

**Guidelines for
Implementing Total Management Planning**

Asset Management

**WATER DEMAND MANAGEMENT
Implementation Guide**

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LIST OF ACRONYMS

COAG	Council of Australian Governments
EPP (Water)	Environmental Protection (Water) Policy 1997
KPI	key performance indicator
SWOT	strengths, weaknesses, opportunities, threats
TMP	Total Management Plan
WSP	Water Service Provider

1 PURPOSE

This guide is intended to provide guidance for water service provider (WSP) practitioners and their consultants on the processes involved in establishing and implementing effective water demand management strategies and procedures and developing associated documentation.

2 OUTCOMES

The outcomes from implementing an effective water demand management strategy include:

- reduced water usage — both average and peak demands;
- reduced water leakage or loss;
- reduced wastewater flows;
- improved financial performance, through:
 - deferment of infrastructure investments, and
 - reduced operational costs;
- greater awareness by consumers of the financial and environmental value of water;
- increased agricultural production through the increased water availability arising from greater water use efficiency;
- improved viability of Queensland’s rural industries; and
- reduced run-off of pesticides and nutrients into rivers and streams.

3 OUTPUTS

- Water Demand Management Plan (TMP sub-plan); and
- detailed supporting documents where appropriate including:
 - WaterWise business plans;
 - water demand management reports dealing with specific water demand management issues;
 - water consumption analysis/benchmarking reports;
 - water audit reports; and
 - meter accuracy/calibration reports.

4 BACKGROUND

Water demand management is an issue that can be addressed right through the asset life cycle.

4.1 Infrastructure planning phase

Least cost planning is a key principle of effective asset management where non-asset solutions such as demand management must be considered before deciding to construct new or replacement assets. Least cost planning (or ‘integrated resource planning’ – Reference 1) aims to identify an appropriate balance between:

- the cost of constructing new assets to augment capacity; and
- the savings associated with non-asset solutions such as programs aimed at water use efficiency and demand management.

4.2 Service operations phase

Water demand management can also be an effective option for overcoming operational problems (e.g. low pressure problems during peak demands) and has the potential to achieve significant savings for the water industry, the electricity industry, and thus the community as a whole.

4.3 Asset replacement/disposal phase

Effective demand management may result in the non-replacement, or replacement by lower-capacity assets, of assets that have reached the end of their economic life.

A number of water demand management strategies exist. These are illustrated in Figure 1 and can broadly be classified into:

- water demand reduction strategies; and
- supply rationalisation strategies.

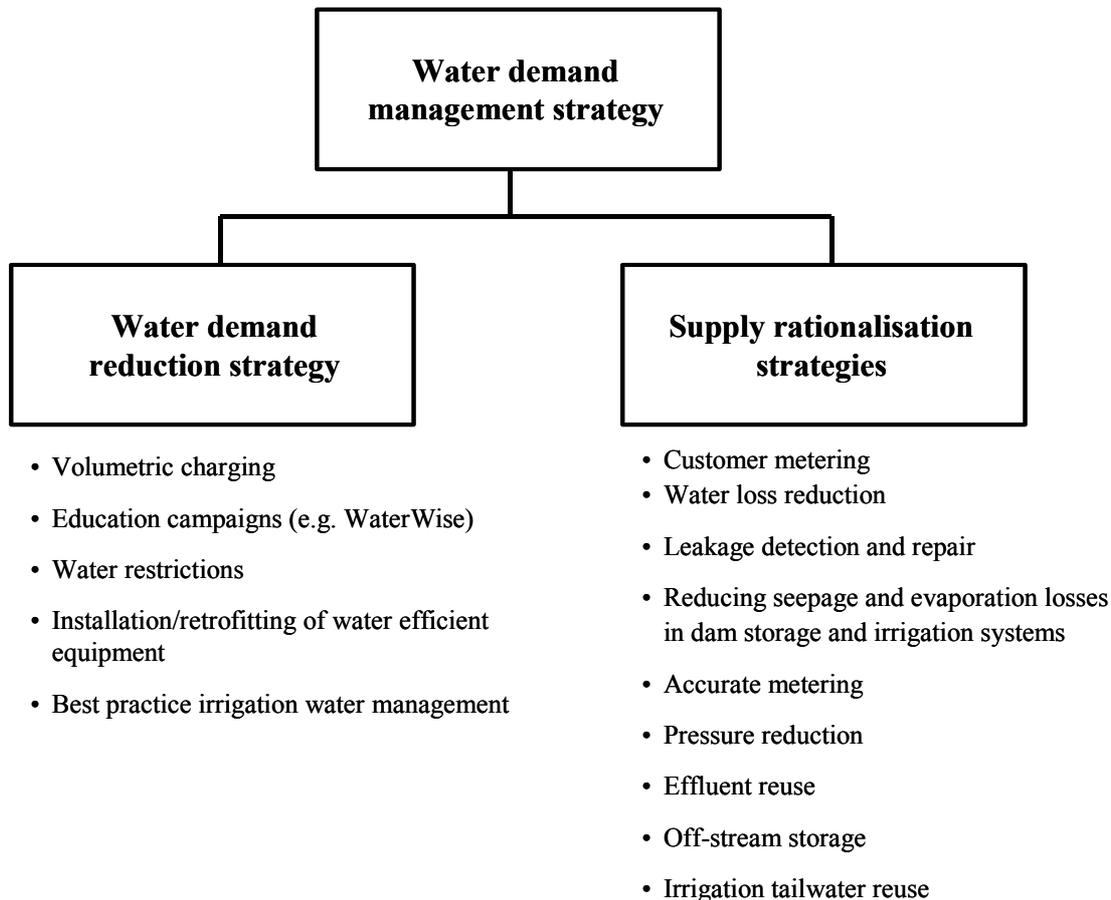


FIGURE 1: Water demand management strategies

4.4 Environmental plan required under EPP (Water)

Under the Environmental Protection (Water) Policy 1997 (EPP(Water)), each local government that operates a water supply system is required to develop and implement an environmental plan for water conservation to improve water use efficiency. This statutory requirement is discussed in more detail in the Environmental Sustainability Implementation Guide. As described in that Guide, a local government can meet these requirements by preparing an appropriate sub-plan as an adjunct to a Total Management Plan.

4.5 COAG water industry reform

The COAG water industry reform framework required WSPs to implement two-part, consumption-based pricing by the year 2001.

In response to the COAG agenda, the *Local Government Act 1993* (Qld) requires local government WSPs (Type 1 and 2 business activities) to have implemented two-part tariffs (where shown to be cost-effective). There is significant evidence, and supporting case studies, confirming that an appropriate two-part tariff is a highly effective water demand management strategy because it sends the right ‘signal’ to consumers.

4.6 Rural water use efficiency

In 1999 the State Government developed the Rural Water Use Efficiency Initiative. The four major aims of this initiative are to:

- improve water use efficiency on dams;
- reduce water losses from storages on farms;
- achieve best-practice irrigation water management, through financial incentives; and
- reduce water losses in irrigation water supply and distribution systems.

4.7 WaterWise

The WaterWise program has been well established in the Queensland urban water industry for a number of years. It is a strategic campaign to increase public awareness about water issues and to encourage better water management practices. The main thrust has been to encourage urban consumers to use less water in households (WaterWise in the House) and industry (WaterWise in the Workplace).

Water restrictions (e.g. restricted sprinkler times) have been quite effective in reducing demand, particularly maximum hour peak demand in urban water reticulation systems and as a drought management measure. Restrictions can thus reduce not only the instantaneous peak demands in a system but also the overall consumption when there are water shortages due to drought, water quality or other water source limitations.

The installation or retrofitting of water-efficient equipment or irrigation systems can be very effective (Reference 2). Facilities such as resorts, hotels, schools and other commercial premises have been able to reduce their water consumption significantly, with corresponding cost savings, through implementing such retrofitting programs.

4.8 Irrigation water demand management

Best-practice irrigation water demand management is the use of appropriate in-field systems to reduce losses through evaporation, deep drainage or surface run-off, and the management of these systems (e.g. using irrigation cut-off lines and water application sites, and minimising spray drift).

WSPs providing irrigation water will also need to consider the following when developing a water demand management strategy:

- the revenue lost if they are not able to deliver water when it is in demand;
- the need to maximise ‘opportunity’ water sales from large river flows; and
- the use of ‘off-channel’ storages by irrigators to reduce peak demands.

5 THE WATER DEMAND MANAGEMENT PROCESS

The water demand management process is illustrated in Figure 2.

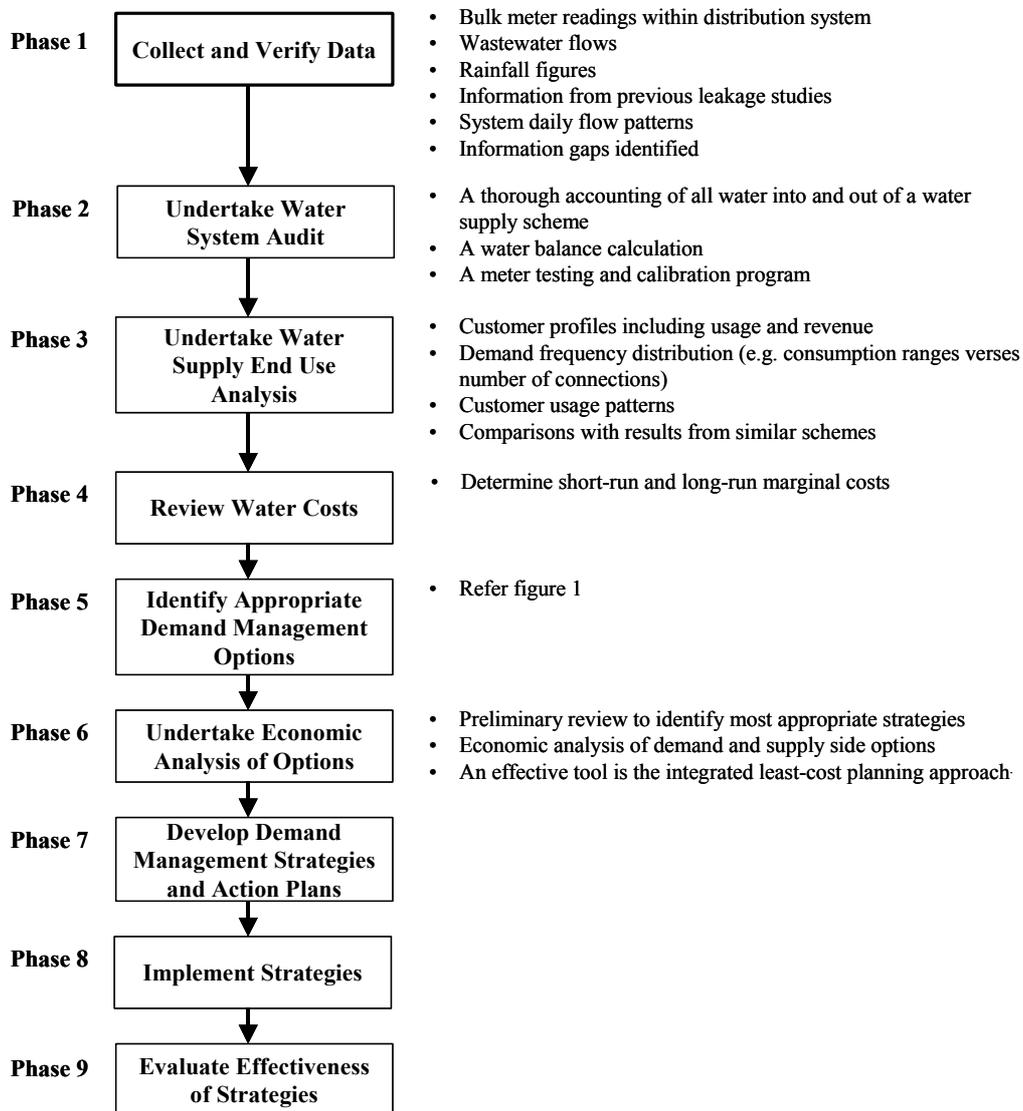


FIGURE 2: The water demand management process

The effectiveness of the water demand management strategies should be evaluated at regular intervals.

6 RISK ISSUES

Potential risks associated with implementation of the water demand management strategies include:

- strategies based on inaccurate data (e.g. consumption, financial);
- over-optimistic consumption reduction targets;
- unsustainable consumption reduction;
- inadequate community education or consultation;
- customer backlash;
- inadequate revenue due to inappropriate tariff levels; and
- implementation of sub-optimal strategies.

7 TMP REQUIREMENTS

Each WSP's Total Management Plan (TMP) should include an outline of key issues and identified strategies addressing these issues for the WSP's services in respect of water demand management. Appendix A provides indicative content and appropriate TMP development level for this sub-plan.

A hierarchy has been established to define the level to which a WSP should develop its plan under total management planning. This is discussed in more detail in the TMP Development Guide. The development level depends on the size of the WSP (in terms of the replacement cost of its assets).

REFERENCES AND FURTHER READING

1. *Improving Water Use Efficiencies in Queensland's Urban Communities*, Queensland Department of Natural Resources, Brisbane, 2000.
2. White, S., Ed., *Wise Water Management: A Demand Management Manual for Water Utilities*, (WSAA Research Report No. 86), Water Services Association of Australia, Sydney, November 1998.
3. *Draft NSW Water Conservation Strategy*, Department of Land and Water Conservation, Sydney, September 1999.
4. *Water Demand Management: A Framework for Option Assessment, Report of the Water Demand Management Forum*, IPART, Sydney, 1996.
5. White, S. and Horne, C., eds, *Water Efficiency and Re-Use, A Least Cost Planning Approach*, 6th NSW Recycled Water Seminar, Australian Water Association, 1998.

APPENDIX A: Content and development level of sub-plans

TABLE A1: Indicative sub-plan content

Sub-plan features	Water Demand Management Plan content
Issues covered in sub-plan	<ul style="list-style-type: none"> ▪ Supply metering. ▪ Water pricing. ▪ Customer education. ▪ Water-efficient hardware. ▪ Irrigation efficiency. ▪ Water restrictions (consumption regulation). ▪ Supply reduction.
Purpose of plan	<ul style="list-style-type: none"> ▪ To provide an overview of the WSP's current water demand management practices. ▪ To outline the WSP's future objectives and initiatives in managing water demand.
Policies that may be required	<ul style="list-style-type: none"> ▪ Pricing. ▪ Customer metering. ▪ Water use restrictions. ▪ Effluent reuse. ▪ Trade waste minimisation. ▪ Infrastructure service standards (re supply rates and pressures).
Other Total Management Plan elements that are linked intimately to this sub-plan	<ul style="list-style-type: none"> ▪ Service Standards Plan: considers supply-side service parameters (e.g. supply rates and pressures) that influence demands. ▪ Financial Management Plan: considers implications of consumption-based pricing and falling demands. ▪ Infrastructure Plan: takes account of deferring future headworks consequent on falling demands. ▪ Water Loss Management Plan: provides for water audits which utilise demand data, and may incorporate common strategy(ies), e.g. pressure reduction, leak detection, etc.
External issues contributing to the current operating environment that need to be considered	<ul style="list-style-type: none"> ▪ New developments in government such as WaterWise. ▪ <i>Local Government Act 1993</i> requirements for two-part tariffs for certain urban supplies. ▪ Increasing encouragement of WSPs by governments to develop formal water demand management programs, with some offering financial assistance on preparation and/or implementation. ▪ Progressive implementation of COAG pricing principles for irrigation water pricing. ▪ Requirements of EPP (Water) for preparation of local government environmental plans on water conservation. (This sub-plan and the Water Loss Management Plan should jointly be formulated so as also to meet these requirements.) ▪ Consumption data from other WSPs for benchmarking current demands. ▪ Efficiency improvements in irrigation practices. ▪ Advances in efficiency of water appliances, irrigation equipment and other hardware.
Issues that need to be considered in summarising the status of current operations	<ul style="list-style-type: none"> ▪ Scope of WSP's water demand management program. ▪ Progress on environmental plan for water conservation under EPP (Water), for local government WSPs. ▪ Status of customer education programs, e.g. WaterWise. ▪ Extent of customer metering. ▪ Water consumption trends and benchmarking results. ▪ Current and planned pricing practices, and effects on consumption trends. ▪ Promotion of water-efficient hardware, improved irrigation practices, trade waste minimisation recycling and reuse, etc. ▪ Broad SWOT analysis of relevant operations.

Sub-plan features	Water Demand Management Plan content
Strategic basis of the plan	<p>The strategic elements forming the basis of the plan should include:</p> <ul style="list-style-type: none"> ▪ goal for asset management; ▪ objective(s) for water demand management; ▪ adopted KPIs; and ▪ management strategies and performance targets. <p>The management strategies developed will be based on the identified key strategic issues and SWOT findings, including risk assessment, in respect of water demand management, and on the required TMP development level.</p> <p>Many WSPs are likely to require strategies for enhancing their customer educational and promotional programs; optimising water-pricing policies in terms of water demand and projected revenue; and minimising consumption on all WSP-owned properties.</p> <p>The strategies should be supported by detailed action plans covering a period of up to 3 years.</p>
Suggested performance measures	<p>Outcome: Ratio of infrastructure investment cost (new works) to base year cost.</p> <p>Output:</p> <ul style="list-style-type: none"> ▪ Average water demand/customer. ▪ Maximum day: average day demand ratio. ▪ Peak hour: average day demand ratio.
Supporting documentation	<p>This will depend on the WSP, but typically would include:</p> <ul style="list-style-type: none"> ▪ current WaterWise (or similar) water conservation program; ▪ strategic water demand management reports; and ▪ water consumption analysis/benchmarking reports.

TABLE A2: Required sub-plan development level

Development level ¹	Target management mechanisms of Water Demand Management Plan
3	<ul style="list-style-type: none"> ▪ Comprehensive water demand management program documented. ▪ Appropriate WaterWise educational program in place. ▪ All services fully metered. ▪ Optimised 2-part pricing policy in place (where cost-effective). ▪ Consumption on WSP-owned properties minimised.
2	<ul style="list-style-type: none"> ▪ Appropriate WaterWise educational program in place. ▪ All services fully metered. ▪ 2-part pricing policy in place (where cost-effective and required under Local Government Act). ▪ Otherwise consumption-based pricing policy in place. ▪ Consumption on WSP-owned properties minimised.
1	<ul style="list-style-type: none"> ▪ Appropriate WaterWise educational program in place. ▪ Metering and pricing policy established.; ▪ Consumption on WSP-owned properties minimised.

¹ Defined in Section 4.2 of TMP Development Guide.