



Partners for Water and Sanitation

Note on project reports

The following report has been prepared by Partners for Water and Sanitation in response to a project Terms of Reference.

The content of the report is based on the opinion of the author(s) and does not necessarily represent the opinions of the wider PfWS partnership, or the project funders.

Any extracts from the report should only be used with prior permission of the report author(s).



Partners for Water and Sanitation

Zululand District Municipality, South Africa

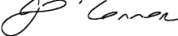
Strategic asset management

Submitted by:

Charlotte O'Connor (Atkins UK Ltd)

February 2009

Contents amendment record

This report has been issued and amended as follows:			
Revision	Description	Date	Signed
0	Draft for circulation	13/02/09	

Contents

1	Introduction.....	4
1.1	PAWS and ZDM	4
1.2	Terms of reference	5
1.3	Deliverables	5
1.4	Activities carried out.....	5
1.5	Structure of this report	6
2	Introduction to asset management.....	8
2.1	Definition.....	8
2.2	Good practice	9
3	Overview of ZDM and current asset management practice	10
3.1	ZDM profile	10
3.2	Current asset management at ZDM	11
4	Development of an asset management framework for ZDM.....	16
4.1	Approach	16
4.2	Defining asset management	16
4.3	Set asset management objectives	17
4.4	Developing the asset management strategy	17
4.5	Risk based asset management.....	18
5	Development of KPIs for performance monitoring.....	20
5.1	Steps in developing KPIs for performance monitoring.....	20
5.2	Long list	21
5.3	Short list.....	23
5.4	Key performance indicators for water service providers	26
5.5	Practical implementation	27
5.6	Benefits of implementation.....	28
6	Implementation programme and proposed PAWS support.....	29
6.1	PAWS support	29
6.2	Implementation plan	30
6.3	Preliminary programme.....	30
	Appendix A Data sources used in the assessment	31
	Appendix B Documents and diagrams produced during the visit.....	34
	Appendix C Overview of MANZI	47

List of figures

Figure 2.1 – Overview of the asset management system, its relationship to the organisational strategic plan and stakeholder expectations	8
Figure 3.1 – ZDM organisational structure.....	11
Figure 3.2 – Current asset management structure in ZDM	13
Figure 5.1 – Schematic to show path to asset optimisation	20
Figure 5.2 – Performance measurement long list	22
Figure 0.1 – Developing asset management objectives.....	35
Figure 0.2 – Performance measurement long list	36
Figure 0.1 – MANZI overview	47
Figure 0.2 – Detail of MANZI	48
Figure 0.3 – Node data.....	49

List of tables

Table 1.1 – Activities and benefits	6
Table 3.1 – Progress on provision of free basic water and sanitation	10
Table 3.2 – Assessment of ZDM current asset management	15
Table 5.1 – Asset management KPIs for ZDM.....	25
Table 5.2 – KPIs for water service providers	26
Table 6.1 – Implementation Plan	30
Table 0.1 –Serviceability indicators used by Ofwat.....	33
Table 0.1 – Asset management objectives, strategy and KPIs for ZDM WSA as captured during the PAWS visit	42
Table 0.2 – KPIs for water service providers within ZDM.....	46

Glossary

Acronym	Meaning
GPS	Global positioning system
hh	household
kl	Kilolitre (one thousand litres)
KPI	Key performance indicator
MANZI	Zululand District Municipality's asset management system
NGO	Non-government organisation
PAWS	Partners for Water and Sanitation
PMS	Performance management system
SIZA	Zululand District Municipality's customer services system
SWOT	Strengths, weaknesses, opportunities, threats
UAFW	Unaccounted for water
UKWIR	United Kingdom Water Industry Research
VIP	Ventilated pit latrine
WSA	Water service authority
WSDP	Water service development plan
WSP	Water service provider
ZDM	Zululand District Municipality

1 Introduction

Partners for Water and Sanitation works with developing countries providing unrivalled knowledge and expertise to help them supply clean water and adequate sanitation to their population. An innovative not-for-profit initiative, the partnership has members from three sectors: government, private enterprises ranging from water companies to engineering groups, and NGOs such as WaterAid, IrishAid and a trade union. This allows the partnership to draw from the widest possible range of expertise to rapidly respond to each unique challenge and to help local African partners develop and strengthen capacity and build truly sustainable solutions.

Each partner brings a unique set of skills and expertise. These are matched with a wide range of potential needs identified with partnering countries at a national or local level, working alongside their existing water and sanitation programmes. The emphasis of partner involvement is on-the-ground capacity building, such as knowledge transfer, to ensure the sustainability of each project and to encourage any lessons learned to be shared and used again throughout the region.

And it's not just about engineering: corporate, institutional and financial capacity building is also required. While the initiative does not itself provide funding, it often strengthens each locality's ability to identify and access available sources through the capacity building approach.

This report is the outcome of a partner visit in February 2009 that is part of an ongoing programme of support that PAWS is providing to Zululand District Municipality (ZDM) in South Africa.

1.1 PAWS and ZDM

ZDM has a long established, constructive working relationship with PAWS partners. Most significantly, ZDM partnered with Yorkshire Water Services over a two year period. Together the organisations identified a wide range of strategic areas for improvement in water and sanitation service delivery at ZDM. This resulted in an implementation plan, which ZDM worked through with ongoing input from Yorkshire Water. Particular areas where improvements have been realised are:

- Customer care;
- Water quality strategy;
- Change management;
- Asset management;
- Identifying and managing water service providers; and
- Strategic metering.

ZDM recognised itself at a point in developing its approach to, and systems for, asset management where it could benefit from further partner support. This partner visit was initiated in response to this need and is anticipated to mark the start of a new partnership between ZDM and PAWS over a 2 year period.

1.2 Terms of reference

The overall objective of this partnership is to support ZDM in establishing good practice asset management.

The aim of the support is to enable ZDM to more effectively achieve the following specific objectives:

1. To share good practice in asset management and understand the requirements of sound asset management, in terms of overall management, possible systems and procedures and appropriate technology;
2. To identify current opportunities and challenges in asset management in ZDM;
3. To compile an appropriate strategy and plan for improvements in asset management;
4. Implementation of the asset management plan.

During the in-country visit, these objectives were extended to cover the particular area of water service provider evaluation and monitoring including key performance indicators.

1.3 Deliverables

The following deliverables were identified for this first stage of partner support:

- Prepare in report and powerpoint formats specialise knowledge and expertise on good international practices in asset management, in developed and developing country contexts.
- In conjunction with ZDM:
 - Establish the status quo of asset management;
 - Provide inputs for a SWOT analysis;
 - Subsequently prepare a strategy for asset management; and
- Support ZDMs preparation of an appropriate implementation plan;

The original terms of reference stipulated that ZDM be supported with delivery of the last two outputs in the interval between the first and second visits. However, PAWS partner, Atkins and ZDM progressed a strategy and an implementation plan as well during the first visit. As indicated in the original TOR, Atkins will support ZDM in the longer term with implementation of its asset management plan.

1.4 Activities carried out

Prior to the visit, a review of good practice asset management in an international context was carried out. This information was compiled into a paper that was shared with ZDM during the in-country visit.

The PAWS visit consisted of 5 working days at ZDM. Activities carried out during those 5 working days were as follows:

Day	Activities	Key benefits
1	<ul style="list-style-type: none">• Overview of ZDM: geography, demography, backlogs.• Site visit to Ulundi WTW and associated regional scheme.• Overview of ZDM asset	<ul style="list-style-type: none">• PAWS partner appreciation of operating environment, levels of service, challenges, strategic approach to water and wastewater service

Day	Activities	Key benefits
	management system, MANZI <ul style="list-style-type: none"> • Site visit to Black Imflozi WTW, under construction 	provision, asset condition.
2	<ul style="list-style-type: none"> • Overview of ZDM organisational structure and responsibilities • Brainstorming session on KPIs for water service providers (WSPs) • Discussion on aims of asset management systems • Defining asset management for ZDM 	<ul style="list-style-type: none"> • PAWS partner appreciation of datasets, responsibilities, reporting structure. • Definition of asset management • Commencement of the development of KPIs for WSPs
3	<ul style="list-style-type: none"> • Setting asset management objectives for ZDM • Developing asset management strategies for ZDM 	<ul style="list-style-type: none"> • Clear objectives to guide future asset management activities • Strategies that will enable the objectives to be fulfilled.
4	<ul style="list-style-type: none"> • Identifying KPIs for ZDM WSA based on asset management objectives and strategies 	<ul style="list-style-type: none"> • Means of measuring progress against strategies.
5	<ul style="list-style-type: none"> • Identifying KPIs for WSPs • Programme for implementation • Identification of requested future PAWS support 	<ul style="list-style-type: none"> • KPIs for WSPs • Implementation plan

Table 1.1 – Activities and benefits

ZDM representatives present over the 5 day period were:

- Christo Nel (days 2 to 5) Head of Planning and Community Development, ZDM
- Johan Jordaan (days 1 to 5) Acting Director of the Water Services Authority (consultant)
- Buyisiwe Madonsela (days 1 to 5) Technician, Water Services Authority
- Craig ?? (days 1 and 2) (consultant)

ZDM is a municipality that has had good support from PAWS and other international and national organisations in the past. It is likely to be considered a leading municipality in the rural South African context. The individuals responsible for the Water Services Authority (WSA) outputs were clear on their achievements to date and had many ideas on how the next steps might look. The approach taken over the 5 days was a workshop style series of discussions and debates.

1.5 Structure of this report

This report is set out as follows:

- This introduction as Section 1;
- An introduction to asset management in Section 2;
- An introduction to ZDM and its current asset management as Section 3;
- The approach to the development of an asset management strategy at ZDM in Section 4;
- Development of key performance indicators for ZDM is in Section 5; and
- A programme for future PAWS support is set out in Section 6.

Where possible the methodology followed has been documented to allow other municipalities to benefit from the PAWS input. However, the main purpose of this report is to provide a summary of the input provided to ZDM.

2 Introduction to asset management

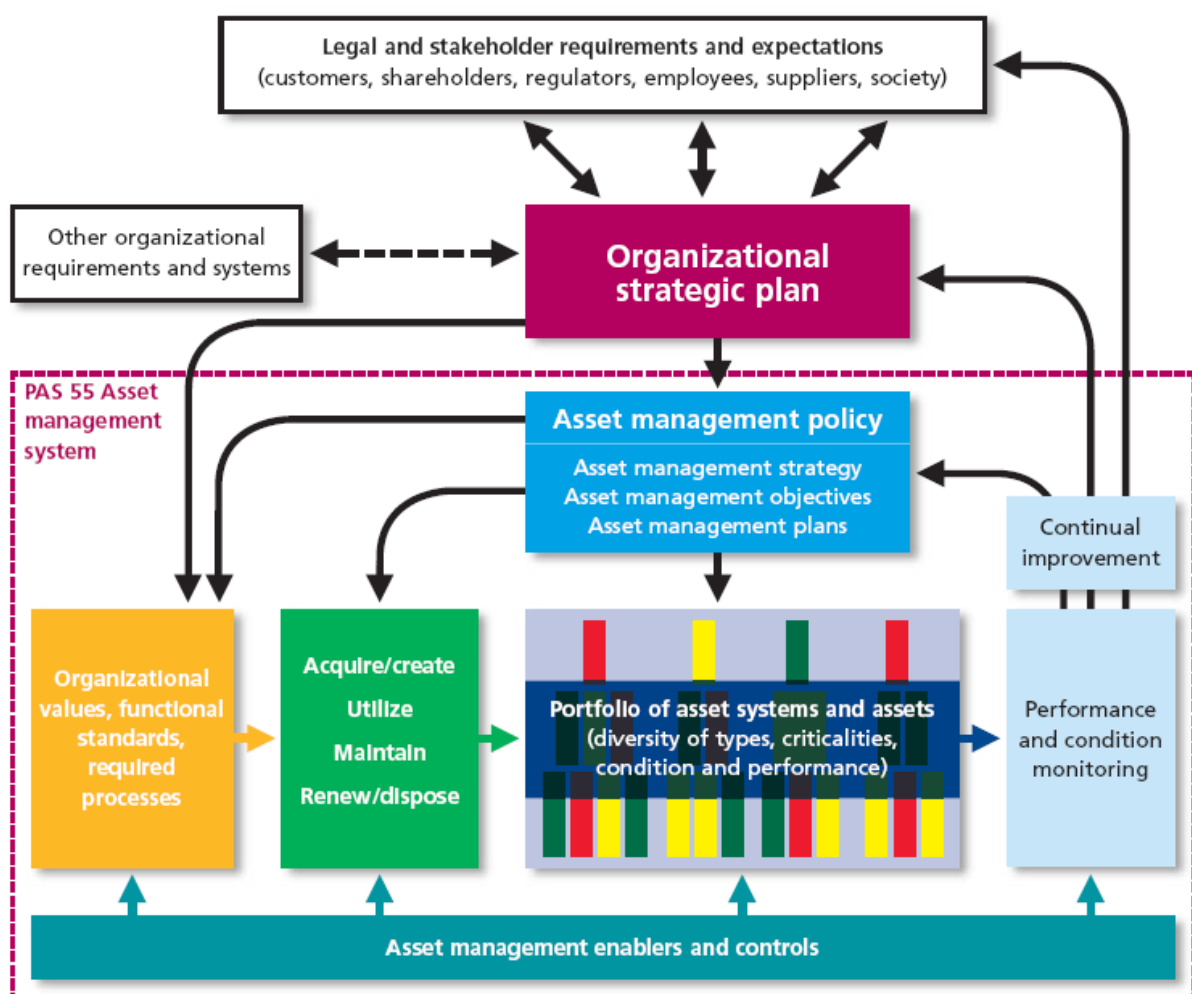
2.1 Definition

Asset management means different things to different people, organisations and countries. A useful wide definition, from the recent document from the Institute of Asset Management (UK)¹ is:

“systematic and coordinated activities and practices through which an organisation optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organisational strategic plan”

The concept in practice can be perhaps more clearly communicated via an asset management system in diagrammatic form and Figure 2.1 provides an example.

Figure 2.1 – Overview of the asset management system, its relationship to the organisational strategic plan and stakeholder expectations²



¹ PAS 55-1: 2008 Asset Management. Part 1: Specification for the for the optimised management of physical assets

² Ibid

The scope of asset management can be wide – covering physical assets, human assets, information assets, financial assets and intangible assets (reputation, morale, intellectual property, goodwill, etc.). Within many water service providing organisations the focus is on physical assets.

2.2 Good practice

There are many available systems for identifying and benchmarking good practice asset management.

The necessary attributes of a good asset management system are also broad – at their widest including not only physical asset attributes but aspects such as organisational structure, authority and responsibilities; training awareness and competence; communication, participation and consultation; asset management system documentation; information management; risk management; legal and other requirements; and management of change³.

Many of the available benchmarking systems are overly complex or procedure-based to be useful in the developing country context. For example, the recent Asset Management Planning Assessment Process published by UKWIR⁴ has a strong focus on documentation. There are not yet many formal documentary requirements for asset management in South Africa.

The World Bank⁵ states that to achieve best practice in asset management, organisations must be able to demonstrate:

- Knowledge of levels of service required by customers
- Ability to predict future demands for service
- Knowledge of ownership of existing assets
- Knowledge of physical condition of assets
- Knowledge of asset performance and reliability
- Knowledge of asset utilisation and capacity
- Ability to predict the failure modes and estimated time of failure for assets
- Ability to analyse alternative scheme options
- Ability to rank schemes or work based on economic analysis
- Ability to prioritise schemes or work to suit the available budget
- Ability to develop and revise strategic objectives for each asset
- Ability to optimise operations and maintenance activities

Two key indicators, linked to full cost capture, can usefully be added to this list:

- Continually assessing and reviewing asset management options to ensure that optimal operations, maintenance, renewal, acquisition and disposal decisions are made, taking into account both social and economic objectives.
- Accounting for assets in such a way that the true cost of services provided can be calculated, and future investment needs required to maintain the 'service potential' of the assets can be determined.

These indicators together have been used to define best practice in the South African context. Some indicators will be largely met by ZDM. Others are an aspiration for the future.

³ Ibid

⁴ Asset Management Planning Assessment Process – A methodology for self assessment, Volume 2, methodology and tool, UKWIR Report reference 07/RG/05/19

⁵ Strategic Municipal Asset Management, The World Bank, 2000

3 Overview of ZDM and current asset management practice

3.1 ZDM profile

The ZDM is situated in northern KwaZulu-Natal (KZN). It covers an area approximately 250km wide and 250km long. The district is predominantly rural with commercial farmland interspersed by protected areas, towns, and dense to scattered rural settlements within traditional authority areas. The majority of these rural settlements are small; the ZDM comprises 1,022 settlements divided into 15 urban areas, 64 dense settlements, 290 villages, 547 scattered settlements and 106 farm settlements⁶.

The total population of ZDM is approximately 1 million in 143,000 households. In 2005 only 16% of the economically active population was employed, with 50% of this population earning less than 800 rand (£50) a month. The illiteracy level is high, at around 40%⁷.

The South Africa government has set national targets for free basic water and sanitation. The free basic water supply is deemed to be a supply of 25l/person/day or ~6kl/household/month, within 200m of the homestead and of good quality. Basic sanitation provision is essentially a ventilated pit (VIP) latrine.

Backlog	February 2005	February 2009
Free basic water	41%	~50%
Free basic sanitation	72%	~50%

Table 3.1 – Progress on provision of free basic water and sanitation

Demand for water within the ZDM supply area has grown from an average of 4.5kl/month to over 6kl/month per household with the introduction of the provision of free water. Service delivery to remote areas is extremely costly and income is generated from only 15% of households. The ZDM WSA has a total of 10-15,000 rands per annum from billing income. The municipality has established that the economic breakeven point to bill and collect income is at around 11-13kl/month, although it seems that this is based on current operational costs of water provision only (no allowance is made for new assets to meet demand or the costs for the replacement and refurbishment of assets).

The ZDM annual expenditure on water and sanitation is approximately R450m. This comprises R200m on operating expenditure and R250m on capital expenditure, being the construction of new assets.

The WSA lies within the Planning and Committed Development department of the Municipality. The Water Service Provider (WSP) role primarily lies with the Technical Services Department. Another external organisation, the Abaqulusi Local Municipality, is also a WSP. Figure 3.1 shows the organisational structure of the ZDM.

⁶ Zululand District Municipality Water Services Development Plan, February 2005

⁷ Ibid

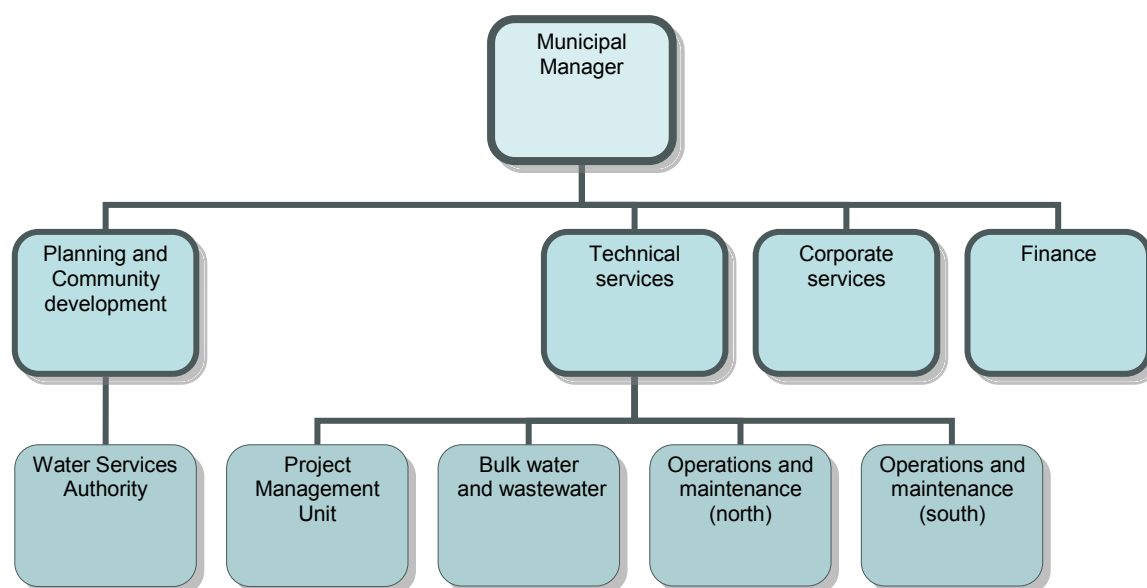


Figure 3.1 – ZDM organisational structure

3.2 Current asset management at ZDM

A report published by the World Bank in 2005 identified that in many developing countries the initial focus of asset management will be on:

- Developing basic asset inventories;
- Documenting asset operation and maintenance processes;
- Developing primary asset information systems;
- Preparing basic asset management plans; and
- Developing skills and awareness.

In general terms, this is a reasonable summary of the focus of asset management at ZDM to date and at present.

From a position some seven years ago when it did not know what assets it owned, where they were or which customers they related to, the Municipality has made considerable progress.

It made an early decision to ensure that all of its data are spatially referenced. ZDM is using a database and map viewers, similar to GIS, as the home for all of its data. This primary information system, MANZI, has been populated with above and below ground asset information. A district wide ground based exercise was carried out to locate as many assets as possible and to capture basic asset information using global positioning systems (GPS). Each asset identified was photographed and this information is all captured within the asset database. This forms the basic asset inventory or current asset register and the ZDM estimates that it is approximately 90% complete. MANZI will eventually hold all documentation in relation to assets, including manufacturers specifications etc, within a document management system. An overview of MANZI is provided in Appendix C of this report.

ZDM also used aerial photography of its district to digitise each property within its supply area. This has enabled it to better quantify its customer base.

Working with Yorkshire Water Services, through PAWS, ZDM identified a need to provide improved customer service provision across the Municipality. It introduced a customer service system, SIZA, which captures customer enquiries and complaints and tracks ZDM's response. An opportunity was identified to use recorded messages to improve communication with customers during incidents.

The operation and maintenance of bulk assets is outsourced to a private contractor. ZDM staff are responsible for the operation and maintenance of reticulation assets. There are around 150 maintenance staff with local responsibilities and 6 roaming teams. All staff have mobile phones and cameras, to help them to communicate and record information.

The ZDM has recognised that it needs to document asset operation and maintenance processes. ZDM intends to develop operational plans for each of its assets and has invested time in determining appropriate planned maintenance schedules for its key (bulk) assets. The staffing requirements, and by proxy some operational maintenance requirements, for water and wastewater treatment works are determined by legislation. As part of the bulk water outsourcing contract monthly cost reporting is required. As such ZDM collects, analyses and reports on the following at its bulk sites each month ;

- Chemical costs;
- Replacement part costs;
- Staffing levels (with costs to follow);
- Power costs (currently collected centrally, but to be linked to each site).

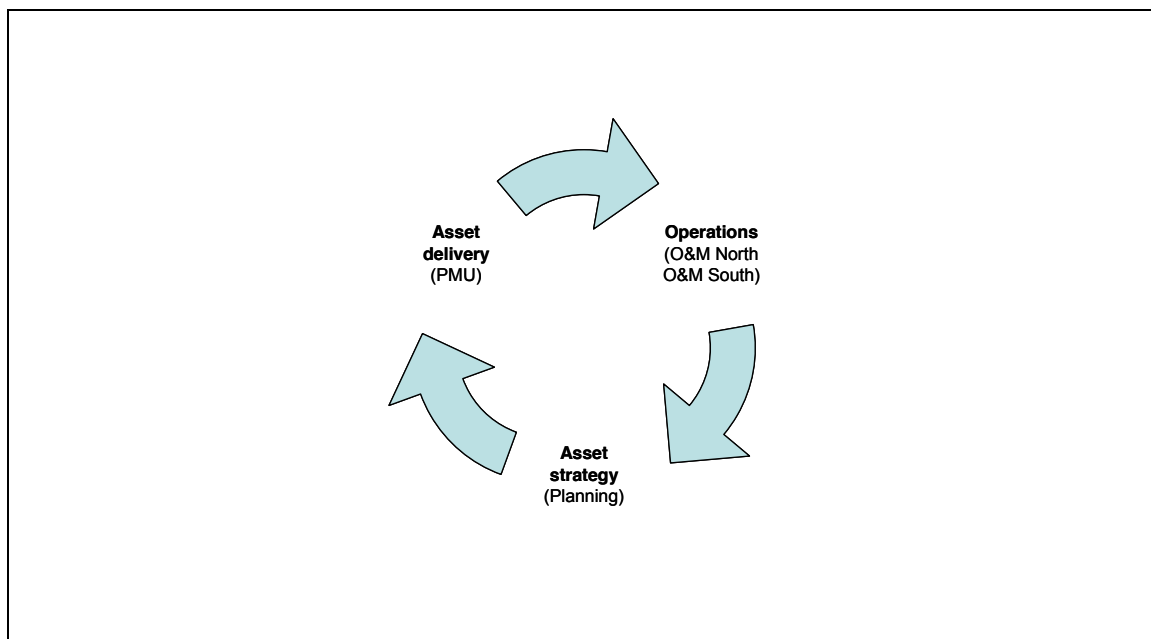
This is in line with good or even best practice operational expenditure data collection in the United Kingdom.

The ZDM has developed a plan for the provision of basic water supply across its area through a series of regional schemes. Progress will depend on grant funding allocations and contractor capability.

ZDM has been developing its management level skills and awareness of asset management for a period of time, in part with PAWS support. Skills and awareness across the wider organisation are less developed at this stage, but ZDM has identified this as an objective for future asset management planning within the organisation.

The organisational structure is well placed to support good practice asset management. A model of "asset planning – asset delivery – asset operations" is often seen in water service providers, and is represented at ZDM. All planning, including tender documents, specifications and drawings, is the responsibility of the WSA.

Figure 3.2 – Current asset management structure in ZDM



Through its relationship with PAWS, ZDM has developed a customer care system. Customers are able to contact the municipality to advise it of a problem about an asset. The ZDM then advises one of its maintenance teams, dispatching them to solve the problem. The Municipality records the time from receiving the contact from the customer until the problem is solved.

Based on a limited knowledge of the ZDM system gained during the partner visit, a simple benchmarking exercise has been undertaken to identify progress against best practice, as identified in Section 3. For this purpose, assets have been broken down into the following five areas:

1. Bulk assets (water and wastewater)
2. Urban water reticulation
3. Rural water reticulation
4. Urban sewerage reticulation
5. Rural sanitation

WSA management and general assets (IT, furniture etc) were left out of the exercise at this time, but the ZDM may like to consider them further in the future.

A scale of 1 to 5 was used, defined as follows:

Score	Definition
5	True for 90% of assets, or strongly agree
4	True for 70% of assets, or agree
3	True for 50% of assets, or neutral
2	True for 30% of assets, or disagree
1	True for less than 30% of assets, or strongly disagree

The results are shown in Table 3.2 and show that ZDM has strengths in:

- Planning for new assets;
- Managing within available budgets.

ZDM has some knowledge of:

- Levels of service required by customers;
- Future demands for service;
- Its existing assets.

ZDM has yet to:

- Understand asset performance and failure mechanisms;
- Optimise asset lifecycle costs;
- Identify needs for future asset replacement.

It is also worth separately considering the Municipality's ability to use risk based approaches in its planning. This ability is key to the long term delivery of service at affordable prices. ZDM has introduced a risk based approach to water quality monitoring. To meet the legislative requirements in full would require nearly 50% of the annual operational income for the WSA. ZDM has therefore developed a risk matrix for all of its water and wastewater treatment works to determine a testing regime that is fit for purpose. This reduced the costs of water quality testing considerably.

Best practice asset management						Notes
	Bulk assets	Urban water reticulation	Rural water reticulation	Urban wastewater reticulation	Rural sanitation	
Knowledge of levels of service required by customers	3	3	3	3	3	Customer charter yet to be defined, but legislation sets some service levels
Ability to predict future demands for service	5	4	4	4	4	Some growth allowed for in regional scheme design, growth study commissioned.
Knowledge of ownership of existing assets	5	4	4	4	4	Asset database 90% populated although some location data inaccurate
Knowledge of physical condition of assets	4	3	2	2	2	Little knowledge of asset condition. Some areas of high water loss identified.
Knowledge of asset performance and reliability	2	3	2	3	2	Recognise probable future issues with urban reticulation assets.
Knowledge of asset utilisation and capacity	3	3	3	3	3	Study recently commissioned into capacity and growth of WTW and WWTW.
Ability to predict the failure modes and estimated time of failure for assets	1	1	1	1	1	
Ability to analyse alternative scheme options	5	5	5	5	5	Good ability within planning team. O&M excluded from analysis.
Ability to rank works based on economic analysis	5	5	5	5	5	Evidence of good governance, although ability not reviewed in detail.
Ability to prioritise works to suit the available budget	5	5	5	5	5	
Ability to develop and revise strategic objectives for each asset	1	2	3	1	1	Review of unaccounted for water initiated
Ability to optimise operations and maintenance activities	2	1	1	1	1	
Continually assessing and reviewing asset management options to ensure that optimal operations, maintenance, renewal, acquisition and disposal decisions are made, taking into account both social and economic objectives;	1	1	1	1	1	
Accounting for assets in such a way that the true cost of services provided can be calculated, and future investment needs required to maintain the 'service potential' of the assets can be determined;	1	1	1	1	1	

Table 3.2 – Assessment of ZDM current asset management

4 Development of an asset management framework for ZDM

4.1 Approach

The following approach to asset management within ZDM was taken during the PAWS partner visit:

1. Define asset management;
2. Set asset management objectives;
3. Develop the asset management strategy;
4. Identify actions and measures;
5. Develop an implementation plan.

This section covers activities 1 to 3. Activity 4 is covered in Section 5 and Activity 5 in Section 6.

4.2 Defining asset management

As set out in Section 3, asset management means different things to different people, organisations and countries. It was important to first set out what asset management means to ZDM.

ZDM first set out its own definition of asset management. This was:

“Asset management is the processes, systems and procedures through which service delivery is constantly maintained, measured and improved, in a cost effective manner”

After some subsequent brainstorming, discussion, and reference to a range of available definitions, an amended version of the PAS 55 definition was adopted for ZDM:

“Asset management is the systematic and coordinated activities and practices through which the ZDM optimally and sustainably manages its assets and asset systems, their performance, manages risks and expenditure over the asset life cycle and all for the purpose of excellent service delivery.”

For other organisations going through this process, some other available definitions are included in Appendix A of this report.

The advantages of this definition included:

- Activities and practices are broader and more flexible than policies, procedures and systems;
- Assets are viewed as part of a system, not treated in isolation;
- Optimising performance was considered an appropriate objective; and
- Managing risk accords with ZDM’s current practices.

The main disadvantages are the length and complexity of the statement and any potential differences to future definitions provided by the South African government.

4.3 Set asset management objectives

ZDM as an organisation has an overall objective “*service delivery through integrity*”.

The objectives of WSA asset management at ZDM were distilled following a discussion on good practice asset management, informed by objectives at other organisations (Appendix A includes examples). Six key themes were identified:

1. Manage costs and risks
2. Customers
3. Management of assets
4. Innovation and technology
5. Capacity building (people)
6. Regulation

These were then rephrased as objectives.

1. To optimise cost and manage risk;
2. To satisfy our customers and continually improve service delivery;
3. To optimise the performance of the assets;
4. To encourage innovation and embrace technology to become more efficient;
5. To have sufficient and capable staff for effective and efficient asset management; and
6. To continuously improve compliance.

4.4 Developing the asset management strategy

For each objective, one or more strategies were developed which summarised the way in which that objective would be met. If the objective is considered the “What”, the strategy then identified the “How”.

Appendix B includes the “framework” for asset management that was developed (using brainstorming and mindmapping techniques) and used to develop the objectives and strategies. These are summarised here.

Objective 1	To optimise cost and manage risk
Strategy	By implementing appropriate systems to collect, analyse and report on selected information that will inform management decisions in optimising costs and managing risk.

Objective 2	To satisfy our customers and continually improve service delivery
Strategy	By establishing and honouring a customer charter within the context of the overall customer care strategy.

Objective 3	To optimise the performance of the assets.
Strategies	By applying a risk based approach to assessing asset condition and performance to review operations, maintenance and refurbishment and replacement requirements.
	By developing systems to collect, analyse and report information that will inform management decisions to optimise asset management.
	By establishing and maintaining a complete and accurate asset register.
	By using planning to effectively manage the asset lifecycle.

Objective 4	To encourage innovation and embrace technology to become more efficient
Strategies	By developing an accurate and complete central database where all information is housed and updated, in an easily accessible way.
	By making use of the latest and appropriate technology, to develop and implement systems that will optimise asset management and enable continuity and succession.
	By ensuring proper forward planning of new assets, using technology where appropriate.
	By establishing appropriate sets of standards.
	By constantly reviewing available technology

Objective 5	To have sufficient and capable staff for effective and efficient asset management
Strategies	By developing a plan to retain current staff, develop skills through mentoring and training and to recruit new staff.
	By including asset management in the Municipality's performance management system at all levels of the organisation.

Objective 6	To continuously improve compliance
Strategies	By ensuring compliance through a WSA compliance checklist.
	By applying and reviewing the ZDM by-laws.

4.5 Risk based asset management

Objective 3 relates to optimising the performance of assets and reference is made to “risk based approaches”. It is worth briefly discussing these points further.

Early in an organisations progress towards asset management, forecasts of asset renewal requirements are often based on empirical asset-life type relationships. Using this approach, without considering the current condition and performance of the asset, can result in higher than necessary replacement cost forecasts. The United Kingdom has developed a “risk based approach” to asset management. This considers the asset condition, whether it is performing the required function and the consequence of the asset failing. Risk is defined as:

$$\text{Risk} = \text{probability} \times \text{consequence}$$

Within Zululand, the focus to date has been on the consequence side of the risk calculation. Over time, this will need to evolve to also consider the probability of failure to enable appropriate expenditure forecasts to be developed.

There are many available indicators of asset condition and performance and these are not replicated here, although an example from Ofwat is included in Appendix A. This was identified as a potential area for future PAWS support to ZDM.

5 Development of KPIs for performance monitoring

5.1 Steps in developing KPIs for performance monitoring

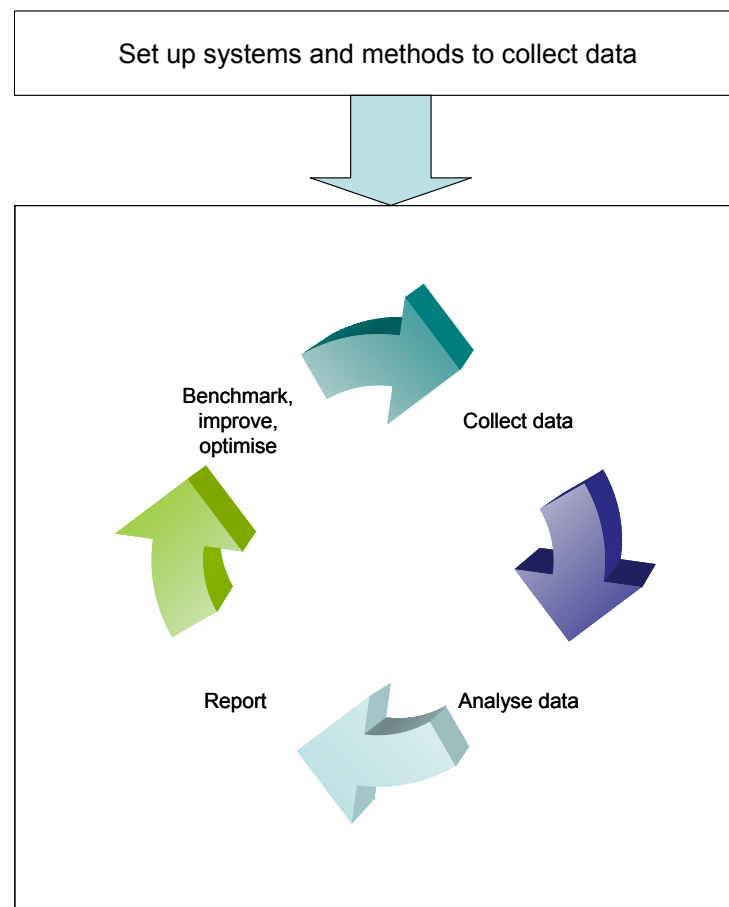
Once the asset management strategies were identified, it was necessary to identify how these could be implemented and measured. KPIs were developed to trigger these actions and to monitor implementation.

When developing KPIs and measures, the “next steps” in the process were identified. For example, the long term objective for assets is to optimise asset performance. The strategy is to “apply a risk based approach to assessing asset condition and performance to review operations, maintenance and refurbishment and replacement requirements”. The first steps in this process are to;

1. Define asset condition and performance indicators;
2. Develop systems to collect and house condition and performance data

Data can then be collected, analysed, reported upon and used to improve asset management, as shown schematically in Figure 5.1.

Figure 5.1 – Schematic to show path to asset optimisation



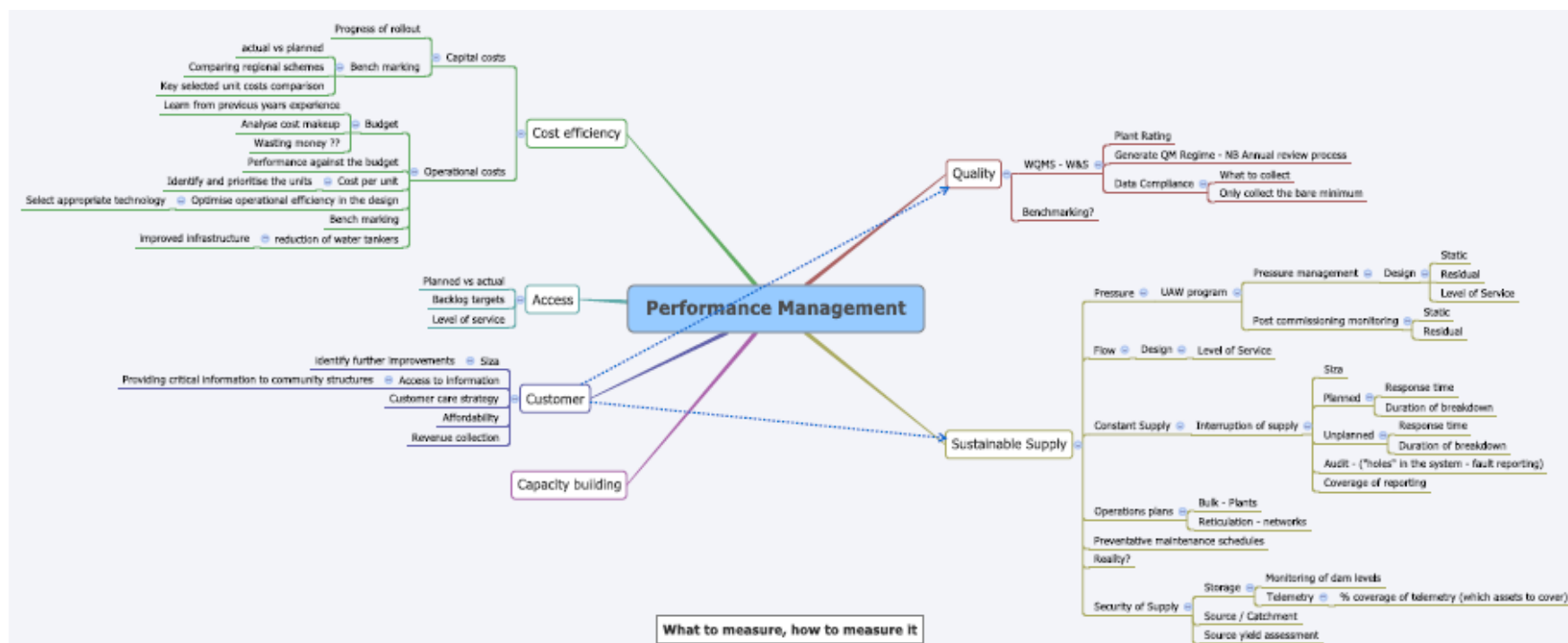
The overall approach to developing KPIs was;

- To carry out a brainstorming exercise to capture all desired performance monitoring indicators (a “long list”);
- To review the current ZDM KPIs (at a district municipal level) to avoid duplication;
- To use the asset management objectives and strategies to develop KPIs; and
- To cross check these to the “long list” to ensure all aspects are covered.

5.2 Long list

Early in the week a long list of KPIs was developed, arising from a brainstorming session and with some reference to international KPIs. These are shown in Figure 5.2

Figure 5.2 – Performance measurement long list



5.3 Short list

When framing the KPIs, the following references were used:

- “To know whether I have succeeded in achieving the objective, I will measure *[KPI]*”
- “We should develop SMART objectives – Specific, Measurable, Achievable, Realistic, Time related”.

As set out in Section 5.1, next steps were considered when developing the KPIs. These will need to be reviewed on an annual basis and future actions and KPIs developed in an evolutionary manner. Table 5.1 provides the KPI short list and associated information. KPIs already captured in the ZDM performance management system were not duplicated. These include;

- Drinking water quality;
- Effluent quality;
- Access to water and sanitation;
- Response time to supply interruptions; and
- Time to rectify supply interruptions.

	Aim	KPI	Unit or measure	Evidence	Data to collect
1	Track actual vs planned capital cost. Graph this to allow updates of projected cashflow needs	That the annual report in the WSDP on actual vs planned capital cost of water and sewerage is updated.	Unit cost/hh	Annual report on unit cost of water and sewerage included in WSDP	Number of households provided with access Capital costs of each W&S scheme
2	Monitor operational cost of W&S in graph format (NB: Must define which O&M costs)	That the annual report in WSDP is updated with actual O&M capital cost of water and sewerage.	Unit cost to produce water and sewerage	Annual report in WSDP updated with actual O&M costs of water and sewerage services	Total kl produced/treated Total ringfenced cost for W&S O&M
3	To establish a customer charter within the context of the overall customer care strategy	That a customer charter is established	Approved customer charter shared with customers.	On display in all ZDM offices and on the website	Potential customer survey to check for awareness of charter.
4	To measure performance against the customer charter	That a monitoring framework for assessing the extent to which the promise to customers in the Charter has been achieved, is established.	Measuring framework is established	Measuring framework in reviewed 2009/10 WSDP.	To be determined in the charter.
5	To establish a current cost asset register (phase 1 – asset location, phase 2 – asset attributes, to be annually prioritised).	That there is high confidence in the asset register.	Annual survey of information users.	Improving annual survey score.	Annual survey of confidence (high, medium or low)
6		Each year asset attribute data is prioritised and high priority data is collected with a high level of confidence.	Priority list is completed using sound data collection processes.	Improving annual survey score.	Annual survey of confidence (high, medium or low)
7	Determine performance and condition indicators to allow risk based approaches to be developed.	Performance and condition indicators for ZDM assets are in place.	Indicators in place	Indicators in place	Indicators to be determined.
8	Use risk/performance based approach to determine capital replacement/refurbishment programme.	That a framework for a risk based capital replacement/ refurbishment programme is in place, including data collection and storage.	Framework, system and data collection methods are in place.	Framework, systems and methods are in place and data is being collected and stored.	To be determined
9	Implement an Unaccounted For Water (UAFW) programme to improve understanding of the water balance.	That a first order (high level) water balance is completed.	First order water balance report	First order water balance report	Meter readings, pressure data.

	Aim	KPI	Unit or measure	Evidence	Data to collect
10	Establish O&M plans in a phased manner, using condition and performance indicator information.	That continuously updated and extended schedules are informing O&M actions.	A live schedule	O&M schedules on agenda for and in minutes of monthly WSP reporting meetings.	To be determined
11	Extend MANZI to perform all required functions. Phase 1: database presented in interactive form.	That the MANZI database is presented in an interactive form.	Web access to MANZI activated	Web access enabled.	N/A
12	To have a complete set of ZDM WSA standards	That the ZDM WSA standards and specs are complete.	PDFs on website	PDFs on website	N/A
13	To know what the skills gaps are and seek to fill them.	That a continuously updated training needs schedule is informing the Workplace Skills plan.	A live schedule	Training schedule on the agenda for and in the minutes of monthly WSP reporting meetings.	N/A
14	Incorporate asset management into the Municipality's performance management system (PMS)	That asset management is included in the 2009/10 PMS.	2009/10 PMS refers to asset management	2009/10 PMS refers to asset management	Measurement of achievement of asset management through the PMS.
15	Use WSA compliance checklist,	That the checklist is used to complete the section on compliance in the WSDP annual review.	Annual checklist	Completed checklist.	As per checklist.
15	To apply and review the by-laws in a practical way, using an annual review process.	That the list of bylaws is annually reviewed and priorities identified, which are implemented through the WSDP.	Annual list in WSDP	Annual list in WSDP	As per list.
16	Improve customer education	Implement customer awareness programme	A plan for the implementation programme exists.	A plan for the implementation programme exists.	To be determined.

Table 5.1 – Asset management KPIs for ZDM

5.4 Key performance indicators for water service providers

The list of KPIs derived in Table 5.1, along with the ZDM's existing KPIs, were used to identify KPIs for all three of the WSPs in the ZDM WSA area, which are;

- The Technical Services department;
- The bulk services provider (an independent contractor); and
- Abaqulusi Local Municipality.

It was important to identify KPIs that related to activities within the WSPs' control. As such, it was necessary to be clear on whether the responsibility for each activity lay with the WSA or the WSP. Many of the KPIs in Table 5.1 relate to the WSA. Others require further action by the WSA before the WSP can implement the required systems and meet the KPIs.

The KPIs for WSPs are included in Table 5.2. Some of these will require the WSA to carry out preliminary activities before monitoring can start. For example the detailed design of the "required daysheets" has yet to take place.

KPI	Description
1	That the required daysheets are submitted daily
2	That map book plans are amended and submitted to WSA annually
3	That the required monthly MANZI reporting is done
4	That a continuously updated training needs schedule is informing the Skills Development Plan
5	Percentage of allocated funds spent on specified WSDP /refurbishment projects
6	Percentage of required tests conducted (samples) as per approved strategy
7	Percentage of conducted tests that passed
8	Average cumulative interruption time during the year per plant
9	Average response time to rectify breakage in service
10	Average time of notification to the community prior to planned interruptions
11	Average time of notification to the community on unplanned interruptions, after incident being reported between 4am & 10pm

Table 5.2 – KPIs for water service providers

For some of the KPIs included in Table 5.2 existing benchmark levels exist as part of the Municipality's performance management system. For others, benchmark levels will be developed by the WSA as it develops the detailed design of the required information. In some cases, benchmark levels are not appropriate or may now be set until 6-12 months of data are available.

5.5 Practical implementation

As indicated above, to implement the asset management strategies there are many actions incumbent upon both the WSA and the WSPs.

As Figure 5.1 shows, in many cases the first step will be to set up the systems to capture and store asset data. ZDM is clear that the main data holding system will be MANZI. It plans to capture basic data using two main documentary sources - “map books” and “daysheets”. Monthly reporting as carried out at present will also continue to be a KPI.

Map books will be a printed copy of the current MANZI asset database. These will be distributed to all field operatives, who will be encouraged to mark them up with improved asset location and attribute data. Information on asset condition and performance could also be recorded on these maps. It is difficult to appropriately incentivise this behaviour. Any requirement to mark up the map books could result in a perverse incentive whereby maps are amended simply because a change is required, whether or not they reflect current reality. ZDM plans to reissue the map books on a six or twelve monthly basis, with operatives required to return their previous book in order to receive a new one. This may also be difficult, as staff mark up their own versions and are reluctant to relinquish them. However, ZDM has the energy to pursue this approach and use it to continually improve its asset knowledge.

Daysheets will also provide valuable information. The ZDM has preliminary plans to include the following minimum information on the daysheets;

- Activities carried out;
- Materials used;
- Co-ordinates of repairs; and
- Basic repair information (burst, leak, sewer collapse etc).

Research by United Kingdom Water Industry Research (UKWIR) has shown that the focus on operational cost capture against individual assets has been driven by the “80:20 rule”. Labour, electricity and chemicals make up three of the largest operating costs and are more closely monitored as a result. Other items, such as miscellaneous spares, are of lesser significance and costs are collected in aggregate only. ZDM should be aware of this when designing the daysheets to avoid data overload.

The daysheets will be a step towards activity based costing, which ZDM recognises will be necessary to monitor and compare costs across the organisation to drive efficiencies.

ZDM has also recently requested tenders for an unaccounted for water strategy. This strategy will be rolled out across the organisation, focussing on areas of high unaccounted for water to begin with. Including field testing and data collection, combined with a telemetry strategy and informing a metering strategy, the benefits are intended to include additional information on the following aspects of asset performance and the water balance;

- System pressures;
- Leakage;
- The location of illegal connections;
- Asset renewal requirements;
- Demand information; and
- Asset location and condition.

5.6 Benefits of implementation

In Section 3.2 a summary of current asset management practice at ZDM was made. It concluded that;

ZDM has some knowledge of:

- Levels of service required by customers;
- Future demands for service;
- Its existing assets.

ZDM has yet to:

- Understand asset performance and failure mechanisms;
- Optimise asset lifecycle costs;
- Identify needs for future asset replacement.

The first phases of the proposed asset management strategy will allow the municipality to;

- Define levels of service in a customer charter;
- Influence future water demands through an awareness campaign;
- Improve ZDM's knowledge of the location and attributes of its existing assets;
- Develop a database of asset performance information and failure mechanisms;
- Analyse the data collected to understand the whole life costs of assets, then use this to optimise future asset decisions; and
- Analyse the data collected to assess future asset replacement needs.

6 Implementation programme and proposed PAWS support

6.1 PAWS support

The ZDM Planning team identified the following areas for future PAWS support:

1. Asset management;
2. WSP performance management;
3. Metering strategy; and
4. Customer care.

At present this is viewed as a preliminary list, as the Technical Services Department may also have priorities that could be addressed through the PAWS programme.

The PAWS support request is broad, and covers the following:

General

- Provision of information – reports, examples of best practice and documentation from other water providers.
- Particular information – customer charters, performance indicators, metering strategies, operations and maintenance plans if possible, review of ZDM proposals by other consultants?
- Ongoing review of documents created by ZDM.

Customer care

- Developing/reviewing customer charter
- Review of awareness programme and input into this
- Next steps in SIZA (reporting and link with MANZI)
- Other possible improvements in customer care
- Tariff and billing model

Metering

- Metering strategy – the municipality is in the process of implementing a strategy for unaccounted for water. Building on this, the Municipality will then design a metering strategy. ZDM is looking for support on this over the coming months and a review in October 2009.

Asset and performance management

- Asset management and performance management – review achievements and progress – discuss challenges – decide on next steps including risk based asset management and operation and maintenance plans
- Pre trip report on risk based asset management
- MANZI – assess status of MANZI and next phases

6.2 Implementation plan

Key activities were prioritised for implementation before a further PAWS visit, as set out in Table 6.1.

Activity	Required pre-trip actions by ZDM	Required pre trip actions by PAWS partner(s)
Metering		
Metering strategy	Draft metering strategy in place	Example metering strategies if available
Asset and performance management		
Asset management and performance management	System for data collection, some data & ability to produce reports	Performance indicators used by others & pre trip report on risk based asset management
MANZI – assess status of MANZI and next phases	Interactive, accessible web browser interface up and running	N/A
Customer care		
Developing/reviewing customer charter	Draft charter available	Provide charters from other organisations
Review of awareness programme and input into this	Business plan/proposed framework for awareness programme	Awareness programme documents if available
Next steps in SIZA (reporting and link with MANZI)	Draft next steps identified	N/A
Other possible improvements in customer care	N/A	N/A
Tariff and billing model	N/A	Sample model if possible

Table 6.1 – Implementation Plan

6.3 Preliminary programme

ZDM is clear that it is seeking support over a period of at least 18 to 24 months. The next visit date is currently proposed as the week commencing 19 October 2009, dependent on activity outlined in the two regular (3 monthly) progress summaries due before this date. Any changes that may result from the rollout of a South African national programme of asset management should also be taken into account when confirming the future timescales.

The proposed high level agenda for the next visit week is:

1. Asset management
 - Risk based asset management
2. WSP monitoring and evaluation
3. Metering strategy
4. Customer care

More detail should be provided over the coming months to clarify the required PAWS partner inputs.

Appendix A Data sources used in the assessment

Asset management definitions considered

“systematic and coordinated activities and practices through which an organisation optimally and sustainably manages its assets and asset systems, their associated performance, risks and expenditures over their life cycles for the purpose of achieving its organisational strategic plan”

PAS 55-1: 2008 Asset Management. Part 1: Specification for the for the optimised management of physical assets

“Strategic asset management is the activity that seeks to align the asset base with the organisation’s corporate goals and objectives. It ensures that the land and buildings asset base of an organisation is optimally structured in the best corporate interest of the organisation concerned.”

RICS’s 2008 Public Sector Asset Management Guidelines

Strategic Municipal Asset Management is an approach to develop and maintain municipally owned infrastructure assets to ensure that:

- (i) Asset requirements and asset management strategies are driven by defined service levels and performance standards.
- (ii) Scarce financial resources are properly allocated and managed to optimize investment in infrastructure.
- (iii) A long-term (life-cycle) approach is taken when determining asset operations, maintenance, renewal and development strategies.

Asset management is an evolving process that improves as understanding of asset condition, performance and operational costs improve, in conjunction with improved decision-making processes.

Asset management objectives considered

- Continually improve service delivery to customers
- Attain continuous improvement in maintaining assets
- Ensure capital projects are robust and delivered to plan
- Comply with all statutory requirements.

Watercare Services Limited

- Providing a continuous supply of quality water;
- Dealing effectively with waste water
- Responding to customers’ needs
- Minimising our carbon footprint;
- Having the lowest possible charges;
- Having the right skills to deliver;
- Maintaining investor confidence; and
- Promoting an effective regulatory regime.

Severn Trent Water
Strategic Direction Statement 2008

- Satisfy our customers and deliver affordable services
- Protect and enhance the environment
- Take a sustainable approach to all our activities
- Behave fairly and responsibly

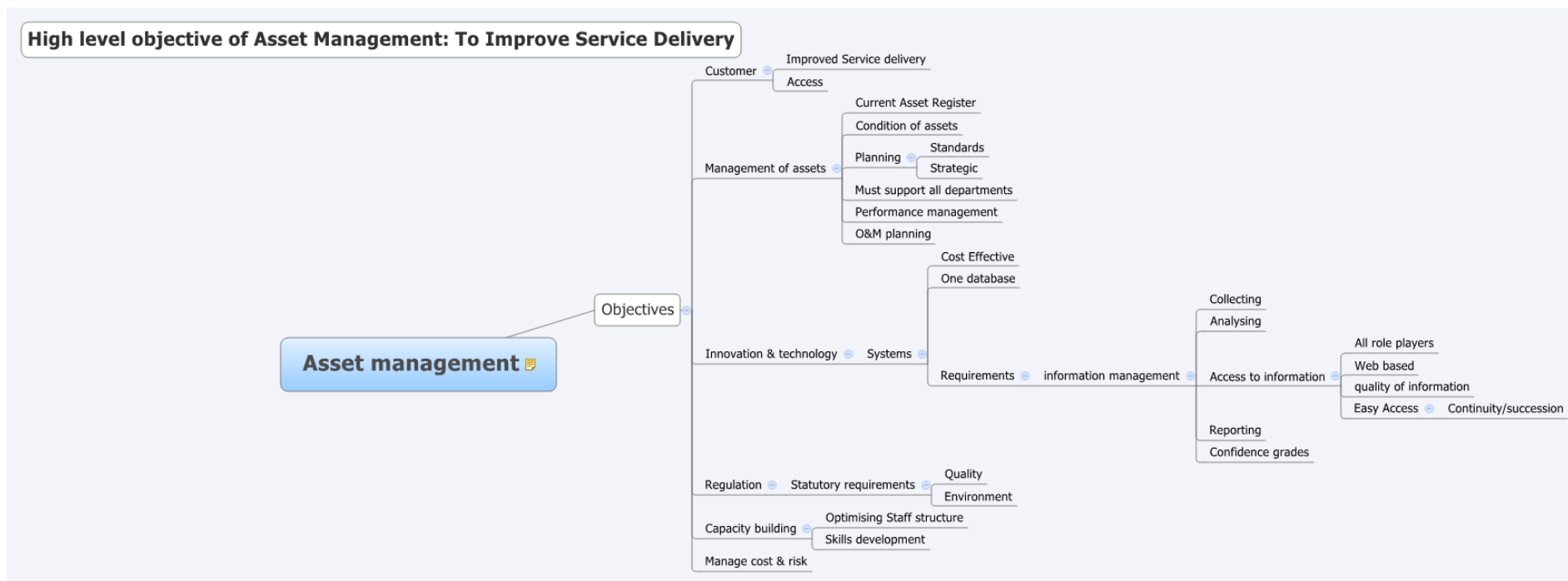
- Contribute to economic development in our region
- Improve the quality of life of the communities that we serve
- Attract and retain high calibre employees
- Be a learning organisation, promoting and embracing innovation

Northumbrian Water Services
Strategic Direction Statement 2008

Water service		Sewerage service	
Infrastructure	Non-infrastructure	Infrastructure	Non-infrastructure
(below ground)	(above ground)	(below ground)	(above ground)
% of properties receiving pressure/flow below reference level - "DG2" at end of year	Water treatment works with determinations containing coliforms ³	Number of properties internally flooded "DG5" due to overloaded sewers	% Sewage treatment works failing numeric consents
% of properties affected by supply interruptions - "DG3", but only the >12 hour time band	Number of possible enforcement actions at water treatment works	Number of incidents of property flooding "DG5" due to sewer collapses	% of Population Equivalent (PE) served by non-compliant works based on look up table (LUT) ⁶
Number of mains bursts ¹	% of water treatment works ⁴ with leaving water turbidity samples' 95 percentile above a threshold of 0.5 Nephelometric Turbidity Unit (NTU).	Number of sewer collapses ⁵	Sub-threshold indicators ⁷ of forecast biochemical oxygen demand (BOD), suspended solids (SS) and ammonia ⁸ compliance.
Water Quality: Iron (100% minus % mean zonal compliance) ²	Percentage of the number of service reservoirs with coliforms detected in more than 5% of tests.	Number of Category 1, 2 and 3 pollution incidents occurring at combined sewer overflows and foul sewers	

Table 0.1 –Serviceability indicators used by Ofwat

Appendix B Documents and diagrams produced during the visit



Note: this diagram was developed in XMind, freeware mind mapping software.

Figure 0.1 – Developing asset management objectives

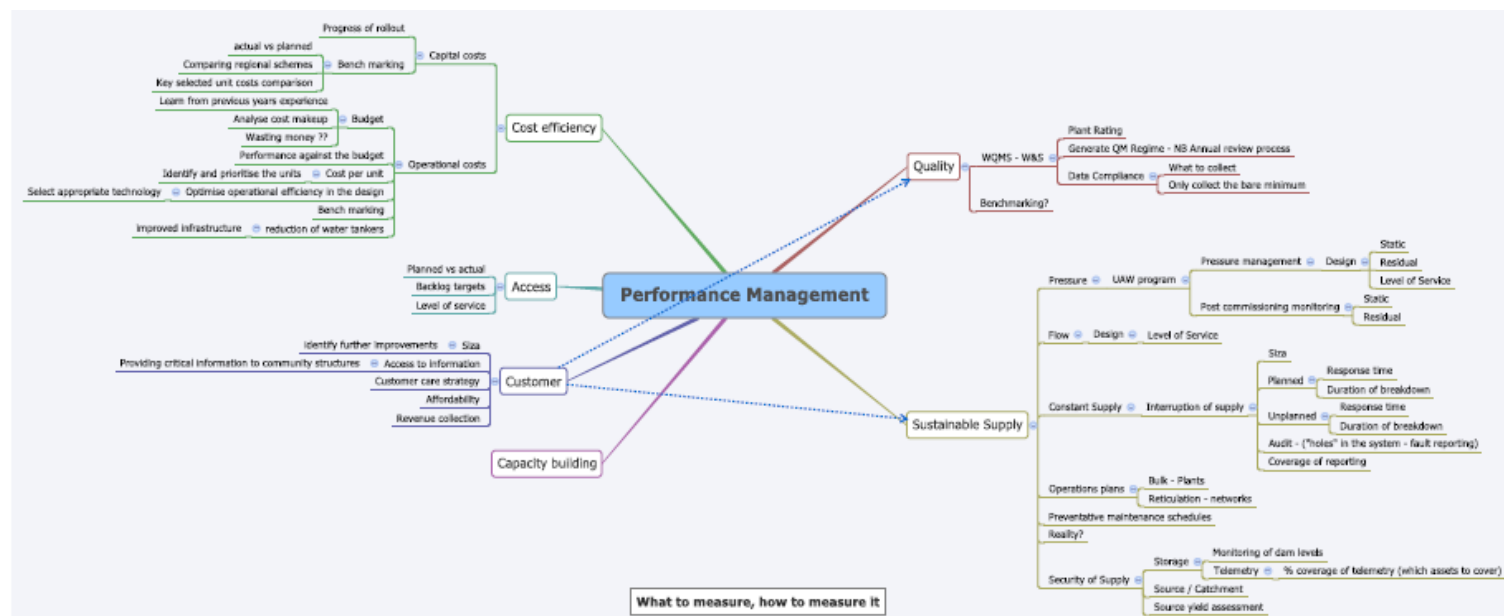


Figure 0.2 – Performance measurement long list

ZDM IAM Framework (Objectives and Strategies): 2009/02/05

	Key themes	Objective	Strategies	Comments		KPI	Measure/Unit	Evidence
1	Manage cost & risk	To optimise cost and manage risk	By implementing appropriate systems to collect, analyse & report on selected information that will inform management decisions in optimising costs and managing risk	Need to track actual capital costs vs planned cost. A graph that will allow us to predict and adjust WSDP	1	That the annual graph on actual vs planned cost in WSDP is updated with actual vs estimated capital cost of water and sewerage	Unit cost/hh	Annual reviewed graph on unit cost of water and sewerage included in WSDP
				Monitor operational cost of W&S in a graph format. (Note: determine which votes to include, e.g. from Fin, CS, etc.)	2	That the annual graph in WSDP on operational cost is updated with actual O&M unit cost of water and sewerage services	Unit cost to produce water and sewerage	Annual graph in WSDP updated with actual O&M unit cost of water and sewerage services
2	Customer	To satisfy our customers continually improve service delivery to customers	By establishing and honouring a customer charter within the context of the overall customer care strategy		3	That a Customer Charter is established	Customer charter in WSDP	Customer charter in reviewed 2009/10 WSDP

ZDM IAM Framework (Objectives and Strategies): 2009/02/05

	Key themes	Objective	Strategies	Comments		KPI	Measure/Unit	Evidence
				How are the expectations in the charter being met (eg response time to complaints, number of unplanned breakages, number of people with access to x, y z LOS, and identify others) Following year: focus on measurement	4	That a monitoring framework for assessing the extent to which the promise to the consumer in the Charter has been achieved, is established	Measuring framework established	Measuring framework in reviewed 2009/10 WSDP
				Awareness campaign, schools, tappie, zappie?		That an awareness programme is established and initiated	Plan for awareness programme	
3	Management of assets	To optimise the performance of the assets	By establishing and maintaining a complete and accurate asset register	Current Asset Register? Ph 1: Asset location; Ph2: Asset attributes (to be annually prioritised)	5	That a high confidence in asset location data (Ph 1) is achieved	Annual survey of information users	Improving annual survey score
					6	That asset attribute data is prioritised each year and high priority data is collected with a high level of confidence (Ph 2a, b, etc)	Priority list completed using sound data collection processes	Improving annual survey score

ZDM IAM Framework (Objectives and Strategies): 2009/02/05

	Key themes	Objective	Strategies	Comments		KPI	Measure/Unit	Evidence
		See XMind on Sustainable supply image	By applying a risk based approach to assessing condition performance new financial, maintenance, replacement requirements	Use risk/performance based approach to determine Capital replacement/refurbishment pgmme; responsiveness; but the condition is that you need to build up a good database. Determine performance and condition indicators to allow risk based approaches to be developed. See Ofwat sheet below. Develop indicators to assist in assessing the refurb/repl needs; Also consider the concept of coverage of reporting in annual review	7	That performance and condition indicators for ZDM assets are in place.	Set of indicators	Set of indicators
			By using planning to effectively manage the asset life cycle	Planning, using indicators in KPI 6 and We have to collect data re the indicators in KPI 6; Must be included in daysheets	8	That a framework for a risk based capital replacement/refurbishment programme is in place, and data is being collected	Framework in place, and data is being collected	Framework in place, and data is beingf collected
			By implementing an UAFW programme	Refer to Mun KPI"s as well, but for yr 1 to do a first order water balance, using Manzi reporting	9	That a first order water balance is completed	First order water balance report	First order water balance report

ZDM IAM Framework (Objectives and Strategies): 2009/02/05

	Key themes	Objective	Strategies	Comments		KPI	Measure/Unit	Evidence
			Performance management	That IAM is included in the Municipality's PMS	10	That IAM is included in the 2009/10 PMS	The 2009/10 PMS document includes IAM	The 2009/10 PMS document includes IAM
				Establish O&M plans! It will have to be prioritised and phased in. WSSA is doing TW's. We need to prioritise the process. The UAFW programme, telemetry and Reg Scheme process, Manzi reporting will indicate needs	11	That a continuously updated and extended O&M schedule is informing O&M actions through Manzi reporting	A live schedule	Alive schedules in minutes of Monthly WSP reporting meetings
4	Innovation & technology	To encourage innovation and embrace technology to become more efficient	By developing systems to collect, analyse and report on information that will optimise management decisions in AM	Manzi: Ph 1 = completed data base presented in an interactive form; Ph 2: tbd	12	That Ph 1 of Manzi is completed	Web access to Mazi activated	Web access enabled
			By establishing appropriate sets of standards	Complete set of standard specs	13	That the ZDM standard specifications are completed	PDF's on the website	PDF's on the website

ZDM IAM Framework (Objectives and Strategies): 2009/02/05

	Key themes	Objective	Strategies	Comments		KPI	Measure/Unit	Evidence
			By establishing a complete and accurate central database where all information is housed, that is easily accessible and is being kept up to date	See KPI 12	14			
			By constantly reviewing available technology	To be considered in planning, O&M	15			
			By making use of the latest and appropriate technology, to develop and implement systems that will optimise asset management and ensure continuity and easy succession	To be considered in planning, O&M	16			
			By ensuring proper forward planning of new assets	IAM to be considered in all forward and detail planning of new assets	17			

ZDM IAM Framework (Objectives and Strategies): 2009/02/05

	Key themes	Objective	Strategies	Comments		KPI	Measure/Unit	Evidence
5	Capacity building (HR)	To have sufficient and capable staff for effective and efficient asset management	By developing a plan to retain current staff, develop skills through mentoring and training, and to recruit new staff.	Constantly identify training needs	18	That a continuously updated training needs schedule is informing the Skills Development Plan	A live schedule	Alive schedule in minutes of Monthly WSP reporting meetings
6	Regulation	To continuously improve on compliance	By ensuring compliance through a WSA compliance checklist	Use the WSA checklist as a compliance checklist, and review annually in the WSDP	19	That the checklist is used to review the chapter on compliance during the annual review of the WSDP	Annual checklist	Annual checklist in WSDP
			By applying and reviewing the ZDM by-laws	Use by-laws to establish and annually review a regulation priority list and implement	20	That regulation priorities are annually reviewed and implemented through the WSDP	Annual list in WSDP	Annual list in WSDP

Table 0.1 – Asset management objectives, strategy and KPIs for ZDM WSA as captured during the PAWS visit

	Key themes	Objective	Strategies	Comments		KPI	Measure	Evidence
1	Manage cost & risk	To optimise cost and manage risk	By implementing appropriate systems to collect, analyse & report on selected information that will inform management decisions in optimising costs and managing risk	(Rand per kiloliter) Monitor operational cost of W&S in a graph format. (Note: determine which votes to include, e.g. from Fin, CS, etc.); the annual graph in WSDP on operational cost is updated with actual O&M unit cost of water and sewerage services: note: discussion on confidence levels, accuracy, coverage, completeness in a"Framework?"	1	That the required daysheets are submitted daily	Unit cost to produce water and sewerage	Annual graph in WSDP updated with actual O&M unit cost of water and sewerage services
2	Management of assets	To optimise the performance of the assets	By establishing and maintaining a complete and accurate asset register	Current Asset Register? Ph 1: Asset location; Ph2: Asset attributes (to be annually prioritised)	2	That book plans are ammended and submitted to WSA annually	Annual survey of information users	Improving annual survey score

	Key themes	Objective	Strategies	Comments		KPI	Measure	Evidence
			By applying a risk based approach to assessing asset condition and performance to review operational, maintenance, refurbishment and replacement requirements	Use risk/performance based approach to determine Capital replacement/refurbishment pgmme; responsiveness; but the condition is that you need to build up a good database. Determine performance and condition indicators to allow risk based approaches to be developed. See Ofwat sheet below. Develop indicators to assist in assessing the refurb/repl needs	3	That the required monthly Manzi reporting is done	Set of indicators	Set of indicators
			By using planning to effecitively manage the asset life cycle	Planning, using indicators in KPI 6 and We have to collect data re the indicators in KPI 6; Must be included in daysheets	1	That the required daysheets are submitted daily	Framework in place, and data is being collected	Framework in place, and data is beingf collected
			Performance management	Establish O&M plans! It will have to be prioritised and phased in. WSSA is doing TW's. We need to prioritise the process. The UAFW programme, telemetry and Reg Scheme process, Manzi reporting will indicate needs	3	That the required monthly Manzi reporting is done	A live schedule	Alive schedules in minutes of Monthly WSP reporting meetings

	Key themes	Objective	Strategies	Comments		KPI	Measure	Evidence
3	Capacity building (HR)	To have sufficient and capable staff for effective and efficient asset management	By developing a plan to retain current staff, develop skills through mentoring and training, and to recruit new staff.	Constantly identify training needs	4	That a continuously updated training needs schedule is informing the Skills Development Plan	A live schedule	Alive schedule in minutes of Monthly WSP reporting meetings
4	Water & Sanitation	To progressively provide a cost effective, reliable water services at a good quality to all potential consumers in the district	To improve access to basic services	Note: This is not just : have you spend your allocation? It is about implementing the planned projects/refurb plans, as per WSDP and refurb /replacement /UAFW plans	5	Percentage of allocated funds spent on specified WSDP /refurbishment projects	As per Mun KPI's	Engineer's certificate indicating no. Of hh and communities served.
			To improve on the quality of water delivered	WSA: split KPI into req'd & actually done; passed & actually done	6	Percentage of required tests conducted (samples) as per approved strategy	As per Mun KPI's	1. Results as certified by an accredited laboratory. 2. WSA written confirmation that the tests were done according to the approved Strategy

	Key themes	Objective	Strategies	Comments		KPI	Measure	Evidence
					7	Percentage of conducted test that passed	As per Mun KPI's	
			To ensure an adequate continuity of the water supply service		8	Average cumulative interruption time during the year of less than 15 days per plant	As per Mun KPI's	Summary of monthly reports to DD on downtime by plant supervisors
					9	Average response time to rectify breakage in service	As per Mun KPI's	Register of breakages as maintained by DD and signed off by HOD monthly
			To implement effective Customer Care		10	Average time of notification to the community prior to planned interruptions	As per Mun KPI's	Isolation approval register maintained by DD
					11	Average time of notification to the community on unplanned interruptions, after incident being reported between 4am & 10pm	As per Mun KPI's	Register, signed by the HOD, of interruptions & notices issued.

Table 0.2 – KPIs for water service providers within ZDM

Appendix C Overview of MANZI

The system contains information about all above and below ground assets. A GIS or similar interface is able to present all data spatially. All information is captured with a co-ordinate and photograph. In future, maintenance, condition and performance information can be captured in the database.

The general asset hierarchy is:

- Regional scheme boundaries
- Scheme footprint – source or multiple sources
- Installations – key or strategic assets. For example, a water treatment works, associated intakes, pump stations, pipelines and storage reservoirs.
- Assets, for example a water treatment works.
- Nodes – for example, dosing unit.
- Components – for example dosing pump.

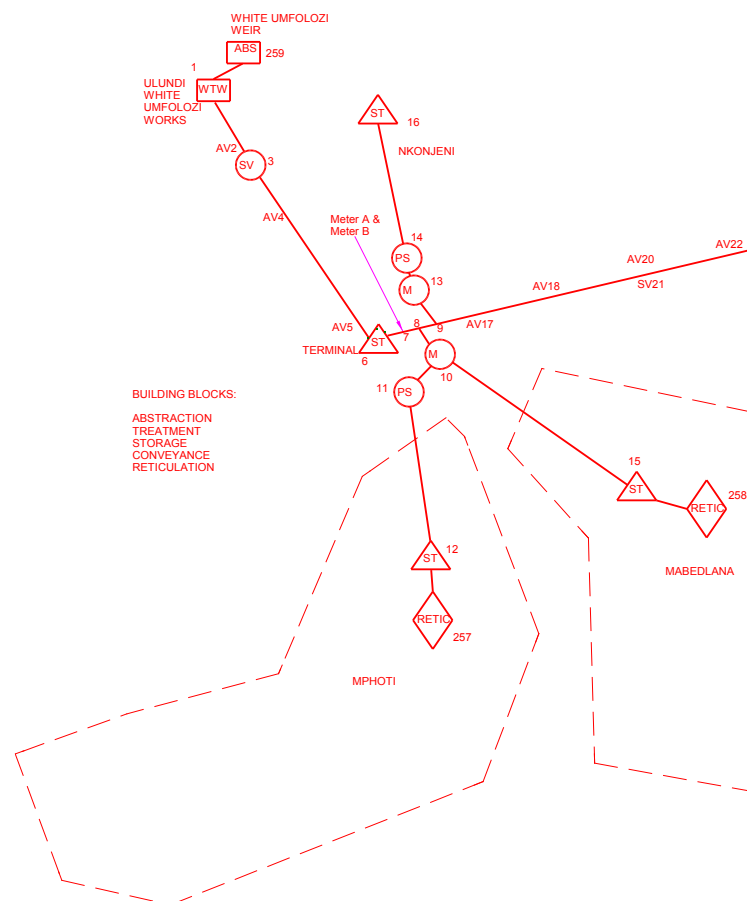


Figure 0.1 – MANZI overview

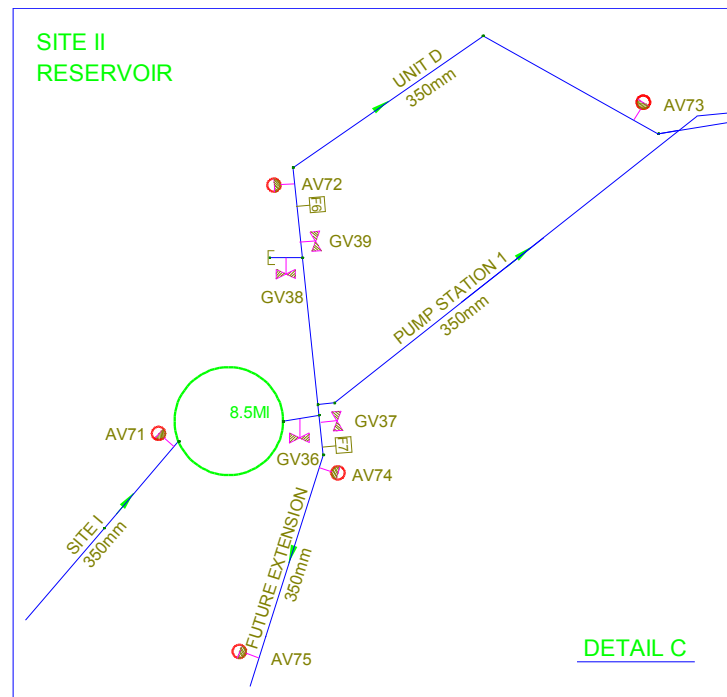


Figure 0.2 – Detail of MANZI

Sch_Node_Com

ComID 4990 Node ID 2007 Component Type Pump Component

Component Pump

PumpID	Comp ID	Com_TypeID	Pump Function	Pump Make
1192	4990	7	Abstraction	Sulzer

Pump Type HZ51/7401 Pump Duty (l/s)

Brief description of controls

Install Date Lifespan (Yrs) Schematic No

0

Component Pump Drive

DriveID	Pump ID	Drive Type	Fuel Tank Capacity (l)
907	1192	Electricity	0

Drive Kw rating	Drive Speed (rpm)	Power Factor	Starting
220	2982		0 telemetry

Average operating h/day	Install Date	Lifespan (Yrs)
8		0

Record: 1 of 1

Component Photo

PhotoID	Comp ID	Image Name	Date
897	4990	Images\Ulundi wTW 02.jpg	

Caption
Ulundi Raw Water Pump

Record: 1 of 1

Record: 1 of 7 (Filtered)

Figure 0.3 – Node data