

**Guidelines for  
Implementing Total Management Planning**

**Performance Management**

**INFORMATION MANAGEMENT  
Implementation Guide**

## TABLE OF CONTENTS

	Page No.
<b>LIST OF ACRONYMS</b>	<b>3</b>
<b>1 INTRODUCTION</b>	<b>4</b>
<b>2 THE PATH TO WISDOM</b>	<b>4</b>
<b>3 INFORMATION MANAGEMENT FOR ASSET MANAGEMENT</b>	<b>5</b>
3.1 Asset data collection	5
3.2 Asset information management	6
<b>4 INFORMATION MANAGEMENT FOR CUSTOMER RELATIONS</b>	<b>7</b>
<b>5 KNOWLEDGE MANAGEMENT IN HUMAN RESOURCES</b>	<b>8</b>
<b>6 INFORMATION MANAGEMENT IN FINANCIAL MANAGEMENT</b>	<b>8</b>
<b>7 INFORMATION REQUIREMENTS IN CORPORATE MANAGEMENT</b>	<b>8</b>
<b>8 DEVELOPING AN INTEGRATED INFORMATION MANAGEMENT PLAN</b>	<b>9</b>
8.1 Data collection	10
<b>REFERENCES</b>	<b>10</b>
<b>APPENDIX A: CONTENT AND DEVELOPMENT LEVEL OF SUB-PLAN</b>	<b>11</b>
<b>APPENDIX B: TYPICAL DATA INPUTS AND OUTPUTS FOR ASSET PLANNING, MANAGEMENT AND OPERATIONS</b>	<b>13</b>

## **LIST OF ACRONYMS**

CCTV	closed-circuit television
GIS	geographical information system
SWOT	strengths, weaknesses, opportunities, threats
TMP	Total Management Plan
WSP	Water Service Provider

# 1 INTRODUCTION

Water Service Providers (WSPs) face an array of regulatory, reporting, cost pressures and related operational challenges, all demanding more responsive levels of information.

Information is required by WSPs to facilitate management decisions on customer relations, human resources, financial management, asset management and corporate management. More importantly, WSPs require accurate, succinct and timely information to enable them to make sound decisions and minimise their exposure to legal, physical and environmental risk.

The complexity of these information needs makes it necessary for WSPs to develop an appropriate approach to information management. Many WSPs have realised significant efficiency gains through careful investment in information systems and evaluation of relevant information.

# 2 THE PATH TO WISDOM

The primary function of information management is to help managers make competent decisions by providing information that is:

- complete;
- accurate;
- timely; and
- usable.

This requires the following ‘hierarchy to wisdom’ (Byrne 1997, pp27-28):

- the collection of **data** — to turn it into...
- **information** — that provides the...
- **knowledge** — to obtain an...
- **understanding** — that assists in obtaining...
- **wisdom** — to make competent decisions.

Information requirements are different for different levels of management. The higher the level, the less detail or the coarser the resolution of information required (refer Figure 1). What is information to a lower level is data to a higher level. Aggregating that data at the higher level turns it into information that assists in the acquisition of wisdom and the making of management decisions relevant to that level. This information will ultimately become the data for a still higher level.

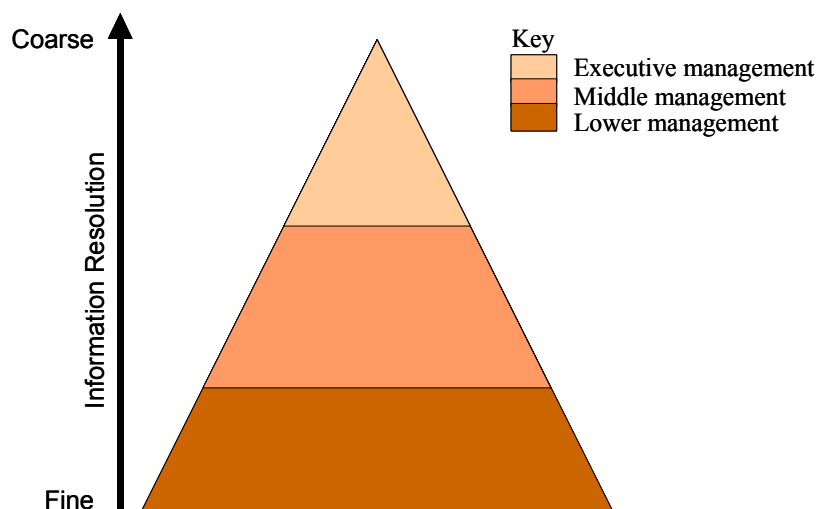
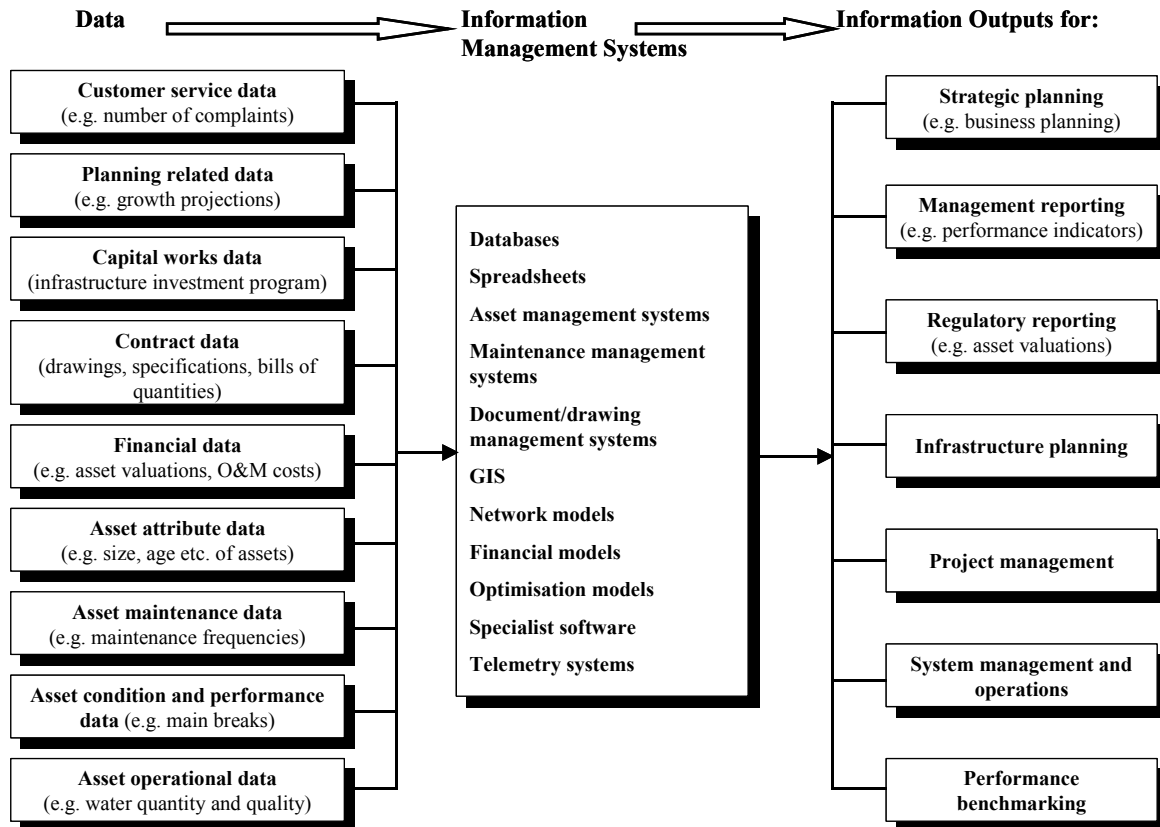


FIGURE 1: Information resolution for management level

### 3 INFORMATION MANAGEMENT FOR ASSET MANAGEMENT

The data will exist in a number of formats, including hard copy (e.g. drawings or log sheets) and digital (e.g. telemetry outputs). New technology allows more effective and efficient data collection compared with earlier manual procedures.

Figure 2 provides an overview of the data inputs and information outputs required for asset management.



**FIGURE 2: Data inputs and information outputs for asset management**

The level of data collection should be sufficient for effective management, in both short and long term, and for meeting regulatory requirements. The extent and frequency of data collection will depend on:

- the desired service level;
- the size and complexity of the scheme managed; and
- skill levels of staff.

#### 3.1 Asset data collection

The extent of data collection must be critically evaluated. It is far preferable to collect limited data and analyse it effectively, rather than collect extensive data but carry out limited analysis. When evaluating data collection the following questions should be asked:

- Is the data being used for any purpose?
- If not, why not?
- Will it be used in the future?
- Has it been used in the past 5–10 years?
- Who is using the data?
- How much time is taken for collecting the data?

- How much is data collection costing?
- Is it sufficiently accurate?
- Can it be used more effectively?
- Is data analysis and reporting effective?
- Is the data being properly stored?
- Is it facilitating the achievement of business objectives?

The need for data should always be balanced against the cost involved in acquiring it. A range of information management systems exists, ranging from simple spreadsheets to fully integrated information management systems. Issues to be considered in developing information management systems include the following:

### **Basic information technology architecture will be open**

In the future, most organisations will adopt an open architecture with a client–server environment and distributed network. The rationale is that this offers the most flexibility for taking advantage of emerging hardware and software technology, ease of support over the long term, and the best overall connectivity with dispersed locations.

### **Standard hardware suite is recommended**

A standardised, single hardware configuration should be adopted by most WSPs for all water and sewerage services, and possibly all service infrastructure for local government WSPs. This virtually eliminates hardware compatibility issues, simplifies operations and maintenance, reduces inventory cost, offers the potential for bulk purchasing at reduced cost, reduces training costs, and assists in system optimisation procedures.

### **Life cycle of operating system and software is important**

A standardised single operating system should be selected for as much of the system as possible. To the extent possible, common software applications (e.g. spreadsheet, word processing, database) should be standardised. This will increase efficiencies, reduce training costs, assist in the selection of applications, ensure compatibility among programs and applications, reduce or eliminate the need to maintain custom programs, and permit realistic budgeting for maintaining software.

Most WSPs will have dispersed assets such as mains or irrigation channels. Geographical Information Systems (GIS) will continue to play an increasingly important role in information management as it allows the presentation of information in a user friendly and effective manner.

There will be a range of information outputs required by different levels of the WSP in managing its infrastructure. In determining the required data and information systems, it is essential that the desired information outputs (and their completeness, accuracy, timelines and format) are clarified and critically evaluated. The WSP business needs should drive the development of the information management system.

## **3.2 Asset information management**

The installation of a quality information management system within a WSP does not always guarantee the delivery of user-friendly, accurate and timely information. The following points should be considered in selecting appropriate asset management information systems:

- Staff (particularly field staff) should understand and accept the need for data capture, storage analysis and reporting.
- Staff should be actively involved in determining required information outputs.
- Project objectives and information outputs should be clearly defined.
- Existing information systems should be properly analysed for their strengths and weaknesses. Possibly the refinement of existing systems may be the most cost-effective system.
- The required information system should be clearly and succinctly specified, including a listing of the data management capabilities and functional capabilities required of the new system.

- Users' expectations should be realistic, taking into account available resources. It is better to have a staged process that delivers results rather than an overly ambitious project that causes frustration and disillusionment.
- The timeframe required to make a system fully operational should be realistic.
- Staff allocated to the project should be capable and motivated.
- Adequate provision should be made for training, system documentation and software support.
- It is important to ensure that the WSP does not rely on one or two specialist operators.
- Operational systems need to be evaluated and objective feedback obtained from users at different levels of an organisation.

## 4 INFORMATION MANAGEMENT FOR CUSTOMER RELATIONS

Customer perceptions on water services issues are often formed on non-factual information, which can create unnecessary concerns as well as communication barriers and conflicts.

If customers are well informed, such problems can be minimised. Input from consultation will then prove more valuable, both to the WSP and ultimately to the community itself. This can be achieved to a degree by the WSP targeting particular individuals or community groups. However, it will prove more effective in the longer term if the WSP maintains a systematic communication program to ensure that all customers have access to appropriate, authoritative information on which to form soundly based opinions.

Each WSP should establish and maintain up-to-date profiles covering all categories of its customers (e.g. residential, commercial, industrial and rural). Accurate customer profiles are a prerequisite to effective customer consultation based on representative sampling techniques.

For a particular service indicator, the relevant customer profile(s) can be used in designing customer surveys and establishing customer committees so as to ensure that consultation results in valid, representative outcomes.

Consumers should be consulted on a range of service issues, for example to obtain their:

- views on major planning proposals;
- expectations regarding service levels and willingness to pay;
- level of satisfaction with existing services; and
- views on the likely environmental, social and economic impacts of existing and proposed WSP practices and infrastructure.

Under the *Water Act 2000*, WSPs are required to produce a customer service standard which represents a formal undertaking or commitment by the WSP to maintain certain service standards. This must address such things as:

- range and level of services to be provided;
- metering and billing;
- complaints procedure;
- dispute resolution; and
- consultation/communication.

## **5 KNOWLEDGE MANAGEMENT IN HUMAN RESOURCES**

Knowledge management is a key attribute to enable an organisation to maintain a competitive advantage in any industry. For the business to grow, it must retain tacit knowledge (experience), insight and endeavour in an organisation's staff in such a way that knowledge is fully utilised, accessible and capable of transfer.

Successful businesses have recognised the important links between learning, continuous improvement and human resource management. Such businesses direct their management skills to creating, acquiring and transferring knowledge as well as to modifying the organisation's internal behaviour and structure to respond to new knowledge and insights.

The key to effective management is to understand what knowledge is important to the organisation, to obtain this knowledge if necessary, and then to develop the appropriate processes and internal information systems to apply the knowledge.

The current trend in the water industry is to obtain the necessary staff skills from outside the organisation. This policy should always be considered in terms of cost-effectiveness and risk. The risk exists in the organisation not having the necessary in-house knowledge to:

- respond to change;
- deal with service emergencies; and
- monitor and manage contractors.

WSPs need to provide sufficient resources (capable infrastructure, information systems, skilled staff and finance) to develop and maintain an effective Total Management Plan (TMP). Although guidance on developing and implementing a human resource management plan is outside the scope of these guidelines, it should be noted that knowledge management (from staff or from contractors) is an important component in managing information within an organisation.

## **6 INFORMATION MANAGEMENT IN FINANCIAL MANAGEMENT**

Increasing pressure and focus on efficiency and financial accountability have brought issues of financial management to the forefront of management for both large and small WSPs. This trend involves increasing competition for capital, and is having a profound effect on the water industry.

Financial management is a process of assessing the organisation's current and projected performance in a manner that provides meaningful information for planning, performance measurement, internal control and corporate management.

The objective of a financial management plan is to provide a single point of reference for a range of statutory and management information without further contributing to the reporting burden of WSPs.

The Financial Management Implementation Guide provides an indication of the extent of information required in the development of a Financial Management Plan.

## **7 INFORMATION REQUIREMENTS IN CORPORATE MANAGEMENT**

Water service owners/managers and elected members require accurate, clear and timely information to enable them to make sound decisions and minimise risk.

The current trends towards benchmarking and performance comparison with best practice in the water industry require organisations to set up supporting information systems. Increased efficiency can be confirmed only through the evaluation of relevant information.

The *Water Act 2000* requires WSPs to establish and publish customer service standards and to report annually on their performance in meeting these standards. Accurate and reproducible data and information is necessary both to set up and to report on these standards, because independent auditing under the Act will demand accessible and accurate information.

Relevant information also needs to be readily available for managing organisational change. Business process needs focus increasingly on better integration of information flow between financial, asset management and customer activities.

The regulatory environment surrounding the water industry requires WSPs to provide a significant amount of information on, for example:

- drinking water quality (*Health Act 1937*);
- environmentally relevant activities (*Environmental Protection Act 1994*);
- environmental plans (*Environment Protection (Water) Policy 1997*);
- service delivery standards (*Water Act 2000*);
- services planning and development (*Integrated Planning Act 1997*);
- services and infrastructure charges (*Queensland Competition Authority Act 1997*);
- financial management (*Local Government Finance Standards 1994*); and
- corporate reporting, corporate plans, operations plans and annual reports (*Local Government Act 1993, Water Act 2000*).

## **8 DEVELOPING AN INTEGRATED INFORMATION MANAGEMENT PLAN**

Each WSP's TMP should include an Information Management Plan. This should outline the methods used to collect data in service delivery, financial, asset, environmental and risk management.

The level of development (comprehensiveness) required of a WSP in documenting its TMP, in terms of the types of management mechanisms it should aim to have, will depend on the size of the WSP (in terms of replacement cost of its assets) and the relative quality of its services.

Appendix A summarises the indicative content and development level required for the Information Management Plan.

The following outcomes will result from implementing an integrated Information Management Plan:

- The WSP will have relevant information to assist with making competent business decisions.
- Service managers and staff will have readily accessible information for infrastructure planning, operation and management.

The objective in developing an Information Management Plan is to integrate the collection, processing and reporting of all water and sewerage service information to meet corporate and service needs in:

- service planning;
- operations and maintenance management;
- service standards monitoring;
- customer information;
- financial management;
- corporate performance and reporting, and
- legislative requirements.

The challenge is to make data capture, storage, analysis and reporting as efficient as possible. An essential tool to meet this challenge is the development of an Information System Manual as a ready reference for all WSP officers. This manual should be succinct, with information presented in 'dot point' form, supported by graphics. It should include:

- a listing of available databases and spreadsheets (including content and extent of data — 'metadata');
- definitions;

- relationships between databases, spreadsheets and geographic information systems (GIS);
- data capture procedures;
- inputs, and outputs to the various systems;
- data verification procedures;
- back-up and storage procedures;
- reporting formats and procedures;
- data input forms; and
- a listing of nominated officers and their responsibilities to administer and manage the various information systems.

The information system manual should closely relate to existing asset register and financial management manuals.

WSPs should develop an Information Management Plan before purchasing any additional business systems or software. This will ensure that management staff are adequately resourced in the delivery of water supply and sewerage services and that existing systems are fully utilised to ensure costs are minimised.

## 8.1 Data collection

To enhance field data capture, it will be necessary to involve relevant field supervisors in the development of the Information Management Plan and Manual. Data capture from the field needs to be simple and easy, to ensure collected data is accurate and reliable. Infrastructure and performance management is only as valuable as the reliability of the data collected.

Field data collection may be achieved in a range of ways: from simply having field staff ‘mark up’ hard copy plans and input forms and give these to dedicated office staff for data entry, to having ‘live’ global position tracking and data links from field computers. There are several proprietary products available for utilising the latest technologies.

The DPI *Total Management Planning Manual* provides a range of data sets that WSPs may wish to consider in developing their Information Management Plan and Manual. Typical data inputs and outputs for asset planning, management and operation are provided in Appendix B by way of example.

## REFERENCES

Byrne, P. ‘The hierarchy to wisdom’, pp27-28, *Management*, March 1997.

*Total Management Planning – Urban Water-related Services: Planning Issues*, Department of Primary Industries (Water Resources), Brisbane, 1994.

*Total Management Planning – Urban Water-related Services: Management Issues*, Department of Primary Industries (Water Resources), Brisbane, 1994.

*Better Practice Principles for Performance Information*, Australian National Audit Office, Canberra, 1996.

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

TABLE A1: Indicative sub-plan content

Sub-plan features	Information Management Plan content
Issues covered in sub-plan	<ul style="list-style-type: none"> <li>▪ Business requirements for effective information management.</li> <li>▪ Input and output data requirements.</li> <li>▪ Business and service reporting.</li> <li>▪ Information management improvement strategies.</li> </ul>
Purpose of plan	<ul style="list-style-type: none"> <li>▪ To provide an overview of the WSP's information management systems.</li> <li>▪ To summarise required information outputs.</li> <li>▪ To outline the WSP's future objectives and strategies for managing and improving business information management.</li> </ul>
Policies that may be required	<ul style="list-style-type: none"> <li>▪ Service Standards monitoring and reporting.</li> <li>▪ Information systems management.</li> <li>▪ Business reporting.</li> <li>▪ Service monitoring and reporting.</li> </ul>
Other Total Management Plan sub-plans that are intimately linked to this sub-plan	<ul style="list-style-type: none"> <li>▪ Business Management Summary: Readily available service and financial information is important for customer satisfaction.</li> <li>▪ Service Standards: a legislative requirement (<i>Water Act 2000</i>) to report on meeting agreed service standards.</li> <li>▪ Financial Management Plan: infrastructure investment and operations and maintenance information required for financial plan.</li> <li>▪ Asset Evaluation and Renewal Plan: Asset registers require accurate and up-to-date information.</li> <li>▪ Maintenance Management Plan: Accessible and accurate information is essential for cost effective asset maintenance management.</li> <li>▪ Operations Management Plan: Data acquisition and analysis is a key activity in optimising system management.</li> <li>▪ Risk Management Plan: Risk management program is predicated on having relevant, timely and accurate information.</li> </ul>
External issues contributing to the current operating environment that need to be considered	<ul style="list-style-type: none"> <li>▪ Increased community expectations on service information availability.</li> <li>▪ Commercialisation necessitates accurate financial and business performance data.</li> <li>▪ Meeting regulatory reporting obligations requires accurate and auditable reporting on environmental and service standards compliance.</li> <li>▪ The <i>Water Act 2000</i> requires WSPs to report on meeting service standards for customer interaction and infrastructure performance.</li> </ul>
Issues that need to be considered in summarising the status of current operations	<ul style="list-style-type: none"> <li>▪ Extent of documentation of existing information systems and information transfer.</li> <li>▪ Existing and future needs for data and information transfer for corporate management and reporting and service planning &amp; management</li> <li>▪ Extent of customer information requirements and response protocols in complaint response.</li> <li>▪ Extent of monitoring, benchmarking and reporting.</li> <li>▪ Broad SWOT analysis of relevant operations.</li> </ul>

Sub-plan features	Information 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>▪ goals for business and service information management;</li> <li>▪ objective(s) for information management;</li> <li>▪ adopted information management enhancement targets; and</li> <li>▪ organisation and service information management strategies.</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 managing information, and on the required TMP development level.</p> <p>WSPs are likely to require strategies for setting information management targets; establishing an integrated information management systems and manuals.</p> <p>The strategies should be supported by detailed action plans covering a period of up to three years.</p>
Suggested performance measures	<p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>▪ The percentage of performance measures in other sub-plans that can be reported on.</li> </ul> <p><b>Output:</b></p> <ul style="list-style-type: none"> <li>▪ Compliance with all regulatory reporting requirements.</li> <li>▪ Compliance with business, environmental, financial, water quality and service standards audit requirements.</li> </ul>
Supporting documentation	<p>This will depend on the WSP, but typically would include:</p> <ul style="list-style-type: none"> <li>▪ quality management systems manuals;</li> <li>▪ information management manuals;</li> <li>▪ TMP coordinator’s manual;</li> <li>▪ operations and maintenance data management manuals; and</li> <li>▪ monthly, quarterly and annual business and service reports.</li> </ul>

**TABLE A2: Required sub-plan development level**

Development Level <sup>1</sup>	Target Management Mechanisms for Information Management Plan
3	<ul style="list-style-type: none"> <li>▪ Information management system in place.</li> <li>▪ Information management manual complete.</li> <li>▪ All business, environmental, financial and service performance indicators measures calculated.</li> <li>▪ Business, environmental, financial and service performance reported monthly and annually.</li> </ul>
2	<ul style="list-style-type: none"> <li>▪ Information management system implementation strategy adopted.</li> <li>▪ Regulatory business, environmental, financial and service performance indicators calculated.</li> <li>▪ Business, environmental, financial and service performance reported annually.</li> </ul>
1	<ul style="list-style-type: none"> <li>▪ Information management strategy developed.</li> <li>▪ Regulatory business, environmental, financial and service performance indicators calculated.</li> <li>▪ Business, environmental, financial and service performance reported annually.</li> </ul>

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

## APPENDIX B: Typical data inputs and outputs for asset planning, management and operations

Data type	Inputs	Outputs
<b>Planning</b>	Census population data. Current zoning. Future land uses and sequencing. Historical demands. Location of planned infrastructure. Numbers of connections and locations. Service network attributes. Asset attributes and location. Current and future demands. Planning scenarios. System modelling attributes (pressure, flows, elevations). Service boundaries.	Population/demand projections for: <ul style="list-style-type: none"> <li>▪ schemes;</li> <li>▪ zones/areas; and</li> <li>▪ catchments.</li> </ul> New and replacement Infrastructure development/location plans. Current and future land uses. Current and future service pressures and flows Impacts from new developments.
<b>Asset management</b>	Field information on: <ul style="list-style-type: none"> <li>▪ service interruptions;</li> <li>▪ blockages;</li> <li>▪ remediation works; and</li> <li>▪ CCTV inspections.</li> </ul> ‘As constructed’ information. Completed works orders. Customer complaint information on: <ul style="list-style-type: none"> <li>▪ pressure, flow, availability;</li> <li>▪ dirty water; and</li> <li>▪ odour.</li> </ul> Feedback from job completion. Infrastructure attribute information. Maintenance strategies. Valuation information. Material costs. Spare parts.	Asset performance (breaks, blockages, overflows). Maintenance histories. Work order generation. Specific reports on asset attributes, condition and performance. Problem areas. Service level reports. Monthly and annual reports. Performance on complaints response times. Complaint information generally. Work order generation. Maintenance planning and budgeting. Resource optimisation. Financial reporting on asset values and depreciation. Time and cost of field staff on maintenance and operation. Spare parts cost and inventory.
<b>Operations</b>	Flows. Pump hours. Reservoir levels. Pressure (node and zonal). Overflow alarms. Flow records. ‘Real time’ process control and telemetry. Job costing.	Monthly and annual operations reporting. Flow data and trends. Design parameters. System water loss. System model calibration. Pressure contours. Operations and facility costs. User specific spatial outputs. Asset attribute information.