

Illustrative Water Demand Management Plan and Guide for Preparation

**Prepared to assist local governments
meet their obligations under the
*Environment Protection (Water) Policy 1997***

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APPENDIX A ILLUSTRATIVE WATER DEMAND MANAGEMENT PLAN

LIST OF ACRONYMS

EPA	Environmental Protection Agency
EPP (Water)	<i>Environmental Protection (Water) Policy 1997</i>
NR&M	Department of Natural Resources and Mines
TMP	Total Management Plan
WQOs	Water quality objectives

1 INTRODUCTION

This provides guidance on preparing a Water Demand Management Plan as a sub-plan of a Total Management Plan (TMP) which will meet the requirements of Section 43 of the *Environmental Protection (Water) Policy 1997* (EPP (Water)).

Section 43 requires that:

- 1) *A local government that operates a water supply system must develop and implement an environmental plan about water conservation that improves water use efficiency in the system.*
- 2) *In developing its plan, the local government must consider:*
 - a) *the water quality objectives for a water to which a release of waste water may occur; and*
 - b) *the maintenance of acceptable health risks.*
- 3) *The local government must consider including the following measures in its plans:*
 - a) *water restrictions, including, for example, restricted garden watering;*
 - b) *the use of rainwater tanks and waste water recycling;*
 - c) *ways of reducing water usage in industrial processes and household appliances, including, for example, low flush toilets and water efficient appliances;*
 - d) *water pricing policies, tariff structures, water meters and financial incentives and concessions to reduce water usage;*
 - e) *voluntary water reduction schemes and community education and involvement in water conservation; and*
 - f) *detection and control of leaks in its water supply system.*

The User's Guide to Queensland's *Environmental Protection (Water) Policy 1997*, published by the Department of Environment (Reference 1) indicates that in developing a model (i.e. illustrative) local government environmental plan for water conservation (and also for sewage management, trade waste management and urban stormwater management), consideration will be given to a number of relevant issues.

These issues will need to be considered by local governments in developing their own environmental plans. As applicable, these issues are:

- *community consultation, involvement and education;*
- *integration into existing local government programs, plans and infrastructure;*
- *balanced consideration of environmental objectives along with health, economic, social and safety issues, such as flooding, cost-effectiveness of measures and efficient use of resources;*
- *different considerations for implementation in new and existing urban areas;*
- *suitability to local conditions, such as topography, rainfall, other climatic conditions, soil types and vegetation;*
- *technical guidelines, such as the design, operation, maintenance and monitoring of composting toilets, use of rainwater tanks, and in-stream methods for stormwater management;*
- *performance criteria, such as kilometres of sewers inspected and maintained, per capita reductions in water usage, number of sewage overflows per unit length of sewer, and milestones for specific goals to be achieved;*
- *environmental priorities and timetable for implementation of plans; and*
- *approval and review of plans and reporting procedures.*

The issues listed above represent preparation and assessment criteria for any Water Demand Management Plan doubling as an environmental plan for water conservation, over and above the applicable TMP assessment criteria.

It should be noted that the scope of an environmental plan for water conservation, as defined above, is confined to aspects of urban water supply within the control of local governments, and even then covers only those aspects with the greatest potential for environmental benefit.

However, when developing TMPs and environmental plans, local governments should be mindful of other aspects of water conservation with environmental implications which are not covered by Section 43 of the EPP (Water), whether or not they fall within their direct control.

For example, local governments could consider issues such as the ecological impacts of exploiting new water sources and the effects of land development on catchment runoff coefficients.

2 NATURE AND SCOPE OF WATER DEMAND MANAGEMENT PLAN

The main factors determining the nature and scope of the Water Demand Management Plan will be:

- the nature of the scheme and condition of the assets;
- the extent of consumption metering and the local government's water pricing policy;
- the local government's progress to date in community education on water conservation, for example through its WaterWise program; and
- the local government's progress with water demand management generally.

In general, the larger the water supply system(s) and/or the poorer the condition of the assets, the greater the scope and complexity of the plan and the cost of implementing it.

As a general rule, and other things being equal, the plan can be expected to be more elaborate and demanding of resources for:

- high growth areas;
- areas where water sources are fully or extensively developed;
- schemes with older and hence "leakier" assets; and
- schemes with unmetered services and/or "non-user pays" pricing policies.

Where the local government has made little or no progress in managing water demand or developing a policy on water demand management, the initial management plan will be fairly high level and strategic in nature.

The emphasis will be on initiating whatever programs or investigations are needed to evaluate the status quo, establish policies and formulate strategies as the basis of detailed action plans.

Where the local government has already made substantial progress, either at the time of preparing its initial Water Demand Management Plan or as a result of implementing its initial plan, its current Water Demand Management Plan may be at a lower level and involve refinement of ongoing initiatives.

What is an appropriate Water Demand Management Plan for a particular water supply scheme will vary from local government to local government. No typical plan can be suggested as a model for use by all local governments or for different categories of scheme, geographical location, or climatic conditions.

The illustrative plan included in the Appendix A is therefore presented merely to demonstrate one approach which, under particular circumstances, should meet the requirements of both a TMP and an environmental plan for water conservation.

3 PLAN PREPARATION CHECK LIST

To satisfy the Environmental Protection Agency's (EPA) requirements for an environmental plan for water conservation, the Water Demand Management Plan will need to address the two sets of criteria listed in Section 1.

The following checklist gives an indication of how these criteria might be approached.

Reference should also be made to the WaterWise program publications which provide comprehensive information on most of the measures listed, and should help local governments decide whether or not to provide for them in their plan.

3.1 Matters that must be considered

Water quality objectives

Under Sections 40, 42 and 43 of the EPP (Water), a local government preparing a related environmental plan must consider the water quality objectives (WQOs) for any water potentially affected by the subject activity.

Part 4 of the EPP (Water) provides for the Chief Executive of EPA to determine the WQOs for particular waters, but few have been determined to date.

A local government may also determine WQOs under the EPP (Water), following the procedure established in Part 3 of the EPP (Water) and explained further in the User's Guide.

Because consideration of WQOs is common to the management of several local government functions, it would be convenient to document their determination separately from individual environmental plans.

The Water Demand Management Plan could cross-reference a separate WQO document or include determination of the WQOs in the scope of the plan.

In the latter case, an example of how to determine WQOs can be found in the Model Urban Stormwater Quality Management Plans and Guideline (Reference 2). The illustrative plan follows the former approach.

Maintenance of acceptable health risks

It can be assumed that health risks will be maintained at acceptable levels if:

- the quality of water supplied to consumers complies (as a minimum) with Australian Drinking Water Quality Guidelines;
- any decision to use unconventional water supply systems such as "constant flow" supply systems, or "off-line" water conservation measures such as supplementary rainwater tanks or waste water recycling, is fully justified based on a comprehensive assessment of costs, technical sustainability, and public health and other environmental risks; and
- provision of water supply infrastructure, plumbing household appliances, and implementing any "off-line" water conservation measures are done in strict accordance with applicable regulatory standards and/or government guidelines.

Guidelines on the use of rainwater tanks are included in the WaterWise program literature. Amongst other things, the guidelines recommend against the use of rainwater tanks for drinking water in urban and industrial areas.

Guidance on wastewater recycling on an area-wide or whole scheme basis is provided in the Interim Guidelines for Reuse or Disposal of Recycled Wastewater (References 3 & 4). For domestic wastewater recycling, reference should be made to the Interim Code of Practice for On-Site Sewerage Facilities (Reference 5).

Water restrictions

Many local governments already maintain permanent garden watering restrictions, usually on an "odds and evens" basis, and for those which do not, there is ample data available to indicate their relative effectiveness in reducing water consumption.

Consideration of restrictions needs to take account of such things as:

- the relative contribution to total water consumption of the use(s) proposed to be restricted; and
- the need for, and cost-effectiveness of, enforcement.

Use of rainwater tanks and waste water recycling

Except where they form part of a “constant-flow” scheme, rainwater tanks represent private water supply schemes. Local governments may regulate and/or promote their use in the interests of conserving community supplies.

Wastewater recycling, whether involving effluent from a local government treatment plant or on-site residential treatment plants, or residential irrigation of greywater (sullage), is similarly aimed at conserving community supplies by reducing landscape or garden-watering demands.

Local governments may regulate and/or promote such measures. Under Standard Sewerage Law, greywater in sewered areas must be discharged to a sewer.

Local governments need to be cautious in permitting and/or promoting such measures, because they introduce the potential for significant health risks not present in conventional water supply schemes.

In such situations, it would be appropriate for local governments to include in their TMP sub-plan dealing with customer relations, the strategies for community education on the associated potential risks to individual and public health.

Local governments also need to make it clear that householders installing rainwater tanks and/or wastewater recycling may in the process assume a degree of potential legal liability in respect of health risks which otherwise might rest with the local government.

Ways of reducing usage in industrial processes and household appliances

In developing its Water Demand Management Plan, a local government may provide for requiring or promoting water-efficient processes and appliances. Both approaches will involve community education, as referred to below.

Water pricing policies and tariff structures

These will be referred to collectively as user-pays policies.

Some local governments will already have investigated such policy options as required under the *Local Government Act 1993*.

For others which have not, but which choose to do so as part of developing their Water Demand Management Plan, reference should be made to the guidelines for Evaluation of Introducing and Improving Two-Part Tariffs (Reference 6).

Voluntary water reduction schemes and community education

Many local governments have already promoted WaterWise initiatives in this regard, and in such cases the Water Demand Management Plan should refer to the initiatives taken and their outcomes to date.

Otherwise, local governments can use the WaterWise promotional literature as the basis for considering what, if any, voluntary water reduction schemes and community initiatives to include in the plan.

Detecting and controlling system leakage

Leakage from urban water supply schemes can be as high as 10 to 25 percent of water supplied, even in well-managed schemes. Total unaccounted-for water can be even higher.

The degree to which leakage can be eliminated will depend on the condition of the infrastructure.

Setting realistic Queensland performance targets for leakage would need to take account of such factors as topography (that is pressure ranges) and the relative magnitude of industrial demands. Currently, there is insufficient data available.

Leakage management can bring significant potential benefits. Generally, the older the assets the greater the potential rewards. If not already done, local governments should carry out a water system audit to assess the relative amount of unaccounted-for water before starting any detection and control program.

Community consultation, involvement and education

A community consultation, involvement and education initiative to promote the WaterWise program should form one element of a successful Water Demand Management Plan. This should also be linked to the TMP sub-plan dealing with customer relations.

3.2 Matters that should be considered

Integration with existing programs, plans and infrastructure

Integrating the plan into a TMP by definition should address this, but appropriate linkages should be demonstrated in the plan.

Balanced consideration of environmental objectives

This should be incorporated in the process of considering the issues listed in Section 3.1 above, for example the cost-effectiveness of measures in respect of two-part tariffs and health issues in respect of “off-line” conservation measures, etc.

Implementation in new and existing urban areas

This consideration will be inherent in basing demand management strategies on an analysis of local consumption data, applying universal metering and user-pays charging, and carrying out leak detection surveys in all representative areas.

Suitability to local conditions

This will be addressed if the local government’s water conservation strategies are based on local investigations and taking account of local factors to the greatest extent practicable.

Technical guidelines and performance criteria

These should be considered under Section 3.1 or, in the case of performance criteria/targets, elsewhere in the TMP.

Environmental priorities and plan implementation timetable

Each strategy and action plan under the Water Demand Management Plan should have specified time lines and budgets, reflecting the local government’s priorities and present commitments.

Approval/review of plan and reporting procedures

The plan will be prepared within the context of the prevailing approval process involving both the Department of Natural Resources and Mines (NR&M) and EPA. Administrative responsibility and reporting procedures should be stated within the plan.

4 ILLUSTRATIVE WATER DEMAND MANAGEMENT PLAN

The illustrative Water Demand Management Plan is included in the Appendix A. It indicates that some progress has been made by the hypothetical local government (“Sunnyside City Council”, located in South-East Queensland), as reflected in the appended list of referenced supporting documents.

It also indicates that the Council has already adopted a policy on water conservation, following appropriate community consultation.

This process and resulting policy represent the consideration of water conservation measures listed in Section 43 of the EPP (Water), for purposes of the illustrative plan.

It should be noted that following such consideration, real local governments may equally decide on a different range of policy elements, excluding some of those adopted by Sunnyside City and including others.

The scope of the plan has been determined so as to allow the matters in the preparation checklist in Section 3 to be generally addressed.

REFERENCES

1. *User's Guide to Queensland's Environmental Protection (Water) Policy 1997*, Department of Environment, January 1997.
2. *Model Urban Stormwater Quality Management Plan and Guideline*, Environmental Protection Agency, March 2001.
3. *Interim Guidelines for Reuse or Disposal of Reclaimed Wastewater*, Department of Natural Resources, April 1996.
4. *Queensland Water Recycling Strategy*, Environmental Protection Agency (in preparation).
5. *Interim Code of Practice for On-site Sewerage Facilities*, Department of Natural Resources, 1999.
6. *Evaluation of Introducing and Improving Two-Part Tariffs*, Department of Natural Resources, November 1997.

APPENDIX A

ILLUSTRATIVE WATER DEMAND MANAGEMENT PLAN

To meet the requirements of:

- total management planning; and
- the *Environmental Protection (Water) Policy 1997* for an environmental plan for water conservation.

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REFERENCES

1. PURPOSE OF PLAN

The plan is intended to:

- provide an overview of Council's current water demand management practices and direction for its future initiatives in water conservation; and
- meet Council's obligations under Section 43 of the *Environmental Protection (Water) Policy 1997* (EPP (Water)), for the preparation of an environmental plan for water conservation.

2. COUNCIL POLICY

Council's goals for operating its water supply system and for environmental management are set out in its Corporate Plan 1997 – 2000 (Reference 1).

Council endorsed the following formal strategic policy statement on water conservation on 13 November 1997, following a structured community consultation program and based on achieving the above goals (Reference 2):

Strategic Policy No. SP 15/97 – Water Conservation

As an integrated water conservation strategy, Council will:

- meter all fixed Council water supply consumers and read each meter at least twice a year;
- meter all standpipe supplies to commercial water carriers;
- adopt a two-part water charging tariff, comprising a fixed access charge and a consumption charge based on a declared charge per unit of consumption;
- continue its current regime of water restrictions;
- continue its current program of WaterWise initiatives;
- seek to maximise effluent reuse from its sewage treatment plants;
- seek to minimise commercial and industrial water consumption;
- investigate the cost-effectiveness of reducing the proportion of unaccounted-for water, particularly infrastructure leakage losses;
- report within Council's annual environmental report on achievements of the water conservation program;
- encourage installation of rainwater tanks by offering a once-off \$200 subsidy on tanks 5kL capacity or larger; and
- require dual-flush cisterns on new and replacement toilet installations.

3. KEY LINKAGES TO TOTAL MANAGEMENT PLAN (TMP)

The Water Demand Management Plan supports, and is supported by, a number of management initiatives in other sections (sub-plans) of Council's TMP for water supply and sewerage, as indicated in the following table. Only those key linkages which are critical to ensuring integrated implementation of the TMP are highlighted in the table.

Sub-Plan	Key linkage
Service Standards	Community focus for voluntary demand management strategies, including WaterWise.
Financial management	Demand management implementation costs; financial implications of demand management measures, including alternative tariffs.
Asset evaluation and renewal	Asset condition implications of leakage losses detected.
Operations management	Procedures for leakage detection; pressure control.
Infrastructure plan	Deferring capital works; incorporating management strategies in planning studies.
Water loss management	Water audits which utilise demand data, and many incorporate common strategies e.g. pressure reduction, leak detection etc.
Effluent management	Effluent reuse for conserving potable supplies.
Trade waste management	Minimising industrial water consumption.
Information management	Data needs for determining water consumption and system losses.
Risk management	Increased supply failure risk consequent on demand management.

4. EXTERNAL CONTEXT

Industry trends

The Department of Natural Resources and Mines (NR&M) has for some years been encouraging demand management. Community education has been promoted by the WaterWise program.

There is a growing trend by Queensland local governments towards universal metering of water consumers.

Local governments serving 93 percent of Queensland's population will have introduced universal water metering by 1998 or are planning its introduction by 2000.

Of the 17 local governments originally categorised as Type 1 or Type 2 local governments for purposes of implementing competitive neutrality reforms under recent amendments to the *Local Government Act 1993*, 15 local governments have already indicated they will have implemented water metering by 1998. Seven of the 17 local governments plan to employ two-part (that is, access charge plus consumption charge) tariffs by 1998.

5. STATUTORY REQUIREMENTS

The Local Government Act requires local governments with water supply and sewerage services which qualify as Type 1 or Type 2 business activities (as defined in the Act) to meet the following obligations:

Within 3 months of receipt of a Public Benefit Assessment Report (as defined in the Act), but on or before 1st July 1998:

- adopt a timetable for implementation of reforms.

By 1st July 1998

- identify water supply and sewerage services as significant business activities within their budgets;
- implement full-cost pricing plus commercialisation reforms to Type 1 or 2 business activities, unless granted an extension by the Minister; and
- fully attribute all costs to these activities (including depreciation and estimates equivalent to government taxes and debt guarantee fees).

By 31st December 1998

- evaluate the cost-effectiveness of introducing two-part tariffs (including the necessary costs of installing or refurbishing water meters); and
 - apply consumption-based charging;
 - identify and make transparent all cross-subsidies between classes of consumer which are retained;
 - recover the full costs of the provision of water supply and sewerage services; and
 - fully disclose the cost of providing such services to classes of consumers at less than full cost.

By 30th June 2000

- fully implement strategies to achieve the objectives listed above; and
- meter and implement two-part tariffs for all parts of their areas where shown to be cost-effective.

The EPP (Water) requires local governments operating a water supply system to develop an environmental plan for water conservation, which includes consideration of alternative pricing policies and associated measures.

A local government may comply with the requirements for an environmental plan for water conservation by preparing a suitable plan under a TMP, such as a Water Demand Management Plan which substantially complies with the requirements of Section 43 of the EPP (Water).

The State Government issued guidelines for evaluating the cost-effectiveness of two-part tariffs in November 1997 (Reference 3).

System losses

System losses (chiefly leakage and theft) can account for a substantial proportion of the total water delivered to urban schemes. For example in 1994/95, 11 country schemes in NSW serving more than 20,000 persons reported system losses of between 10 and 26 percent. For the same year major authorities reported losses as follows:

Sydney	17%	South Australia (Metropolitan)	18%
Hunter	17%	Northern Territory (Metropolitan)	14%
Melbourne	20%	Gold Coast	28%

Source: Government Trading Enterprises Performance Indicators 1990-91 to 1994-95 Vol.2: Data, Steering Committee on National Performance Monitoring of Government Trading Enterprises, June 1996

6. WATER QUALITY OBJECTIVES (WQOS)

Surface waters potentially impacted by augmentation of existing Council water supply sources or treatment plants, or development of new sources or treatment plants are as follows:

Source	Status	Waters	Category	Comments
Mammoth Dam	Existing	Mountain River	Freshwater	Undeveloped catchment
Rockville Weir	Existing	Rocky Creek	Freshwater	10km D/S of Southville Sewage Treatment Plant
Endsville Borefield	Existing	Endsville Aquifer	Freshwater	
Goliath Dam	Future	Uplands Creek	Freshwater	Some rural development

WQOs for all waters within the City have previously been determined, according to the provisions of the EPP (Water), as documented in the consultancy report by Smith & Associates (Reference 4). For the waters listed above, the adopted WQOs are as set out in Table 1.

TABLE 1: Water quality objectives for surface waters in Sunnyside City

(Note: The notional WQOs in Table 1 are examples for purposes of the Illustrative Water Demand Management Plan only. For real applications, WQOs arrived at by due process may vary substantially from these examples.)

Parameter	Units	Marine waters	Freshwaters
Total-Phosphorus [Dry season]	µg/L	< 20	< 50
Total-Phosphorus [Wet season]	µg/L	< 100	< 500
PO ₄ Phosphorus	µg/L	< 10	
Total Nitrogen	µg/L	< 20	< 500
Chlorophyll-a	µg/L	< 1	< 15
Clarity		Black disc > 1.6m horizontally	< 10% change in euphotic depth
Faecal coliforms	Organisms /100mL	Median < 150; 80% samples < 4000	Median < 150; 80% samples < 4000
Dissolved oxygen	mg/L	> 6 (> 80–90% saturation)	> 7 (> 80–90% saturation)
pH		6.5–9.0	< 0.2 pH unit change
Salinity	mg/L		< 1000 (about 1500 µS/cm)
Suspended particulate matter/turbidity		< 10% change in seasonal mean concentration	< 10% change in seasonal mean concentration
Toxicants, heavy metals		As per ANZECC AWQG	As per ANZECC AWQG

Source: Reference 4

7. CURRENT STATUS OF WATER DEMAND MANAGEMENT

Water consumption

Water consumption statistics for Sunnyside City are shown in Table 2.

TABLE 2: Water consumption statistics

Year	Total consumption (ML/yr)	Number of connections	Consumption/connection (kL/yr)
1994/95	27,166	40,480*	671
1995/96	24,479	42,350	578
1996/97	25,752	43,811	588

Source: Reference 5

* Estimate

The current connected population is estimated to be 132,000 (44,000 connections). With an estimated industrial/commercial consumption of 10 percent, this equates to a domestic per capita consumption of 480 L/p/d.

In recent years, Council has used a design average day domestic per capita consumption of 550 L/p/d, which is fairly high in comparison to other South-East Queensland (SEQ) local governments (see Table 3). The *South-East Queensland Water and Wastewater Management and Infrastructure Study* indicates that a target domestic per capita consumption of 400 L/p/d may be achievable in the longer term.

For example, Maroochy Shire Council, with a focused water demand management program, is already able to achieve this target. A 25 percent reduction in per capita consumption has been experienced since 1992 in Maroochy Shire.

TABLE 3: Per capita consumption by SEQ local governments

Local government area	Long-term per capita consumption adopted by council (L/p/d)	Per capita consumption adopted for SEQ study (L/p/d)	
		Resident	Visitor
Beaudesert	390	390	
Boonah	480	480	
Brisbane	630	630	
Caboolture	436	436	
Caloundra	478	478	400
Crow's Nest	300	350	
Esk	460	500	
Gatton	630	500	
Gold Coast	550	550	400
Ipswich	550	550	
Jondaryan	---	400	
Kilcoy	470	470	
Laidley	---	550	
Logan	550	550	
Maroochy	400	400	400
Noosa	555	550	400
Pine Rivers	500	500	
Redcliffe	415	415	
Redlands	446	446	
Rosalie	---	345	
Toowoomba	345	345	

Source: *South-East Queensland Water and Wastewater Management and Infrastructure Study*

Water charging

Currently, 32,059 (73 percent) of the 43,811 connections are metered. All industrial and most commercial premises are metered. Council is in the process of metering most parks and gardens. Treatment plant water supplies are metered.

Council policy is that all new services be metered. Metering of existing residences is on a voluntary basis. Ratepayers contribute \$180 to the meter installation cost, with a 50 percent discount to pensioners. Some of the standpipes within the Council area are coin operated.

Over the past few years, Council has attempted to encourage existing users to adopt a voluntarily-metered supply through increasing the fixed annual charge for unmetered connections, so that average and low-water consumers would benefit from being metered.

In early 1997, Council undertook a marketing program to encourage 1,800 pensioners to connect to a metered supply. 1,400 (82 percent) responded positively. Further marketing programs are proposed, depending on the outcome of the consultancy study mentioned below.

For residential connections, unmetered consumers currently pay a fixed annual water charge of \$540 per annum, while metered consumers pay an access charge of \$120 pa and 45¢ per kL consumed.

To meet its statutory obligations, Council recently commissioned a consultancy to evaluate the cost-effectiveness of universal metering and two-part charging throughout the City, as discussed in the Financial Management Sub-Plan (Reference 6).

Water restrictions

Council has a permanent regime of garden watering restrictions in place, with Council officers having the authority to impose "on the spot" fines for infringements. Odd and even house numbers each are allowed to water on three days per week, under defined times and conditions.

WaterWise program

The program is co-ordinated through Council's WaterWise Committee, which produced an initial, limited WaterWise Business Plan in 1993 (Reference 7).

Council supports the government's WaterWise program partly by promoting water conservation among consumers and requiring use of dual-flush toilets for new and replacement installations. In addition, rebates were made available in 1995/96 and 1996/97 for water efficient devices such as shower roses and rainwater tanks, and these are continuing.

New initiatives which will also be introduced in the near future are a "give-away" trial of water-efficient devices for toilets and a commercial water audit program. The commercial program will encourage local businesses to undertake a free water audit, which will be conducted by WaterWise Master Plumbers.

System losses

The extent of unaccounted-for water in the system is currently not known. A recent broad assessment undertaken as part of the Water Supply Master Planning Study has estimated losses to be in the order of 20 percent (Reference 8).

Council officers have undertaken a trial water loss analysis on a suspected leakage area, but the results indicated minimal leakage. Nevertheless, the need for a wider study has been recognised on the basis of all available information.

Council has a procedure in place for the use of metered stand pipes by water carriers, in line with its strategic policy (Reference 2).

Effluent reuse

The extent of effluent reuse from Council's wastewater treatment plants is:

- Northville - 20 percent (golf course; sporting fields; Central Park)
- Southville - minor
- Westside - trial program scheduled for implementation in 1999/2000
- Eastpoint - minor

This reuse can reduce community requirements for potable water as effluent is used for some non-potable uses such as irrigation of golf courses, for which potable water would otherwise be used.

Full details of Council's effluent reuse programs and future initiatives are included in the Effluent Management Sub-Plan.

8. STRATEGIC BASIS OF PLAN

7.1 Related TMP elements

The related strategic elements of the TMP framework are:

Key result area:	Asset Management
Goal:	To optimise the long-term cost-effectiveness of capital investment

7.2 Key elements of plan

Objective:	To defer the need for augmentation works by managing water demand	
Management strategies:	DMS1	Enhance the current WaterWise program
	DMS2	Identify and manage system water losses
Related strategies:	FMS1	Investigate cost-effectiveness of two-part tariff
	EFS1	Investigate effluent reuse potential at Southville and Eastpoint Plants
	EFS2	Conduct pilot effluent marketing program

9. PERFORMANCE TARGETS

Strategic targets

- WaterWise Business Plan implemented by 31st December 2001; and
- Loss management plan prepared by 31st March 1999.

Operational targets

- 15 percent reduction in average day per capita consumption by December 2001; and
- 25 percent reduction in relative proportion of unaccounted-for water by December 2001.

10. IMPLEMENTING THE PLAN

9.1 Overview

A demand management strategy will allow Sunnyside City Council to defer expensive infrastructure augmentation by reducing average and peak water consumption and minimising system losses. The success of the strategy will largely depend on the implementation of full volumetric charging for all consumers.

Pricing and volumetric charging are discussed in the Financial Management Sub-Plan. Pricing reform would need to be complemented by public education through the WaterWise program and the management of system water loss.

9.2 Action plans

(See the attached Tables 4 and 5 for Action plan details.)

Action plan DMA1

Enhance the current WaterWise program

Implementing full volumetric charging (subject to results of cost-effectiveness evaluation – see Financial Management Sub-Plan) will be an opportune time to increase resources for community education. This will require a specific marketing/communication/education staff position to be established. The position's role would be to:

- develop an updated WaterWise Business Plan;
- implement community consultation and education programs;
- develop and disseminate marketing material on Council's activities; and
- facilitate customer service initiatives within Council.

Developing an expanded WaterWise Business Plan will allow specific goals, objectives, strategies, actions and detailed performance targets to be developed for community education. The Queensland Government's WaterWise initiative provides excellent resources to put into a WaterWise program (References 9–12). Components will include:

- a primary school education program;
- a school competitions;
- "WaterWise" school programs;
- "Garden Use" awareness program;
- "Council Use" education program;
- an industry education program;
- retrofitting water efficient appliances and continuing rebate scheme;
- tours of facilities;
- public displays and promotions;
- communication/education through the Internet;
- engagement of contract education staff as required; and
- review of all current water use practices.

Action plan DMA2

Identify and manage system water losses

Unaccounted-for water is a critical performance indicator for any water authority, as high relative levels represent inefficient use of resources, an unwarranted environmental impact, are incompatible with the "user pays" principle, and result in significant loss of revenue.

It should be possible to determine the extent of leakage through the measurement of water usage at times of zero or low demand (i.e. 1:00am– 4:00am in winter), through a flow balance using existing pump station, flow meter and reservoir telemetry and flow measurements for major industries. Technical literature indicates that an estimated night consumption would be in the order of 2 L/hr/connection.

Other reasons for unaccounted-for water could include:

- unauthorised use by bulk water carriers;
- water used for subdivisional works by developers, including use for bulk earthworks and dust control;
- water used by Council for testing subdivisional development infrastructure;
- water used for maintaining Council infrastructure;
- water used for construction purposes in other Council departments;
- water used for irrigating Council parks and gardens, and water used in community and recreational facilities;
- use of unmetered fire hoses for washing down/cleaning;
- water used for fire fighting;
- mains flushing programs;
- illegal use of water from hydrants;
- illegal water connections; and
- inaccurate water meters (particularly older domestic meters).

The project report on water loss (see Table 5) will include:

- an estimate of leakage and other unaccounted-for water demands;
- recommended strategies to reduce unaccounted-for water and the cost/benefits of such strategies. Some categories of unaccounted-for demands (such as use by other Council departments) would be classified as community service obligations on behalf of Council; and
- an action plan, incorporated into and implemented under this sub-plan.

9.3 Monitoring and review of plan

Monitoring of Action plans	Quarterly
Reporting to Council	Annually
Updating of sub-plan	Annually or as required (at least every 3 years)

Reporting to NR&M (if plan is in TMP)	} As required under Section 39 of the EPP (Water)
Reporting to EPA (if plan stands alone)	

9.4 Management responsibility

Overall management responsibility	} Manager, Water Supply and Sewerage
Reporting to Council	
Reporting to NR&M (if plan is in TMP) Reporting to EPA (if plan stands alone)	

Monitoring of Action Plans	} Technical Officer, Water Supply and Sewerage
Updating of sub-plan	

TABLE 4: Action Plan DMA1

Strategy DMS1 : Enhance the Current WaterWise Program

(a) Action Plan

Action	Target Date	Responsibility
Employ community marketing/ education/customer service officer	30/9/99	Manager, Water Supply and Sewerage
Prepare WaterWise Business Plan	30/12/99	Community Marketing/Education/ Customer Service Officer
Implement Stage 1 of Business Plan	30/12/00	Community Marketing/Education/ Customer Service Officer
Implement Stage 2 of Business Plan	30/12/01	Community Marketing/Education/ Customer Service Officer

(b) Required Budget

Financial Year	97/98	98/99	99/00	Budget Required to Complete Action Plan
Total	-	\$15,000	\$70,000	\$70,000

TABLE 5 : Action Plan DMA2

Strategy DMS2 : Identify and manage system water losses

(a) Action Plan

Action	Target Date	Responsibility
Estimate water leakage	30/9/98	Water Supply Engineer
Estimate other unaccounted-for water demands	30/12/98	Water Supply Engineer
Prepare project report	30/3/99	Water Supply Engineer
Implement recommendations of report	ongoing	Water Supply Engineer

(b) Required Budget (external costs only)

Financial Year	97/98	98/99	99/00	Budget Required to Complete Action Plan
Total		\$30,000		-

REFERENCES

REFERENCES

1. *Corporate Plan 1997 – 2000*, Sunnyside City Council, June 1997
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