

**Guidelines for  
Implementing Total Management Planning**

**Asset Management**

**WATER LOSS MANAGEMENT  
Implementation Guide**



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## **LIST OF ACRONYMS**

|             |   |
|-------------|---|
| 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 loss management strategies and procedures and developing associated documentation.

# 2 INTRODUCTION

## Outcomes

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

- more efficient use of existing supplies;
- increased knowledge of the distribution system;
- reduced leakage levels;
- reduced disruption to customers (More leaks are repaired on a planned basis, rather than being allowed to develop into major breaks.);
- increased revenues from previously undercharged customers; and
- savings to customers, who pay only for the water received rather than for water lost in the distribution system.

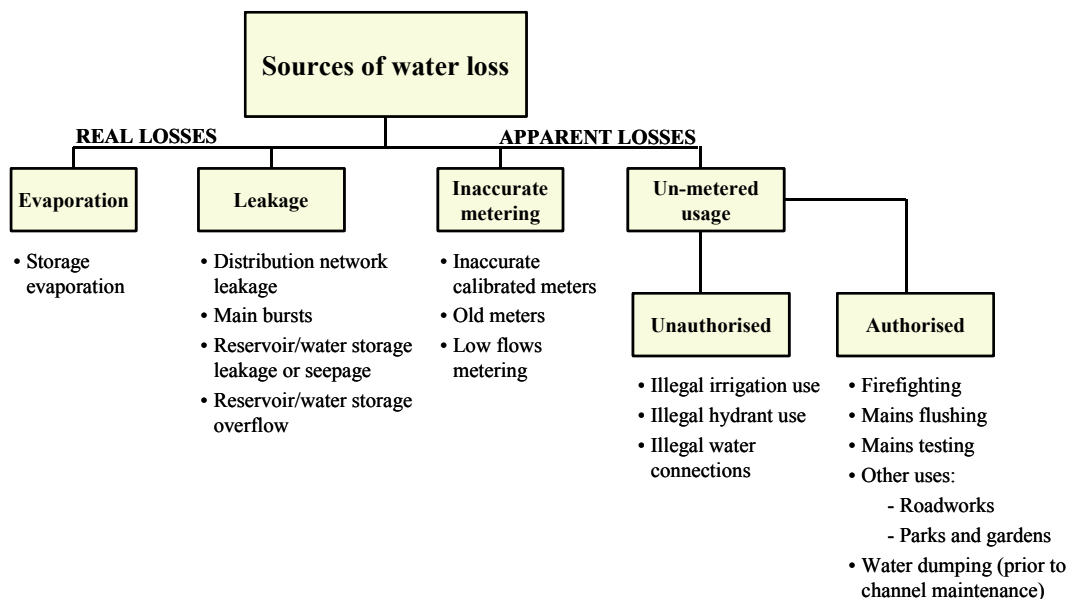
## Outputs

Outputs from the water loss management process include:

- Water Loss Management Plan (TMP sub-plan); and
- detailed supporting documents, where appropriate, including:
  - leakage survey reports;
  - water audit reports; and/or
  - meter accuracy/calibration reports.

# 3 BACKGROUND

System water loss can be over 30% in some schemes. Sources of water loss are illustrated in Figure 1.



**FIGURE 1: Sources of water loss**

## 4 THE WATER LOSS MANAGEMENT PROCESS

The water loss management process is summarised in Figure 2.

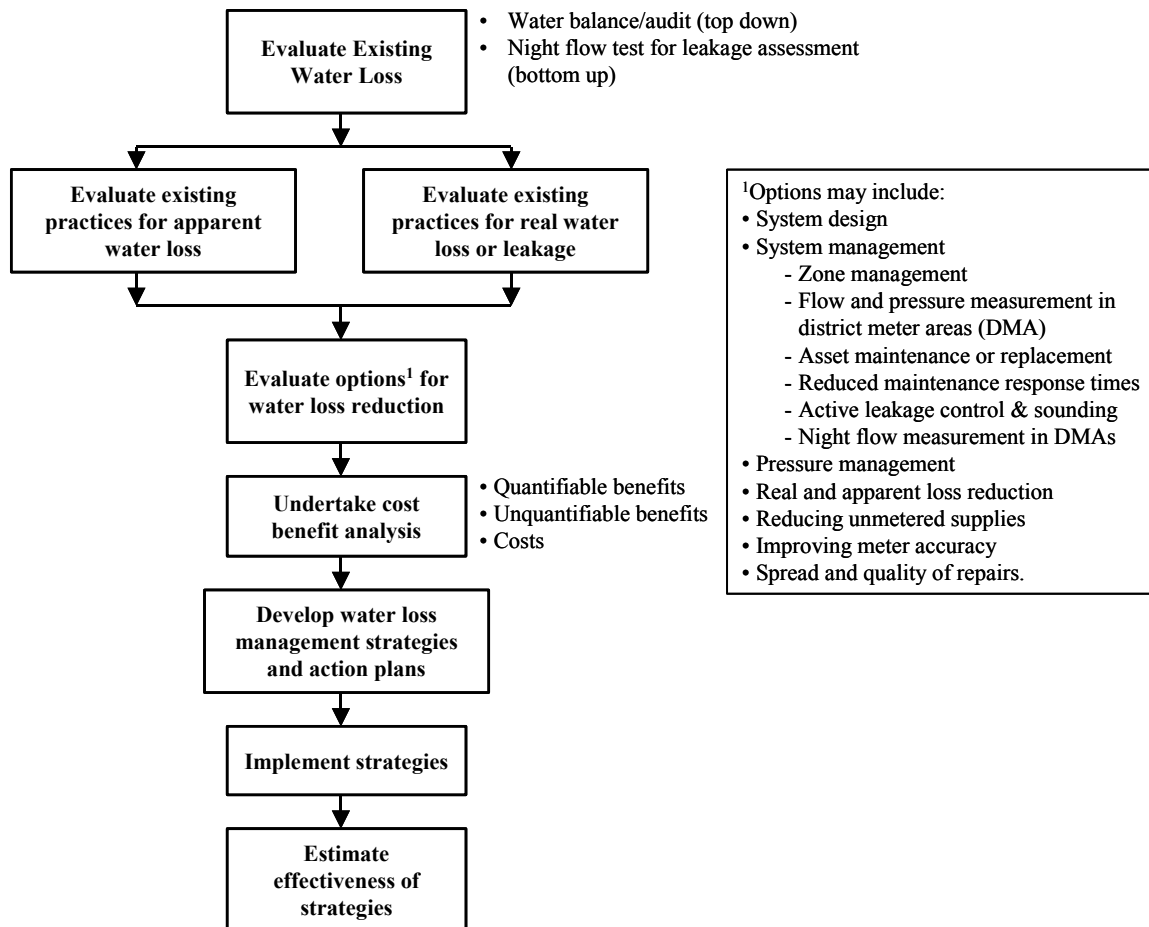


FIGURE 2: The water loss management process

## 5 RISK ISSUES

Potential risks associated with implementation of water loss reduction strategies include:

- quality of raw data;
- implementation of sub-optimal water loss reduction strategies; and
- sustaining the levels of water loss reduction.

## 6 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 loss 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. Horvath, B., *Leakage Management: Assessing the effect of pressure reduction on losses from water distribution systems*, Urban Water Research Association of Australia, Research Report No. 5, December 1989.
2. *Water Audits and Leak Detection* (Manual M36), American Water Works Association, 1999.
3. 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.

## APPENDIX A: Content and development level of sub-plan

TABLE A1: Indicative sub-plan content

| Sub-plan features  | Water Loss Management Plan content  |
|--|---|
| Issues covered in sub-plan   | <ul style="list-style-type: none"> <li>▪ Water audits.</li> <li>▪ Leakage management.</li> <li>▪ Oversizing of infrastructure.</li> <li>▪ Validity of demand benchmarking.</li> </ul>   |
| Purpose of plan  | <ul style="list-style-type: none"> <li>▪ To provide an overview of the WSP's progress in identifying the extent and causes of unaccounted-for water in its distribution systems.</li> <li>▪ To outline the WSP's future objectives and initiatives for characterising and minimising unaccounted-for water.</li> </ul>  |
| Policies that may be required  | <ul style="list-style-type: none"> <li>▪ Infrastructure service standards (e.g. supply pressures, channel construction standards);</li> <li>▪ Customer metering.</li> <li>▪ Metering of uncharged supplies (e.g. firefighting, standpipes, construction uses, WSP uses).</li> </ul>   |
| Other Total Management Plan elements that are intimately linked to this sub-plan             | <ul style="list-style-type: none"> <li>▪ Demand Management Plan: provides input data to water audit and may incorporate common strategy(ies), e.g.. pressure reduction.</li> <li>▪ Service Standards Plan: recognises link between supply pressures and leakage severity.</li> <li>▪ Infrastructure Plan:– reduction in unaccounted-for water allows deferral of future headworks.</li> </ul>   |
| External issues contributing to the current operating environment that need to be considered | <ul style="list-style-type: none"> <li>▪ Minimisation of distribution system losses (where cost-effective) will be required under proposed Queensland water services legislation.</li> <li>▪ Queensland guidelines on managing unaccounted-for water are currently being developed.</li> <li>▪ Concern has been expressed over subsidisation of infrastructure capacity provided solely to meet system losses.</li> <li>▪ Levels of system losses reported by other WSPs.</li> <li>▪ Requirements of EPP (Water) for preparation of local government environmental plans on water conservation. (This sub-plan and the Water Demand Management Plan should be formulated jointly to meet these requirements also.)</li> </ul> |
| Issues that need to be considered in summarising the status of current operations            | <ul style="list-style-type: none"> <li>▪ Current levels of system losses where already identified.</li> <li>▪ Status of system loss studies e.g. water audits, leak detection surveys).</li> <li>▪ Validation of customer meter accuracy.</li> <li>▪ Adequacy of system telemetry and other instrumentation.</li> <li>▪ Broad SWOT analysis of relevant operations.</li> </ul>  |

| Sub-plan features              | Water Loss 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"> <li>▪ goal for asset management;</li> <li>▪ objective(s) for unaccounted-for water management;</li> <li>▪ adopted KPIs; and</li> <li>▪ management strategies and performance targets.</li> </ul> <p>The management strategies developed will be based on the identified key strategic issues and SWOT findings, including risk assessment, in respect of unaccounted-for water management, and on the required TMP development level.</p> <p>Many WSPs are likely to require strategies for conducting water audits to identify, quantify and prioritise losses; minimising losses as prioritised; replacing inaccurate customer meters; and upgrading telemetry and other system instrumentation.</p> <p>The strategies should be supported by detailed action plans covering a period of up to 3 years.</p> |
| Suggested performance measures | <p><b>Outcome:</b> Water loss as proportion of total supply.</p> <p><b>Output:</b> Water loss (litres/100 km main/day).</p>  |
| Supporting documentation       | <p>This will depend on the WSP, but typically would include:</p> <ul style="list-style-type: none"> <li>▪ leakage detection survey reports;</li> <li>▪ water audit reports; and</li> <li>▪ meter accuracy survey reports.</li> </ul>   |

**TABLE 2: Required sub-plan development level**

| Development level <sup>1</sup> | Target management mechanisms of Water Loss Management Plan  |
|--------------------------------|---|
| 3                              | <ul style="list-style-type: none"> <li>▪ A strategic/rational approach to unaccounted-for water management exists.</li> <li>▪ System instrumentation optimised for valid water audits.</li> <li>▪ Water audits periodically conducted.</li> <li>▪ Loss minimisation program in place where appropriate (e.g. leakage detection, pressure control).</li> <li>▪ Accuracy monitoring program in place for water meters.</li> <li>▪ Loss rectification program in place where appropriate, prioritised on benefit/cost assessment and integrated with long-term asset replacement program.</li> </ul> |
| 2                              | <ul style="list-style-type: none"> <li>▪ A strategic/rational approach to unaccounted-for water management exists.</li> <li>▪ Water audits periodically conducted.</li> <li>▪ Leakage detection program initiated where appropriate.</li> <li>▪ Loss rectification program in place where appropriate, prioritised on benefit/cost assessment and integrated with long-term asset replacement program.</li> </ul>   |
| 1                              | <ul style="list-style-type: none"> <li>▪ A strategic/rational approach to unaccounted-for water management exists.</li> <li>▪ A systematic water audit completed.</li> <li>▪ A feasibility study of loss reduction completed where appropriate.</li> </ul>  |

<sup>1</sup> Defined in Section 4.2 of TMP Development Guide.