

# DEPARTMENT OF NATURAL RESOURCES & MINES

## Planning Guidelines for Water Supply and Sewerage

### Chapter 2

## KNOWLEDGE MANAGEMENT

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## **Knowledge Management**

### **1.0 Purpose**

Effective knowledge management is a critical foundation for quality infrastructure planning. Without this foundation, the resources allocated to planning studies become focussed on information capture and verification. This diverts the allocation of resources from the application of strategic thinking skills in developing and critically evaluating options to provide optimal solutions for stakeholders.

This chapter provides an overview of knowledge management as it applies to the planning process. It is based on the interim Australian Standard AS 5037 (int) 2003 Knowledge Management.

## Definitions

### **Knowledge Management**<sup>1</sup>

“A multi-disciplined approach to achieving organisational objectives by making best use of knowledge. It involves the design, review and implementation of both social and technological processes to improve the application of knowledge, in the collective interest of stakeholders.” Two types of knowledge exist, namely:

- Explicit knowledge – knowledge that has been recorded as information in a document or some other medium; and
- Tacit knowledge – information that resides in a person’s mind and may include aspects of culture or “ways of doing things”.

### **Data**<sup>2</sup>

- A set of discrete, objective facts about events;
- Provides no judgement or interpretation;
- Gives no sustainable basis for action;
- It cannot tell you what to do; and
- Says nothing about its own importance or irrelevance.

Data is important to organisations because it is essential raw material for the creation of information.

### **Information**<sup>2</sup>

Unlike data, information has meaning. Data becomes information when its creator adds meaning. We transform data into information by adding value in various ways:

- ***Contextualised***: we know for what purpose the data was gathered
- ***Categorised***: we know the units of analysis of key components of the data
- ***Corrected***: errors have been removed from the data
- ***Calculated***: the data may have been analysed mathematically or statistically
- ***Condensed***: the data may have been summarised in a more concise form

### **Knowledge**<sup>2</sup>

Knowledge derives from information as information derives from data. If information is to become knowledge, human action must be directly involved in the transformation. This transformation happens through such actions as:

- ***Comparison***: how does information about this situation compare to other situations we have known?
- ***Consequences***: what implications does the information have for decisions and actions?
- ***Connections***: how does certain information relate to other information?
- ***Conversation***: what do other people think about this information?

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<sup>1</sup> Interim Australian Standard AS5037 (Int) – 2003

<sup>2</sup> Working Knowledge: How Organisations Manage What They Know. Davenport, T.H, Laurence P. Harvard Business School Press 1998

## **2.0 Key Principles**

The management of both explicit and tacit knowledge facilitates effective and efficient planning.

Effective knowledge management exists when there is:

- a culture of knowledge sharing within an organisation and with key stakeholders
- a process in place for:
  - capture of explicit knowledge
  - sharing tacit knowledge
  - continual learning and improving
- appropriate information systems in place to collect, analyse and transfer knowledge
- an understanding of what knowledge is required and where it can be accessed.

## **3.0 Why Is Knowledge Management Important?**

Knowledge management is an important support process for planning because:

- Planning requires access to a wide range of complex and inter-related information.
- It minimises the loss of critical knowledge when key personnel (which is usually one person in a small service provider) depart from the organisation.
- The move from hardcopy to electronic data storage requires rigorous management to ensure data integrity.
- Water and sewerage provision requires the input of a range of specialists and disciplines.
- It improves the efficiency of planning as:
  - Resources can be focussed on analysis and optimisation rather than data collection and verification.
  - Inputs are comprehensive, reliable and timely.
- It contributes to continuous improvement through the feedback of experiences and knowledge into the planning process.
- It facilitates cooperative sharing of knowledge within an organisation and with external stakeholders.
- It ensures that systems are in place to deliver information that is readily accessible, accurate, consistent and current.

## **4.0 When Should Knowledge Management Be Undertaken?**

Knowledge management already exists to varying degrees in all organisations which involve a continuous process of:

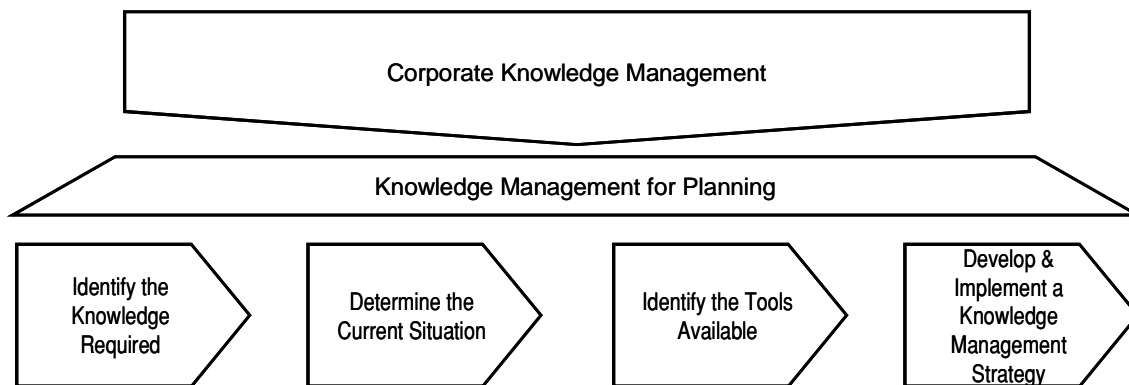
- creating, discovering and acquiring knowledge
- capturing and storing knowledge
- presenting, distributing and sharing knowledge
- revising and disposing of knowledge.

Knowledge management procedures should be implemented to address the full asset lifecycle.

## 5.0 Key Elements

Key elements of developing appropriate knowledge management for the planning process are illustrated in Figure 5.1.

**FIGURE 5.1 –Alignment with Corporate Knowledge Management**



Knowledge management initiatives related to water and sewerage planning should align as far as is practicable with the overall organisational knowledge management strategies particularly in regard to:

- technology and systems
- document and records management.

### 5.1 Identification of the Knowledge Required

This involves identifying and prioritising what knowledge is required to provide effective and efficient planning. This would include knowing about:

- the strategic direction for the service provider
- the outcomes from local, regional and State planning initiatives
- the regulatory framework including compliance and approvals
- trends in the water industry both in Australia and overseas
- the needs of customers and other stakeholders
- how particular planning studies relate to other planning studies
- what planning has previously been undertaken
- factors that affect critical planning data (eg what is the basis of unit demands? What is the basis of cost estimates?)
- regional issues that will impact on water and sewerage service provision or be impacted by these services
- experiences of the organisation or other organisations with similar projects in the past
- issues that have potentially serious impacts on the service provider in the future (eg climate change).

## 5.2 Determine the Current Situation

This would involve determining:

- how the required knowledge is collected, stored and shared
- what other planning related knowledge is collected, stored and shared and why.

This allows gaps between knowledge requirements and current capabilities to be quantified. It may be necessary to delay the planning process and implement some monitoring in order to collect additional data where very little is currently available.

## 5.3 Identification of Knowledge Management Tools Available

AS5037 provides a comprehensive listing of knowledge management tools, techniques and approaches (termed “enablers”). Table 5.1 provides a summary listing of potential tools that could be readily applied to the planning process.

Some service providers are utilising AS/ISO10007 – Quality Management Systems Guidelines for Configuration Management to assist them to maintain information integrity and reliability.

Benchmarking is a powerful knowledge management tool. It allows a service provider to measure its performance and search for best practices that can be adapted to its own organisation. There are two components of a benchmarking exercise. These include:

- **Metric benchmarking.** This involves the development of performance indicators to measure the efficiency and effectiveness of current performance and to track future performance. These indicators can be compared to the organisations to assess comparative performance and identify potential areas for improvement.
- **Process benchmarking.** This involves identifying and implementing process changes to achieve or exceed performance targets. Metric benchmarking will identify where performance gaps exist and organisations which are achieving best practice. Process benchmarking involves understanding the processes that contribute to best practice outputs and outcomes, and adapting these processes to one’s own organisation.

**TABLE 5.1 – Tools Available**

<b>Tool</b>	<b>Description</b>	<b>Typical Application for Planning</b>
Organisational Learning	Learning from situations and using this learning to continuously improve	Post completion audits/reviews in relation to project outputs (costs, benefits, timeliness, quality) outcomes. Learning from the experiences of others through: <ul style="list-style-type: none"> <li>- Peak bodies (eg Queensland Water Directorate, AWA)</li> <li>- Meeting with similar organisations</li> <li>- Conferences/seminars</li> <li>- Technical literature</li> <li>- Benchmarking</li> </ul>
Innovation	Sharing of knowledge and creativity.	Value management or similar workshops during all stages of the planning cycle. Workshops to include planning and operational staff plus other stakeholders as appropriate.
Organisational Memory	A means by which past knowledge is brought to bear on present activities	Post completion audits Documenting information before departure of key staff Documented procedures for the planning process Documented Operations Management Plan that is maintained up to date
Meetings	Cross-team meetings to foster innovation and for the sharing of “lessons learnt”	Regular and structured meetings between planning and operations staff and where appropriate, relevant stakeholders.
Mentoring and Coaching	Transfer of expertise and tacit knowledge from expert to less experienced or knowledgeable staff	Mentoring and skills transfer from senior planner to more junior staff. Transfer of external consultant’s knowledge to service provider staff. Apply approaches that keep knowledge with the service provider staff rather than developing knowledge externally
Knowledge Literacy and Resourcing	Skills, attitudes and mindset to acquire knowledge	Openness to new ideas and willingness to share knowledge. Assimilation of new knowledge into the planning process.
Market Research		Customer and other stakeholder surveys.
Information Management	Collection, storage, analysis and presentation of outputs	Typical planning related information is listed in Table 5.2.
Document Records Management		Registration, storage and retrieval of planning related documents (hardcopy and digital) including: <ul style="list-style-type: none"> <li>- Planning reports</li> <li>- Models</li> <li>- Calculations</li> <li>- Supporting studies</li> <li>- Spreadsheets and databases</li> <li>- GIS files</li> <li>- Drawings</li> </ul>
Technology & Systems – Communication		Utilisation of telemetry system outputs.
Databases		Databases/spreadsheets
Portals, Intranets and Extranets	Use of Internet and web technologies to support groups, formal work units or informal communities of practice	Systems for sharing planning data and knowledge across the organisations.
Search Engines		Accessing of relevant information from Internet.

**TABLE 5.2 – Typical Planning Related Information**

Category	Information
Benchmarking	Benchmarking information from similar organisations
Compliance	Regulatory requirements
Control	Telemetry system outputs
Customer	Census data Number/ type of connections Occupancy ratio Aspirations and/or expectations Socio-economic distribution, particularly 'capacity-to-pay'
Water demand/sewage flow	Current demands Flows by customer type Customer water meter readings Daily demand/flow Daily rainfall Daily temperature Demand/flow projections by customer type Diurnal demand patterns by customer type Diurnal demand/flow patterns Duration and extent of water restrictions External water use History of demand management initiatives Internal water use (by type) Peaking factors by customer type Seasonal extremes (tourist areas) Trade waste (quantity and quality) Water losses
Documentation	Demand management/ water loss studies I/I management studies Previous planning studies
Financial	Capital cost estimates Operation, maintenance & administration (OMA) costs including components OMA cost estimates Tariff (including historical changes) Unit rates
Infrastructure	Asset condition/ performance Design criteria Size, location, capacity, age, levels
Knowledge	"As constructed" drawings Experiences of other authorities as well as own authority
Models	Hydrological, hydrogeological and hydraulic analyses Network models Population models Treatment process models
Operation & maintenance	Energy consumption Information on how the system is operated and reasons for the operating philosophy Operational experience Operational objectives Operational settings (including seasonal adjustments)

Category	Information
	Pump hours Staffing - resources and capabilities System operation including zonings
Regulatory framework	Legislation, standards, guidelines, codes, and industry "best practice"
Risk management	Risks associated with water and sewerage provision System security
Service standards	Complaints Current service levels Service standards
Source	Groundwater levels Streamflows
Spatial	Aerial photographs Land use classification Land use plans Priority infrastructure plans
Stakeholders	Stakeholder requirements
Strategic Direction	Organisational objectives
Treatment	Wastewater composition Treatment plant unit performance and efficiency Water quality (raw and treated)

#### 5.4 Develop and Implement Knowledge Management Strategy

As illustrated in Table 5.1 and in the interim Australian Standard (AS 5037-2003) a number of strategies exist to maximise use of knowledge within an organisation. The strategies depend on:

- the size of the organisation and available resources
- the benefit/cost of implementing the strategies.

## 6.0 Checklist

How confident are you that the data being used in the planning study is reliable? What has been done to ensure this level of confidence?

Has the tacit knowledge of operational staff been effectively utilised?

Have you learnt from the experiences of others? How?

How has the knowledge gained by the external consultant been transferred to the service provider?

How has the service provider been included in the collection and processing of information so that they have ownership of the knowledge?

Are the outputs of planning studies registered in a corporate library (hardcopy and digital)?

How have you been able to minimise the impact of losing key planning staff?

Have outcomes of planning studies been clearly communicated to stakeholders?

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