Targets

Due to the highly differential impact water restrictions have on open space water use versus all other Council uses (mostly via buildings), it is proposed to set independent water conservation targets for each of these areas. This will reduce uncertainty and ensure that all areas of council operations continue to strive to conserve water.

Target 1 - Council's Playing Fields, Open Space & Garden Beds

Council aims to reduce potable water consumption across playing fields, open space and garden beds by **25%** from the average of the baseline years 2004/05 and 2005/06 (168ML) by 2018.

Target 2 – Buildings and all Other Facilities

Council aims to reduce water consumption across buildings and all other facilities by **25%** from the average of the baseline years 2004/05 and 2005/06 (99ML) by 2018.

Combined, these goals represent an **overall water consumption goal of 25%** or 66ML from the base years by 2018.

THE ACTION PLAN & PERFORMANCE REPORTING

Strategic Basis of the Action Plan

To achieve the potable water conservation targets just outlined, a detailed 10 year action plan has been developed. The development of the Action Plan has been based on the premise that "you cannot manage what you do not monitor". The strategic objectives of the action plan are to:

- To move Council towards a solid footing with improved monitoring and data management relating to Council's use of water - good decisions flow from good data and good strategies.
- To broaden accountability and ownership for water conservation and efficiency actions across council.
- To respond to sound data, water audit outcomes and conservation strategies to facilitate improved costing and prioritisation, via an adaptive management process.
- To reduce water consumption through sustainable behaviour change.
- To facilitate a cultural change in the way Council manages its water use through integrating water conservation actions into council systems and processes.
- To increase rainwater harvesting, grey water reuse and recycled water use to replace drinking water where appropriate.
- To assist Council prepare for an uncertain future in the face of increasing water prices.
- To promote achievements.

The Action Plan has also been developed bearing in mind the fact that Council has a responsibility to demonstrate to the community that it is serious about reducing its potable water use. This will therefore require Council to undertake highly visible, and potentially more expensive actions earlier on that demonstrate this commitment and demonstrate to the broader community ways in which water can be conserved.

Adaptive Management

Adaptive Management is a critical component of this SWUP. By taking an adaptive management approach, Council can select the most appropriate water conservation measures and the timing of these actions. Trialling initiatives before rolling them out in full is a key element to minimise costs and potential difficulties. Data that is collected through the implementation of this strategy will guide the ongoing management, and inform improvements / adjustments to the plan.

This is a financially responsible approach to reduce Council's potable water use. Having better information enables projects to be more effective and cost-effective.

Monitoring and Reviewing Towards a Water Smart City

It is essential that *'Towards a Water Smart City'* be monitored and reviewed on a regular basis to ensure objectives and actions are being implemented. This is especially critical given the range of individuals and groups involved and the need for the actions to be incorporated into the normal operations of Council.

It is anticipated that the progress of the water plan will be assessed and reported at the completion of each financial year. This monitoring will be reported in the OPRA reporting system by responsible managers utilising CGD's water use data from utility tracker and

other sources available. This reporting and data management will inform the corporate water use component for the State of the Environment Report when it is produced.

It is proposed that *'Towards a Water Smart City'* be reviewed biannually, with the first review commencing two years from the date of adoption by Council. The review will consider:

- Water usage data
- The reported outcomes generated from managers and OPRA
- Council's performance towards adopted water conservation targets.
- The status of each initiative in the Action Plan and identification of barriers which may have emerged.

It is proposed that *'Towards a Water Smart City'* will be fully reviewed at the conclusion of the 10 year action plan time frame (2017/18).

It should be noted, however, that if the current record period of low rainfall continues, and water restrictions strengthen, then the reviews outlined may need to be brought forward.

Key Performance Indicators

Listed below are the performance indicators within OPRA that will measure the performance of the Sustainable Water Use Plan.

These KPI's are to be reported by each relevant Department Manager as indicated in the Responsibility Matrix (see table following page).

KPI's for assessment are outlined as follows:

- Total potable water consumption (ML) and Cost ($)
    - Across Council as a whole
    - For relevant departmental areas (according to responsibility matrix)
    - Indicative trend of water consumption (ML & %) compared with past years for each relevant department
- Total amount of non-potable water consumption (ML) and cost ($)
    - Recycled Water
    - Bore Water (if applicable)
    - Water reused
    - Indicative trend of water consumption (ML & % change) compared with past years for each relevant department
- Initiatives to decrease water consumption or increase water reuse for each departmental area
    - Process changes directed at reducing water consumption
    - Initiatives to reduce, recycle or reuse water
    - Programs to raise staff responsibility and awareness of water conservation

Total water consumption figures (both potable and non-potable) for each relevant department manager are to be reported quarterly in OPRA (consistent with billing periods). The initiatives to conserve potable water use are to be reported by each relevant department manager on a monthly basis in OPRA, with a total list at the end of the reporting year.

Responsibility Matrix

The responsibility matrix as shown below, outlines the responsible managers who will need to report in OPRA on water consumption and conservation measures across Council the various facilities and operations.

Property type	Description	Responsible Manager
Total Council facilities & operations	Compilation of all data & measures reported as well as trends	Environmental Planner
Administration Buildings	Office buildings including Springvale and Dandenong Municipal offices	Asset Management Services
Child Care Centres	Childcare Centres and Maternal and Child Health Centres	Children, Youth & Family
	Kindergartens	Children, Youth & Family
Cultural Buildings	Municipal libraries and museums	Library Arts & Heritage Services
Depots	Operation Centre for parks, roads & waste employees	Asset Management Services
Recreation Centres	Sites dedicated to indoor recreation including pavilions,	Property & Leisure
Facilities & Toilets	Public conveniences/toilets	Asset Management Services
Function and Community Centres	Mixed halls and neighbourhood and community centres	Library Arts & Heritage Services / Children, Youth & Family
Gardens	Nature strips, median strips, roundabouts, plantations and trees	Asset Management Services
Market Buildings	Dandenong Market – Not included to date	Manager Property & Leisure
Miscellaneous	Sites that cannot be classified into any other sector	As appropriate
Open Space	Reserves within the municipality	Manager Asset Management Services
Playing Fields	Sporting Ovals / Sports Pavilions	Manager Asset Management Services / Manager Property & Leisure
Residences	HL Williams for this report	
Metered Hydrants		Manager Asset Management Services
Swimming pools	Oasis Pool and Gymnasium and Noble Park Pool	Manager Property & Leisure

IMPLEMENTATION OF THE ACTION PLAN

Management and Coordination

Council will act as the manager and coordinator for Action Plan incorporated into '*Towards a Water Smart City*'. It is recommended that the proposed Environmental Sustainability Reference Group provide support to the Environmental Planner and responsible managers for overseeing the implementation of this plan.

Implementation

The Action Plan outlines 60 separate actions. It provides an indication of the priority, indicative costs and timelines for these actions. It also outlines responsibilities across council for these actions and reporting mechanisms.

The implementation of the Action Plan is expected to occur over the next 10 years. Many of these actions are anticipated to be undertaken as part of the normal operations or as in-house projects.

Individual actions contained in the Action Plan will need to be incorporated into the business planning for each respective Business Unit, indicating lead, support, timeframes and budgets.

Funding the Action Plan

The Action Plan indicates costs of around $1.4 million over 10 years. The indicative costs highlight the fact that for Council to achieve its desired water saving target, there will be significant cost involved.

It is anticipated that the funding of these actions will be based on annual CIP investment over 10 years. A significant proportion of the expenditure will be dependent on staged audit and conservation strategy development across council facilities.

The cost of these actions, however, will be significantly offset by monetary savings generated through reduced water use. Implementing these actions will in-turn reduce the impact on Council of increasing water prices.

It is considered that the cost for many of these actions can be also offset through alternative funding sources. 'Grant Friendly' actions have been indicated in the Action Plan. In certain circumstances the tenants of some facilities may co-fund some actions.
These alternative sources of funding would significantly reduce the cost to Council of implementing the Action Plan.

The actions identified in this action plan will have to compete with all other aspects of Council's operations for funding. Payback periods, whilst important in assessing the priorities of actions, should not be seen as the only determining factor for priority selection. Many other Council operations are undertaken for social benefit or other reasons - payback periods are not necessarily a key consideration. As a large water user, this Council has a responsibility to show leadership to the community in the efforts to reduce our water use.

THE ACTION PLAN

No.	Action	Intended Year of Action Commencement										Responsibility		Other Information & Examples	Indicative Costs	Assumptions / Comments on costs	Grant Friendly
		1	2	3	4	5	6	7	8	9	10	Lead	Support				
		✓ Action Commences															
		✓ Action Continuing															
1	**State Government Requirements**																
1.1	Ensure Council complies with the Permanent Water Saving Rules (PWSR) and applicable water restrictions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	All staff		See Melbourne Water website for summary of rules. Please see Actions 4.1.1 & 5.1.1 for specific actions required as part of waterMaps component of PWSR		Mandatory State Government Requirement	
2	**Council Systems, Culture & Purchasing**																
2.1	**Planning, Standards & Information Management**																
2.1.1	Incorporate actions of this Sustainable Water Use Plan into appropriate departmental business plans with suitable targets and KPI's	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Council Business	Executive	Appropriate KPI's to be determined for each department, consistent with Responsibility Matrix & KPI's outlined in SWUP.		In house Project	
2.1.2	The proposed Environmental Sustainability Reference Group (ESRG) is given a charter to oversee the implementation of Sustainable Water Use Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Executive	ESRG	The ESRG's role would include ensuring that the progress of the action plan is assessed on an annual basis.		In house Project	
2.1.3	Responsible departments to report on water conservation measures & usage figures (when available) monthly into OPRA.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Dept Managers	Contract auditing	See Responsibility Matrix (Towards a Water Smart City) for responsible managers		In house Project	
2.1.4	Create annual report from OPRA and Utility Tracker on Council's water usage, costs and water conservation actions.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Env. Planning	Department Managers; Contract Auditing	This report should also track Council actions towards the sustainable water management target and form the basis of the water component for the State of the Environment Report. Format should support ICLEI Water Campaign requirements.		In house Project	
2.1.5	Develop standard template for water audits	✓										AMS (Building Maintenance)	Env. Planning	Standard based on existing water audit formats, such as Green Plumbers. Utilise standard formats for consistency of approach.		In house Project	
2.1.6	Develop and maintain water use efficiency (WELS Rated) and product quality standards for all water fixtures and appliances for new and refurbished facilities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS (Building Maintenance)	Strategic Risk Services, Project Delivery, Contracts, Env Planning	Utilise existing standard formats for consistency of approach. To ensure ease of: maintenance; availability of spare parts; and replaceability. Undertaken as part of the Strategic Asset Management Planning (SAMP).		In house Project	
2.1.7	Monitor any new water saving technology as it becomes available and incorporate into water saving initiatives as appropriate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	All business units		Particularly those Departments that have significant opportunity to save water - AMS (Parks & Building Maintenance) Property & Leisure		Part of normal operations	
2.1.8	Ensure the ICLEI Water Campaign's Milestones progressively completed by Council.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Env. Planning,	All business units	Sustainable Water Use Plan Part A achieves corporate water use milestones 2 & 3		Part of normal operations	
2.1.9	Monitor external funding opportunities to implement actions in this plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	All business units	Env Planning	Awareness of grant opportunities should be shared with other relevant Council departments and interested community organisations as necessary		Part of normal operations	
2.1.10	Develop water saving specific service standards for Council fleet, plant and equipment		✓									AMS.(Fleet), All Staff		Washing of plant & equipment to be conducted at a frequency required to meet mechanical, environmental and OH&S needs only.		Undertaken internally	
2.1.11	Develop standards to ensure Council contractors comply with best practice water conservation measures			✓								Contracts	Infrastructure Planing & AMS	Ensuring contractors follow best practice water conservation principles & Council standards, particularly as outlined in this plan		Part of normal operations	
2.1.12	Undertake study of the extent of embodied water use in Council purchasing and works and provide recommendations for reductions where appropriate										✓	Env. Planning			$15,000	Undertaken internally	
2.2	**Promotion & Education Program**																
2.2.1	Promote Sustainable Water Use Plan to Council staff and community	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Media	Env Planning	Through a mix of media releases, council publications, signage, website etc		Part of normal operations	
2.2.2	Provide training for Councillors and Council staff on sustainable water use principals and practices		✓	✓	✓	✓	✓	✓	✓	✓	✓	Env Planning	Organisational Development	Develop material for Council's staff induction program water conservation measures. External representatives from water authorities invited to assist.		Part of normal operations	

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		1	2	3	4	5	6	7	8	9	10	Lead	Support				
		✓ Action Commences															
		✓ Action Continuing															
3	**Infrastructure Planning & Works**																
3.1	**Planning, Standards & Information Management**																
3.1.1	Lobby State Government and other appropriate agencies to secure a pipeline for class A recycled water for corporate and community use.	✓	✓	✓								Executive	Env. Planning, AMS, Strategic Planning				
3.1.2	Investigate opportunities to reduce or eliminate the use of potable water by the works & cleansing fleet.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS		About 2,750kL is used per year by the jet truck and street sweepers. The drinking water used is obtained from fire hydrants at present under a permit system. Use of recycled water dependent on EPA approval.		In house project	
3.1.3	Investigate in conjunction with the Dandenong Development Board (DDB) and DIIRD the feasibility of a recycled water pipeline from the Eastern Treatment Plant for corporate & community use.	✓										DDB	Executive, Env. Planning, DIIRD	Recycled water feasability study to commenced in February 2008			
3.1.4	Investigate opportunities available to utilise the existing dam at Sandown Park to improve water quality and recycle water						✓					Infrastructure Planning	AMS (Parks)			Undertaken by Council and in conjunction with water authorities and Melbourne Racing Club	
3.1.5	Develop Water Sensitive Urban Design Guidelines and standards(WSUD) for Council & developers		✓	✓								City Improvement	Urban & Open Space	To be developed as part of broader of broader Ecologically Sustainable Development (ESD) guidelines for design and construction of new and refurbished Council facilities, infrastructure and landscapes. Should include approaches to grey water, recycled water, stormwater and potable water.	$50,000	External consultants utilised	✓
3.2	**Physical Actions**																
3.2.1	Implement priority water conservation intiatives identified for the works & cleansing fleet as identified in Action 3.1.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			Could be achieved through behavioural change, improved design, efficiencies and use of alternative water sources. (Refer to action 3.1.2)	$50,000		
																.	
4	**Open Space**																
4.1	**Planning, Standards & Information Management**																
4.1.1	Undertake a water audit & develop a water conservation strategy for Greaves Reserve.	✓										AMS.(Parks)		New state government mandatory water saving rules require all sites with metered use above 10ML to develop a specific water conservation strategy ('waterMaps') prior to the end of 2007. Greaves Reserve last year used just over 10ML.		In house project	
4.1.2	Monitor, and investigate where appropriate, the feasibility of using alternative sources of water to irrigate ovals and open space areas.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)				Part of normal operations	
4.1.3	Undertake Investigation of possible termination or reduction of irrigation services to parks		✓									AMS.(Parks)				In house project	
4.1.4	Investigate use of synthetic turf & or surfaces for various sports						✓					Property & Leisure	AMS.(Parks)	eg. - athletics, bowls & tennis		In house project	
4.1.5	Monitor impacts of reduced rainfall / irrigation and alternative water sources on soil & vegetation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)				Part of normal operations	
4.1.6	Develop improved technical standards for the design, construction & management of council's open spaces, garden beds and amenity trees to minimise the need for artificial irrigation.			✓								Urban & Open Space	AMS.(Parks)	Some work already happening in Parks. Would link in with planned development of urban design tech notes. Examples include plant selection, use of hydro zones, WSUD and soil preparation	$5,000	Part in-house, but also assumes some expert advice.	

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		1	2	3	4	5	6	7	8	9	10	Lead	Support				
		✓ Action Commences															
		✓ Action Continuing															
4.2	**Physical Actions**																
4.2.1	Continue to plant drought tolerant warm season grass species on sports fields	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)		The biggest use of water by Council, as such this should continue to be a high priority. This action dependent on situation with water restrictions over the next 5 years.		A continuation of an existing successful program. 5 playing fields converted per annum @ an average of $25,000 per playing field.	✓
4.2.2	When upgrading systems, utilise the highest efficiency irrigation systems available when artificial irrigation is required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)				Part of normal operations.	
4.2.3	Continue to use mulch on all garden beds where appropriate to improve soil quality and reduce evaporative losses	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)				Part of normal operations.	
4.2.4	Ensure efficient application of irrigation water & phasing out spray irrigation where possible	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)		Already happening. Examples include: irrigate at night to avoid evaporation; use drip irrigators; & soil moisture monitoring		Part of normal operations.	
4.2.5	Increase utilisation of water from the Eastern Treatment Plant for irrigation throughout the municipality.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)		For playing fields, garden beds & planter boxes. Dependent on access and cost of cartage of water . Discussions to obtain water have been protracted. (refer also actions 3.1.1). 21, 45kL tanks have been installed to key sports fields as insurance against continued severe restrictions. Use rate over summer period would be about 1ML per week. Timeframe for use of recycled water will depend on state restriction levels.			
4.2.6	Implement storage of rainwater harvesting from Springers Leisure Centre roof for storage in Tatterson Park Dams				✓							AMS.(Parks)	Env planning, Property & leisure	Existing dams at Tatterson Park can hold 10ML plus. A 10mm rain event assuming collection from 2/3 of the Springers roof) would deliver over 45KL. 500mm per year (drought year) would deliver 2.2ML per year.	$65,000	350 lin meters of 300mm pipe approximately $55,000 plus 20% contingency	✓
4.2.7	As parks are developed / renovated, drought tolerant warm season grasses on non irrigated parks are to be used where appropriate.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)				Part of normal operations.	
4.2.8	Continue to install storage tanks at ovals as required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Parks)		Tank installation for recycled water / rainwater harvesting & storage			
5	**Buildings**																
5.1	**Planning, Standards & Information Management**																
5.1.1	Undertake a water audit & develop a water conservation strategy for Dandenong Oasis.	✓										Property & Leisure	Environmental Planning	New state government mandatory water saving rules require all sites with metered use above 10ML to develop a specific water conservation strategy ('waterMaps') prior to the end of 2007. Dandenong Oasis is Council's largest water using facility -+46ML p/a. or 24% of Council's total water use in 06/07. Strategy will have 3 key components - water audit, water conservation study & investigation of options to reduce water used by the filtration system.	$15,000	External consultants to undertake investigation. Estimated to cost $15,000 . Approved CIP project for 07/08	✓
5.1.2	Review and improve metering of all Council owned facilities, particularly where multiple uses are present.	✓	✓	✓								Contract Auditing	Property & Leisure, Env. Planning	Appropriate location of meters & improved data management will enable detailed water use patterns to be determined and water usage to be more effectively managed. 'Smart Metering' can provide detailed water usage information, as well as warnings when water usage exceeds set limits, to avoid excessive water waste & cost. Increased number of billed meters should also be investigated with SE Water	$25,000	Non billed 'usage check' water meters: 30 @ $300 ea = $9,000 Smart water meters 5 @ $1,400 = $7,000 Contingency allowance = $9,000. The cost for these actions could be offset by the ability to bill tenants where appropriate. Actual numbers & costs of check meters & smart meters to be determined in review.	
5.1.3	Establish and maintain data base (using Conquest) of tap ware, toilets and other water use devices / appliances at all council facilities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Building Maintenance)	Infrastructure Planning (Asset Management Systems)	To enable accurate planning and estimations of savings and costs. Expand existing audits to achieve a coordinated approach. For example, currently poor data on number & type of toilets across council & how many are dual flush.	$6,000	In house Project	

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		✓ Action Commences															
		✓ Action Continuing															
5.1.4	Limit unnecessary loss of water through leaks and faults through regular inspections, improved reporting mechanisms and rapid repair.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Contract Auditing,	AMS.(Parks) Property & Leisure, All staff	An audit undertaken of public toilet facilities by Contracts unit in December 2006 identified leaks at many of the facilities assessed. Actions to include signage with the appropriate number to report faults at facilities, undertaking regular inspections of the facilities water appliances to check for leaks/faults and rapid response to repair leaks. Utilise Smart Meters where appropriate - Action 5.1.2		This will provide a cost saving to Council.	
5.1.5	Undertake a water audit and conservation strategy for Council public toilets			✓								Contract Auditing	AMS Urban & Open Space Property & Leisure, Project Delivery	Contract Auditing have identified a high proportion of toilets that leak. A priority is an assessment of the water usage by automated toilets.		Undertaken internally. Audit likely to produce immediate savings through identification of leaks etc.	
5.1.6	Undertake program of rolling, 'general facilities', water audits and conservation plans across council building sites (excluding those specifically listed elsewhere)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Building Maintenance)	Department Managers / Env Planning	Facilities for water audits to be identified by Building Maintenance and responsible department managers, using Logomatrix database and concentrating on highest water users and likeliest best conservation outcome potential 1st. Audit will include payback period estimate for each water proposed conservation measure to help determine implementation priorities Audits to be undertaken by Asset Management Services staff where possible. Some properties may require a more comprehensive audit to be undertaken by external consultants. Audit utilising standard templates (Action 2.1.5)	$12,500	Allowance for external consultants will be utilised for larger sites	
5.1.7	Undertake a water audit & develop a water conservation strategy for Noble Park pool. To be undertaken in conjunction with energy audit.				✓							Property & Leisure	Environmental Planning	Similar format to Oasis strategy	$10,000	Allowance made for external consultants to undertake	✓
5.1.8	Undertake a water audit & develop a water conservation and recycling strategy for Springers Leisure Centre. To be undertaken in conjunction with energy audit.							✓				Property & Leisure	AMS. (Parks) Environmental Planning	As part of water conservation study, investigate the utilisation of water harvested from the roof as a substitute to potable water for flushing toilets as well as diversion to tatterson park Dams for open space irrigation (links to 4.2.6)	$7,000	Allowance made for external consultants to undertake	✓
5.1.9	Investigate possible improvements to water use at the operations centre, in addition to current initiatives. To be undertaken in conjuction with an energy audit								✓			AMS		Some existing measures already in place, but further improvements are possible		To be undertaken Internally	
5.1.10	Undertake a water audit and conservation strategy for the Dandenong Basketball & Volleyball stadium. To be undertaken in conjunction with energy audit.									✓		Property & Leisure	Environmental Planning		$10,000	Allowance made for external consultants to undertake	✓
5.2.11	Investigate the use by council of composting toilets where appropriate										✓	AMS.(Parks)	Env Planning / Health			Undertaken internally	
5.2	**Physical Works**																
5.2.1	Implement water conservation initiatives with shorter payback periods as identified in Oasis conservation strategy.	✓	✓									Property & Leisure		Items include but not limited to: WELS rated fixtures such as showerheads and flow restrictors, meters and signage etc. Will add to previous water conservation measures undertaken at this facility such as installation of auto showers & pushbuttons taps.	$100,000	Costs will depend on measures outlined in water audit. $40,000 to connect the toilets to rainwater tanks, An allowance of $60,000 to undertake other actions identified with shorter payback periods.	✓
5.2.2	Implement the higher cost, high water saving initiatives as identified in the water conservation strategy developed for Dandenong Oasis.		✓	✓	✓							Property & Leisure		Dependent on costs & availability of funding	$400,000	Costs will depend on measures outlined in water audit. Allowance to include $300,000 for filtration system, $100,000 for other opportunities	✓
5.2.3	Implement water conservation initiatives with shorter payback periods as identified in Noble Park Pool water conservation strategy.					✓						Property & Leisure		Items include but not limited to: WELS rated fixtures such as showerheads and flow restrictors, meters and signage etc	$30,000	Costs will depend on measures outlined in water audit. An allowance of $30,000 to undertake actions identified in strategy with a shorter payback period	✓
5.2.4	Implement the higher cost, high water saving conservation initiatives as identified in the water conservation strategy developed for Noble Park pool.						✓	✓				Property & Leisure		Dependent on costs & availability of funding	$100,000	Allowance only - costs will depend on measures outlined in water audit.	✓

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		✓ Action Commences															
		✓ Action Continuing															
5.2.5	Implement water conservation initiatives identified by general facilities water audits.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AMS.(Building Maintenance),	Department Managers	Final priorities dependent on audit recommendations. Actions with short payback periods should be implemented 1st (eg. WELS rated appliances such as flow restrictors and shower heads. Dual flush toilets & rainwater tanks likely to be lower priorities)	$270,000	End of tap flow restrictors 300@$20ea = $6,000. Showerheads 200@$225ea = $45,000 Push button taps 250@$300ea. = $75,000 Dual flush cisterns 80@$800ea = $64,000 Water tanks 6@$12,000ea = $72,000	✓
5.2.6	Implement water conservation initiatives for the Dandenong Basketball & Volleyball stadium.										✓	Property & Leisure	Environmental Planning	Priorities and actions as identified in audit and conservation plan	$50,000	Costs will depend on measures outlined in water audit. An allowance of $50,000 to undertake actions identified in strategy with a shorter payback period	✓
5.2.7	Install water conservation / educational signage at Council facilities (in high water use areas such as kitchens, bathrooms etc)	✓	✓									Env. Planning	Department Managers	This initiative is to instill individual responsibility for conserving water Signage would include simple stickers and small mounted panels.	$3,000	Assumes predominant use of 'off the shelf signage' - costs for supply & install	
5.2.8	Implement behavioural water conservation plans with staff / managers of Kindergartens, Maternal Health Care Centres, Community Centres etc.		✓	✓	✓	✓	✓	✓	✓	✓	✓	Community Services		To foster individual accountability & responsibility. Will link with educational signage roll-out (Action 5.2.7)	$2,000	Supply & install of signage, otherwise in-house project	
5.2.9	Implement water conservation measures identified for Springers Leisure Centre by audit & conservation plan								✓			Property & Leisure	AMS.(Building Maintenance)	Detailed project to be in response to water audit and conservation plan. Items include but not limited to: Flow restrictors, meters, rainwater tanks etc. Harvesting water for Tatterson park dams is covered in action 4.2.6.	$50,000	1x 45KL Rainwater tank plumbed to toilets = $26,000. Allowance of $24,000 to undertake other actions.	✓
5.2.10	Implement water conservation initiatives identified for public toilets					✓	✓	✓				AMS.(Parks)	AMS.(Building Maintenance),	Initiatives to be determined by audits	$75,000	General allowance	
5.2.11	Continue to progressively implement charging of water bills to end users wherever possible.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Property & Leisure		As lease agreements are renewed, conditions will ensure that, where appropriate, all bills are charged to tenants. This would provide incentives for tenants to save water energy etc. (Dependent on upgrade to metering system - Action 5.1.2 and ability of tenant to pay)		This would enable cost recovery for water use, where appropriate	
5.2.12	Implement priority water use improvements at Operation Centre as identified in Action 5.1.9									✓		AMS			$25,000	Allowance to be confirmed	
5.2.13	Trial of waterless retrofit to urinals	✓	✓									AMS.(Parks)	AMS.(Building Maintenance)	Already underway in public toilets at reserves. About to commence at Springvale & Dandenong offices.		Cost approximately $1,000 per year per urinal. Approximately 20 urinals to be included in trials. Trial will ascertain whether this is a worthy project or not to continue to role out across Council	
5.2.14	Install waterless urinals in Council facilities where appropriate.			✓								AMS.(Building Maintenance)		Cost effectiveness questionable compared to other actions. Needs to be assessed as part of trial - large scale implementation will lead to large ongoing maintenance costs		Urinal Conversions & then ongoing management 20@$1000 p/a	
5.2.15	Install water isolation valve at Police Paddocks	✓										AMS.(Building Maintenance)	Contract Auditing	The installation of a smart meter at Police Paddocks, due to major water leaks, has identified leaks on a frequent & regular basis. This has resulted in increased reactive costs. The Isolation valve is required to break up main into 4 sectors to enable a quicker & accurate determination of leak location and to enable the leak to be isolated.	$21,000		
														Total	**$1,396,500**		