1. INTRODUCTION

1.1 Background

The Municipal Systems Act (Act No. 32 of 2000) declares that development is the responsibility of local government i.e. municipalities are responsible for improving the quality of life of the residents within their areas of jurisdiction. Meintjies (2001: 29) notes that the delivery of infrastructural services, for example water, is a prerequisite for "improved economic growth, welfare, quality of life and productivity of people". He continues to explain that the supply of "well-planned and managed infrastructure" creates "economic opportunities" (2001: 29). However, the lack or decline of services adversely affects the "efficiency of a region's economy" (Meintjies 2001: 29). Infrastructure therefore has a "dual role in the economic system, viz. an improvement in economic activity and an improvement in living conditions" (Meintjies 2001: 29).

Nevertheless, "the provision of infrastructural services does not necessarily lead to the eradication of poverty" (Meintjies 2001: 30). He explains that the "social and environmental effects, as well as the financial capability of the households" must be evaluated during infrastructure design (2001: 30).

Traditionally, the planning of water services has used supply planning with the product of this process being the master plan. However, water is simply one sector that contributes to development and therefore cannot be considered in isolation. Hence the use of Integrated Development Planning. Integrated Development Planning requires thinking and acting holistically across the conventional sectoral boundaries and the product of this process is the Integrated Development Plan.

To date, regional water services providers and municipalities have been undertaking their long-term planning in isolation. The only time there is an exchange of information is when water demands need to be met in the short-term and to date this focus has been around backlog alleviation. The fact that the long-term planning is being undertaken in isolation is undermining the objective of the Integrated Development Plan i.e. the coordination of development leading to an improvement in the quality of life for all. Presently, forums are being investigated as a useful vehicle to facilitate the co-ordination and integration of planning between the municipalities and the different sector/service providers e.g. Robinson's (2003) case-study of the Zululand District Municipality looked at the strengths and weaknesses of the municipality's service

providers forum and the KwaZulu-Natal Department of Traditional and Local Government Affairs (DTLGA) are using the newly-established IDP Forum as a vehicle for the alignment of sector plans with the IDPs besides the core function of reviewing IDPs.

Forums however fulfil only one aspect of the planning process viz. communication.

1.2 Purpose

The purpose of this study is to identify the linkages between regional water service providers' plans, the municipal Integrated Development Plans (IDPs) and Water Services Development Plans (WSDPs) with the goal of answering the following question:

> How can a regional water service provider's master planning process improve a municipal IDP process and how can a water service provider's master planning process benefit from a municipal IDP process?

Answering the above question puts forward the following hypothesis.

1.3 Hypothesis

The hypothesis put forward is:

> A regional water service provider's master planning process can contribute to the successful accomplishment of an IDP by not only addressing backlogs in the short-term but by also providing sustainable bulk infrastructure that facilitates the proposed economic developments. The major benefits of this synergy for those residing in the area are that investment costs are shared and the costs associated with a lack of knowledge are eliminated as knowledge is shared between the regional water services provider and the municipalities. The collaborative timing in the implementation of projects also means that more services are provided at one particular time. The master planning process interacting with the IDP process refines the projections in terms of where future development will occur thereby reducing the risk of investing in poor locations.

Subsidiary questions that will be answered in testing the above hypothesis include:

- What are the similarities and differences between integrated resource planning and integrated development planning and the processes of a master plan, an IDP, a WSDP and a regional water service provider's business plan?
- What strengths does a regional water service provider's master planning process have over a municipal IDP process?
- How can those residing in the jurisdiction of the regional water service provider benefit from the master planning process interacting with the IDP process? When will these benefits be felt? In terms of the case study, do the areas of development coincide? What does this mean in terms of investment?
- Who should be guiding whom? Who is monitoring the performance? Is there a gap in terms of responsibilities for development at a regional level?

1.4 Methodology

1.4.1 Overall Approach

To answer the research question put forward in Section 1.2, the study looked at the following:

- The products of the water plan, the IDPs and the WSDPs.
- The processes of the water plan, the IDPs and the WSDPs.

Comparing and contrasting the products of the different planning products for the study area, the following facets were investigated:

- The spatial location of investments/developments,
- How implementation was presented and
- Demand projections.

In addition to comparing and contrasting the different planning processes, the level of stakeholder participation in each process and the levels to which the objectives of stakeholder participation were met were evaluated.

The study was divided into activities and each activity consisted of various tasks, which led to the deliverables being met for that activity. Each deliverable provided a portion of the answer to the research question stated in Section 1.2.

1.4.2 Research Methodology

This section specifies the activities that were undertaken, why these activities were required and where in this report the outputs of these activities can be found.

Activity Title: 1. Literature Review

Activity Objectives: To understand the context in which water planning is undertaken and the issues municipalities and water utilities face in implementing good planning.

Tasks:

1.1 Reviewed literature on how infrastructure planning is undertaken.

1.2 Reviewed literature on water demand projections.

1.3 Reviewed literature on the importance of the project life-cycle.

1.4 Undertook an analysis of the term "master plan".

1.5 Reviewed literature on the different water planning methods and elaborated on the IRP process as the literature review identified that the IRP process is the preferred water planning process.

1.6 Selected a sample of 26 water plans (excluding those in the study area) and identified the elements of a water plan.

1.7 Reviewed the legislative requirements for water planning and IDP.

1.8 Reviewed literature on the IDP process.

1.9 Reviewed the South African Water Planning Framework.

1.10 Reviewed literature on stakeholder co-ordination.

1.11 Consolidated the results of the different reviews and amended the hypothesis accordingly.

Outputs: The results of this activity are presented in Chapter 2.

Activity Title: 2. Selection of study area.

Activity Objectives: A representative study area needed to be selected as time and budgetary constraints did not allow the study to be undertaken for the entire KwaZulu-Natal nor for South Africa.

Tasks:

2.1 Selected Umgeni Water as a water board.

2.2 Selected The Msunduzi Municipality, Umgungundlovu District Municipality, Sisonke District Municipality and Ilembe District Municipality as WSAs.

2.3 Selected The KwaDukuza Municipality, uMshwathi Municipality and uMngeni Municipality as municipalities that are not WSAs.

2.4 The selected period for the comparison of the different plans was the 2005/2006 financial year.

2.5 Key characteristics of the study area were identified using a version of

the STEEPLE analysis (12manage 2006; Marketing Teacher Ltd 2006; Mind Tools Ltd 2006; NetMBA.com 2006; Tutor2u Limited 2006; Value Based Management.net 2006; Viljoen 2006; Finlay 2000). This version used the institutional and legal, the natural environment, the social/demographic, the economic, poverty and water services elements for the evaluation.

Outputs: The description of the study area is provided in Chapter 3.

Activity Title: 3. Collation of secondary information.

Activity Objectives: Obtain copies of all the IDPs, WSDPs and water plans applicable to the study area.

Tasks:

3.1 Identified all applicable documents and obtained copies of these documents.

Outputs: The outputs of this activity were used in the following activity viz. Activity 4, Review of Secondary Information.

Activity Title: 4. Review of secondary information.

Activity Objectives: Review all the IDPs, WSDPs and water plans applicable to the study area to provide a description of the products.

Tasks:

4.1 Reviewed all of Umgeni Water's water master plans and provided a summary of these plans.

4.2 Identified the component information in Umgeni Water's master plan and policy statement and corporate business plan using the elements identified in Activity 1.6.

4.3 Compared and contrasted Umgeni Water's master plan, Umgeni Water's policy statement and corporate business plan and the recommended elements for an IRP.

4.4 Identified the status of the IDP products.

4.5 Identified the status of the WSDP products.

4.6 A complete review of the IDP and WSDP products was not undertaken. Only those sections applicable to this study were reviewed.

Outputs: The results of this activity are presented in Section 4.1.

Activity Title: 5. Map of proposed developments.

Activity Objectives: Consolidate the SDFs to determine if the proposed developments are aligned.

Tasks:

5.1 All the SDFs within the sample were evaluated.

5.2 The district SDFs were only mapped as not all the local municipalities had SDF maps.

5.3 The evaluation also identified that the SDFs did not have consistent elements e.g. some did not show land use, others showed desired land use whilst others only existing land use. It was decided to only use the identified nodes and corridors for the assessment.

5.4 The SDFs were consolidated.

5.5 The results were mapped.

5.6 Umgeni Water's proposed infrastructure as shown in its infrastructure master plan was mapped.

5.7 An overlay analysis of Umgeni Water's proposed infrastructure and the consolidated SDF's for the study area was undertaken.

Outputs: The results of this activity are presented in Section 4.2.

Activity Title: 6. Compare the projects.

Activity Objectives: Determine if money is being invested in different projects, which have the same objectives.

Tasks:

6.1 In terms of implementation, each of the plans were compared and contrasted using the following criteria:

- Is there a list of projects provided?
- Are the project start and end dates provided?
- Is a project sequence and schedule provided for the five and twenty year periods?
- Is the financial programme provided?

6.2 The results and the implications of the findings were summarised.

Outputs: The results of this activity are presented in Section 4.3.

Activity Title:	7. Compare and contrast the demand projections.
Activity Objectives:	Determine if all the plans are working with the same future population growth patterns and water demands.
Tasks:	7.1 The methodology used for each of the growth projections was identified. 7.2 The results were compared and contrasted. 7.3 The implications of the differences were summarised.
Outputs:	The results of this activity are presented in Section 4.4.

Activity Title:	8. Stakeholder analysis.
Activity Objectives:	Determine if the level of participation by the different stakeholders are adequate with regard to water planning.
Tasks:	8.1 The different stakeholders and their interests were identified and presented using a stakeholder identification matrix. 8.2 The manner in which the identified stakeholders engage with Umgeni Water was evaluated and presented in a stakeholder participation matrix. 8.3 The importance-influence classification for each of the stakeholders was established using the results of the above two steps.
Outputs:	The results of this activity are presented in Section 4.5.

Activity Title:	9. Compare and contrast the different planning processes.
Activity Objectives:	Determine the commonalities and unique differences in each of the planning processes.
Tasks:	9.1 The IDP and IRP processes were described in Activity 1. 9.2 Umgeni Water's planning process was described and then assessed. 9.3 The IDP and IRP processes were compared and contrasted. Umgeni Water's process was not used in the analysis as it was identified that it follows an IRP process. 9.4 The different planning cycles were evaluated in terms of alignment.
Outputs:	The results of this activity are presented in Chapter 5.

Activity Title:	10. Preparation of final report.
Activity Objectives:	Consolidation of findings and recommendations.
Tasks:	10.1 The results from Activities 1, 2, 4, 5, 6, 7, 8 and 9 were consolidated. 10.2 Draft reports were submitted to the supervisor for comment and the requested amendments made. 10.3 The final report was submitted.
Outputs:	Report explaining how a regional water service provider's IRP planning process can improve a municipal IDP process and how the water service provider's IRP planning process can benefit from the municipal IDP process.

2. SETTING THE SCENE

In terms of understanding the context in which this study is situated, one needs to understand some concepts, how they relate to one another, the influences they have on planning and previous studies undertaken on key elements of this study. This section provides a wide ranging overview of these.

2.1 Key Concepts

Planning:

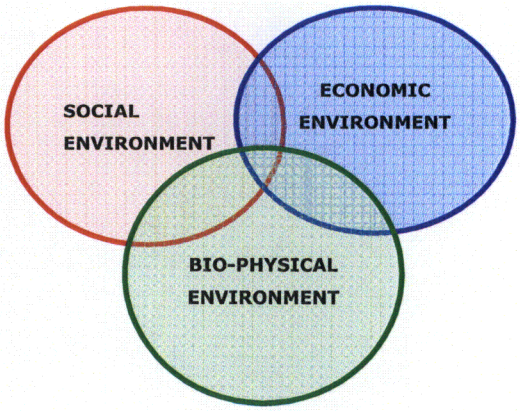
"Planning is the preparation of decisions for action directed at achieving specified goals by desirable means. It may be seen as having two aims, namely (i) improving efficiency in the use and management of RESOURCES, and (ii) improving the quality of material and social ENVIRONMENTS ... As to the means by which goals might be realised, planning always has to operate within certain constraints (financial, political, social), balancing costs against benefits, balancing the good that might accrue to the community as a whole against the fact that there may be a group or groups disadvantaged by a certain course of planned action ..."

(Small and Witherick 1995: 186)

Sustainable Development:

"Development that meets the needs of the present without comprising the ability of future generations to meet their own needs."

(WCED 1988: 43)



Master Plan:

"A detailed plan drawing of some desired or intended future situation (e.g. of a new town, as shown in its completed form)."

(Small and Witherick 1995: 153)

The International Water Services Association (IWSA), now called the International Water Association (IWA) identifies the following objectives of a water master plan:

- Service to customers – service contracts, minimise supply interruption (1 in 5 years or 1 in 12 years), reduce complaints, quality, quantity and pressure.
- Business Activity – Investment priorities and programme competitive tariffs, human resources.
- Renewals – Expenditure of 1% of capital valuation per year on renewals, reduction of leakage, eliminate inappropriate pipe materials (e.g. AC.DI).
- Environmental Protection – ecological balance (water and sewage).

(IWSA 1998)

Physical Planning:

"The allocation of land to specific uses, taking into account both the physical qualities of land on the one hand and economic and social needs on the other."

(Small and Witherick 1995: 184)

Integrated Resource Planning:

"A way of analysing the change in demand and operation of water institutions that evaluates a variety of supply-side and demand-side management measures to determine the optimal way of providing water services" (DWAF 2000: 11).

"Integrated resource planning (IRP) or integrated least-cost planning, is a process for determining the appropriate mix of demand-side and supply-side resources that are expected to provide long-term, reliable service to users at the lowest reliable total cost and that, which maximises benefits to society and minimises the negative impact to the

environment" (DWAF 2000: 11).

"There are four differences between IRP and the current planning practices in water institutions:

- Integration of planning to achieve the best results to society (end consumer). Current planning practices focus on the best-perceived solution from the institutional perspective.
- Evaluation criteria must be comprehensive and include social, economic and environmental (i.e. bio-physical).
- Water demand-side management measures are considered as an alternative resource option and not a separate campaign.
- Evaluation criteria must be looked at from the life cycle of the different measures and not just on implementation."

(DWAF 2000: 12)

"IRP and Integrated Water Resources Management (IWRM) cannot be used interchangeably. IWRM focuses on the integration of all water resources within a particular catchment whereas IRP is a broader principle where one of the key objectives can be to achieve sustainable water services. IRP focuses on the integration of a number of criteria including water resources, environmental, financial and social. IRP considers the possibility of achieving the desired outcome by integrating various options in reconciling water resource demands and requires the planning integration of the entire water supply chain" (DWAF 2000: 12).

Integrated Development Planning:

"Integrated Development Planning is a process through which municipalities prepare a strategic development plan for a five year period and the Integrated Development Plan (IDP) is a product of this planning process. The IDP is a principal strategic planning instrument, which guides and informs all planning, budgeting, management and decision-making in a

municipality."

(DPLG 2004: 4)

Refer to Municipal Systems Act (32 of 2000).

Water Services Development Plan (WSDP):

"A WSDP is a plan to progressively ensure efficient, affordable, economical and sustainable access to water services. It is the product of the water services development planning process and it is a sectoral plan, which deals with socio-economic, technical, financial, institutional and environmental issues as they pertain to water services. It also functions as a management tool in ensuring the provision of total, effective and sustainable water services. The WSDP is a critical part of planning for integrated sustainable development where socio-economic, environmental and institutional components are addressed. Hence the WSDP bridges the gap between the current situation and the desired future situation."

(DWAF 2001: 7)

Refer to Water Services Act (108 of 1997).

Water Board:

"A water services provider, which is an organ of state and whose primary function is that of bulk water services provider."

(DWAF 2003: 68)

Regional Water Services Provider:

"A water services provider that operates a regional scheme. A regional scheme is a water services scheme that crosses water services authority boundaries."

(DWAF 2003: 67)

Water Services Authority:

"Any municipality that has the executive authority to provide water services within its area of jurisdiction in terms of the Municipal Structures Act or the ministerial authorisations made in terms of this Act."

(DWAF 2003: 68)

Process: The Oxford Dictionary (Wehmeier 2001: 928) defines a process as "a series of things that are done in order to achieve a particular result".

Product: "A thing produced during a process" (Wehmeier 2001: 929).

Project: The Project Management Institute (PMI 2004: 5) defines a project as "a temporary endeavour undertaken to create a unique product, service or result". The Project Management Institute continues to explain the characteristics of a project as follows:

- "Temporary means that every project has a definite beginning and a definite end. The end is reached when the project's objectives have been achieved, or it becomes clear that the project objectives will not or cannot be met, or the need for the project no longer exists and the project is terminated...In addition, temporary does not generally apply to the product, service or result created by the project. Most projects are undertaken to create a lasting outcome.
- A project creates unique deliverables, which are products, services or results...Uniqueness is an important characteristic of project deliverables. *It is this and the above characteristics which create the difference between projects and operations – operations are ongoing and repetitive while projects are temporary and unique.* The purpose of a project is to attain its objective and then terminate. Conversely, the objective of an ongoing operation is to sustain the business. Projects are different because the project concludes when its specific objectives have been attained, while operations adopt a new set of objectives and the work continues.
- Progressive elaboration is a characteristic of projects that accompanies the concepts of temporary and unique. Progressive elaboration means developing in

> steps and continuing by increments. Progressive elaboration should not be confused with scope creep. Progressive elaboration of a project's specifications needs to be carefully coordinated with proper project scope definition".
>
> (PMI 2004: 5 – 7)

Strategy: Köster (1996: 44) defines strategy as "that **system of logic** which will give the **highest likelihood or probability** of achieving the defined goals/objectives while overcoming and bypassing problems and constraints". He continues to explain that:

> If the **goals/objectives/mission** are the **ultimate destination**, the minimisation of arrival time and overall cost of the "journey"; then **strategy** is selecting the most feasible road map and mode of travel. **Planning** is the implementation of strategy to reach the destination by choice of vehicle, specific routes, speed of travel, cost and risk.
>
> (Köster 1996: 45)

Project Management: "The planning, organising, directing and controlling of company resources for a relatively short-term objective that has been established to complete specific goals and objectives. Furthermore, project management utilises the systems approach to management by having functional personnel (the vertical hierarchy) assigned to a specific project (the horizontal hierarchy)."

(Kerzner 2001: 4)

Business Plan: "A document describing the current activities of a business, setting out its aims and objectives and how they are to be achieved over a set period of time. A business plan may cover the activities of an organisation or a group of companies, or it may deal with a single department within the organisation. In the former case, it is sometimes referred to as a corporate plan. The sections of the a business plan usually include a market analysis describing the target

> market, customers and competitors, an operations plan describing how products and services will be developed and produced and a financial section providing profit, budget and cash flow forecasts, annual accounts and financial requirements. Businesses may use a business plan internally as a framework for implementing strategy and improving performance or externally to attract investment or raise capital for development plans. A business plan may form part of the overall planning process, or corporate planning, within an organisation and be used for the implementation of corporate strategy."
>
> (Chartered Management Institute 2004: 60 – 61)

2.2 Conceptual Framework

The purpose of this section is to provide an overview of how the concepts of master planning, strategic planning and an implementation-focus are linked.

Master planning is traditionally associated with Rational Comprehensive Planning theory. However in practice, the realities of planning dictate that decisions need to be made within specified time frames or else no action will ever occur and this, in developing countries can become a very expensive process. Lindblom's critique of Rational Comprehensive Planning highlighted this in which he explained why planning practioners use incremental approaches instead of the comprehensive approach as indicated by the Rational Comprehensive Planning theory:

> Although such an approach can be described (i.e. the Rational Comprehensive Planning Process), it cannot be practiced except for relatively simple problems and even then only in a somewhat modified form. It assumes intellectual capacities and sources of information that people simply do not possess, and it is even more absurd as an approach to policy when the time and money that can be allocated to a policy problem is limited, as it always the case.
>
> (Lindblom 1959: 289)

The advantage of the Rational Comprehensive Planning model is that is offers decision rules that are logical and clear and that allow planners to study alternatives and consequences (Sandercock 1998: 88). This strength is utilised in the master planning

process but the reality is that water planners are not totally objective because as Davidoff states:

> Appropriate planning action cannot be prescribed from a position of value neutrality, for prescriptions are based on desired objectives.
>
> (Davidoff 1965: 306)

The danger of the consolidation of desired objectives and the limitation on time and money allocated to the process is that one runs the risk of what Peattie describes as the 'manipulator model' which she defines as one in which "professionals set the agenda, conceptualised the problem and defined the terms in which a solution to the problem would be sought" (Peattie 1968 cited by Sandercock 1998: 90). She identified that "the issues raised were likely to be those that the professionals were most comfortable with, rather than those, which were highest on the community's list" (Peattie 1968 cited by Sandercock 1998: 90). The Advocacy Model initially sought to avoid this (the 'manipulator model' was identified as part of the critique on the Advocacy Model) in which one of its aims was that the planning process must include the participation of citizens in the process. Davidoff explained this as follows:

> "Inclusion" means not only permitting citizens to be heard. It also means allowing them to become well informed about the underlying reasons for planning proposals, and to respond to these in the technical language of professional planners.
>
> (Davidoff 1965: 306)

Currently, it is only the WSA's which liaise directly with the community. Water boards depend on the WSA to represent the views of the community and only interact directly when there are EIAs and when invited to attend public participation forums.

The overall approach of water planners can be said to be that of the Equity Planning Model, which has as its foundation the Advocacy Model, which in turn has been built up on the Rational Comprehensive Model. Krumholz explains that "equity planners are those who consciously seek to redistribute power, resources or participation away from local elites and toward poor and working class city residents" (Krumholz 1990 cited by Sandercock 1998: 93). Krumholz emphasises "the importance of talk and sees the planner as a communicator who reformulates problems to shape public attention to issues, which planners see as important" (Krumholz 1990 cited by Sandercock 1998:

94). This is important for when planning water resources at a regional scale with impacts at the local scale, local communities may fail to see the bigger picture and the importance of the development to the broader community. Hence it becomes important to communicate the water development plan so that it becomes important to the community. The importance of this approach is that it works both ways for although DWAF is responsible for the water resources development, in implementing it; they may fail to take into consideration local conditions and the importance thereof. Hence the equity planner may be able to guide DWAF in terms of what is important at the local level.

The evolution of planning from a comprehensive approach to that of equity planning attempted to address the criticism of a lack of participation by those planning was supposed to assist. However, planning was still unsuccessful in terms of implementation i.e. those planning sought to assist still did not benefit. Planning then turned to the corporate world to assist in implementation.

Strategic planning originated in the 1970s in the private sector when "long-range planning", "new venture management", "planning, programming, budgeting" and "business policy" were combined and there was an increased importance to be "externally oriented" i.e. there was prominence placed on "environmental forecasting and external considerations in formulating and implementing plans" (Pearce and Robinson 2005: 3; Dash 2006: website; Kaufman and Jacobs 1987: 325). 12manage explains that strategic planning:

> ...consists of the process of developing and implementing activities and plans to reach the goals, purpose and objectives of the organisation within the strategic context (environment).
>
> It is more or a less a synonym for "strategy" but the term "planning" has a deliberate meaning attached to it, while "strategy" can accommodate both the emergent, flexible, dynamic vision to strategy formation as well as the traditional, deliberate, intended, military, planned form.
>
> (12manage 2006: website)

Pearce and Robinson (2005: 3) identify that strategic management is composed of nine important tasks:

1. Formulate the company's mission, including broad statements about its purpose, philosophy and goals.
2. Conduct an analysis that reflects the company's internal conditions and capabilities.
3. Assess the company's external environment, including both the competitive and general contextual factors.
4. Analyse the company's options by matching its resources with the external environment.
5. Identify the most desirable options by evaluating each option in light of the company's mission.
6. Select a set of long-term objectives and grand strategies that will achieve the most desirable options.
7. Develop annual objectives and short-term strategies that are compatible with the selected set of long-term objectives and grand strategies.
8. Implement the strategic choices by means of budgeted resource allocations in which the matching of tasks, people, structures, technologies and reward systems is emphasised.
9. Evaluate the success of the strategic process as an input for future decision making.

(Pearce and Robinson 2005: 3)

Adapting the above for strategic planning at a community level, Sorkin, Ferris and Hudak (1984 cited by Kaufman and Jacobs 1987: 325 – 326) identified the following steps:

1. Scan the environment.
2. Select key issues.
3. Set mission statements or broad goals.
4. Undertake external and internal analyses.
5. Develop goals, objectives and strategies with respect to each issue.
6. Develop an implementation plan to carry out strategic actions.
7. Monitor, update and scan.

(Sorkin, Ferris and Hudak 1984 cited by Kaufman and Jacobs 1987: 325 – 326)

Kaufman and Jacobs (1987: 327) identified the following differences between corporate strategic planning and "conventional public planning":

- Corporate strategic planning is oriented more toward action, results and implementation.
- It promotes broader and more diverse participation in the planning process.
- It places more emphasis on understanding the community in its external context, determining the opportunities and threats to a community via an environmental scan.
- It embraces competitive behaviour on the part of communities.
- It emphasises assessing a community's strengths and weaknesses in the context of opportunities and threats.

(Kaufman and Jacobs 1987: 327)

DPLG and GTZ (2002: 9) indicate that the strategic planning process includes:

- **Prioritising** on a few crucial issues rather than dealing in a comprehensive manner with all issues.
- **Focussing** analysis rather than wasting resources for collection of useless information.
- **Addressing root causes** of problems, rather than only symptoms.
- Taking given **resources and relevant context** into account.
- **Identifying** and **analysing alternative strategic options** (asking the "How-question") rather than going for preconceived solutions.

(DPLG and GTZ 2002: 9)

The key groups and variables of planning, differentiating generally between strategic and operational planning are summarised in Figure 2.1 (Dale 2003: 59).

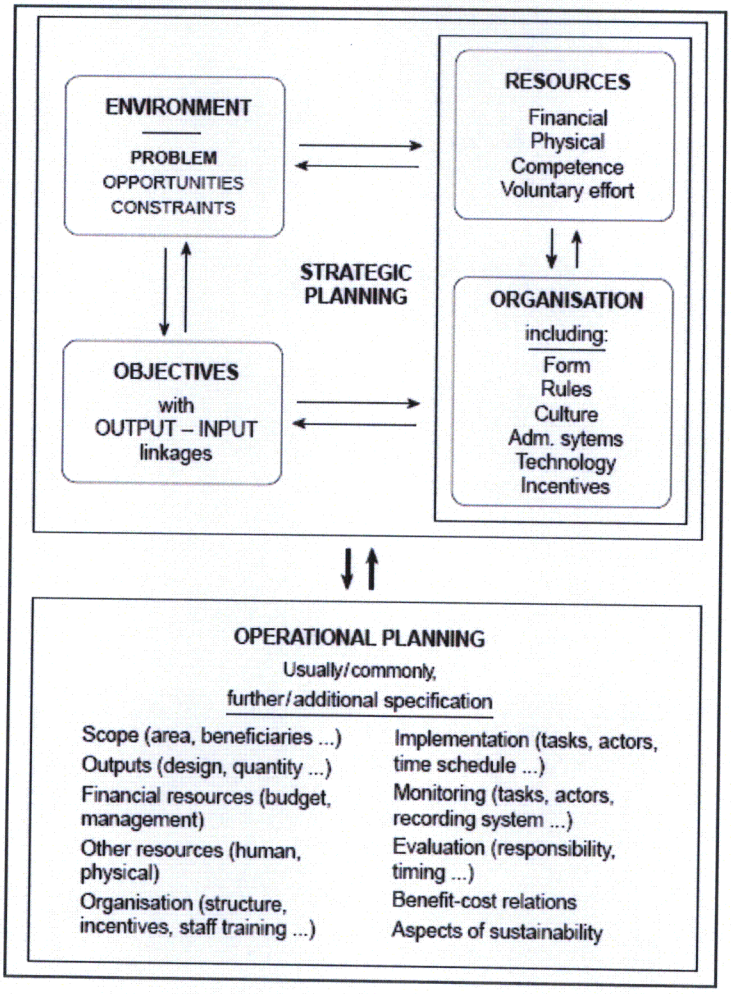


Figure 2.1 Key variables of strategic and operational planning (Dale 2003: 59).

However, although "the solution may be clear with the strategic planning approach, implementation does not always follow the same route" (Pearce and Robinson 2005: 241) and "successful implementation still continues to elude those practising strategic planning" (Irons 1991: 3). Irons et al identified six broad factors, which have an impact on implementation:

- Communication.
- The Human Factor.
- Organisation Change.
- Involvement.
- Realism and Culture.
- Resources.

(Irons 1991: 3 – 5)

Noble states that "well-formulated strategies only produce superior performance for the firm when they are successfully implemented (cf. Bonoma, 1984)" (Noble 2000: 14). He has identified that relatively little research has been undertaken on the importance of the implementation process and that a possible reason for this is that "some strategists assume that shrewd strategy formulation is the only necessary elements for strategic success" and that "implementation is often viewed as a fairly mechanistic control function" i.e. "implementation is treated by some managers and many scholars as a strategic afterthought" (Noble 2000: 14). Day and Wensley (1983) indicate that

> Many of the models of strategic management ... tend to assume too simple a link between the development of strategic direction and its actual implementation via the allocation of resources. In practice, ... the actual process of resource allocation often incorporates a number of implicit but critical strategic moves (p. 86).
>
> (cited by Noble 2000: 14)

One tool used to assist successful implementation is monitoring and evaluation. The purpose of monitoring and evaluation is to determine if one will succeed in achieving one's goal and if there are problems in terms of achieving the goal, to implement corrective action before nothing can be done and the time and money spent in trying to achieve the particular goal is wasted.

Another tool at the strategic planning level (Figure 2.1) is that of strategic controls. Pearce and Robinson (2005: 366) define a strategic control as:

> ...concerned with tracking a strategy as it is being implemented, detecting problems or changes in its underlying premises and making necessary adjustments. In contrast to post-action control, strategic control is concerned with guiding action on behalf of the strategy as that action is taking place and when the end result is still several years off.
>
> (Pearce and Robinson 2005: 366)

There are four types of strategic control, which are summarised in Figure 2.2 (Pearce and Robinson 2005: 366):

- **Premise control** is designed to check systematically and continuously whether the premises on which the strategy is based is still valid.

- **Special alert control** is the thorough and often rapid, reconsideration of the firm's strategy because of a sudden, unexpected event.
- **Strategic surveillance** is designed to monitor a broad range of events inside and outside the firm that are likely to affect the course of its strategy.
- **Implementation control** is designed to assess whether the overall strategy should be changed in light of the results associated with the incremental actions that implement the overall strategy. The two basic types of implementation control are monitoring strategic thrusts and milestone reviews.

(Pearce and Robinson 2005: 366 – 369)

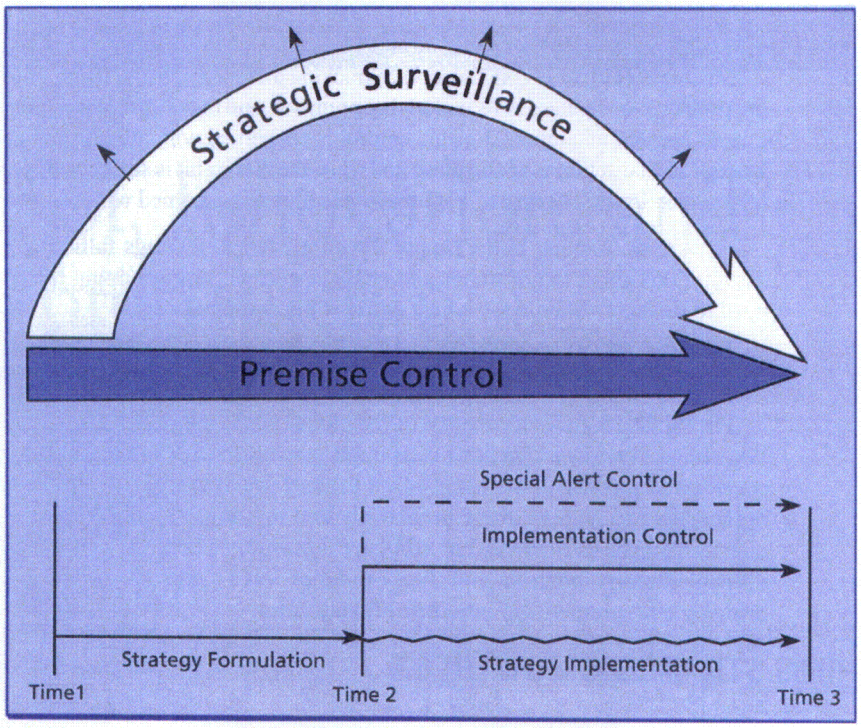


Figure 2.2 Four types of strategic control (Pearce and Robinson 2005: 367).

Budgeting, scheduling and monitoring key success factors are important means of controlling strategy implementation at the implementation level (Pearce and Robinson 2000: 454). Operational control systems identify the performance standards associated with allocation and use of the organisation's financial, physical and human resources in pursuit of its strategy (Pearce and Robinson 2000: 462). Pearce and Robinson define "control" as the process of obtaining timely information on deviations from the identified performance standards, determining the cause of the deviations and taking corrective action (Pearce and Robinson 2000: 454). The primary means of operational control are

budgets, schedules and key success factors. Operational control systems require systematic evaluation of performance against predetermined standards or targets. Crucial at this point is the identification and evaluation of performance deviations, with careful attention paid to determining the underlying reasons for and strategic implications of observed deviations before the organisation's management reacts i.e. before time and money is spent unnecessarily (Pearce and Robinson 2000: 462).

The implementation of strategies is undertaken via projects which address the six broad factors identified by Irons et al. The Project Management Institute (PMI 2004: 7) states that projects are "a means of arranging tasks that cannot be undertaken within the organisation's regular operational limits and therefore, are often used as a way of attaining an organisation's strategic plan". They continue to explain that "projects are usually approved as an outcome of one or more of the following strategic considerations":

- A market demand.
- An organisational need.
- A customer request.
- A technological advance.
- A legal requirement.

(PMI 2004: 7)

Burke (2003: 4) identifies that "many organisations are changing in nature as more of them are accomplishing their business through projects" and that the "management-by-projects" approach promotes:

- Organisation flexibility.
- Decentralised management responsibility.
- Holistic view of problems.
- Goal-orientated problem solution process.

(Burke 2003: 4)

Project management exists in a "larger environment that includes programme management, portfolio management and project management office" (PMI 2004: 16). Generally, there is a "hierarchy of strategic plan, portfolio, programme, project and subproject, in which a programme consisting of several associated projects will

contribute to the achievement of a strategic plan" (PMI 2004: 16). PMI (2004: 16 – 17) defines these terms as follows:

- "**Programmes and Programme Management:** A programme is a group of related projects managed in a co-ordinated way to obtain benefits and control not available from managing them individually. Programmes may include elements of related work outside the scope of the discrete projects in the programme. Programmes also involve a series of repetitive or cyclical undertakings e.g. utilities often speak of an annual "construction programme", series of projects built on previous efforts. In contrast with project management, programme management is the centralised, co-ordinated management of a group of projects to achieve the programme's strategic objectives and benefits."
- "**Portfolios and Portfolio Management:** A portfolio is a collection of projects or programmes and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives. The projects or programmes in the portfolio may not necessarily be interdependent or directly related. Organisations manage their portfolios based on specific goals. One goal of portfolio management is to maximise the value of the portfolio by careful examination of candidate projects and programmes for inclusion in the portfolio and the timely exclusion of projects not meeting the portfolio's strategic objectives. Other goals are to balance the portfolio among incremental and radical investments and for efficient use of resources."
- "**Sub-projects:** Projects are frequently divided into more manageable components or subprojects, although the individual subprojects can be referred to as projects and managed as such."
- "**Project Management Office:** A project management office (PMO) is an organisational unit to centralise and co-ordinate the management of projects under its domain. A PMO can also be referred to as a "programme management office", "project office", or "programme office". A PMO oversees the managements of projects, programmes or a combination of both."

(PMI 2004: 16 – 17)

Friend and Hickling (1997: 303) indicate that the "design of any major project involves planning some progression of activities extending from its beginning to its intended end date, related in some way to the passage of time". They continue to say that "the purpose of this is to enable all those involved to keep track of what is going on at any time" (1997: 303). They summarise the required activities in the acronym **ISCRA**:

I	Identifying the Issues
S	Setting the Structure
C	Confirming the Concept
R	Reviewing the Recommendations
A	Approving any Amendments

(Friend & Hickling 1997: 303)

Köster's presentation of these activities are shown in Figure 2.3.

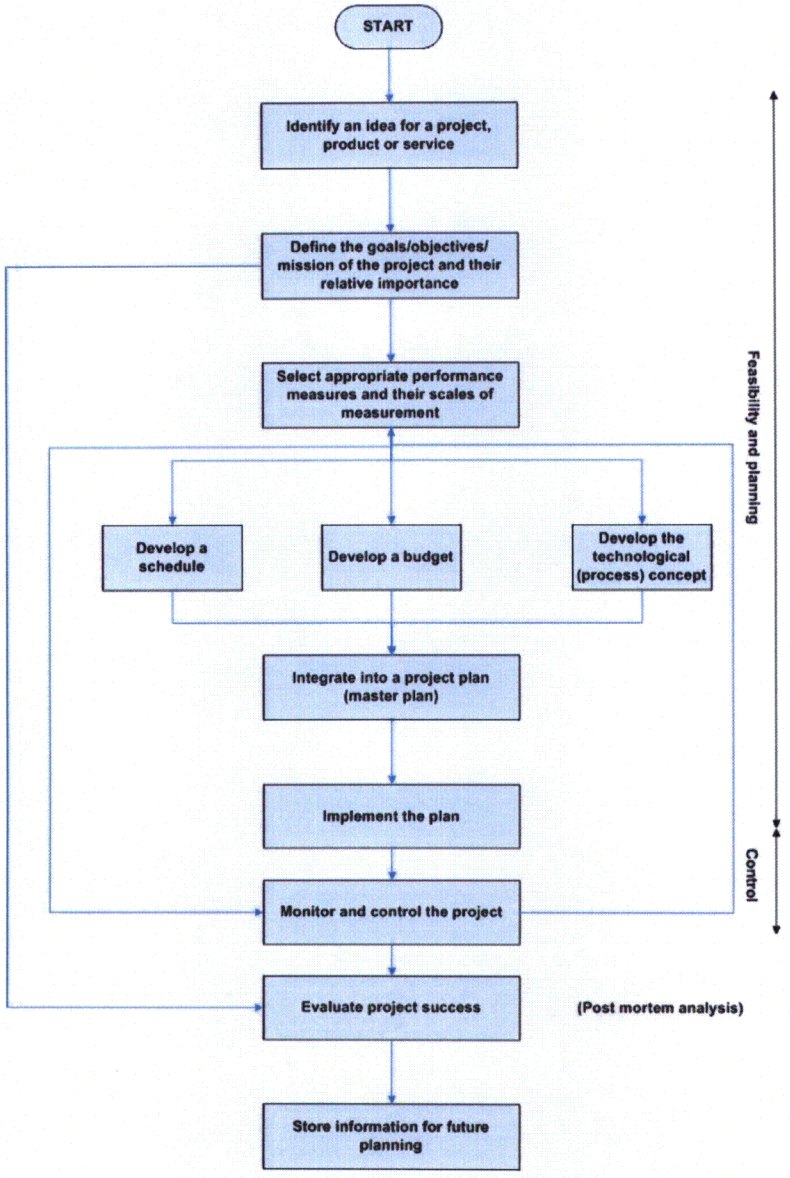


Figure 2.3 Major processes in project management (Köster 1996: 9).

In a project management context, another definition of a master plan is shown in Figure 2.3 i.e. a master plan can be said to be a project plan.

A review on planning case studies has demonstrated that projects implemented successfully have used an action-oriented approach e.g. Denmark's Urban Traffic Project (Flyvbjerg 2002) and the Conservation Plan for the Cape Lowlands Renosterveld (von Hase, Rouget, Maze & Helme 2003). Finch (2001: 109) explains action-oriented planning by first saying:

> that a plan that is drawn up to help manage a business must result in actions. If nothing is done as a result of the plan then it is of no use and the time devoted to producing it has been wasted. It should not, therefore, just map out broad strategies and objectives.
>
> (Finch 2001: 109)

Action-oriented or action-centred planning "emphasises systems and processes of planning rather than what has been referred to as substantive or subject matter" (Faludi 1984, 1998; Dale 2002 cited by Dale 2003: 58). A system can be defined as:

> A group of elements, either human or nonhuman, that is organised and arranged in such a way that the elements can act as a whole toward achieving some common goal, objective or end.
>
> (Kerzner 2001: 70)

and that the systems approach:

- Forces review of the interrelationship of the various subsystems.
- Is a dynamic process that integrates all activities into a meaningful total system.
- Systematically assembles and matches the parts of the system into a unified whole.
- Seeks an optimal solution or strategy in solving a problem.

(Kerzner 2001: 86)

The systems analysis process, as shown in Figure 2.4 can be explained as follows:

> ...begins with systematic examination and comparison of those alternative actions that are related to the accomplishment of the desired objective. The alternatives are then compared on the basis of the resource cost and associated benefits. The inputs from the constraints and limitations identify the explicit consideration of the uncertainty variables. The loop is then completed using feedback in order to determine how compatible each alternative is with the objectives...
>
> (Kerzner 2001: 86)

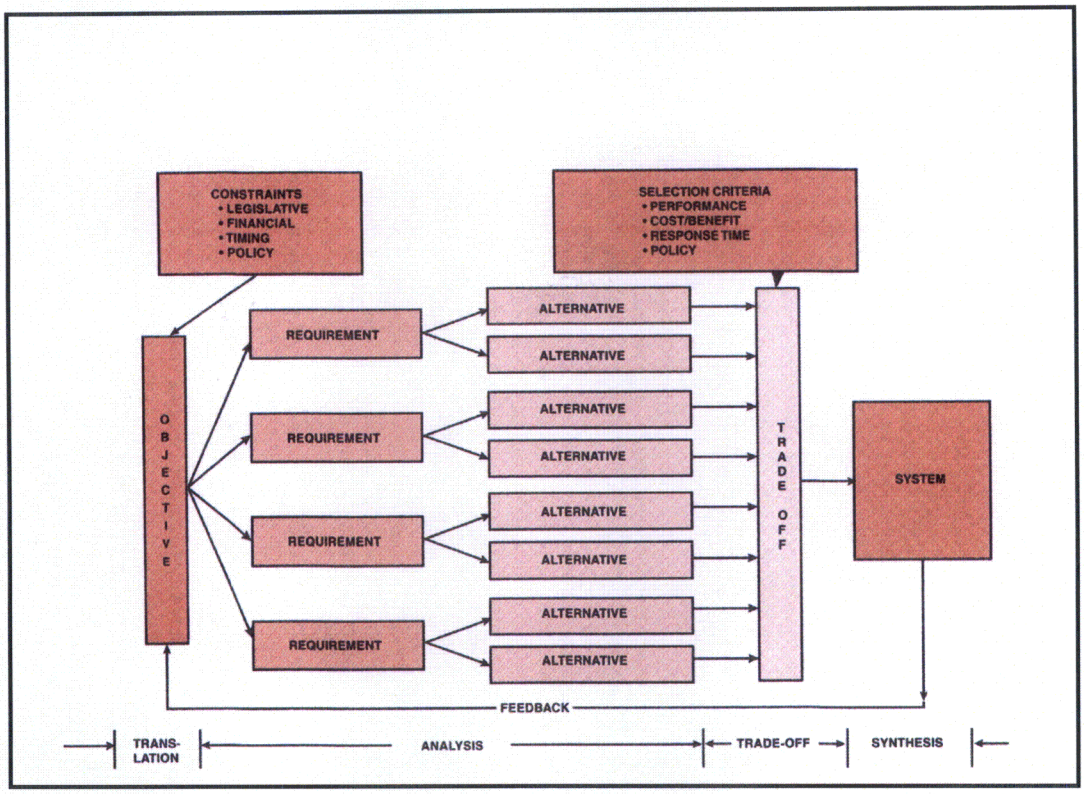


Figure 2.4 The systems approach (Kerzner 2001: 88).

Kerzner (2001: 86) asserts that "systems thinking is vital for the success of a project". He (2001: 86) explains that "project management systems strategically view, question and analyse project needs for alternative non-technical as well as technical solutions". He continues to say that the "ability to analyse the total project, rather than individual parts, is the first prerequisite for successful project management".

Finch identifies four disciplines that lead to useful plans (2001: 109):

- Establish goals and strategies;
- Involve staff who must carry out the plan and win their commitment to the plan;
- Have clear actions specified and responsibilities defined and
- Review progress and be prepared to amend the plan or to deal with people who are not meeting their objectives.

(Finch 2001: 109)

He states that:

> ...the outcome of this exercise must be a written document that sets goals for a business or activity and states what must be done to achieve those goals or targets. Ideally it will also state who must do what and by when. It may be that the process of producing the plan will be in two or more parts; after setting the broad objectives and strategy it may need a second phase to define detail and to specify precise actions.
>
> (Finch 2001: 109 –110)

Two keys to action-oriented planning is that (Finch 2001: 110):

- The actions must be specific and measurable.
- The review must result in actions.

Finch identifies the result of the review as:

- Finding out why actions have not been taken.
- Doing things to ensure they are done in a timely manner.
- Setting revised targets, actions and timing.
- Revise the plan itself if appropriate.

(Finch 2001: 110)

It is noted that there are few differences between what is termed "action-oriented planning" and the tasks performed in using a project management approach. A project management approach utilises the planning and control cycle for the successful integration between the planning and implementation phases (Burke 2003; PMI 2004). The planning process comprises of the following steps:

- Project charter.
- Feasibility study.
- Scope management.
- Build method.
- Execution strategy.
- Work Breakdown Structure (WBS).
- Organisation Breakdown Structure (OBS).
- Critical Path Method (CPM).
- Schedule bar-chart.
- Procurement schedule.
- Resource histogram.
- Budgets and project cash-flow.
- Communication plan.
- Project quality plan.
- Risk management plan.
- Baseline plan.

(Burke 2003; PMI 2004)

The steps performed in the project control cycle are:

- Work authorisation.
- Expedite.
- Tracking and monitoring progress.
- Change control.
- Evaluation and forecasting.
- Problem-solving.
- Decision-making.
- Revise baseline plan.

(Burke 2003; PMI 2004)

An important component of the project management approach is the WBS which may be defined as:

> ...a system-oriented breakdown of all work activities required for the execution of a project. The WBS is a *task inventory* which forms a *consolidated management framework* used to:

- Define all work tasks needed for accomplishing the project.
- Assign responsibility for performing each task.
- Plan the cost, time and other resources required for each task.
- Measure the cost, schedule and technical performance whilst performing each task.
- Report and summarise progress of each task separately and of the entire project.

(Sparrius unknown date cited by Köster 1996: 60)

Sparrius (unknown date cited by Köster 1996: 60) stresses that the WBS is "action oriented" i.e. each WBS task must start with a verb to "clearly define the activity to be accomplished".

The IDP Guide Packs use the term "implementation-oriented approach" and explain that this approach determines that:

- The *project proposals* have to be rather concrete and specific in respect of quantitative targets, quality, timing, location, costs and responsible implementing agencies. This is required in order to provide the necessary information for the business planning of envisaged implementing agencies and for fulfilling approval requirements of potential financing agencies.
- The plan has to be checked for its *compliance with the financial resource framework* and with the available institutional capacities.
- There has to be a close link between the planning and the budgeting process.
- Those in charge of managing the implementation process have to play a key role in the *planning process* in order to ensure realism of the plans and to promote their buy-in.
- There has to be sufficient *consensus* among potential users, affected groups and other interested stakeholders on the planned projects to avoid delay of implementation resulting from conflicts. This means, that concerned groups have to be involved in the project designing process.

(DPLG and GTZ 2002: 10)

The above points are common to good project management practices and therefore for this study, the terms "action-oriented" and "implementation-oriented" will be not be regarded as something different from common project management practices.

This section has provided an overview of the concepts and practices that influence the manner in which water planning and integrated development planning are undertaken. The next section will review literature applicable to this study.

2.3 Literature Review

The term "master plan" has many negative connotations associated with it in the spatial planning arena with Hadingham, Paige and Smith (2002: 3) identifying that there is a "trend to switch the focus from the preparation of comprehensive master planning to flexible strategic planning". However in the infrastructure/facilities arena, it is still commonly used as demonstrated in Smith et al's case of the City of Beira and the Municipality of Dondo in Mozambique (2002) where the strategic urban plan included the recommendation for water, sewage, urban drainage and roads master plans. Does this mean that infrastructure master plans are undertaken only at a meticulous level of detail? Or does this mean that infrastructure plans are not relevant and are simply produced for the sake of producing them whilst the planning of infrastructure is undertaken in an ad-hoc crisis mode?

The purpose of this section is to attempt to answer the above question. In answering this question, the approach used in infrastructure planning is first identified. The methods used in water demand projections are then described followed by an explanation on the different levels of detail found in projects. Thereafter, an identification of what constitutes master plans and the different methods of water planning are undertaken. This section next looks at the legislative requirements, the IDP process and the South African water planning framework. The section then concludes by looking at stakeholder co-ordination.

2.3.1 Infrastructure Planning

The purpose of this section is to identify the generic approach used in infrastructure planning.

Biermann and Landré (2002: 329) recognised that "in practice, infrastructure planning has generally tended to follow land use planning, with infrastructure costs seeming to play no role in the generation of land use strategies". To tackle this dilemma, Biermann and Landré (2002) developed a bulk infrastructure cost model to "provide a tool for planners to ensure the incorporation of bulk infrastructure capacity and cost considerations into the early, land suitability assessment phase of the integrated

development planning process" (Biermann and Landré 2002: 329). In developing the model, Biermann and Landré (2002: 330 – 331) explained:

> An overview of the relevant literature reveals a paucity of research on the interrelationship between land use planning and infrastructure planning. In practice, infrastructure planning has generally tended to follow land use planning and plays no role whatsoever in the generation of land use plans...The costing of bulk infrastructure has typically been reactive to land use planning, as strategic land use plans are prepared without due consideration of infrastructure costs. Only once a final plan has been selected does bulk infrastructure planning commence relatively, as part of the implementation process, so as to optimise the provision of services in relation to the pattern of employment and population, as set out in the plan.
>
> (Biermann and Landré 2002: 330 – 331)

Biermann and Landré (2002) used threshold analysis as the theoretical basis for the potential cost model for bulk infrastructure (please refer to Appendix A for the summary on Biermann and Landré's bulk infrastructure cost model). The three essential elements of Biermann and Landré's bulk infrastructure cost model viz. threshold, density and cost are illustrated in Figure 2.5, which shows the generic approach used in infrastructure planning.

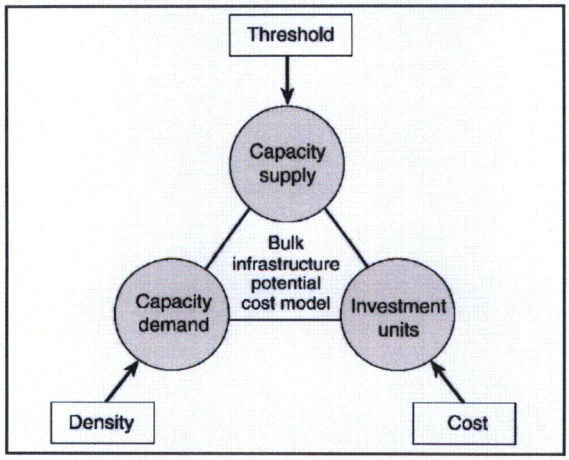


Figure 2.5 Mechanisms of interaction between the three elements of the bulk infrastructure potential cost model (Biermann and Landré 2002: 338).

The generic potential costing methodology developed by Biermann and Landré for the bulk infrastructure potential cost model is shown in Figure 2.6. The steps performed in infrastructure planning are illustrated clearly in this figure.

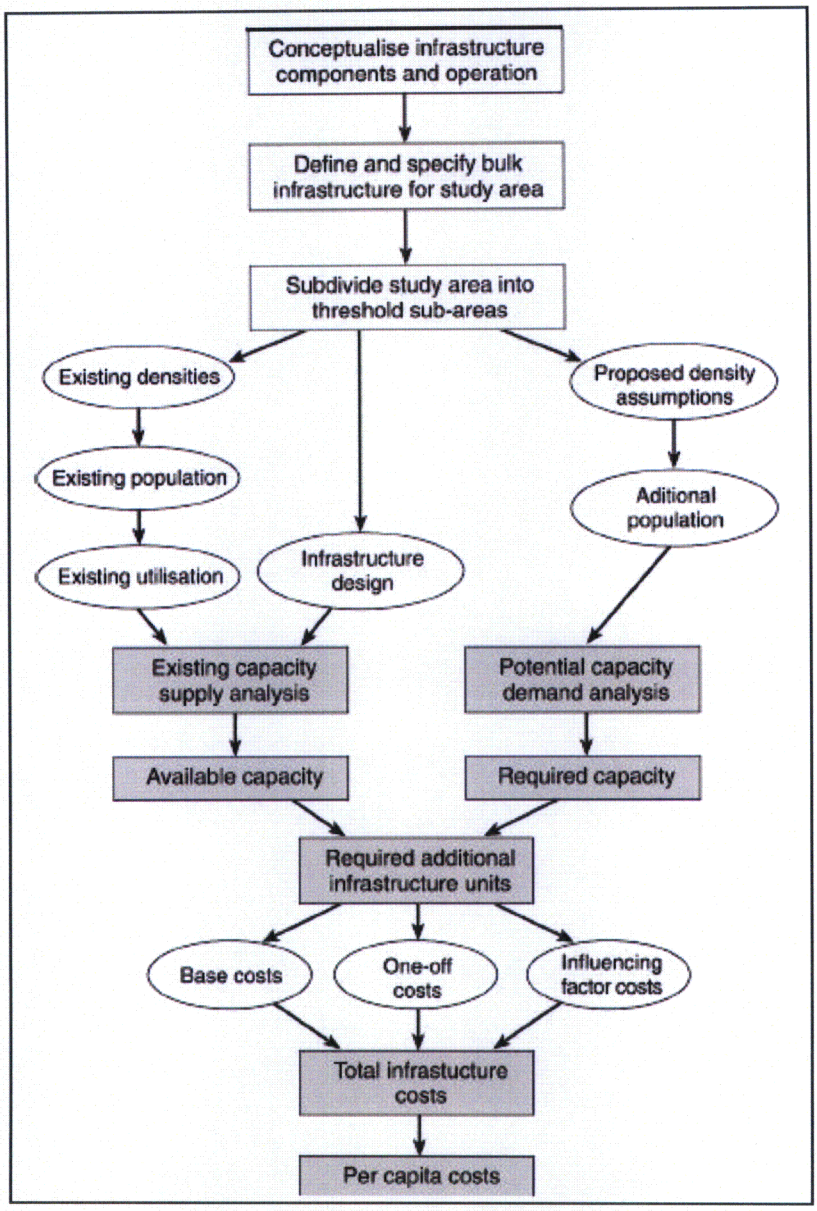


Figure 2.6 Overall methodology of the bulk infrastructure potential cost model (Biermann and Landré 2002: 340).

In water planning, the capacity demand is determined by water demand projections. The next section evaluates the different methods used in water demand projections.

2.3.2 Water Demand Projections

It was shown in Section 2.3.1 that the projection of the required capacities is a critical step in the planning of infrastructure. Similarly, water projecting is a crucial decision support tool (Atsalakis and Ucenic 2005) in water planning and in particular, "supply reliability, facility location and size and the transmission and distribution systems design and phasing depend on the accuracy of the demand projection" (Wessels 2005: 178). The challenge is that "no area of water planning is more beset by risk than the projecting of water demands" (Prasifka 1994: 72). Prasifka (1994: 72) discusses that:

> ...if future water use exceeds the level projected, the planned facilities will be extended beyond their economic loading and/or service limits and water supply deficits may occur. If future water use fails to reach the level projected, unnecessary economic and environmental costs will have been incurred. In spite of the risks involved, however, attempts at projecting must be made (even in the face of uncertainty) if planners are to have some role in managing the future rather than just witnessing its arrival.
>
> (Prasifka 1994: 72)

The importance of accurate demand projections is illustrated in Figure 2.7.

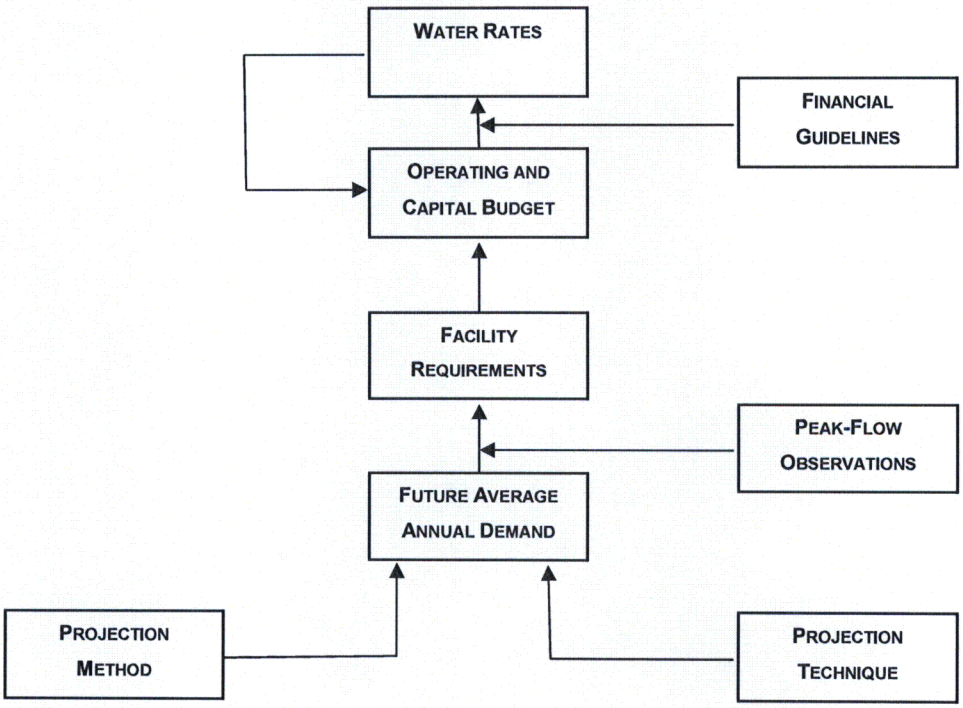


Figure 2.7 Flow chart of water demand projecting (AWWA cited by Prasifka 1994: 74).

A water use projection is "a conditional prediction of the level of water use at some future time" (Prasifka 1994: 72 – 73). Hence it is "important that uncertainties resulting from a lack of information are explicitly reflected in the demand projections" (DFID 2003: 158). Fullerton (2001: 167) argues that "given the levels of regional uncertainty surrounding water resources, a question arises in terms of the quantitative tools available to policy analysts and planners". Wessels (2005: 178) affirms that "no single method of projecting will satisfy the needs of all water planning and that the projection method used and the data required to correctly apply the method is dependent on the situation". DFID (2003: 158) explains that:

> ...there is no absolute level of accuracy that is appropriate in all demand projecting circumstances. As a consequence the level of accuracy of the projection should be sensitive to its purpose. The cost of improving the demand projection should be balanced against the additional benefits that are derived from the greater accuracy. The demand projection method that is used will be dependent upon the purpose of the projection and the cost of assembling the data. For example a more accurate and costly projection would be required to justify the construction of a major new piece of infrastructure (e.g. a dam or large pumping station) than for general internal monitoring purposes of a catchment management agency.
>
> (DFID 2003: 158)

Prasifka (1994), Wessels (2005), DFID (2003) and the Institute for Futures Research, Ninham Shand (Pty) Ltd and Palmer Development Group (2000) all indicated that one cannot obtain a "one-size fits all" solution for water demand projections. They (1994; 2005; 2003 and 2000) contend that judgement and intuition are essential components of the decision-making process when selecting the methodology to use for the different stages of a project and are important in recognising that places are different and will therefore use water differently. Hence the methods selected need to reflect these differences.

Prasifka (1994: 83) asserts that "a complete review of water-use projection approaches would reveal a great many individual methods and techniques, ranging from simple to complex". Common methods include extrapolation, judgemental projections, micro-component analysis, projecting based on socio-economic scenarios, statistical methods and neural networks (Atsalakis and Ucenic 2005; DFID 2003; CSIR 2000; Prasifka 1994). Atsalakis and Ucenic (2005: 2) explain that "models are usually focussed on the relationship between water use and variables, which are able to

explain the variations in water consumption". A summary of the different methods identified is elaborated in Appendix B.

One common variable used is that of population. Widespread methods of projecting population, especially from those coming from a non-demographic background, make use of the exponential and geometric methods. The geometric method assumes that change only occurs once a year whilst the exponential method assumes that change is continuous (Kpedekpo 1982). These methods which are only recommended for periods less than ten years are based on the extrapolation of past trends into the future (Kpedekpo 1982). The mathematical methods "do not explicitly include the components of population growth viz. fertility, mortality and migration" (Kpedekpo 1982: 161).

The standard method of demographic projections is referred to as the "Component Method" (please refer to Appendix B). The effects of HIV/AIDS on a population uses this method. Computer models used in South Africa to model the impacts of HIV/AIDS include the Spectrum Policy Modelling System used by Stats SA to determine the mid-year population estimates (these estimates include the effects of AIDS) and the Actuarial Society of South Africa's (ASSA) AIDS model (Stats SA 2004; 2005; ASSA AIDS Committee 2006).

The Component Method considers fertility and mortality and the effects of migration may be calculated using the Balancing Equation Method (Appendix B). The Balancing Equation is "the fundamental demographic formula used to estimate total population change between two points in time and includes all components of population change: births, deaths, immigration, emigration, in-migration and out-migration" (Haupt and Kane 2004: 55).

A literature review undertaken identified that although the former Town and Regional Planning Commission (now called the Provincial Planning and Development Commission) has updated its report on the impact of HIV/AIDS on planning issues in KwaZulu-Natal (HEARD 2001), the projections were only over a 10-year horizon and that the only recent study undertaken on a provincial basis was Calitz's 2000 study (2000a; 2000b). This study was undertaken over a 25-year horizon. Van Aardt et al's Singular Projection Approach method, also a component method was undertaken for the entire country in 1999.

The above section has emphasised the importance of selecting a water projection method that is appropriate to the purpose. The following section unpacks the differences in purpose in a project.

2.3.3 The Project Life-Cycle

The PMBOK (2004: 368) defines the project life cycle as "a collection of generally sequential *project phases* whose name and number are determined by the *control* needs of the *organisation* or organisations involved in the *project*. A life cycle can be documented with a *methodology*". The PMBOK (2004: 369) continues to explain that:

> ...a project phase is a collection of logically related project activities, usually culminating in the completion of a major *deliverable*. Project phases are mainly completed sequentially, but can overlap in some project situations. Phases can be subdivided into *sub-phases* and then *components*; this hierarchy, if the project or portions of the project are divided into phases, is contained in the *work breakdown structure*. A project phase is a component of a *project life cycle*. A project phase is not a *project management process group*.
>
> (PMBOK 2004: 369)

Burke (2003: 28) says that "there is general agreement that most projects pass through a four phase life-cycle under the following headings" (see Figure 2.8):

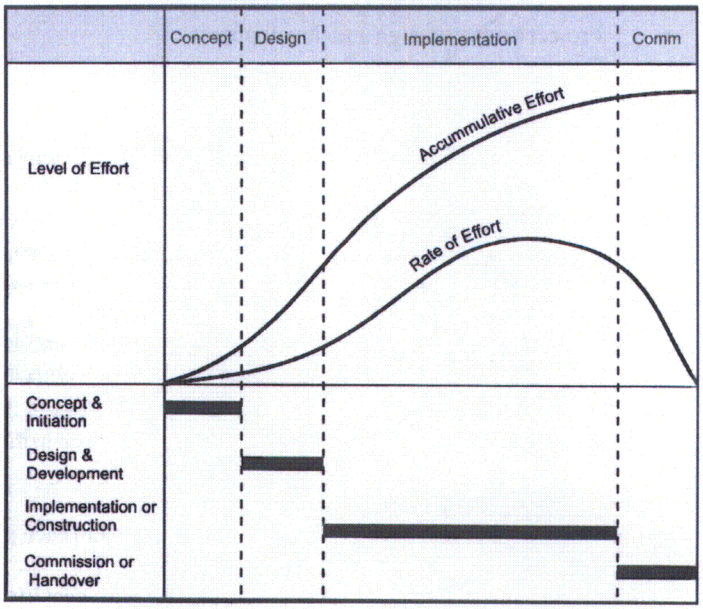


Figure 2.8 Project life-cycle showing bar chart, project phases, level of effort and rate of expenditure (Burke 2003: 29).

He defines each of the phases as follows:

- "**Concept and Initiation Phase:** The first phase starts the project by establishing a need or opportunity for the product, facility or service. The feasibility of proceeding with the project is investigated and on acceptance of the proposal moves to the next phase."
- "**Design and Development Phase:** The second phase uses the guidelines set by the *feasibility study* to design the product, outline the build-method and develop detailed schedules and plans for making or implementing the product."
- "**Implementation or Construction Phase:** The third phase implements the project as per the *baseline plan* developed in the previous phase."
- "**Commissioning and Handover Phase:** The fourth phase confirms the project has been implemented or built to the design and terminates the project."

(Burke 2003: 28 – 29)

Please refer to Appendix C for a summary on the importance of the project life-cycle.

The application of the project life-cycle to water infrastructure projects and the phases that are commonly used are shown in Table 2.1.

Table 2.1 Description of phases for new water infrastructure projects (Planning Services, Umgeni Water 2006: 1 – 3).

	Concept/Reconnaissance Planning Initial exploratory study to conduct a preliminary examination of an area in order to obtain and evaluate existing information and identify likely schemes and layouts.	Pre-Feasibility Planning A pre-cursor to the feasibility study where the resources and constraints of the likely final scheme, as well as the most beneficial layouts, are identified for final optimisation.	Feasibility Planning An intensive investigation and optimisation of the most beneficial layouts of the final scheme resulting in the best layout with final specifications of major dimensions.	Detailed Design Designs the scheme, outlines the construction method and develops detailed schedules and plans for implementing the scheme (Burke 2003: 28).	Construction/Implementation Implements the project as per the *baseline plan* developed in the detailed design phase (Burke 2003: 29).	Commissioning & Handover Confirms that the project has been implemented or built to the design and terminates the project (Burke 2003: 29).
Input:	• Problem identification, strategic requirement, formulation of problem statement.	• Utilise information from Reconnaissance study when available. • Can move directly to this level from problem identification if options are limited and known, and if time is a limiting factor.	• Utilise information from Pre-Feasibility study when available.	• Design Brief based on Feasibility Planning report.	• Letter of award. • Signed Contract Documents. • Construction drawings.	• Completed (of phased completion) of infrastructure.
Key Activities:	• This level of study comprises a desk study of available mapping and existing reports and databases with only limited verification and fieldwork. • Generally applicable to studies where the accuracy and detail of the results are not likely to be determinant with respect to a final decision. • Confidence limits on final project costs is ±35%.	• This level of study requires fieldwork to obtain accurate information and data and often requires considerable verification. Drilling and sampling are not usually required at this stage. • The level of accuracy and detail resulting from the study are not considered sufficient for the purpose of detailed design of a scheme and will require further investigation and final optimisation for that purpose. • Confidence limits on final project costs is ±25%.	• The results of this study must be of sufficient detail and accuracy to define the detailed design of the scheme. • Confidence limits on final project costs is ±15%.	• The results must be of sufficient detail to compile tender documentation and to proceed into implementation. • Confidence limits on final project costs is ±5%.	• Implementation of design. • Contract management. • If necessary – Submission to EXCO (and the Procurement, Fixed Assets & Capital Projects Sub-Committee of the Board if the project CAPEX budget change is greater than 10%) for scope/budget revision.	• Produce as-built drawings. • Pressure test certificate. • Carry out appropriate tests in the company of Operations staff. • Snag list and final inspection certificate.
Output:	• Report - Recommendation of possible solution(s) that should be investigated at a greater level of detail. • Best solution included in 30-year CAPEX programme.	• Report - Recommendation of possible solution/scheme configuration that should be investigated at a greater level of detail. • 30-year CAPEX programme updated with improved information (or project included if not captured previously). • Submission to EXCO (and the Procurement, Fixed Assets & Capital Projects Sub-Committee of the Board if the project CAPEX budget is greater than R10 million) requesting project approval for implementation.	• Planning Report and Design Brief. • Record of Decision (RoD) from environmental authority (?) • 30-year CAPEX programme updated with improved information (or project included if not captured previously). • If not undertaken previously - Submission to EXCO (and the Procurement, Fixed Assets & Capital Projects Sub-Committee of the Board if the project CAPEX budget is greater than R10 million) requesting project approval for implementation.	• Design report. • Tender document complete with drawings. • Adjudication report. • If necessary – Submission to EXCO (and the Procurement, Fixed Assets & Capital Projects Sub-Committee of the Board if the project CAPEX budget change is greater than 10%) for scope/budget revision based on tender submissions.	• Certificate of completion.	• Close-out report.

Do master plans then include all phases of projects or do they only include for example, the feasibility phases? The next section attempts to find the answer to this question.

2.3.4 An Analysis of the Term "Master Plan"

The term "master plan" is traditionally associated with a "blueprint" which establishes "desired end states" (Poxon 2000: 78) i.e. it is "a kind of photograph of how a city's basic land use and circulation pattern may look at some future point in time" (McNeill 1983: 4). Kinuthia-Njenga (2002:1) describes that the "master plan through maps and text described the proposed future land use and infrastructure patterns for a city 15 to 20 years in the future". McNeill (1983: 4) explains that this paradigm, which "originated from the architectural and engineering traditions over a century ago has the following characteristics":

- Long-range emphasis.
- Product is process.
- Strong physical emphasis.
- Non-strategic quality.
- Lack of interaction with the users (op. cit.).

(McNeill 1983: 4)

Criticisms levelled at the master plan include:

- "...not up to date; not forward-looking; not responsive to change; not adequately dealing with traffic and land use; not sensitive to changing trends, including demographic changes; and not in touch with emerging planning problems..." (Peel and Lloyd 2005: 269).
- "Master plans take too long to prepare. It is made worse in situations where the plan has to be embodied in a statutory development order. This can cause serious frustrations to top civil servants and politicians who are faced by rapid urban growth and enormous infrastructure deficits" (Kinuthia-Njenga 2002: 3).
- "Master plans rarely offer guidance on the phasing or techniques of implementation. They show where infrastructure will be located, but in most cases say nothing about the standards to be employed or priorities for phasing implementation" (Kinuthia-Njenga 2002: 3).
- "Master plans rarely evaluate the cost of the development they propose, or how they will be financed. For this reason, it is impossible to tell whether the plans are financially feasible. In too many cases, true consigns ultimately show that the plans require outlays far beyond what is affordable. The typical master plan offers no guidance on which parts of the plan could be scrapped if adequate resources

for implementing the entire plan are not available (you may wish to say that it does not set priorities?)" (Kinuthia-Njenga 2002: 3).

- "Master plans are seldom based on realistic appraisals of the city economic potential or realistic population growth. While projects of formal sector job creation often are over-stated, projections of population growth are under-estimated. As a result, "informal" business activities spilled out of the zone set-aside for commercial and industrial development" (Kinuthia-Njenga 2002: 3).
- "Key stakeholders – community leaders and implementation agency executives and private sector – are seldom meaningfully involved in the master planning process. Professional planners working in city hall are often cut-off from both community expression of infrastructure demands and infrastructure providers often prepare master plans" (Kinuthia-Njenga 2002: 4).
- "Master plans are infrequently updated. Urban growth is a dynamic process, particularly in Africa. It is not surprising that master plans become updated on a regular basis (a contradiction). However, the initial preparation effort is normally an expensive multi-year affair and African governments may not afford to update the master plan frequently enough to keep pace with development" (Kinuthia-Njenga 2002: 4).

These criticisms have resulted in recommendations calling for change and alternative approaches e.g.

- "...the planning process needs to be informed to a much greater extent by existing trends rather than planning ideals (master plans) and a greater emphasis needs to be placed on managing what already exists..." (Abbott and Douglas 2003: 5).
- "...comprehensive blueprint planning for urban development ends has long ceased to be a viable approach to establishing management principles for urban development. Rather, metropolitan strategies need to be underpinned by robust planning processes that are capable of adapting desired outcomes to account for increasingly complex and spatially variable urban conditions. Such processes will require improved integration across policy realms and importantly, across tiers of government" (McGuirk and O'Neill 2002: 313 – 314).
- City Development Strategies (CDS) (Kinuthia-Njenga 2002).
- Integrated Development Plans.

Poxon (2000: 74) believes that the proposals for reform "reflect a concern with the *procedures* of plan formulation". She continues to say (2000: 74) that "much of contemporary normative planning theory is equally concerned with the strategy-making *process*, putting it forward in itself as a potentially important part of a consensus-building approach to planning practice". In concluding her review of development planning in the United Kingdom, she notes that:

> ...within this very broad concept of a development plan there have been different emphases placed on their appropriate role during the last 50 years. Thus, they have been viewed as master plans, as frameworks and goal-setters, as corporate plans, as guides for development control, as aids to market mechanisms, as a means of balancing the conflicting demands of development and conservation and as tools for increasing public participation in the planning process.
>
> (Poxon 2000: 85)

Master plans are still used today, however in the infrastructure context, the message they convey is slightly different. One definition used for an educational facilities master plan is as follows:

> The facilities master plan is a long-range look at the development of your facilities, combined with an implementation plan that indicates the steps, sequences and costs to get you there. There are three basic steps: analysing what you have, determining what you need in the future and creating the plan to transition your school from today to tomorrow.
>
> (Kalina 2006: 28)

For an airport, the purpose of a master plan is as follows:

> Master plans promote a continuous planning process with vision and proactive planning, rather than reactive planning, while providing a logical development plan based on current and projected conditions. The Master Plan will provide a phased and flexible plan that is responsive to short-term and long-term needs. The Master Plan also provides a realistic plan that meets the needs of the users and community and can be funded. The plan is required to receive federal development approval and grant funding.
>
> (Gerald R. Ford International Airport 2006: website)

Gerald R. Ford International Airport defines a master plan as "a concept of the ultimate development of an airport, which is reviewed and updated periodically and displays the concept graphically and reports the data and logic upon which the plan is based" (Gerald R. Ford International Airport 2006: website).

The elements of the master plan are classified as follows:

- The study design and identification of issues.
- Inventory, surveys and data collection.
- Aviation forecasts.
- Demand capacity and analysis.
- Determination of facility requirements.
- Development of alternatives and concepts.
- Financial feasibility.
- Environmental overview/analysis.
- An implementation plan for development.
- The updating of Airport Layout Plan documents in accordance with federal airport operating and design standards.

(Gerald R. Ford International Airport 2006: website)

Gerald R. Ford International Airport declares that "under a continuous planning process master plans are reviewed and benchmarked against actual performance and formal comprehensive master plan updates are completed every seven to ten years" (2006: website).

The above two examples put forward the proposition that in the infrastructure context the term "master plan" has remained the same but its objectives and the process in which it is undertaken has been adapted to address the short-comings of the master plan in its initial form. This adaptation is not consistent but has occurred in an ad-hoc manner and the process and product of the master plan is dependent on the planning project team. Is this proposition applicable to water master plans? The following definitions of water master plans support this proposition (Table 2.2).

Table 2.2 Some identified definitions of water master plans.

Institution	Definition
Anne Arundel County	"Anne Arundel County's Water and Wastewater Master Plan has evolved over the past 35 years as an important policy plan for the provision of water and sewer service to County residents and for managing and directing growth and development to appropriate and suitable residents...As Anne Arundel County has settled over the years, the Water and Sewer Master Plan has proven to be an important and effective document, addressing and implementing the goals and policies of the County's General Development Plan...As new information and data is determined, the Water and Wastewater Master Plan will be amended to maintain its accuracy." (2004: website)
City of Hamilton	"...the master planning process allows the City to take a holistic look at its existing infrastructure in order to identify opportunities to optimise current capacities and to develop the most efficient means of securing future infrastructure requirements. The City of Hamilton's Water and Wastewater Master Plan comprises of three documents: • **Water and Wastewater Master Plan Policy Paper** which provides a framework for planning water and wastewater infrastructure. • **Baseline and Optimisation Report** which provides a review of existing infrastructure and identifies opportunities/constraints with respect to optimisation and servicing future growth. • **Integrated Water and Wastewater Master Plan** which follows the Municipal Class Environmental Assessment process (a statutory requirement) and is integrated with the Transportation and Stormwater Master Plans through the City of Hamilton's Growth Related Integrated Development Strategy." (2005: website)
The Ministry of Agriculture, Forestry and Water Management of Macedonia	"...a document consisting of the following principal parts: • The description of the water resources (surface and ground water plus alternative resources) in quantity and quality. • The description of the present and likely future development of water demands by different user sectors. • The presentation of the technical (physical) and operational water management measures to fulfil the demands in their temporal and spatial distribution under consideration of social, environmental and economic aspects. The New Water Master Plan of the Republic of Macedonia will serve as a base for information and as framework for operation and planning in the water sector." (2000: website)

Institution	Definition
City of Delaware	"a water master plan, which has a projection horizon of 20 years, includes: ...planning of three major segments of water service: water resources, water treatment and water distribution. The master plan will: • Develop a basis for water service planning criteria, including growth and water demand projections as well as regulatory requirements to be met in the near future. • Assess water resource options and develop a strategy for increased capacity and storage. • Assess water treatment options and develop a strategy for meeting capacity and quality improvements. • Assess water distribution needs and develop a strategy for on-going replacements and extension improvements. • Integrate the strategies for water resources, water treatment and water distribution into a cohesive plan addressing capital costs, schedules and potential financing." (2005: website)
The Ministry of Water and Irrigation of Jordan	"Without water, there is no life. Individuals, private companies and public institutions are taking great efforts to make water useable for their needs – be it drinking water, pastoral needs, industries, agriculture or others. In order to coordinate these activities and to safeguard that the resources are also available for future generations, a common planning framework is needed. This framework is given by the **Water Master Plan**. According to the United Nations, the primary objective of a Water Master Plan is to establish a basic framework for: • Orderly and integrated planning and implementation of water resource programmes and projects. • A rational water resources management consistent with overall national socio-economic development objectives. *(Guidelines for the Preparation of National Water Master Plans, Water Resources Series No. 65, UN, N.Y. 1989)"* (2005: website)
Citrus County	"The Water Master Plan was developed for the orderly expansion of Citrus County Utilities Division's Central Water System, with specific emphasis on integration and maximum utilisation of the existing facilities...This plan addresses the capabilities of existing facilities and analyses their ability to meet the needs through the year 2020. The impact of population growth was evaluated with emphasis on identifying the extent and timing of future infrastructure needs." (2006: website)

Institution	Definition
Rapid City	"The City of Rapid City is experiencing a high rate of growth that presents challenges related to utility infrastructure planning. Many of these challenges are related to water supply, water delivery, wastewater collection, changing source water qualities and maintenance... ...The utility water system master plan will provide the City with a planning document for the next 20 – 25 years as well as a set of tools and processes to improve efficiency, enhance customer service and prepare for future growth. The master plan will not be just a document that sits on a shelf, rather it will be an integrated planning tool to allow the City to grow and adapt to the changing needs of the Rapid City community." (2006: website)
City of Ann Arbor	"The City of Ann Arbor's water master plan vision is "to ensure a sustainable, high quality and cost-effective drinking water system for the City of Ann Arbor" (City of Ann Arbor 2004: website). They explain (2004: website) that the focus and approach of their water master plan is to answer the following questions: 1. How much water do we need? 2. Where should we get our water supply? 3. How should we treat the water? 4. What should we do to protect our water supply? 5. What conditions are our assets in? 6. How should we manage our assets? 7. What assets do we need in the future?" (2004: website)
The Los Osos Community Services District	"The Los Osos Community Services District Water Master Plan (WMP) is critical to responsible planning, management of services and for sustainable future development in the Los Osos water service area. First developed in June 2001, the WMP is used to develop and assess not only current existing water system infrastructure and water demands, but also to determine deficiencies in infrastructure and treatment facilities. It also addresses growth in future years to come." (2005: website)
Pendleton South Carolina	"The project will provide an adequate and reliable water supply, address low system pressures, provide sufficient elevated storage to meet the State Primary Drinking Water Standards and offer ample fire protection to the central business district." (2006: website)
Arlington Virginia	"...the policy document that guides the operation, maintenance and expansion of the County water system. The plan evaluates the existing water distribution system facilities and operation practices and determines the policy and facility improvements that will be necessary to meet and maintain the desired quality of service." (2006: website)

It is shown in Table 2.2 that there is no one consistent definition of a water master plan and that the definition of put forward in Section 2.1 is no longer relevant.

If there are different definitions of a water master plan, does this mean that there are different elements of water master plans and are these elements dependent on the water planning method? The next section looks briefly at the different methods used in water planning before an attempt is made to determine if there are different or similar elements between water plans.

2.3.5 Water Planning Methods

All utilities use some form of planning which may differ in "extent and scope" (Beecher 1995: 36). This was illustrated in Section 2.1 where three different water planning concepts were introduced viz. the water master plan, integrated resource planning and the water services development plan. However, it was shown in Table 2.2 (Section 2.3.4) that there is no one consistent definition of a water master plan with some "water master plans" including elements of integrated resource planning. This implies that the approaches used in deriving these different planning products are borrowing from one another. But what are these utility planning approaches? Beecher (1995: 36) identified four general approaches:

- Traditional supply planning
- Least-cost planning
- Integrated resource planning
- Total water management

(Beecher 1995: 36)

She further maintains that for each approach "each iteration retains the tried and true methods of the preceding approach while expanding the scope of the planning horizon to include new issues and solutions" (Beecher 1995: 36). This is similar to the evolution of the spatial planning approaches as demonstrated in Section 2.2.

Traditional Supply Planning

Traditional planning stresses "supply reliability and risk avoidance" (Beecher 1995: 36) and is characterised (this is similar to electrical utilities traditional planning) by:

- Emphasis on "utility ownership and control of all production resources" (ownership and control of water resources are restricted e.g. limits to water abstraction but the focus on ownership of the water delivery infrastructure e.g. plants, pipelines etc. are similar to that of electrical utilities).
- Dependence on "internal system and financial planning processes".
- Importance of the "goals of minimising prices and maintaining a high level of system reliability".

(Beecher 1995: 36)

Beecher (1995: 36) notes three important concerns on traditional planning:

- "Forecast demand taken as a given and no attempt is made to integrate supply-management and demand-management options."
- "The public, outside experts and government regulators generally have little or no involvement in traditional utility planning. Demand analysis and the assessment of supply alternatives take place behind closed doors of the utility; only the final product is made available for review or regulatory approval. Often, major investment decisions are made with little or no oversight."
- "Traditional planning tends to be confined to individual utilities in virtual isolation. The traditional decision-making process excludes parties who do not only have a vested interest but who may have unique insights about resource alternatives."

(Beecher 1995: 36 – 37)

Beecher (1995: 37) summarises the concerns by saying that "traditional planning tends to be narrowly focussed and exclusionary" and that "once a utility has committed itself to a plan, little room is left for altering the chosen course".

The latter two concerns are similar to the criticisms made on rational comprehensive planning and spatial master planning as identified in Section 2.2 with Peattie (1968 cited by Sandercock 1998: 90) identifying the "manipulator model" and Section 2.3.4 with Kinuthia-Njenga (2002: 4) noting that "key stakeholders are seldom meaningfully involved". However, the first concern does not have explicit parallels in Sections 2.2 and 2.3.4 as it deals with the concept of sustainable development (Section 2.1) which has not been specifically addressed in Sections 2.2 and 2.3.4. An important note on sustainable development as identified by Freeman (2004: 308) is that:

> Sustainable development as a concept graphically illustrates some of the tensions evident in planning. In particular, it illustrates the ongoing tension in planning between theory and practice (Allmendinger and Tewdwr-Jones 1997; Thompson 2000), between the ideal and the achievable, a problem sometimes referred to as the 'implementation deficit'.
>
> (Freeman 2004: 308)

The question that arises is whether IRP as a theory faces similar tensions in practice?

Nevertheless, criticisms highlighted in Section 2.3.4 relevant to the first concern include "not sensitive to changing trends" and "offers no guidance...if adequate resources for implementing the entire plan are not available".

The first concern revolves around the existing planning process characteristic of utilities viz. the planning process is "internally driven and dominated by supply considerations" (Beecher 1995: 37). As demonstrated in Sections 2.3.1 and 2.3.2 (refer to Figure 2.7), water supply planning commonly projects future demand and formulates and examines supply options to "meet the projected demand level, plus a comfortable margin" (Beecher 1995: 37). Beecher concludes that "the result is a disaggregated planning approach focussing only on new supply alternatives, while initiatives in the areas of demand management and conservation are consigned to separate programmes" and that "conservation effects are often not reflected in revised demand and revenue forecasts" (Beecher 1995: 37). Beecher further notes that "the utility corporate culture, which understandably emphasises selling more (not less) product, also seems to favour the supply side" and that "utilities traditionally have had little incentive to promote conservation" (1995: 37).

Beecher argued that the "emphasis on supply options can result in additions to capacity that outpace growth in demand, which is a problem familiar to the electricity industry" (1995: 37) and that "water's natural abundance in many areas may explain why the central water supply issue is delivery rather than managing demand" (1995: 37). Hanson (1991 cited by Beecher 1995: 37) writes that "the shortcomings of traditional planning, along with significant external economic and political forces, gave rise to the current interest in least-cost planning or IRP". This differs from the predominant driving force for water-stressed regions e.g. Africa, Australia, California etc. where it is the natural resource forces viz. insufficient water resources that have been the principal motivator in addition to economic and political stimuli.

Least-Cost Planning (LCP)

Least-cost planning developed in the 1980s as an "essential tool in the economic regulation of electricity utilities" as a result of "frustration with the rising costs of capital additions that sometimes result in excess capacity, a poor record of demand forecasting and inattention to environmental externalities" (Beecher 1995: 37 – 38). Beecher further contends that "least-cost planning is an essential regulatory tool" (1995: 37) and that for many US states, the concept is regarded as one of the basic "regulatory standards" (Beecher 1995: 38). Advocates of least-costing assert that it "allows regulators to be more "proactive" i.e. to actively affect utility decisions rather than simply react to them later on" (Beecher 1995: 38). One definition of least-cost planning put forward is:

> ...a way of analysing the growth and operation of utilities that considers a wide variety of both supply and demand factors so the optimal way of providing electric service to the public can be determined. A path is chosen that will ensure reliable service for the customers, economic stability and a reasonable return on investment for the utility, environmental protection, equity among ratepayers and the lowest costs to the utility and the consumer. A least-cost plan balances three interests (reliability, profitability and affordability) while keeping a sharp eye on the risks and uncertainties associated with each component of the plan.

(National Assoc. of Regulatory Utility Commissioners 1988 cited by Beecher 1995: 38)

However, there are several and "sometimes competing definitions" of least-cost operationally even though it can be "translated into economic and technical efficiency" (Mitchell 1986 cited by Beecher 1995: 38). Subject to the definition used, least-cost planning highlights "the minimisation of rates, customer bills, utility revenue requirements, or production (both capacity and operating) costs" (Beecher 1995: 38). Hirst (1988 cited by Beecher 1995: 38) asserts that "the variety of available perspectives leaves open the question of whose costs are supposed to be "least": existing customers, future customers, utility shareholders or society at large". Beecher reports that "another unfortunate implication of the concept" is that "it suggests a single, optimal solution" (1995: 38). Furthermore, regulators and utility managers do not automatically share the same interpretation of least-cost planning (Beecher 1995) with some regulators focussing on conservation whilst utility managers emphasis "integrated supply and demand analysis" (Haynes and Sheer 1987 cited by Beecher 1995: 38). Nevertheless, least-cost planning is commonly understood as "the comprehensive evaluation of all supply and demand alternatives in an attempt to

minimise costs and create a flexible plan that allows for uncertainty and a changing economic environment" (National Association of Regulatory Utility Commissioners 1988 cited by Beecher 1995: 38).

General characteristics of least-cost planning are:

- Cost minimisation.
- Resource diversity.
- Risk management.
- Flexibility.

(Beecher 1995: 38)

At an operational level (Figure 2.1), features include:

- "Consideration of a diverse set of resource options (including conservation, load management, pricing and purchases from other producers)."
- "Co-ordination among several utility departments".
- "Use of multiple resource selection goals including those that address prices, costs, revenue requirements, utility financial condition, risk reduction, technological diversity, environmental quality and economic development".

(Beecher 1995: 38 – 39)

Advantages of least-cost planning include:

- "Sound engineering practices" are placed into "a broader context".
- "Can facilitate regulatory review of supply-management and demand-management practices and regulatory approval of capacity expansion projects prior to construction".
- "Can be used to educate policymakers about the critical issues in utility supply decisions and to induce utilities to aggressively engage in long-term strategic planning" (the importance of strategic planning was discussed in Section 2.2).
- "Can focus on a particular utility or take the form of state-wide (or regional) assessment of all utilities in a given utility sector, the latter of which is typically performed by a state resource management agency. Individual utilities can be reviewed for consistency with state-wide plans".

(Beecher 1995: 39)

Least-cost planning differs from traditional supply planning with its emphasis on the "distinction between demand-management and supply-management activities, both of which can be used to achieve reliability goals" (Hemphill and South 1986 cited by Beecher 1995: 39) and the recognition that "demand is malleable" (Beecher 1995: 39). Beecher explains that the "demand side involves any strategy to eliminate or defer the need for an investment in new capacity by the utility, including load management, conservation and pricing strategies" (1995: 39) whilst the "supply side involves determining the most efficient method of meeting growing demand, including investments in new capacity" (1995: 39).

The importance of demand management activities is that those activities which "decrease the demand for utility services affect supply management because existing system capacity is released for other customers and other uses" (Baldwin 1983 cited by Beecher 1995: 39). Beecher contends that "the freed or redirected utility capacity can be compared to that provided by more traditional means" (1995: 39) and hence "emerged the concept of "negawatts" – electricity "produced through conservation and efficient use of existing resources" (1995: 39).

Challenges to least-cost planning include:

- "Lack of familiarity with demand management".
- "Barriers to co-ordination with nearby utilities".
- "The use of broad definitions of costs (such as those associated with externalities)".
- "The inclusion of goals (such as resource protection) not directly attributable to the utility".

(Baldwin 1983 cited by Beecher 1995: 39)

One criticism on least-cost planning put forward by traditional planners is that it is "more risky in terms of supply reliability" (Beecher 1995: 39). However, this criticism is opposed by least-cost planning supporters arguing that it "actually reduces some forms of risk, such as the revenue recovery risk associated with excess capacity" (Beecher 1995: 39). Beecher states that "these disagreements can be overcome" (1995: 39) but one issue requires specific thought and that is the "cost of planning itself" (1995: 39).

Beecher elaborates by saying that "the benefits of planning should outweigh the costs" (1995: 40) and that "this calculation itself poses a rational decision-making problem"

(1995: 40). She continues to explain that "the benefits of increased awareness and understanding (and reduced ignorance and uncertainty) can be substantial but are not easily quantified (1995: 40).

Three areas identified as "potential barriers to success" and therefore requiring attention by planning (Rosen 1988 cited by Beecher 1995: 40) are:

- "Access to analytical tools and adequate information".
- "The level of commitment of utilities and regulators to considering and pursuing new options".
- "The consistency of approaches and methods within the context of existing utility and regulatory practices".

(Rosen 1988 cited by Beecher 1995: 40)

The above-identified issues are relevant to water utilities because:

- "For water systems, information resources vary substantially and the need to develop data processing and analytical capabilities is clear. Attention should be paid to designing and implementing planning strategies that minimise the effects of inadequate attention."
- "The second barrier involves the attitudes of those involved in resource planning. In part, success in least-cost planning will depend on whether the prevailing corporate culture accepts demand management and related concepts as legitimate utility goals."
- "Successful least-cost planning requires good practice as well as good theory. Water utility managers need practical methods for dealing with new forms of uncertainty, such as the revenue uncertainty associated with conservation (Beecher et al 1994)."

(Beecher 1995: 40)

Integrated Resource Planning (IRP)

As mentioned by Beecher (1995), the definition of IRP builds upon the previous approaches by saying that:

> ...it is a process for determining the appropriate mix of demand-side and supply-side resources that are expected to provide long-term, reliable service to users at

> the lowest reliable cost and that, which maximises benefits to society and minimises the negative impact to the environment.
>
> (DWAF 2000: 11; please refer to Section 2.1)

Beecher explains that the term IRP "evolved partly to address potential misconceptions and complexities arising from the use of the term "least-cost"" (1995: 40; refer to above section on "Least-Cost Planning") with the concept of IRP appearing to be a "more encompassing term" (1995: 40) despite the two terms being "consistent" and "can be used interchangeably for many analytical purposes" (1995: 40). As demonstrated by the DWAF IRP definition (see above and Section 2.1), the expression "integrated least-cost resource planning" is occasionally applied (Beecher 1995: 40).

Beecher notes that the evolution of IRP has its "intellectual roots spanning over several decades" (1995: 35):

- "Rational-comprehensive and benefit-cost analysis (1960s)".
- "Environmental impact assessment and multi-objective resource planning (1970s)".
- "Least-cost utility planning (1980s)".
- "Total quality management (1990s)".

(Beecher 1995: 35)

Beecher puts forward that "in a broadened sense, IRP recognises that demand management can help achieve multiple policy goals e.g. cost control and pollution prevention" (1995: 41) and this is important because "water resources are often subject to competing uses as well as competing policy goals" (Beecher 1995: 35). In terms of achieving these "multiple policy goals", IRP offers a "more comprehensive evaluation system which emphasises the construction of various planning scenarios in which key variables and assumptions can be altered" (Beecher 1995: 35). These "pre-screened resource options and alternative planning scenarios can help evaluators assess how a given resource mix will affect the utility, the environment and the community" (Beecher 1995: 41) and "these scenarios help utilities to incorporate uncertainties, environmental externalities and community needs into decision-making" (Beecher 1995: 35).

The incorporation of uncertainties is a result of IRP calling for "utilities and others in the water sector to adopt a more forward-looking perspective than that associated with traditional approaches" (Beecher 1995: 36). She continues to state that "this new

orientation means that decision-makers must contend with substantial uncertainty" (1995: 36) but that this does not mean that "the difficulties associated with incomplete and imperfect information should not become the rationale for delaying the evolution of planning strategies" (1995: 36) as "analysts have recognised that IRP helps utilities deal with uncertainties and risks" (1995: 36).

The achievement of multiple policy goals, the development of scenarios and the incorporation of uncertainties leads to IRP identifying "new roles and responsibilities for water supply utilities" (Beecher 1995: 35) and "encouraging the development of new institutional roles in addition to new analytical tools" (Beecher 1995: 34). Beecher contends that "IRP emphasises the importance of establishing a more open and participatory decision-making process and co-ordinating the many institutions that govern water resources" (1995: 35) and that it "promotes consensus-building and alternative dispute resolution over conflict and litigation" (1995: 35).

With reference to the "integration" part of the IRP term, Beecher emphasises that "in addition to integrating resource options, IRP also seeks integration along temporal (short-term and long-term) and spatial (local and regional) dimensions" (1995: 41) where the "integration of resource options" refers to all the "environmental, engineering, public health, financial, rate-making, social and economic considerations feeding into the planning process" (1995: 41). She further explains that this occurs with all the "planning data and information being linked internally to the other management activities of the water utility e.g. physical facilities management, financial management, environmental management, research and development, economic development and public involvement" (1995: 41). She continues to discuss that "IRP also links water utility planning with external planning processes e.g. planning by other water, wastewater and energy utilities; local and regional planning; river basin planning and state-wide, inter-state and federal water planning and policy" (1995: 41) with "some of these relationships being formal e.g. permit process involving state resource or drinking water regulators and others less formal e.g. a utility's use of regional water planning data to develop forecasts" (1995: 41). Beecher highlights the important issue of "the relationship of water utility planning to various government policies that may constrain utility choices" (1995: 41).

Beecher cautions that while "in the final analysis, the severity of water and other crises we may face...will depend heavily upon our ability to be 'society wise' as well as 'technology wise'" (Viessman 1982 cited by Beecher 1995: 36), IRP although "playing a

role in meeting these challenges and averting water crises in water supply" (1995: 36), is "not a panacea for the many problems confronting water utilities" (1995: 36). She discusses as follows:

- "Industry's capital investment needs (including new supply sources) will be substantial even with improved planning and management".
- "Acceptance of a utility's integrated plan does not constitute blanket approval of the utility's programmes nor does it preclude assessment of management's prudence".
- "Comprehensive, integrated planning should enhance other management and regulatory determinations but it is not a substitute for them".

(Beecher 1995: 36)

Beecher concludes her review on IRP by highlighting the relevance of IRP to the water sector:

- "IRP can facilitate co-ordination with resource planning in other sectors – e.g. utility planning co-ordinated with water resource planning, land use planning, wastewater service planning, energy resource planning and emergency response planning. Historically, the interrelationships between water resource and land-use planning have been inadequately addressed because of organisation conflicts between federal and state water resource development and management on the one hand and local land use on the other...Water supply adequacy has not always been recognised as a critical factor in land use planning...better planning can promote ways to limit future water needs..." (Beecher 1995: 44).
- "IRP can provide a means of assessing water utility performance. Planning instruments provide utility managers and their regulators with performance benchmarks...Regulators also might consider providing performance incentives and designing evaluation criteria consistent with long-term integrated planning goals" (Beecher 1995: 44).

Total Water Management

Beecher (1995: 41) declares that "total water management seeks to inspire industry". She explains that it was first observed in the 1990s as a "potential salient concept for water and wastewater utilities" (1995: 41) and that it "reflects the philosophy that water resources should be managed for the greatest good of people and the environment,

with opportunities for participation in water policy by all segments of society (AWWA Mainstream 1994 cited by Beecher 1995: 41).

Beecher disputes that it is "strictly a planning model" (1995: 41) but acknowledges that it "encompasses the basic principles of IRP" (1995: 41) and that it has "many symbolic connotations" (1995: 41). She further maintains that total water management "recognises the paradigm shift from considering water available in unlimited quantities to understanding water supply as a limited resource" (AWWA Mainstream 1994 cited by Beecher 1995: 41) and that it "seeks to inspire the water industry to embrace such ideas as stewardship, unified water resource policies, watershed and ecosystem management, water conservation and the importance of public and political support for water management decisions" (Beecher 1995: 42).

Beecher identifies that "total water management recognises that water resources are a part of numerous complex systems (Section 2.2), both natural and social", which "IRP advocates" also assert (1995: 42). This results in "numerous intellectual, analytical and evaluative challenges" (1995: 42). She further believes that "the term "total water management" and its manifestations are more normative and prescriptive than the seemingly value-neutral realm of rational analysis" (1995: 42) and that the "explicit consideration of values in planning can be uncomfortable, particularly for members of the many science-based disciplines involved in water resource issues" (1995: 42). However, she continues to maintain that "trade-offs among competing values are inevitable when policy choices are being made" (1995: 42). This is similar to the challenges encountered in addressing the limitations with rational comprehensive planning (Section 2.2). She concludes by stating that "a paradigm that allows for dialogue about how to make these trade-offs should be welcomed by the water industry" (1995: 42).

A general overview of the differences between traditional planning and IRP was provided in Section 2.1. These differences are elaborated in Table 2.3.

Table 2.3 Comparison of traditional planning and integrated resource planning (Beecher 1995: 46)

Criteria	Traditional	Integrated Resource Planning
Planning orientation		
Resource options	Supply options, with little diversity	Supply managements and demand management options; efficiency and diversity are encouraged
Resource ownership and control	Centralised and utility owned	Decentralised; utilities, customers and others
Scope of planning	Single objective, usually to add supply capacity	Multiple objectives as determined in the planning process
Evaluation criteria	Maximise reliability and minimise prices	Multiple criteria, including cost control, risk management, environmental protection and community
Resource selection	Based on a commitment to a specific option	Based on developing a mix of options
Planning process		
Nature of the process	Closed, inflexible and internally oriented	Open, flexible and externally oriented
Judgement and preferences	Implicit	Explicit
Conflict management	Conventional dispute resolution	Consensus-building
Stakeholders' identity	Utility and its rate-payers	Multiple interests
Stakeholders' role	Disputants	Participants
Planning issues		
Supply reliability	A high priority	A decision variable
Environmental quality	A planning constraint	A planning objective
Cost considerations	Direct utility system costs	Direct and indirect costs, including environmental and social externalities
Role of pricing	A mechanism to recover costs	An economic signal to guide consumption
Efficiency	An operational concern	A resource option
Trade-offs	Hidden or ignored	Openly addressed
Risk and uncertainty	Should be avoided or reduced	Should be analysed and managed

Section 2.3.5 shows that the evolution of water planning has followed a similar evolution to that of spatial planning as explained in Section 2.2 and Section 2.3.4. Furthermore, a "master plan" is the product of traditional supply planning. Section 2.3.5 also shows that the recommended approach for water planning is IRP of which the product is an integrated resource plan. The following section provides a review of IRP with the IRP process being described.

2.3.6 A Review of the IRP Process

An alternative definition to that provided for least-cost planning in Section 2.3.5 is:

> LCP is a process whereby, for example, a water service provider determines a range of options that at lowest cost provide their customers with the water related services they require rather than the water itself. **This process recognises that customers do not necessarily want more water, rather they want the services that water provides** such as aesthetically pleasing landscapes, sanitation and clean clothes. The process aims to investigate the whole of society costs and benefits to highlight the most economically, environmentally and socially appropriate solution.
>
> (Turner, White and Bickford 2005: 1)

White and Fane (2002: 226) also point out that IRP and LCP are "often seen as synonymous" (Section 2.3.5) but elaborate the difference as follows:

> ...although both involve consideration of demand management for meeting future service needs, IRP provides a broader framework into which LCP fits. Over time, an IRP process should see the iterative reapplication of LCP as part of the cycle of evaluating and assessing options, investing in selected options, assessing conservation results and demand forecasts and then re-evaluating options. IRP also takes into account a range of parameters which go beyond the costs. Planning decisions about demand management need to include a range of other issues including equity; uncertainty of supply/conservation; timeframes for implementation and the potential for changes to rates structures.
>
> (White and Fane 2002: 226)

They illustrate this process in Figure 2.9.

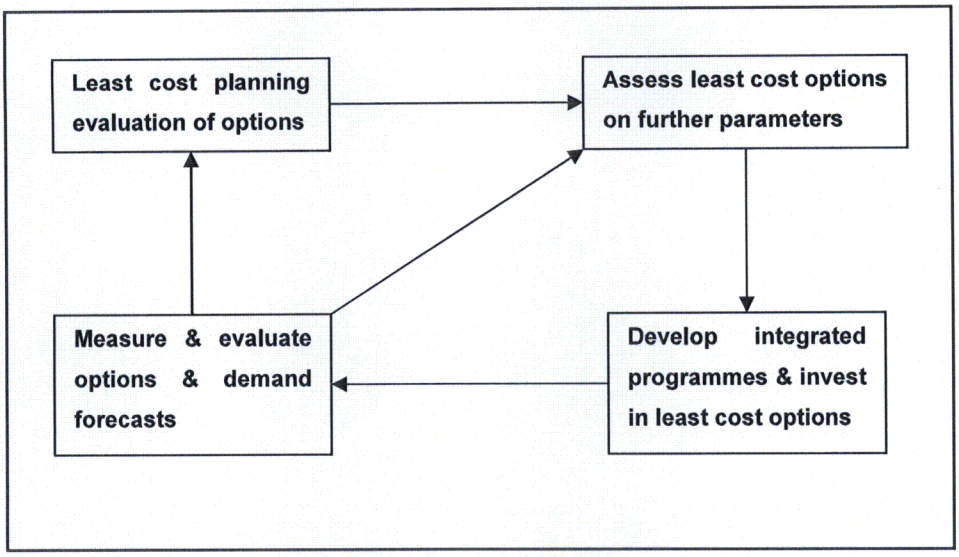


Figure 2.9 Integrated resource planning involves the iterative re-evaluation of options (White and Fane 2002: 226).

Beecher provides a generic process for IRP in Figure 2.10.

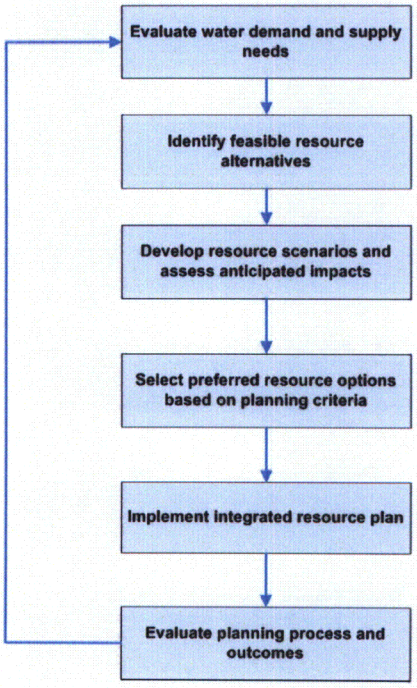


Figure 2.10 The IRP process (Beecher 1995: 44).

The core elements for an IRP as identified by Beecher are listed in Appendix D. Maddaus and Maddaus (2002) also refer to this list and provide a summary of the process as follows:

...

- Demographic trends, historic water use, economic indicators and climate data are needed to prepare a **water demand forecast**.
- The existing and planned **conservation programmes**, such as plumbing codes, landscape ordinances, rebate programmes should be accounted for in the forecasts.
- **Forecasts** are needed for normal, dry year and critical dry year conditions, wet years in future years.
- **Supply side planning** starts with the safe yield of existing supplies and, if inadequate for future needs, locates alternative ground or surface water supplies to meet all or part of future demands.
- **Demand side planning** identifies additional conservation methods and wastewater reclamation projects to reduce demand and quantifies their costs and savings. In addition, short-term demand reduction possibilities in critical dry years are quantified.
- The **supply reliability evaluation** ties together the probability of a supply shortage with the short term demand reductions that could be used to balance supply and demands in droughts. The result is a tabulation of the magnitude and frequency of imposition of mandatory short-term demand reduction programmes.
- **Resource strategies** are the alternatives which combine new supply development and demand reduction alternatives into a manageable number of combinations.
- Evaluate resource strategies involves traditional economic analysis plus consideration of **water quality** and other **environmental impacts**.
- The utility **goals and policies** enter into the evaluation of supply reliability and the resource strategies.
- **Financial planning** is needed at the end to assure that the IRP projects can be funded. The **water rate design** may be radical enough to cause a reduction in water demand that needs to be factored in.
- **Public input** is shown at a couple of key points but needs to be recognised as continuous throughout the process.
- **Evaluation of the results** is a feedback loop to keep the plan updated.

(Maddaus and Maddaus 2002: 3 – 4)

Maddaus and Maddaus (2002: 4) state that the following important elements must be included if the process is to be considered an IRP:

- "Clear goals and policy objectives adopted by the utility management".

- "A planning horizon or future design year".
- "An interdisciplinary process, considering not just engineering details but also a range of key policy objectives".
- "Equal treatment of supply-side and demand-side options (a level playing field)".
- "Consideration of supply reliability".
- "Explicit consideration of uncertainty".
- "An open process with a heavy dose of public participation".

(Maddaus and Maddaus 2002: 4)

An alternative process flow is provided in Figure 2.11.

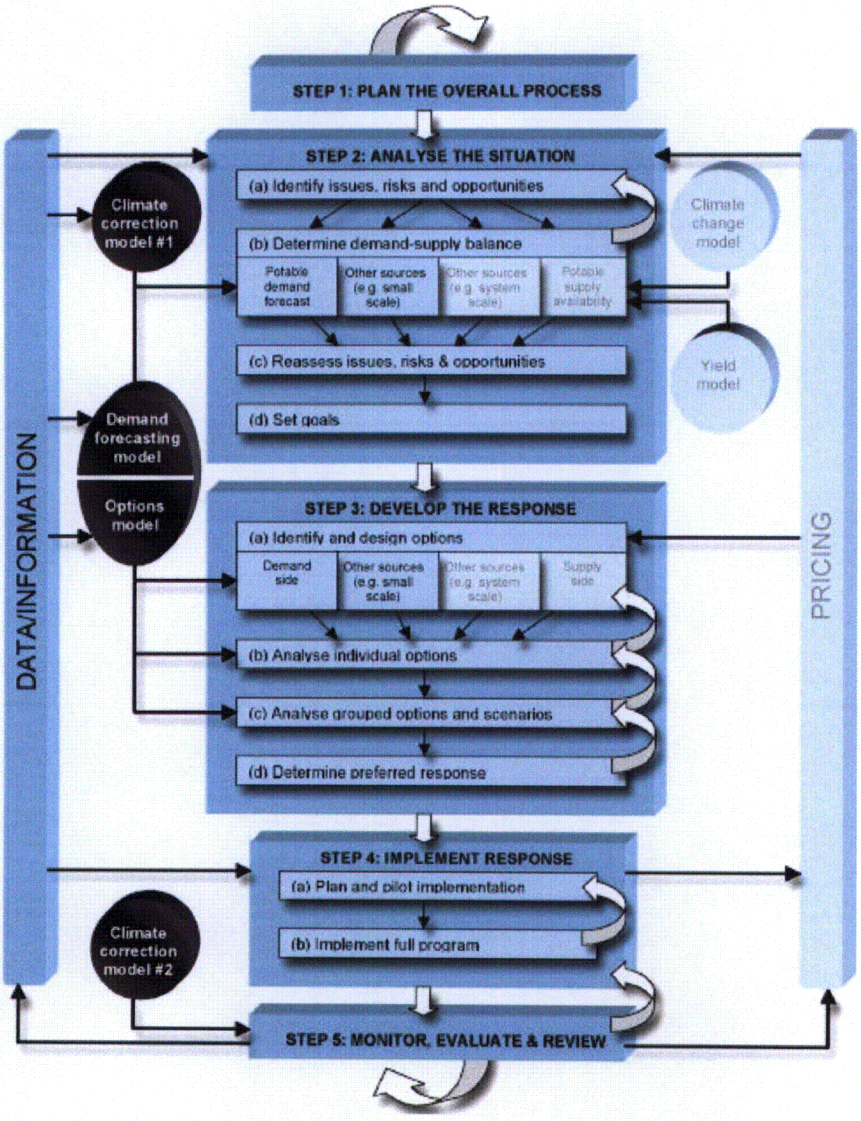


Figure 2.11 The Australian Integrated Resource Planning Framework (Turner et al 2005 cited by Turner and White 2006: 5).

A comparison of the IRP approach with the strategic planning approached described in Section 2.2 reveals that the IRP approach does use a strategic planning approach. One important difference is noted in the comparison of Figures 2.10 and 2.11 viz. "Step 1: Plan the Overall Process". This step could be regarded as the development of the "project plan" which would use the "planning and control cycle" explained in Section 2.2. This is an important step as a project plan allows for successful implementation.

Literature reviewing and assessing the IRP process include the issues of:

- Overall process and elements (Maddaus and Maddaus 2002; Beecher 1995).
- End-use modelling (Fane, Turner and Mitchell 2004; Mitchell and White 2003).
- Backcasting (Fane, Turner and Mitchell 2004; Mitchell and White 2003).
- Least-cost evaluation framework (Fane, Turner and Mitchell 2004).
- Demand management (Turner and White 2006; White and Howe 1998; Mitchell, Turner, Cordell, Fane and White 2004; White 2001; White and Fane 2001).
- Calculations of unit cost in IRP (Fane and White 2003; Fane, Robinson and White 2003).
- Application and assessment of IRP (White and Campbell 2002; Howe and White 1999; White et al 1999).

Turner, White and Bickford (2005: 1) define end-use analysis as:

> ...the disaggregation of water demand into customer sectors (e.g. single and multi-residential dwellings, commercial/industrial properties, institutional properties and unaccounted for water/leakage) and then into individual end-uses (e.g. toilet, showers, baths, taps and washing machines which constitute indoor demand (going to sewer) and garden irrigation and pools which constitute the outdoor component of demand). An end-use model is designed to provide a detailed forecast of water demand using end-use analysis. Thus providing a 'bottom up' approach, which can then be checked against customer meter readings.
>
> (Turner, White and Bickford 2005: 1)

The concept of backcasting is a new concept and was therefore not introduced in Section 2.3.2, which dealt with forecasting, the method normally associated with traditional supply planning. Backcasting is used in IRP approaches and Fane et al (2004) explain the term as follows:

> Backcasting studies involve describing a desired future end-point and then working back from that point, to determine the feasibility and what would be required to reach that goal...Forecasting in comparison involves projecting into the future based on what are perceived as the current dominant trends...
>
> ...Mitchell and White (2003) contend that forecasting and backcasting are complementary in planning for the future of water systems. Forecasting can tell us important information about the near future. This allows us to optimise the existing system in the short term. Backcasting is in contrast much more powerful as a means of reflecting on the medium- to long-term. This is because it allows assumptions about how systems might be configured in the future to be challenged and reconsidered.
>
> Detailed forecasting is the basis of insightful backcasting...
>
> (Fane et al 2004: 2 – 3)

Analysing the above shows that:

- The IRP process follows the strategic planning process identified in Section 2.2.
- The IRP process uses forecasting for the short-term horizon but backcasting for the medium- to long-term horizons.
- The IRP process however does follow the comprehensive approach when using end-use modelling. Nevertheless, White and Campbell's application of IRP on the NSW North Coast (2002) showed that end-use modelling can be undertaken successfully with limited available data. Still, it was recommended than a more comprehensive end-use model was to be set-up once the required data was collated.
- The IRP process emphasises integration, alignment and co-ordination (Sections 2.3.5 and 2.3.6).

The sample shown in Table 2.2 in Section 2.3.4 showed that the term commonly used for the water planning product is "master plan". Does this mean that although the water planning approach has evolved into something addressing the criticisms identified in Section 2.3.4 and Section 2.3.5, the popular approach is still the traditional supply planning with all the identified short-comings? The following section evaluates 26 water plans with the objective of answering this question.

2.3.7 Identified Elements of a Water Plan

This section evaluates 26 water plans with the objectives of:

- Determining if there are different or similar elements between water plans.
- Determining if the IRP approach is used.

There are different definitions of a water master plan as shown by Section 2.3.4. However are there any differences in the elements of a water plan? One guideline document prescribing the elements of a water plan and the reasons they are required is the State of Washington's Water System Planning Handbook (1997). Within the State of Washington, it is a statutory requirement for water service providers to prepare a Water System Plan and therefore the Washington State Department of Health which has the jurisdiction of water service provision has prepared guideline documents to assist in the preparation of the required water plans (1997; 2001; 2003). The prescribed elements are:

- Description of water system.
- Basic planning data and water demand forecasting. The required planning horizon is 20 years.
- System analysis.
- Conservation programme, water right analysis, system reliability and interties.
- Source water protection.
- Operation and maintenance programme.
- Distribution facilities design and construction standards.
- Improvement programme.
- Financial programme.
- Miscellaneous documents e.g. supporting documents; agreements and contracts etc.

(Washington State Department of Health 1997)

Comparing these elements with those of an IRP's elements (Section 2.3.6 and Appendix D) shows that a water plan adhering to the State of Washington's requirements, fulfils the needs of an IRP.

In the South African context, the WSA's are guided by DWAF's WSDP Guideline document (2006) and the WSA's Checklist document (2005) on the elements of their

water plan. The WSDP Guideline document describes the required elements (a summary of this information is listed in Appendix E) whilst the WSA's Checklist document explains why the prescribed information is needed (Appendix E). There are no guideline documents on the water plan for a water board but DWAF does have a guideline document for a water board's business plan (Appendix F).

The comparison of the elements of regulated South African water plans with those of an IRP's elements (Section 2.3.6 and Appendix D) again reveals that DWAF's guidelines are using an IRP approach. It is further noted that in contrast with the strategic planning approach in spatial planning (Section 2.2 and 2.3.4), the water plans although referring to "strategies" and "priorities", follow the comprehensive approach. This was shown in Section 2.3.6 to be part of the IRP approach. Still, the DWAF guidelines do not refer to "backcasting" although they do indicate that a water board's demand projections should be reconciled with those of the respective WSAs (DWAF 2003; Appendix F). However, the WSA Checklist maintains that "some WSAs might have a Water Services Master Plan in which they comply with section 13 of the Water Services Act. The master plan is acceptable..." (DWAF 2003: 17; Appendix E). The document does not acknowledge the importance of water demand management and that the "water services master plan" may use the traditional water supply planning approach and therefore not provide all the information as prescribed in the WSDP Guidelines document.

Contrasting and comparing the elements further reveals that the only significant difference is that of specifying the desired goals and the strategies that will be adopted in achieving these goals i.e. the difference between the strategic and operational levels (Figure 2.1).

Using the above-identified elements as a basis, a sample of 26 water plans were compared and contrasted with the objective of identifying the common elements. The complete set of results of this analysis is displayed in Appendix G.

From the sample, there were 19 different terms used for a water plan with "water infrastructure master plan" being the most common and none using the term "integrated resource plan". The terms used and the frequency of the terms are shown in Table 2.4.

Table 2.4 Frequency of terms used.

Term	Percentage
Water Infrastructure Master Plan	19.23
Master Plan	7.69
Water System Master Plan	7.69
Infrastructure Development Plan	3.85
Integrated Regional Water Management Plan	3.85
Long Term Water Project Master Plan Update	3.85
Metropolitan Water Plan	3.85
Non-Potable Water Master Plan	3.85
Raw Water Master Plan	3.85
Retail Water Master Plan	3.85
Surface Water Master Plan	3.85
Urban Water Management Plan	3.85
Water and Wastewater Master Plan	3.85
Water Demand and Infrastructure System Evaluation	3.85
Water Master Plan	3.85
Water Plan	3.85
Water Resources Master Plan	3.85
Water System Plan	3.85
Waterplan 2021	3.85
Wholesale Master Plan and Treatment	3.85

From the literature review, it was identified that the spatial extents covered by the different plans vary. This correlates to what Beecher identifies where she indicates that water utilities cover a range of spatial extents (2002). This situation is further complicated by what Ledo (2000: 124) explains as "the terms 'local' and 'regional' are used indistinctly". One definition of regions is "sub-national units defined by functional, administrative, landscape, tradition and heritage, or programme commonalities" (Lawrence and Bartels 2006: 350). It was therefore decided to compare the areas covered by the plans in the sample to determine the range of spatial extents covered. The sample ranged in spatial extent from 13 square kilometres to 44 030 square kilometres and this distribution is shown in Figure 2.12.

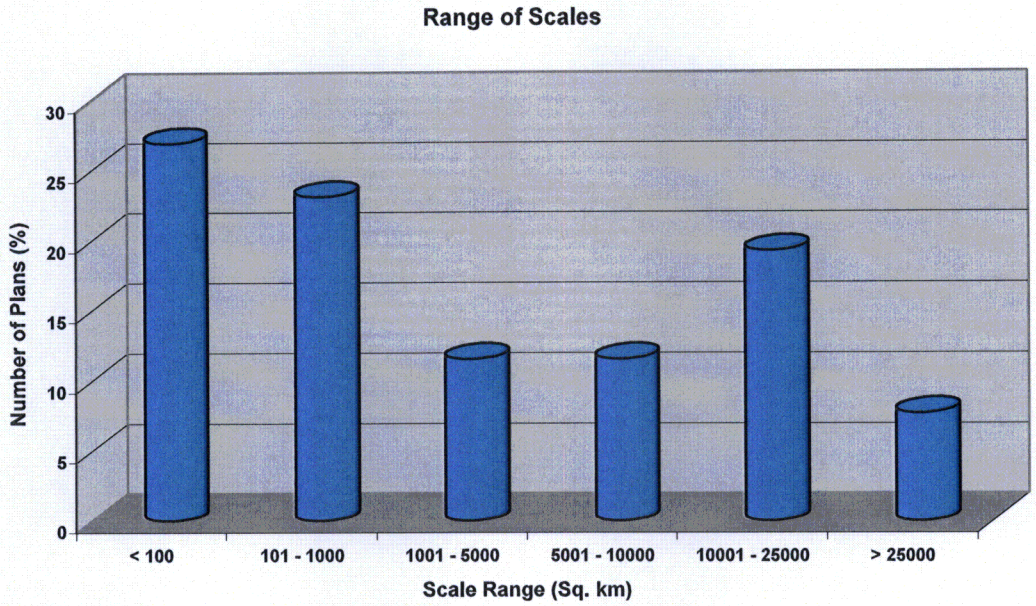


Figure 2.12 Range of spatial extents.

This shows that water plans are prepared for regional areas.

As identified above, the State of Washington's guideline document refers to a planning horizon of 20 years whilst the WSDP and water board business plan guidelines refer to a planning horizon of 5 years. What then is the planning horizon for a water plan?

The literature reviewed identified the following durations:

- **Short-range / Short-term:** Köster (1996: 13) explains that "these would be very specific, generally covering a time period of, say, a few days, weeks or a month".
- **Medium-range / Mid-term:** These cover a period of one to five years. Köster (1996: 13) explains that "there are a few exceptions where these time ranges cover a period of more than five years" and that "they are generally used to achieve the long-range strategic plans and goals". Dusik and Sandler (2004: 90) provide an example of mid-term economic development plans in all the Central and Eastern Europe countries under the former socialist regime e.g. five-year plans that established targets for all sectors of the economy and all state-owned enterprises.
- **Long-range / Long-term:** Köster (1996: 14) states that "these commonly cover a period of five years or more" and that "most textbooks refer to long-range plans

as being from five to 20 years". Agreeing with this statement, Dusik and Sadler (2004: 90) explain long-term as "up to 20 years and beyond" and provide the example of sectoral-development plans in the Central and Eastern European countries under the former socialist regime e.g. "national master plans for transport, energy, mining or tourism that were largely drawn up within the national tier of land-use planning".

Evaluating the sample revealed that the planning horizons ranged from five to 50 years with the 20, 25 and 15 year planning horizons being the most common (Figure 2.13).

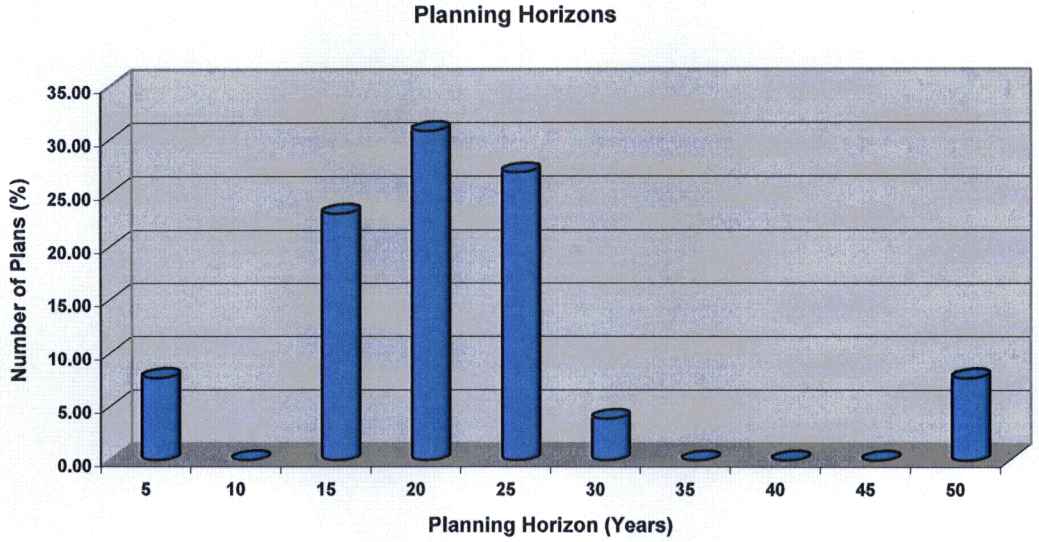


Figure 2.13 Range of planning horizons (years).

With regard to urban-rural character, none of the plans sampled included areas that were totally rural in character. Of the areas covered by the sample, 69% had an urban-rural character whilst the remaining 31% had an urban character.

Majority of the plans sampled provided bulk water as a core service which was closely followed by retail water and for those providing wastewater, catchment management and agricultural water services, there was an equal distribution. This is shown in Figure 2.14.

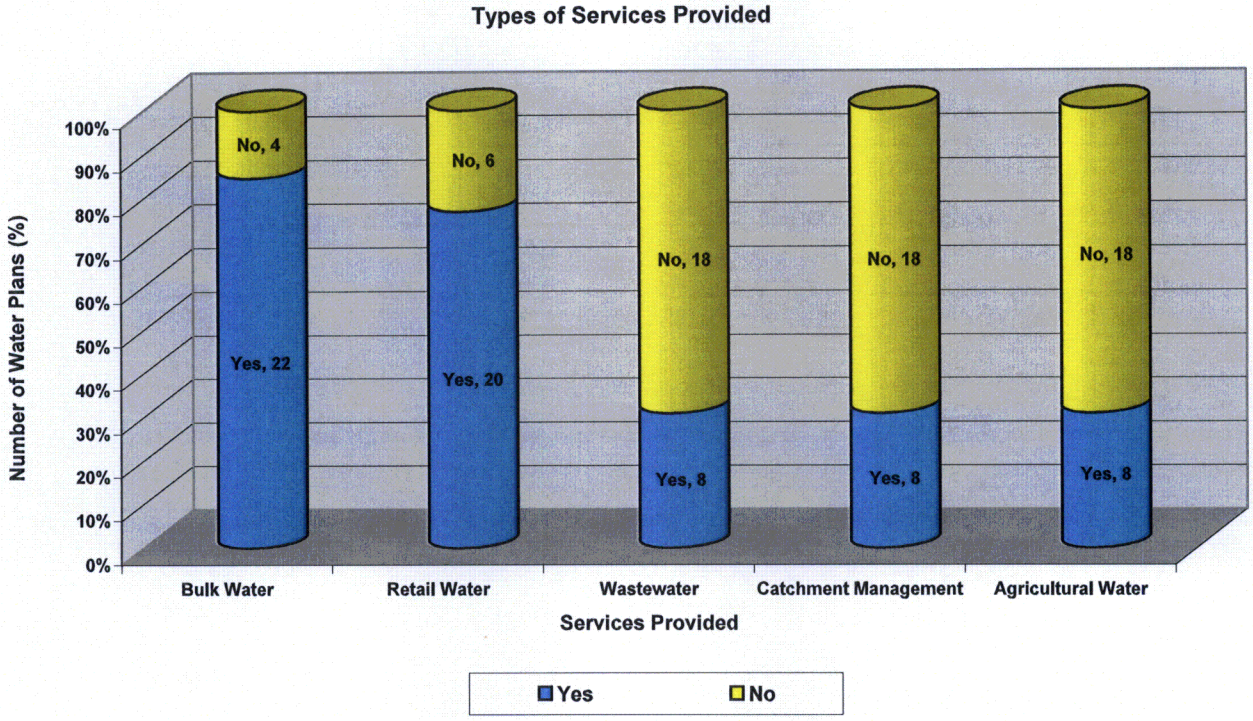


Figure 2.14 Types of services provided.

In terms of the content of the plans, approximately 12% of the plans did not have any maps, which means these plans do not fulfil a basic requirement of a water plan.

The constituent information found in the sample is illustrated in Figure 2.15. From this figure, it can be concluded that for all water plans, the context and background, the status quo, demands and the systems analysis are core pieces of information. This is followed by measuring progress, the planning process and methodology, the list of projects, financial information and the budget.

However, it is important to note that the programme schedule and the financial programme did not feature predominantly in those plans sampled (approximately 27% and 39% respectively). This implies that the logical sequence in which the identified projects need to be implemented to achieve the desired outcomes is not known or if it is known, it is not shown on the plan. The lack of logical sequencing in implementing projects is a common reason for failure and the lack of this information in the plans could lead to the unsuccessful implementation of these plans.

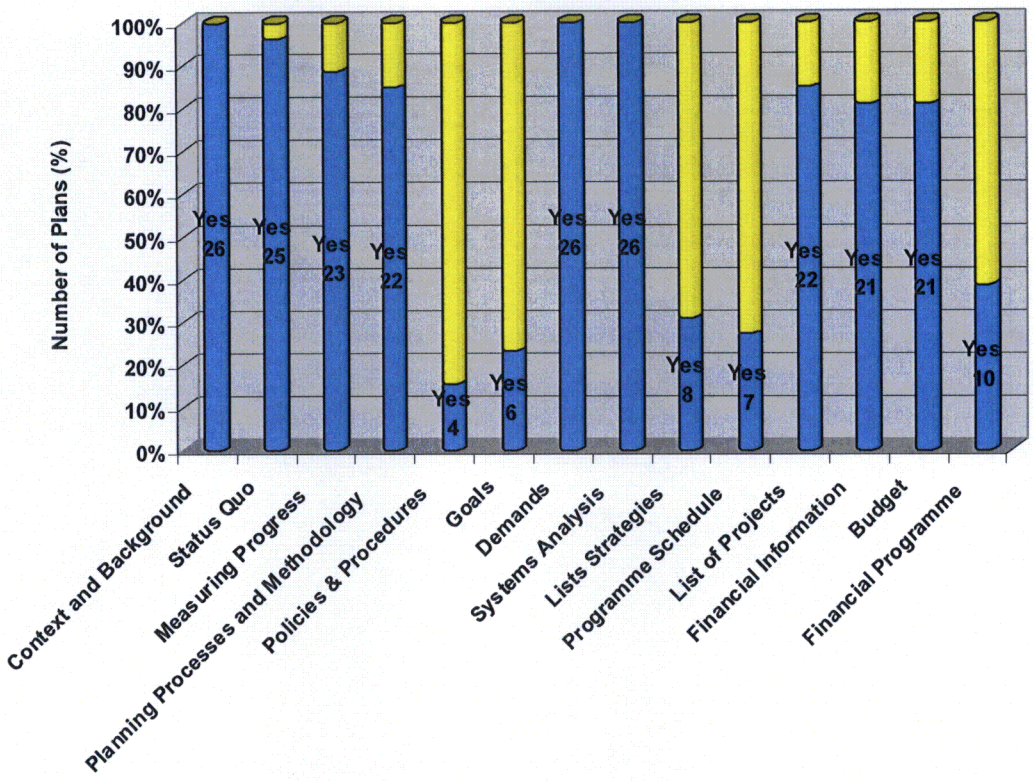


Figure 2.15 Component information.

In terms of IRP's holistic approach, some of the issues that would need to be addressed are shown in Figure 2.16. However, as this figure illustrates, the strategies do not feature prominently in the plans sampled and therefore it may be put forward that IRP may be common as a paradigm but it still has not been entrenched into regular water planning (the plans sampled ranged from 2000 – 2006) or those preparing the plans do not fully understand the paradigm shift in water planning.

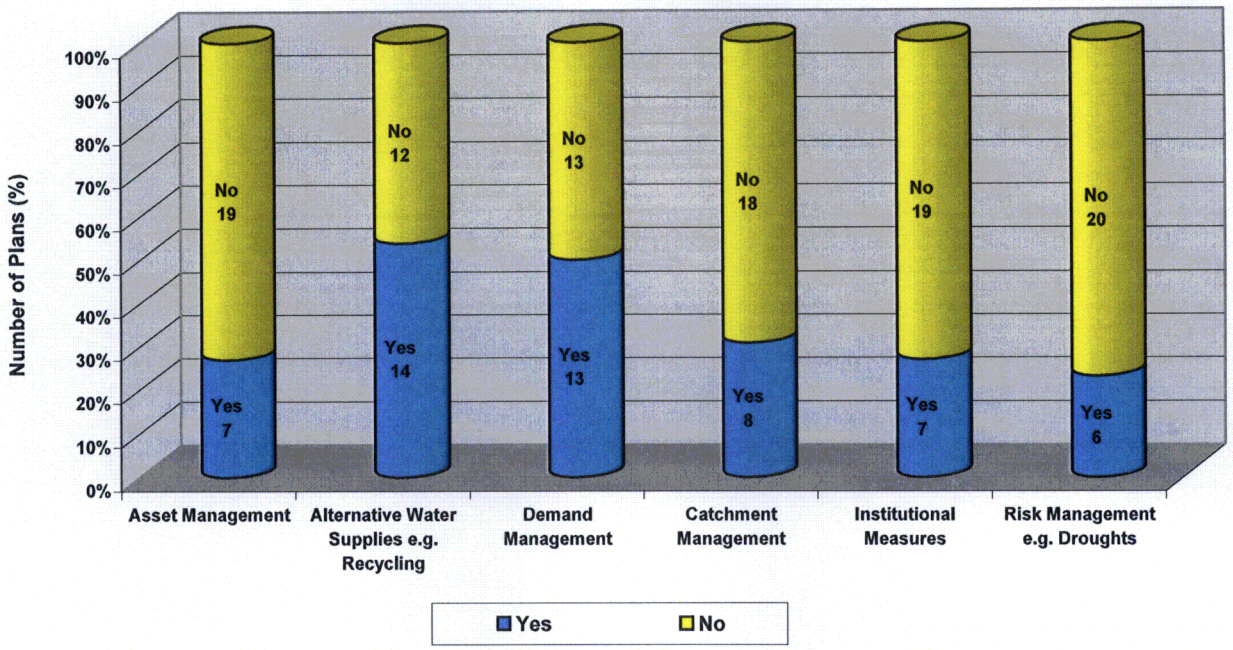


Figure 2.16 Strategies that are considered as part of an IRP approach.

One of the criticisms of the master plan was the lack of co-ordination between institutional stakeholders as illustrated by the following comments:

- "...plans are now expected to be part of a relatively more corporate and integrated approach in local governance arrangements" (Peel and Lloyd 2005: 270).
- "...require improved integration across policy realms and importantly, across tiers of government" (McGuirk and O'Neill 2002: 313 – 314).

In the sample, approximately 35% of the plans were a regulatory requirement and approximately 12% of the plans were submitted for external review. It can therefore be proposed that majority of water plans are undertaken because they are deemed to be useful? Or are they undertaken for the sake of being undertaken?

The following section looks at the role of the water plan and the IDP in the South African regulatory environment.

2.3.8 The Legislative Requirements

The pieces of legislation directly governing the planning processes in this study are:

- Section 16 of the Municipal Systems Act (32 of 2000). This section requires that all municipalities develop a system of participatory governance i.e. a "culture of community participation".
- Section 23 of the Municipal Systems Act (32 of 2000). This section requires that all municipal planning must be developmentally oriented.
- Section 24 of the Municipal Systems Act (32 of 2000). This sections requires that all municipal planning must be "aligned with and complement the development plans and strategies of other affected municipalities and other organs of state so as to give effect to the principles of co-operative government contained in section 41 of the Constitution".
- Section 25 of the Municipal Systems Act (32 of 2000). This section prescribes the requirement of a "single, inclusive and strategic plan for the development of the municipality" i.e. an IDP for all municipalities.
- Section 26 of the Municipal Systems Act (32 of 2000) lists the "core components" of IDPs which are as follows:

    - The municipal council's vision for the long term development of the municipality with special emphasis on the municipality's most critical development and internal transformation needs.
    - An assessment of the existing level of development in the municipality, which must include an identification of communities which do not have access to basic municipal services.
    - The council's development priorities and objectives for its elected term, including its local economic development aims and its internal transformation needs.
    - The council's development strategies, which must be aligned with any national or provincial sectoral plans and planning requirements binding on the municipality in terms of legislation.
    - A spatial development framework, which must include the provision of basic guidelines for a land use management system for the municipality.
    - The council's operational strategies.
    - Applicable disaster management plans.

- A financial plan, which must include a budget projection for at least the next three years.
- The key performance indicators and performance targets determined in terms of section 41.

- Sections 27 – 30 of the Municipal Systems Act (32 of 2000) describe the process in which the IDP is undertaken and includes the formation of a framework which binds both the district municipality and the local municipalities in the area of the district municipality and the adoption of the process to be followed in which the draft process is commented on by the community and requested amendments made. Section 29 emphasises alignment in the process for both the district municipality and the local municipalities occurring within the district municipality and "for the identification of all plans and planning requirements binding on the municipality in terms of national and provincial legislation".
- Section 31 of the Municipal Systems Act (32 of 2000) requires the MEC for local government in the province to monitor the process, assist the municipality with the "planning, drafting, adoption and review of its IDP", "facilitate the co-ordination and alignment" of the different IDPs and the "plans, strategies and programmes of national and provincial organs of state".
- Section 32 of the Municipal Systems Act (32 of 2000) requires that the IDP be submitted to the MEC for local government in the province.
- Section 34 of the Municipal Systems Act (32 of 2000) requires that the IDP be reviewed annually and amended in "accordance with a prescribed process".
- Section 12 of the Water Services Act (108 of 1997) requires every WSA to prepare a draft WSDP and Section 13 specifies the contents of this plan as follows:

  - The physical attributes of the area to which it applies.
  - The size and distribution of the population within that area.
  - A time frame for the plan, including the implementation programme for the following five years.
  - Existing water services.
  - Existing industrial water use within the area of jurisdiction of the relevant WSA.
  - Existing industrial effluent disposed of within the area of jurisdiction of the relevant WSA.

- The number and location of persons within the area who are not being provided with a basic water supply and basic sanitation.
- The future provision of water services and water for industrial use and the future disposal of industrial effluent, including:
  - The water services providers which will provide those water services.
  - The contracts and proposed contracts with those water services providers.
  - The proposed infrastructure necessary.
  - The water sources to be used and the quantity of water to be obtained from and discharged into each source.
  - The estimated capital and operating costs of those water services and the financial arrangements for funding those water services, including the tariff structures.
  - Any water services institution that will assist the water services authority.
  - The operation, maintenance, repair and replacement of existing and future infrastructure.
- The number and location of persons to whom water services cannot be provided within the next five years, setting out:
  - The reasons therefore.
  - The time frame within which it may reasonably be expected that a basic water supply and basic sanitation will be provided to those persons.
- Existing and proposed water conservation, recycling and environmental protection measures.

- Section 14 of the Water Services Act (108 of 1997). This section prescribes the requirement of the WSA to make available the draft WSDP for public comment.
- Section 15 of the Water Services Act (108 of 1997) requires that the WSA must consider all the comments received before adopting the WSDP. A copy of the adopted WSDP must be provided to the DWAF Minister, the DPLG Minister, the relevant province and all neighbouring WSAs.
- Section 16 of the Water Services Act (108 of 1997) specifies that a WSA must prepare and adopt a new WSDP at intervals determined by the DWAF Minister in consultation with the DPLG Minister.
- Section 17 of the Water Services Act (108 of 1997) states that "no substantial deviation from a development plan is valid unless it is embodied in a new

development plan adopted in accordance with procedures set out in sections 12 to 16".

- Section 52 of the Public Finance Management Amendment Act (29 of 1999) states that water boards which are listed in Schedule 3 of the Act must submit to DWAF and "to the treasury, at least one month, or another period agreed with the National Treasury, before the start of its financial year:

  - A projection of revenue, expenditure and borrowings for that financial year in the prescribed format.
  - A corporate plan in the prescribed format covering the affairs of that public entity or business enterprise for the following three financial years, and, if it has subsidiaries, also the affairs of the subsidiaries."

- Section 18 of the Water Services Act (108 of 1997) requires that a WSA must report on the implementation of its WSDP during each financial year.
- Section 39 of the Water Services Act (108 of 1997). This section prescribes the requirement of a policy statement for all water boards.
- Section 40 of the Water Services Act (108 of 1997). This section prescribes the requirement of a business plan for all water boards.
- The Development Facilitation Act (67 of 1995) which requires that developers obtain the approval from the relevant authorities with regard to services. Prior to the establishment of WSAs, Umgeni Water would have been the responsible authority for those areas outside the former Transitional Local Councils (TLCs). However, all developers for water services need to go to the WSA who in turn may refer them to Umgeni Water if Umgeni Water is the WSP.

Analysing the above statements from the applicable Acts shows that:

- The IDP process follows the strategic planning process identified in Section 2.2.
- The IDP process emphasises integration, alignment and co-ordination.
- The IDP process emphasises community participation.
- The Water Services Act emphasises the product of the WSDP and therefore it is not clearly identified that a strategic planning process is being used.
- The emphasis on the product of the WSDP also means that the importance of integration, alignment and co-ordination is not explicitly stated.

- The Water Services Act does however emphasise the importance of community participation (Section 14).
- Amdam (1995: 306) states that the "planning process must function as a continuous learning process". The Water Services Act uses the term "new development plan" (Sections 16 and 17) whereas the Municipal Systems Act uses the term "amend" (Section 34). The implicit message conveyed by the use of these two different terms is that the Water Services Act may condone the development of new WSDP which disregards the work achieved by a previous WSDP. In contrast, the use of the term "amend" by the Municipal Systems Act implies that strategic control (see Section 2.2) is being used and work achieved to date will not be disregarded.
- Water services providers are legislated to provide business/corporate plans but none of the Acts prescribe what is required in terms of the planning process and product.
- The Water Services Act does not refer to integrated resource planning, the paradigm on which the provision of water services is suppose to be built. Instead this is referred to implicitly in the guideline documents as shown in Section 2.3.7.

Wilkinson (2002) looked at the linkages between integrated development planning and the sector planning of integrated transport planning. He concluded that:

> "In South Africa, the current legislative and regulatory frameworks governing integrated development planning and integrated transport planning at the municipal level have introduced expectations that local IDPs and ITPs will – or should – be essentially aligned or compatible with one another, if not fully and directly integrated...these expectations are unlikely to be met while rationalities and practices in the fields of land use and transport planning remain separated by the present disciplinary and professional divides, despite the establishment of a unified and rationalised system of local government explicitly committed to a developmental agenda and the concept of integrated planning."
>
> (Wilkinson 2002: 8 – 9)

The above assessment has only looked at the applicable Acts. The next section evaluates the above identified points in the context of the integrated development planning framework.

2.3.9 A Review of the IDP Process

The IDP is a "planning, budgeting and management" tool that is being used by municipalities to achieve "decentralised, strategic, participatory, implementation-orientated, co-ordinated and integrated development" by:

- "Providing an instrument which guides what and where investment should occur to speed up delivery and secure the buy-in of all relevant role-players for implementation".
- "Attracting additional funds by providing private investors and sector departments with a clear framework of the municipality's development direction".
- "Overcoming apartheid legacy at local level by facilitating redistribution of resources in a consultative process".
- "Promoting intergovernmental co-ordination by facilitating a system of communication and co-ordination between local, provincial and national spheres of government".

(Ambert and Feldman 2002: 1)

One conceptualisation of a "typical IDP" is illustrated in Figure 2.17 (Fox 2002: 6).

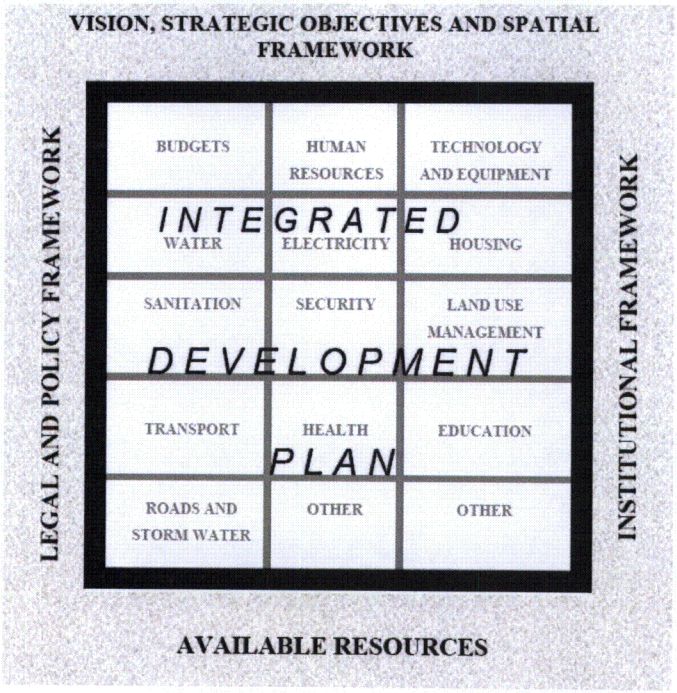


Figure 2.17 A conceptualisation of a typical IDP (Fox 2002: 6).

The strategic planning approach used by the IDP process and identified in Section 2.2 is shown clearly when comparing the process in Figure 2.18 and Section 2.2.

The process to be followed is described in the IDP Guideline Documents (DPLG and DTZ 2002) and an assessment of the process is provided by the Decentralised Development Planning Task Team (2002). The IDP process (Figure 2.18) leads to the IDP product. However, in preparation for the process shown in Figure 2.18, municipalities need to prepare a "process plan" and if a district municipality, additionally a "framework plan". These two plans are defined in Sections 27 – 30 of the Municipal Systems Act (32 of 2000) as recorded in Section 2.3.8. The IDP Guidelines note that:

> The process plan is a management tool for each municipality (local and district) which helps with the management of the IDP process on a day-to-day basis. The Framework is a co-ordination tool for the district which helps ensure inter-related parallel processes at district and local level.
>
> (DPLG and DTZ 2002: 5)

The process plan performs a similar function to that of the planning and control cycle described in Section 2.2 and is comparable with the first step in the IRP process shown in Figure 2.11. However, although the importance of co-ordination in the IRP process was emphasised in Section 2.3.5 and referred to in Section 2.3.6, the literature reviewed on the IRP process does not show that there is a similar function to that performed by the framework plan.

An alternative model (shown in Figure 2.19) to that provided in the IDP Guideline Documents has been provided by eThekwini Municipality (Dlamini and Moodley 2002). This model provides an alternative process to address the challenges of planning, budgeting, implementation and evaluation.

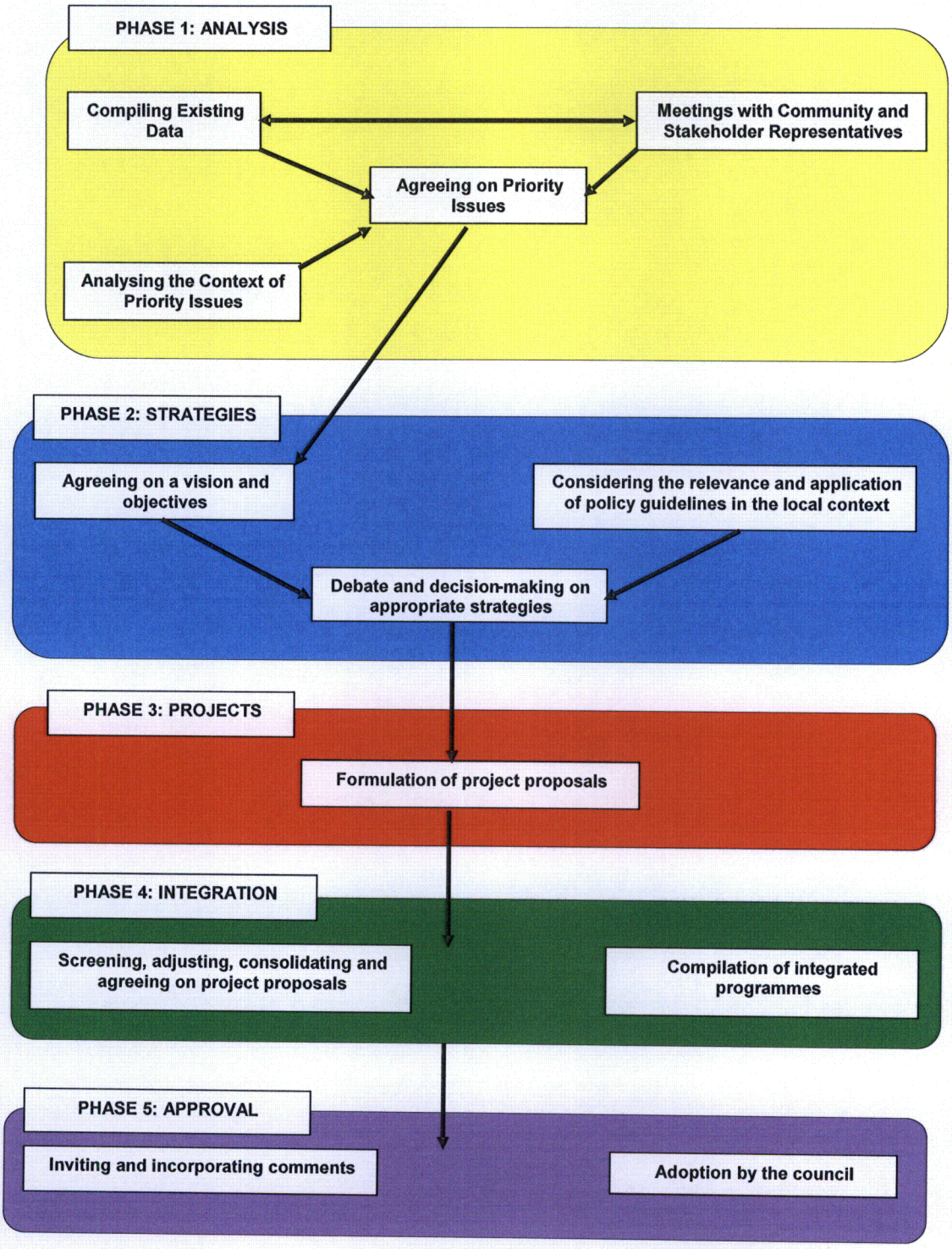


Figure 2.18 The IDP process (DPLG and GTZ 2002: 18).

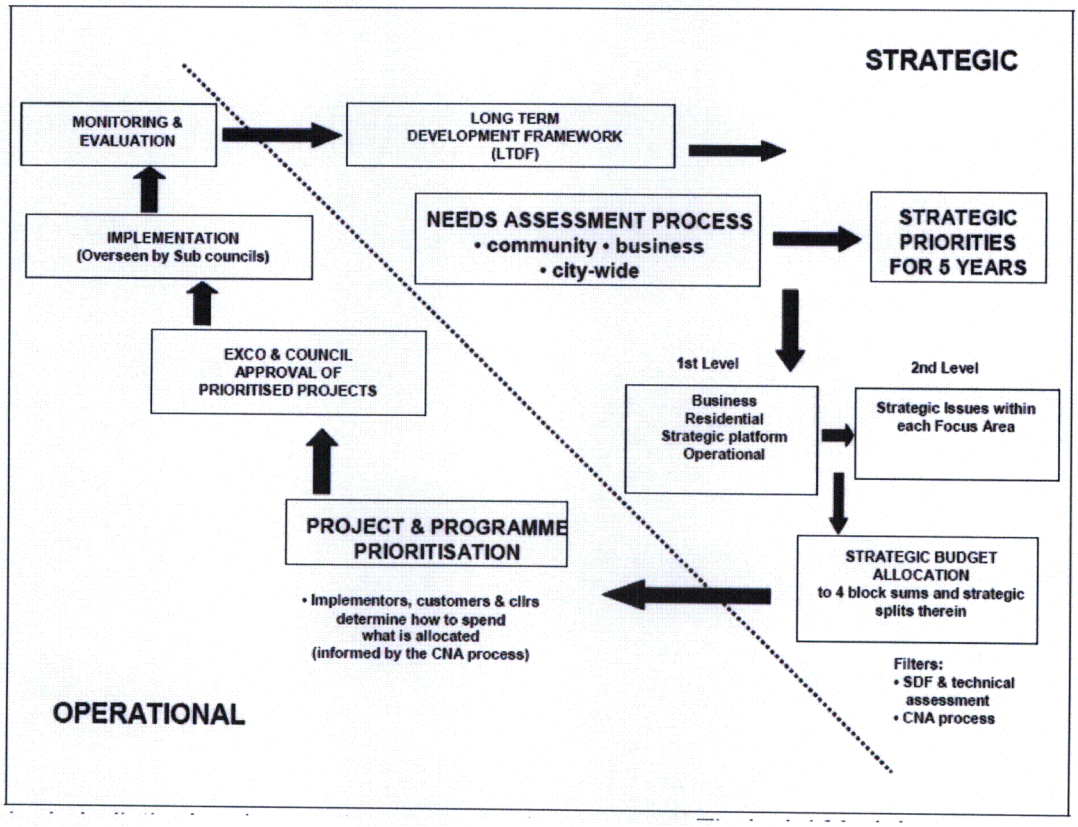


Figure 2.19 The eThekwini Model – "a single holistic development management process" (Dlamini and Moodley 2002: 8).

Literature reviewing and assessing the IDP process includes the issues of:

- Overall assessment (DDP 2002)
- Capacity building – Agyemang (2002)
- Budgeting and financial analysis – Amber and Feldman (2002); Dayomi (2006)
- Alignment – Amber and Feldman (2002); Aucamp and Moodley (2002); DLGTA (2004); Brits (2006); Mazibuko (2006); Maree et al (2006); Muller (2006)
- Management systems – Fox (2002); Brits (2006)
- Participatory planning – CBP Partners (2002)
- The Spatial Development Framework (SDF) and land use management – Kahn et al (2002); Green et al (2002); Forse et al (2002); Robinson (2006)
- Sustainability – Shippy (2006); Muller (2006); Todes (2002); Tapela (2002); Luca and Venter (2002); Niegaardt (2002)
- Organisational culture, leadership and management – Paige (2006)

The DDP assessment (2002) on the issue of alignment identified the following:

- "Delivery-orientation of the planning process was only successful for projects which fall under municipality/district responsibility. Due to lack of involvement of provincial and national sector agencies, projects which need to be implemented by them were not planning in detail." (DDP 2002: 22).
- "Effective alignment of IDP and provincial and national planning processes did not happen...Neither side showed keen interest in interacting. The municipalities, being delayed in their IDP processes, tried to speed up and avoid any further delay and complication through involvement of external role players. The provincial and national departments, had priorities other than municipal planning and sent junior officers without any strong and consistent mandate to Provincial IDP Steering Committees and to district-level IDP-related events. The lack of commitment may have been as well as a result of lack of clear understanding on how to align." (DDP 2002: 23).

One of the recommendations put forward by the DDP assessment to address the above-identified issues on alignment was that "a legal and policy framework for inter-governmental planning systems/mechanisms has to be established as part of a wider policy framework on inter-governmental relations" (2002: 33).

The DDP assessment also identified that spatial planning tended to be neglected by the IDP:

> **Spatial development planning**, which in the past had played a dominant role in municipal planning has become somewhat marginalised in IDP. Looking at IDP only as a participatory way of project planning and budgeting, as it was done in the majority of municipalities, has resulted in a tendency to neglect or to sideline spatial development planning. As a consequence, the drafting of a spatial development framework was either done as a parallel process by consultants or it was postponed. The positive exceptions again were municipalities where strategic planning had been done and where a spatial strategic framework had been used as a point of reference for project prioritisation. The tendency to isolate spatial development framework drafting as a merely technical task resulted, in some cases, in a neglect of spatial policy guidelines and tendency to perpetuate the spatial legacy of the past.
>
> (DDP 2002: 21)

The concept of a "grand strategy" was identified in Section 2.2. Using a similar concept, one of the recommendations put forward by the DDP on "specific methodological aspects" related to strategies was that "the methodology should include a strong overall municipal strategy which is more specific than a vision and which can inform issue-specific strategies" (2002: 30).

Ambert and Feldman (2002) critiqued the process of alignment by looking at the intergovernmental fiscal and institutional system (Appendix H provides a summary of their critique). As one of their recommendations, Ambert and Feldman (2002: 20) similar to that of the DDP, state that an intervention "to bind the manner in which provincial and national sector departments plan and budget, through legislating alignment mechanisms with the municipal planning process, to mitigate the degree of fiscal decentralisation is needed".

Section 2.3.3 identified that there were no legislative requirements for a water board to align its planning with those of the municipalities it serves and Section 2.3.4 further referred to this. So how does the water sector see alignment occurring? The next section briefly describes the water sector's planning framework.

2.3.10 The South African Water Planning Framework

In 2001, the WSDP General Overview (DWAF 2001: 21) explained that "there is no standard recipe or methodology for preparing a WSDP" but it did recommend that "a strategic planning methodology be used, based on the methodology outlined in the IDP manual". This document referred to the WSDP process and described the linkages between the IDP and WSDP processes in Figure 2.20.

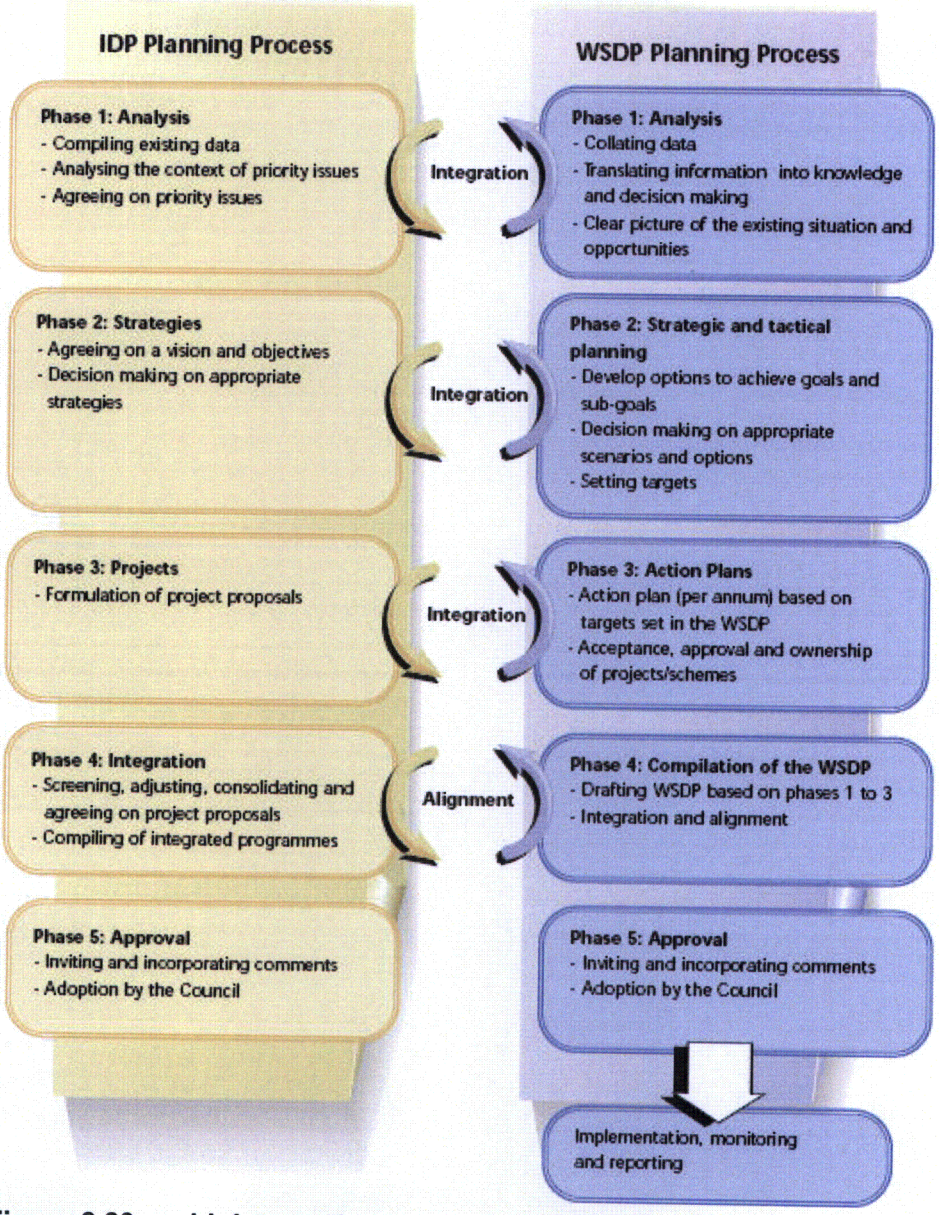


Figure 2.20 Linkages between the IDP and WSDP processes (DWAF 2001: 22).

The WSDP General Overview (DWAF 2001: 28) also distinguished between the WSDP process and the product and explained how the process linked to the product in Figure 2.21.

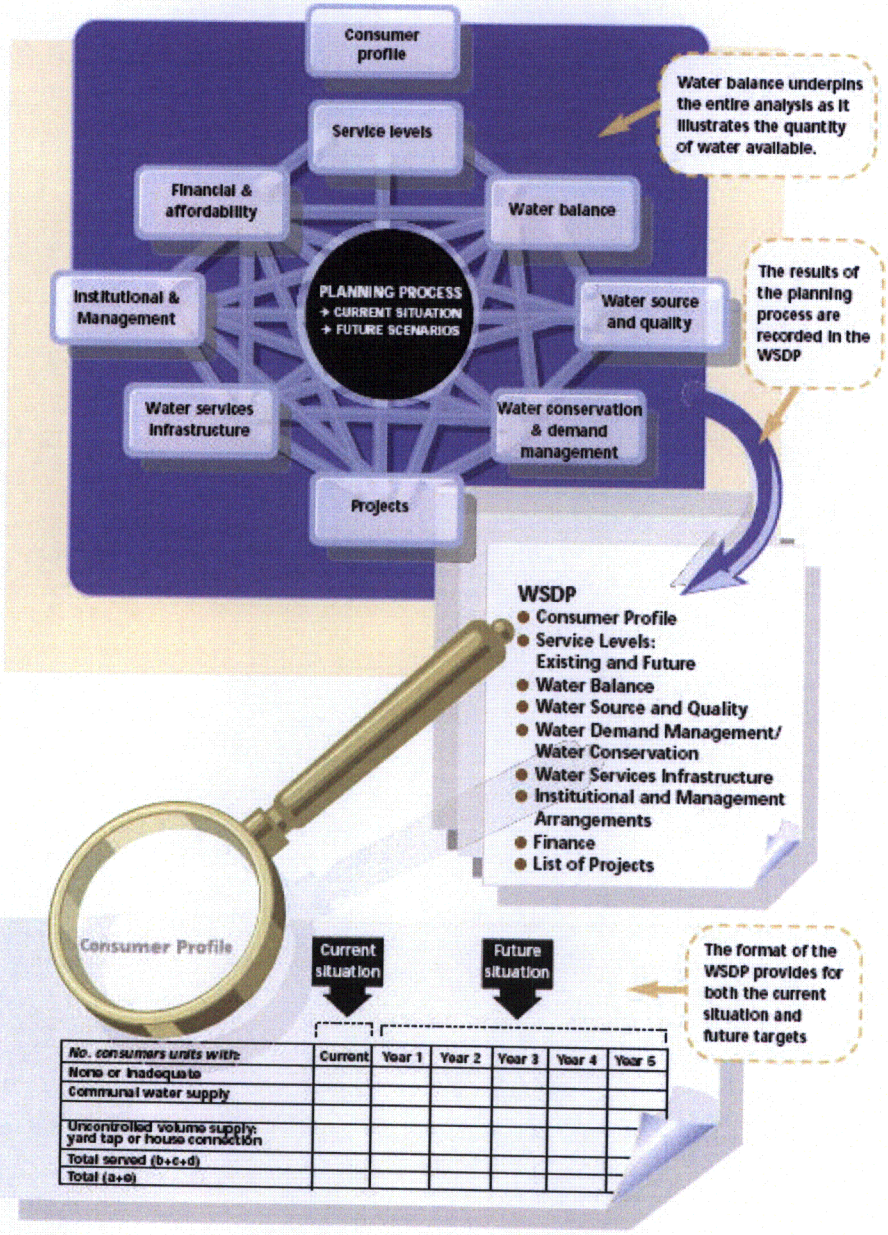


Figure 2.21 The linkages between the WSDP process and the product (DWAF 2001: 28).

As shown in Section 2.3.7, DWAF prescribes the format of the WSDP in the document entitled "DWAF's Guide Framework and Checklist for the Development of Water Services Development Plans". In the first version of the document which appeared in 2001, there was no mention of a strategic planning approach for the WSDP process. However, in the following version which came out in 2004, the strategic planning approach was explicitly explained in Section A of the document (DWAF 2004 1 – 4) and this approach was carried through to the following two versions which were released (2005 and 2006). The process is described in Figure 2.22.

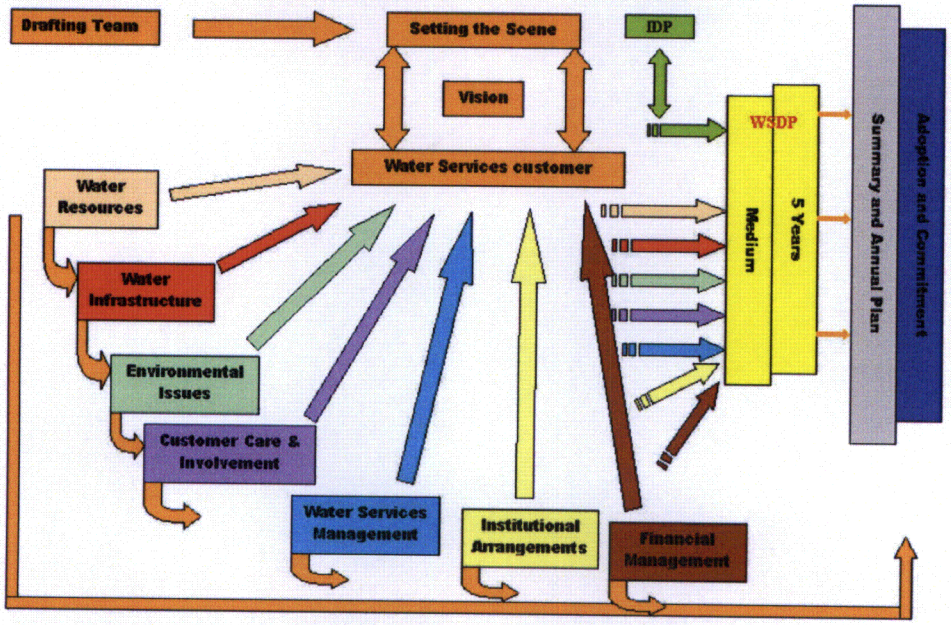


Figure 2.22 The WSDP framework (DWAF 2006: 1).

However, the guidelines indicate that a "strategic analysis" as shown in Figure 2.23 must be undertaken for each water services business element viz. consumer profile; service levels; water balance; water source and quality; water demand management and water conservation; water services infrastructure; institutional and management arrangements, finance and projects (Appendix E).

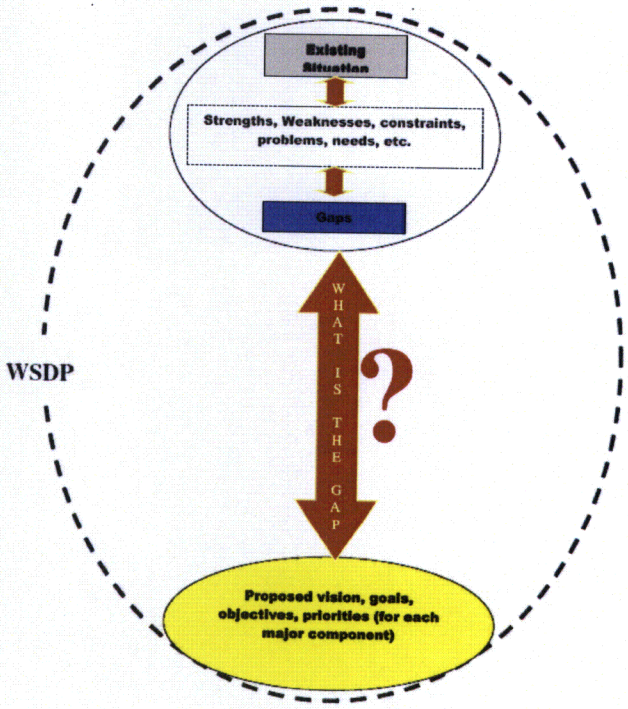


Figure 2.23 Strategic analysis to be undertaken for each water services business element (DWAF 2006: 2).

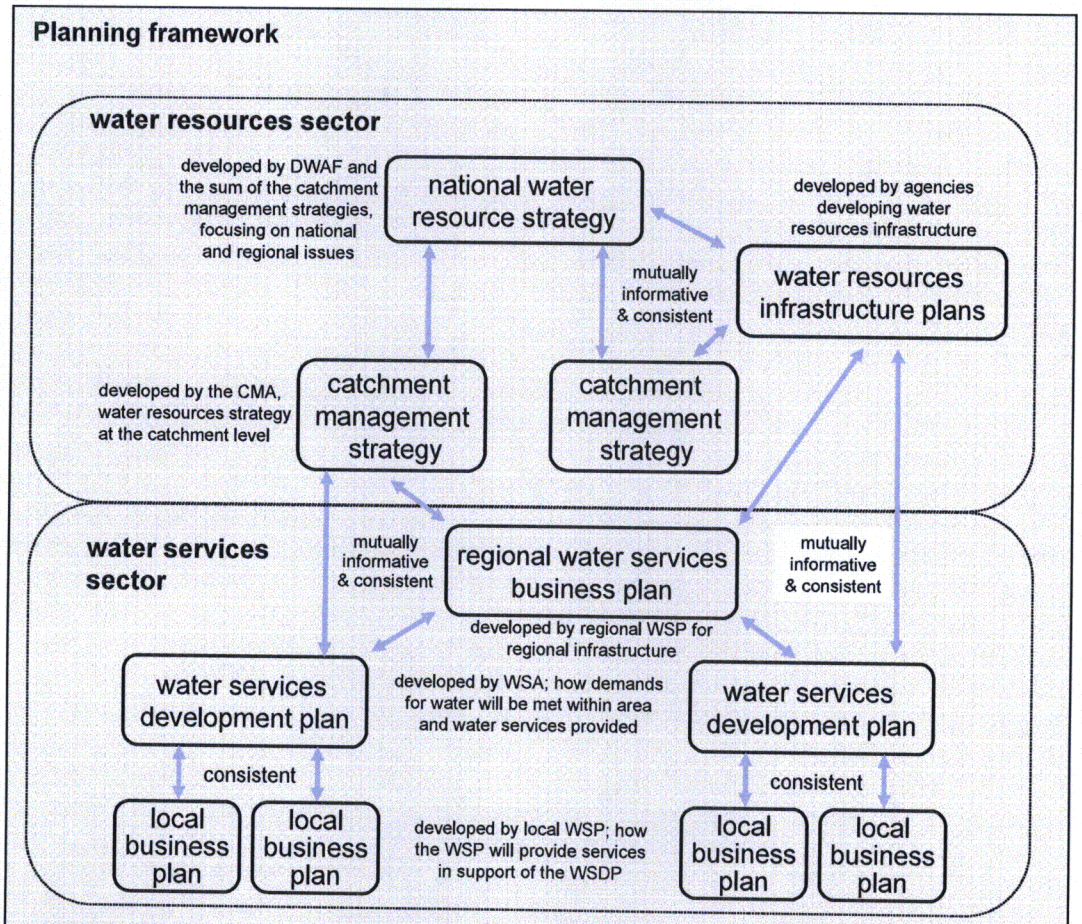
The guidelines do not explicitly specify at which step in the process one should look at integration, alignment and co-ordination. Nor do the guidelines refer to integrated resource planning nor do they explain how IRP should be undertaken. This means that one could end up with a list of projects that are duplicating effort and are unsustainable.

The document which refers to IRP and which shows how all types of water sector planning are linked is the "Strategic Framework for Water Services" (DWAF 2003). The overall water planning framework as explained by this document is shown in Figure 2.24. Allmendinger (2003: 325) states that "sub-regional issues should be fully integrated into the regional strategy making process" (ODPM 2002b: para. 31 cited by Allmendinger 2003: 325) and the water planning framework demonstrates this in Figure 2.24. However, if the WSDP identifies the planning at a strategic level and a business plan the planning at an operational level, what determines strategic planning of water services infrastructure at a regional level?

The catchment management strategy and water resources infrastructure plans shown in Figure 2.24 feed into the regional water services business plan which in turn feeds into the WSDP but there is no explicit planning process or product which looks at the integration, alignment and co-ordination of water services infrastructure at a strategic and regional level. It may be argued that there is no need to look at the planning of water services at a regional level as regional water services infrastructure do not occur. However this is incorrect as regional water infrastructure do exist e.g. the water services infrastructure that provides water to Durban from Midmar Dam which is located near the town of Howick. The provision of regional water services infrastructure is currently undertaken by DWAF, water boards and water services providers. The argument put forward may further be rejected for if there was no need for regional water services plans, why does the Strategic Framework for water services make allowances for regional water services providers and regional water services business plans?

Another possible reason for the lack of an explicit link could be attributed to time as Catchment Management Agencies (CMAs), the institutions accountable for the development of catchment management strategies are still in the process of being established. DWAF has however established a process called "Internal Strategic Perspectives" with the objectives of "providing a framework for DWAF's management of water resources in each Water Management Area (WMA) until the relevant DWAF

Regional Office can hand over the management functions to the established CMA" (DWAFb,c,d 2004: 3).



The basic framework for planning within the water sector is described below with reference to the above diagram.

Water services development plans. The primary instrument of planning in the water services sector is the water services development plan (WSDP). This plan requires the consideration of the physical, social, economic, financial, environmental and institutional aspects of water services provision in a particular water services authority area.
Business plans. The water services development plan is supported by business plans, which show how the water services development plan will be achieved on an annual basis. There are two kinds of business plans:
Local business plans are plans, which are developed wholly in support of one particular water services development plan.
Regional business plans are plans, which are developed to plan for regional infrastructure provided across more than one water services authority area.
Integrated planning. The water services development plans (and related business plans) must inform, and be informed by:

- the local government's integrated development plan (IDP), of which it forms part;
- catchment management strategies and the national water resource strategy;
- water resource infrastructure plans; and
- regional water services business plans.

Figure 2.24 The South African water planning framework (DWAF 2003: 40).

The Internal Strategic Perspective (ISP) documents further state that the "report will be updated on a regular basis until it is eventually superceded by the Catchment Management Strategy" (DWAFb,c,d 2004: 3) and that the "report is a living document and will be updated on a regular basis. If the version of this report is older than 12 months, please check whether a later version is not available" (DWAFb,c,d 2004: 4). A check has shown that currently there is only one version of the ISPs available with no more recent updates available (DWAF 2006: website).

A review of the ISPs shows that they only deal with water resources. Does this mean that the regional water services business plan includes the strategic planning of regional water services?

There are 15 water boards in South Africa (Directorate: Planning and Information 2004) of which 12 can be classified as regional water service providers (Section 2.1) (Appendix I). Section 2.3.8 showed that both water boards and water services providers (if different) are required by legislation to submit business/corporate plans to the appropriate authority. DWAF prescribes that water boards need to submit both policy statements and business plans. The objective of a policy statement is to "set out publicly, in concise and unambiguous language, the broad philosophy of a water board together with the main strategies it intends to use to implement that philosophy" (DWAF 2003: 2). DWAF (2003: 3) explains that the policy statement "is the foundation for the rest of business planning process" and that the purpose of the business plan is to demonstrate:

- "How the vision defined in the Policy Statement will be achieved".
- "How revenue will be generated".
- "What strategic priorities have been set to be achieved over a three to five year planning horizon".
- "How resources will be allocated and applied to achieve these goals".

(DWAF 2003: 3)

The Guidelines explain that the Water Services Act is not prescriptive as to the formats of the policy statements and business plans but the Guidelines do provide an outline of the preferred format. Preferred requirements for the policy statement in terms of planning include a vision statement, policies, the planning approach being used (this includes the corporate planning cycle, the approach to the planning of capital works and the co-ordination with municipal WSDPs), performance management and risk

management (DWAF 2003: 7 – 10). Although the definition of the policy statement refers to strategies, the preferred format does not include strategies but policies.

The Guidelines further explain that the business plan should show:

- What will be done and what will be accomplished.
- The resources to be applied.
- How progress will be measured.

(DWAF 2003: 11 – 12)

In terms of the planning horizon, the Guidelines describe that:

> The planning period refers to the following five financial years of the water board. In other words the board should estimate the year end position for the year in which the plan is being compiled (year 0), prepare a comprehensive forecast for the first year of operation of the business plan (year 1) and project forward for the following four years (up to year 5) using best estimate information. The actual financial performance of the board reported in the annual financial statements and annual report at the end of year 1 will be measured directly against the year 1 projection in the business plan.
>
> (DWAF 2003: 12)

The Guidelines prefer to see the water resource development plans, the bulk potable water supply plans, the retail water services plans, the financial plan and the performance indicators (DWAF 2003: 13 – 19). The Guidelines also require the Environmental Management Programme and Plans and the Water Conservation and Demand Management Plans but they separate these into different sections (DWAF 2003: 17).

For both the policy statement and the business plan, the Guidelines put forward formats for the product but do not make any recommendations in terms of the process.

DWAF undertook a study assessing water boards with the objective of "compiling a status quo report indicating information availability, quality and gaps in Water Board reporting at present" (Directorate: Planning and Information 2004: 1). However this assessment did not evaluate the planning of water boards and instead looked at

"tariffs, current provider contracts, financial viability, volumes supplied, water quality and water resources used" (Directorate: Planning and Information 2004: 1).

For water services providers, DWAF provides a possible business plan outline (2002) which includes a section on planning but does not elaborate on what is required in terms of the planning. Again, the recommendations are on the product and in terms of integration, alignment and co-ordination, a section entitled "Links to Integrated Development Plan and Water Services Development Plan" and another section entitled "Water Services Development Plan: Information to be Provided to WSA" are recommended but with no suggestions on the process to be followed.

The above assessment has shown that is it important for co-ordination to occur. What does this mean and how is this supposed to occur? The next section attempts to answer this question.

2.3.11 Stakeholder Co-Ordination

One of the criticisms of the master plan identified in Section 2.3.4 was that there was a "lack of meaningful participation from key stakeholders". This was further emphasised in Section 2.3.5 with recommendation of IRP being used as it prescribes stakeholder co-ordination.

The Oxford Dictionary (2001: 1161) defines a stakeholder as "a person or company that is involved in a particular organisation, project, system etc., especially because they have invested money in it". Similarly, the PMBOK (2004: 24) defines project stakeholders as "individuals and organisations that are actively involved in the project, or whose interests may be affected as a result of project execution or project completion...may also exert influence over the project's objectives and outcomes". Ramírez (2001: website) states that "in the context of natural resource management... Röling and Wagemakers (1998: 7) say that stakeholders are natural resource users and managers". Stakeholders can be classified into the following groups:

- **Primary stakeholders** are those ultimately affected, either positively (beneficiaries) or negatively (e.g. those involuntarily resettled).
- **Secondary stakeholders** are the intermediaries in the development process. They can be divided into funding, implementing, monitoring and advocacy organisations, or governmental, NGO and private sector organisations. This

definition of stakeholders includes both winners and losers and those involved or excluded from decision-making processes.

- **Key stakeholders** are those who can significantly influence, or are important to the success of the project. Influence refers to how powerful a stakeholder is, 'importance' refers to those stakeholders whose problems, needs and interests are the priority of the funder – if those important stakeholders are not assisted effectively then the project cannot be deemed a 'success'.

(Network of Applied Anthropologists 2004: website)

One case-study looking at the role of stakeholder participation in master plans was Hirt's (2005: 219) in which she examined the "adjustments of the urban planning process to the post-communist context in the case of Sofia, the capital of Bulgaria with the objective of determining whether master planning processes have substantially changed from top-down and technocratic to open and participatory". Hirt (2005: 219) evaluated four master plans: one pre-communist, two communist and one post-communist and concluded that "despite the increased capacity of the citizenry to both influence and challenge government planning and decision-making, there is little evidence of sharp discontinuity between past and present planning processes".

Hirt (2005) used two typologies of citizen participation in her assessment and these are presented in Figure 2.25 and Table 2.5. Hirt (2005: 222) explains as follows:

> Randolph (2004: 63; partially based on Arnstein 1969) suggests a five-step citizen participation ladder premised on the citizen's role in planning and assumptions behind the process. The International Association of Public Participation distinguishes five levels of active (direct) citizen participation based on goals and techniques used in the process.
>
> (Hirt 2004: 222)

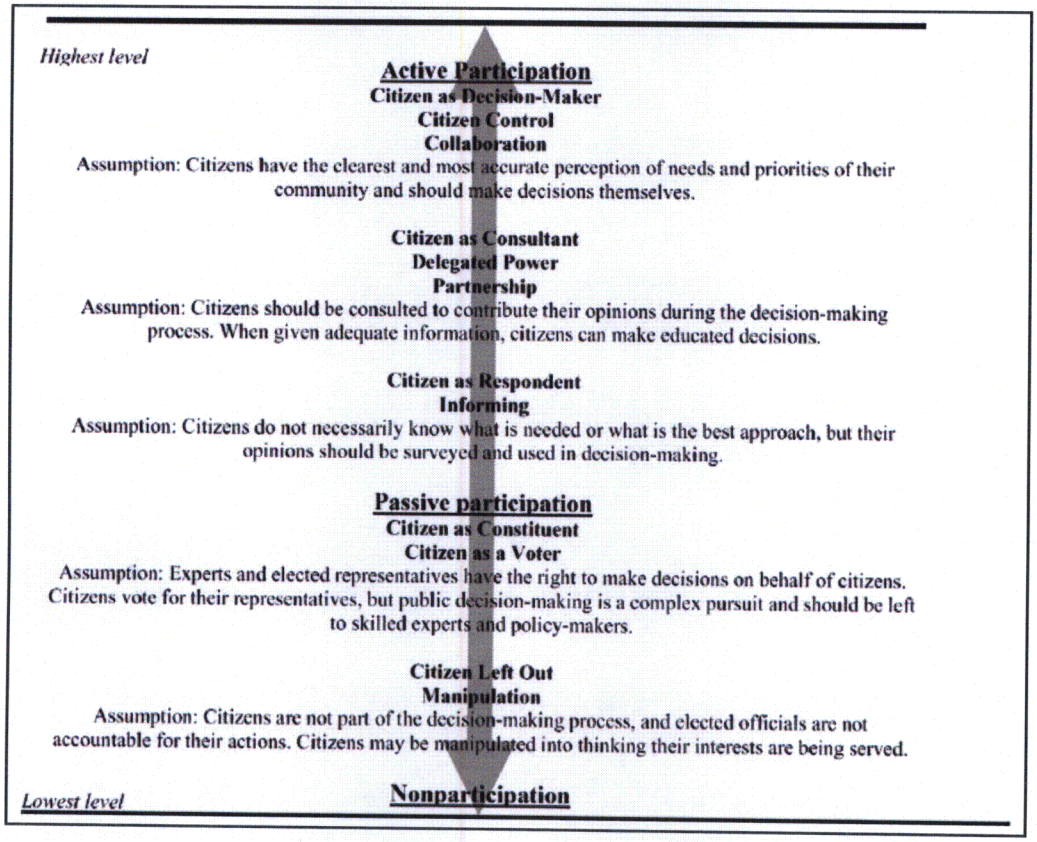


Figure 2.25 A typology of citizen participation (Randolph 2004 cited by Hirt 2005: 222).

Table 2.5 A typology of citizen participation (International Association of Public Participation cited by Hirt 2005: 223).

Level of Participation	Goal of Participation	Techniques
Empower	To place final decision-making in the hands of the public.	Citizen juries Ballots Delegated decisions
Collaborate	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	Citizen advisory committees Consensus-building Participatory decision-making
Involve	To work directly with the public throughout the process to ensure that public concerns and aspirations are understood and considered.	Workshops Deliberate polling
Consult	To obtain public feedback on analysis, alternatives and/or decisions.	Public comment Focus groups Surveys Public meetings
Inform	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	Fact sheets Websites Open houses

Hirt evaluated the process where stakeholders were the community/public. Alexander looked at stakeholders which are organisations. Institutions as stakeholders are important in the context of water planning as shown in Section 2.3.5. Alexander (1998: 303) states that "implementation is one of the main concerns for co-ordinative planning, which involves interaction between organisations". He explains as follows:

> "Co-ordinative planning involves organisations interacting to concert their future decisions and actions in pursuit of mutual goals...Co-ordinative planning, then, is planning to effect inter-organisational co-ordination (IOC)...IOC structures present a typology of the links between organisations that enable them to concert their decisions.
>
> (Alexander 1998: 304 – 306)

Appendix J provides a summary on Alexander's explanation of co-ordinative planning.

The range of tools which allows for the identification and description of stakeholders on the foundation of their attributes, interrelationships and interests related to a given issue or resource is referred to as "stakeholder analysis" (Ramírez 2001: website; Overseas Development Administration 1995; Network of Applied Anthropologists 2004).

2.4 Amendment of Hypothesis

Section 2.3 has shown that the approach used in water planning is integrated resource planning and not master planning. The hypothesis is therefore amended as follows:

> A regional water service provider's integrated resource planning process can contribute to the successful accomplishment of an IDP by not only addressing backlogs in the short-term but by also providing sustainable bulk infrastructure that facilitates the proposed economic developments. The major benefits of this synergy for those residing in the area are that investment costs are shared and the costs associated with a lack of knowledge are eliminated as knowledge is shared between the regional water services provider and the municipalities. The collaborative timing in the implementation of projects also means that more services are provided at one particular time. The IRP process interacting with the IDP process refines the projections in terms of where future development will occur thereby reducing the risk of investing in poor locations.

Subsidiary questions that will be answered in testing the above hypothesis include:

- What are the similarities and differences between integrated resource planning and integrated development planning and the processes of an IRP, an IDP, a WSDP and a regional water service provider's business plan?
- What strengths does a regional water service provider's IRP process have over a municipal IDP process?
- How can those residing in the jurisdiction of the regional water service provider benefit from the IRP process interacting with the IDP process? When will these benefits be felt? In terms of the case study, do the areas of development coincide? What does this mean in terms of investment?
- Who should be guiding whom? Who is monitoring the performance? Is there a gap in terms of responsibilities for development at a regional level?

3. STUDY AREA

The purpose of this section is to list the constituents of the selected study area and to provide key characteristics using a version of the STEEPLE analysis.

3.1 Selected Institutions in the Study Area

The South African water boards that can be classified as regional water service providers are shown in Appendix I. Of these 12 water boards, two are located in KwaZulu-Natal, which also has a third regional water service provider viz. uThukela Water (Appendix I). The regional water service provider selected for the study area is Umgeni Water.

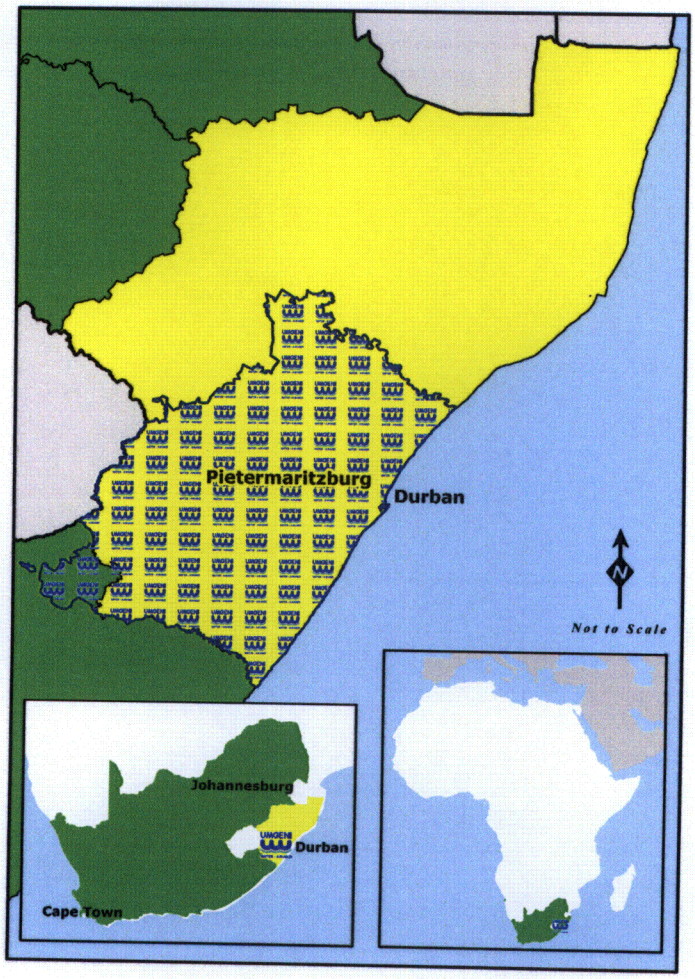


Figure 3.1 Location of Umgeni Water's supply area in KwaZulu-Natal, South Africa and Africa.

Established in 1974, Umgeni Water developed rapidly into the largest catchment-based water utility in southern African (Figure 3.1), supplying almost 350 million cubic metres (350 000 million litres) of purified water annually to its customers including eThekwini Municipality (Durban), The Msunduzi Municipality (Pietermaritzburg) and 15 other local municipalities. In terms of volume of safe drinking water sold, it has grown into one of the four largest water utilities in Africa.

The institutions, in addition to Umgeni Water, selected in the study area are shown in Table 3.1.

Table 3.1 Selected institutions in the study area.

Name	Entity Type	Water Entity Type
Umgeni Water	Water Board	Water Board/Regional Water Services Provider
The Msunduzi Municipality	Category B Municipality i.e. a local municipality	Water Services Authority
Umgungundlovu District Municipality	Category C Municipality i.e. a district municipality	Water Services Authority
Sisonke District Municipality	Category C Municipality i.e. a district municipality	Water Services Authority
Ilembe District Municipality	Category C Municipality i.e. a district municipality	Water Services Authority
The KwaDukuza Municipality	Category B Municipality i.e. a local municipality	None
uMshwathi Municipality	Category B Municipality i.e. a local municipality	None
uMngeni Municipality	Category B Municipality i.e. a local municipality	None

3.2 STEEPLE Analysis

3.2.1 Institutional and Legal

Located in southern KwaZulu-Natal, there is a difference between what Umgeni Water considers to be its working area and what its actual legal boundaries are. This difference is shown in Figure 3.2 together with the different water institutions occurring within Umgeni Water's area.

It is shown in Figure 3.2 that there is a discrepancy of approximately 5 000 km^2 between what has been gazetted as Umgeni Water's area of jurisdiction and what is claimed to be Umgeni Water's supply area. Umgeni Water's supply area has expanded

three times since it was established. The gazettes citing Umgeni Water's area of jurisdiction are as follows:

- Gazette No. 4300 (14 June 1974), No. 114. This gazette details Umgeni Water's establishment.
- Gazette No. 5367 (31 December 1976), No. 276. Umgeni Water's boundaries were extended.
- Gazette No. 7466 (6 March 1981), No. 40. Umgeni Water's boundaries were further extended.
- Gazette No. 15428 (21 January 1994), No. 89. Umgeni Water's boundaries were extended from approximately 7 000 km^2 to 19 000 km^2.

The above are summarised in Figure 3.2 as follows:

- The area indicated by the light brown colour shows Umgeni Water's area of jurisdiction in 1993.
- The area indicated by the green shows what is claimed to be Umgeni Water's extended area.
- The area demarcated with the purple stippled pattern shows the area that was gazetted as Umgeni Water's extended area in 1994.

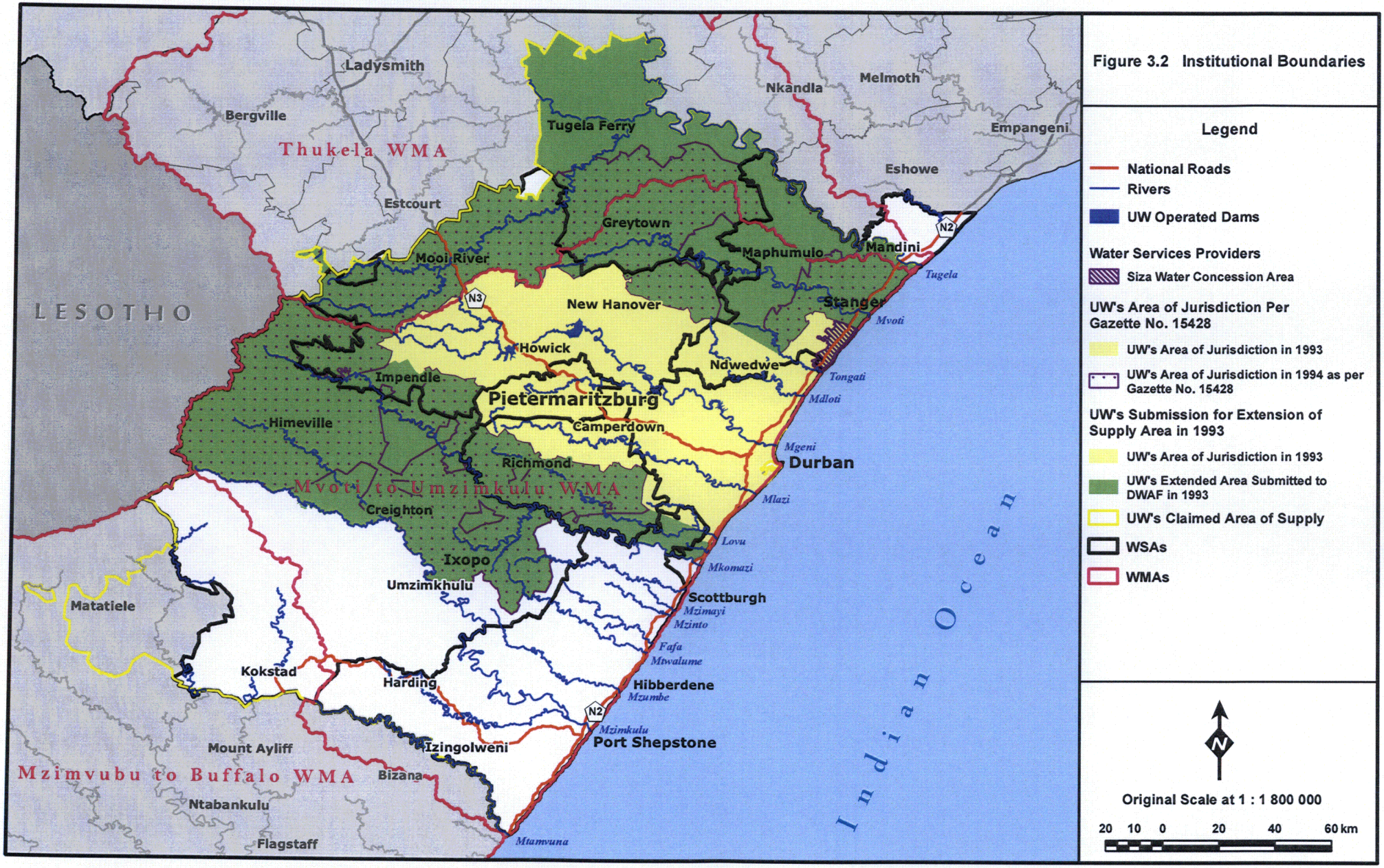


Figure 3.2 Institutional Boundaries

Legend

- National Roads
- Rivers
- UW Operated Dams

Water Services Providers

- Siza Water Concession Area

UW's Area of Jurisdiction Per Gazette No. 15428

- UW's Area of Jurisdiction in 1993
- UW's Area of Jurisdiction in 1994 as per Gazette No. 15428

UW's Submission for Extension of Supply Area in 1993

- UW's Area of Jurisdiction in 1993
- UW's Extended Area Submitted to DWAF in 1993
- UW's Claimed Area of Supply
- WSAs
- WMAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

Also shown are:

- The areas delineated by the black lines show the areas of jurisdiction of the Water Services Authorities.
- The areas demarcated by the dark pink lines show the areas of jurisdiction of the Water Management Areas. It is shown that Umgeni Water's area is predominantly within the Mvoti to Umzimkulu WMA with small portions in the Thukela WMA (northern boundary) and the Mzimvubu to Buffalo WMA (southern boundary).
- The area indicated with the dark purple hatching shows the area supplied by a water service provider other than Umgeni Water. This area is the Siza Water Concession Area which is a retail water service provider for the Ilembe WSA and which purchases its bulk water from Umgeni Water.

The significance of the discrepancy between Umgeni Water's legal boundaries and what it considers to be its working area is that it would be responsible for the provision of bulk water services for a much larger area. However, with the change in the Water Services Act in 1997, water boards are now contractually bound to provide water to those WSAs with whom they have a Bulk Water Supply Agreement (Section 2.3.5). It is for this reason that Umgeni Water is not the bulk water services provider for the Mvoti Local Municipality (Greytown) as it belongs to the Mzinyathi WSA for whom uThukela Water is the bulk water services provider.

The different WSAs and their constituent local municipalities are shown in Figure 3.3. The information shown in this figure is summarised in Table 3.2.

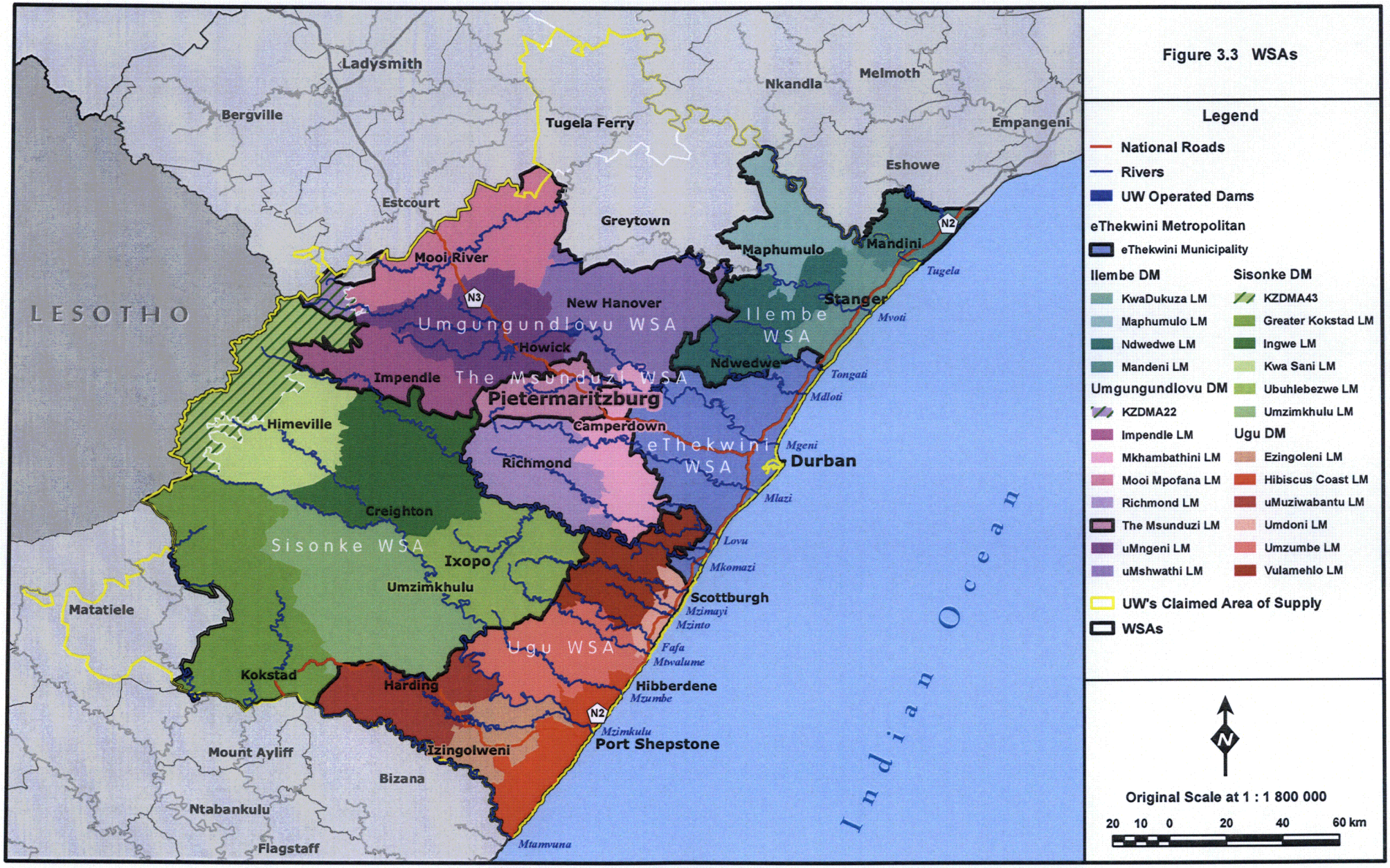


Figure 3.3 WSAs

Legend

- National Roads
- Rivers
- UW Operated Dams

eThekwini Metropolitan

- eThekwini Municipality

Ilembe DM

- KwaDukuza LM
- Maphumulo LM
- Ndwedwe LM
- Mandeni LM

Umgungundlovu DM

- KZDMA22
- Impendle LM
- Mkhambathini LM
- Mooi Mpofana LM
- Richmond LM
- The Msunduzi LM
- uMngeni LM
- uMshwathi LM

Sisonke DM

- KZDMA43
- Greater Kokstad LM
- Ingwe LM
- Kwa Sani LM
- Ubuhlebezwe LM
- Umzimkhulu LM

Ugu DM

- Ezingoleni LM
- Hibiscus Coast LM
- uMuziwabantu LM
- Umdoni LM
- Umzumbe LM
- Vulamehlo LM

- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

Table 3.2 The WSAs and their constituent local municipalities occurring within Umgeni Water's area.

WSA	Type of Municipality	Constituent Municipalities
eThekwini	Metropolitan i.e. Category A	-
The Msunduzi	Local i.e. Category B	-
Umgungundlovu	District i.e. Category C	Impendle Local Municipality, Mkhambathini Local Municipality, Mpofana Local Municipality, Richmond Local Municipality, The Msunduzi Local Municipality, uMngeni Local Municipality, uMshwathi Local Municipality, KZDMA22 District Management Area
Ilembe	District i.e. Category C	KwaDukuza Local Municipality, Maphumulo Local Municipality, Ndwedwe Local Municipality, Mandeni Local Municipality
Ugu	District i.e. Category C	Ezingoleni Local Municipality, Hibiscus Coast Local Municipality, uMuziwabantu Local Municipality, Umdoni Local Municipality, Umzumbe Local Municipality, Vulamehlo Local Municipality
Sisonke[1]	District i.e. Category C	Greater Kokstad Local Municipality, Ingwe Local Municipality, KwaSani Local Municipality, Ubuhlebezwe Local Municipality, Umzimkhulu Local Municipality, KZDMA43 District Management Area

The cadastral boundaries viz. the farm boundaries and the erven and those areas falling under the jurisdiction of the Ingonyama Land Trust are shown in Figure 3.4. The percentage of Ingonyama Land Trust areas occurring within the selected municipalities are shown in Table 3.3.

[1] At the start of this study in 2005, Sisonke District Municipality was composed of the Greater Kokstad Local Municipality, Ingwe Local Municipality, KwaSani Local Municipality, uBuhlebezwe Local Municipality, KZDMA43 District Management Area and Matatiele Local Municipality. However with the Cross-Boundaries Municipalities Laws Repeal and Related Matters Act of 2005 and with the KwaZulu-Natal Provinicial Gazette No. 6453 (28 December 2005), Matatiele Local Municipality was excluded from the Sisonke District Municipality and included into the municipal area of Alfred Nzo District Municipality (Eastern Cape) and the Umzimkhulu Local Municipality was excluded from Alfred Nzo District Municipality and included into the municipal area of Sisonke District Municipality. This study therefore uses the new boundaries.

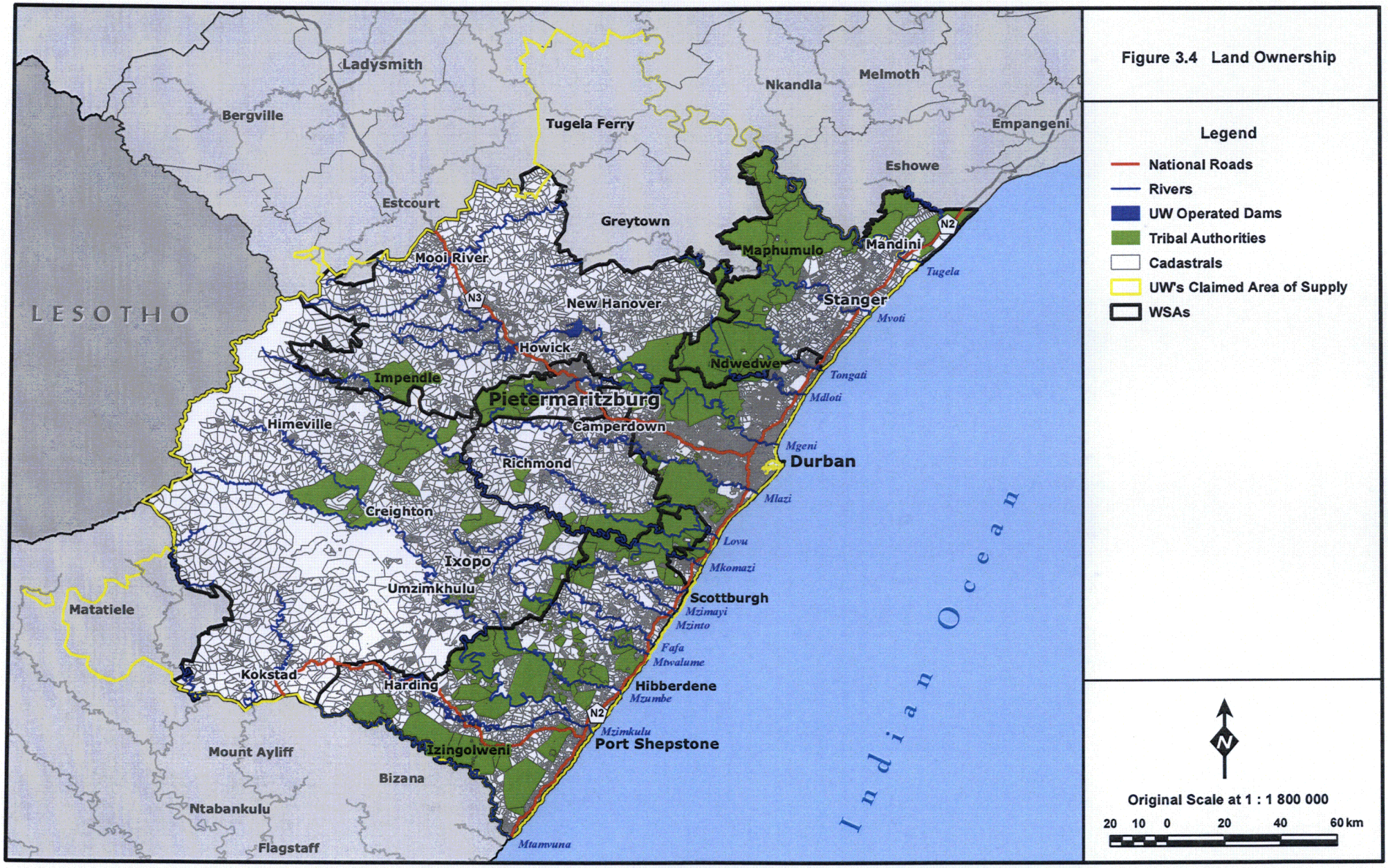


Figure 3.4 Land Ownership

Table 3.3 Percentage Area of Ingonyama Land Trust

Name	Total Area (km^2)	Traditional Authorities Area (km^2)	Percentage
The Msunduzi Municipality	633.941	224.914	35.479
Umgungundlovu District Municipality	8935.084	1041.561	11.657
Sisonke District Municipality	11132.001	1015.330	9.121
Ilembe District Municipality	3268.850	1991.864	60.935
The KwaDukuza Municipality	633.143	10.489	1.657
uMshwathi Municipality	1818.056	258.006	14.191
uMngeni Municipality	1566.858	0.011	0.001

3.2.2 Natural Environment

The land cover i.e. "all the natural and human-made features that cover the earth's immediate surface" (and not the land use which is "the human activity that is associated with a specific land-unit in terms of utilisation, impact or management practice") (Thompson 1996: 35) occurring within Umgeni Water's area is illustrated in Figure 3.5. This figure shows that the predominant land covers within Umgeni Water's area are agricultural and natural with the largest urban areas occurring in the eThekwini and The Msunduzi Municipalities.

The distribution of land cover within the selected municipalities is shown in Figure 3.6 and Table 3.4

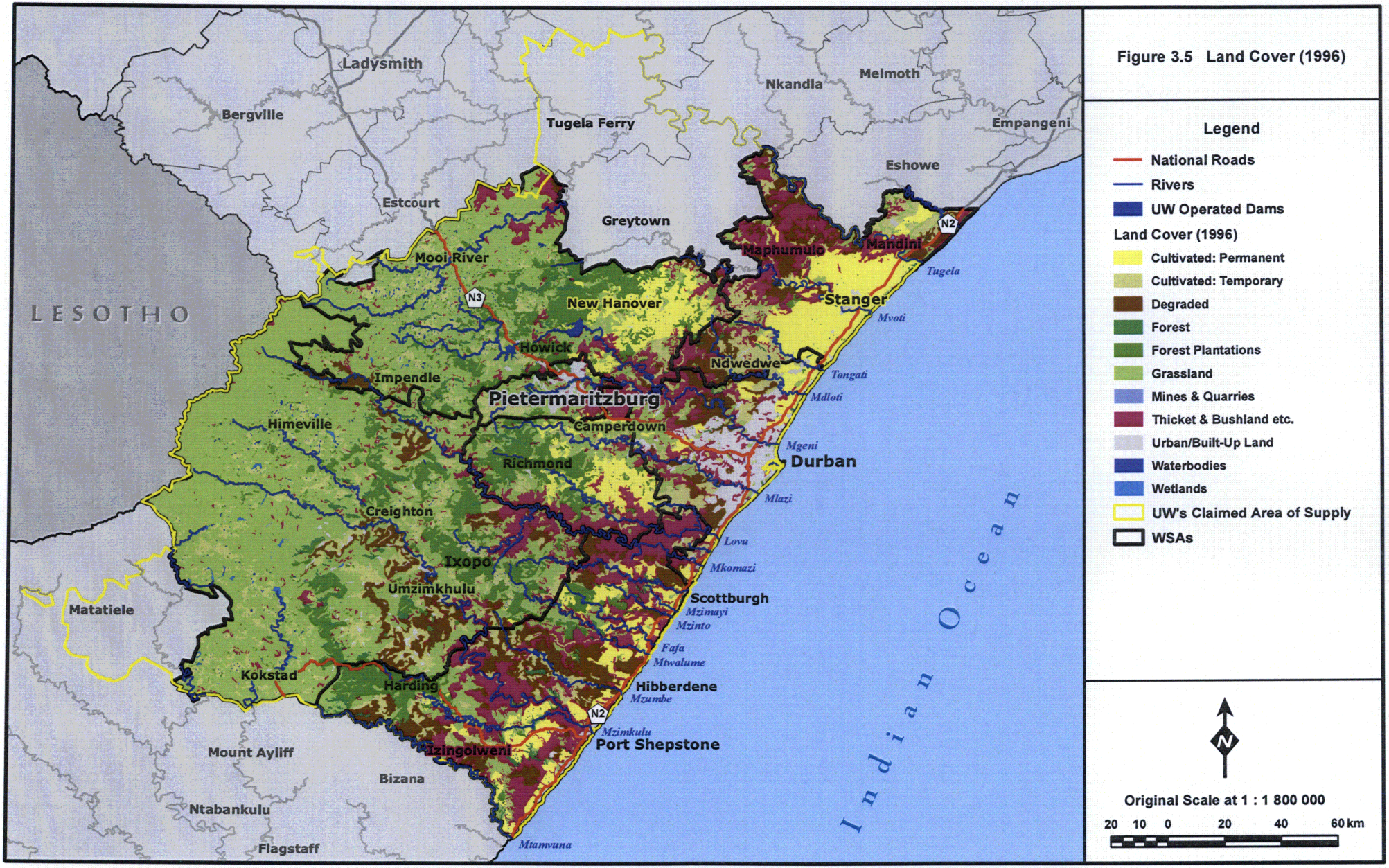


Figure 3.5 Land Cover (1996)
Legend
National Roads
Rivers
UW Operated Dams
Land Cover (1996)
Cultivated: Permanent
Cultivated: Temporary
Degraded
Forest
Forest Plantations
Grassland
Mines & Quarries
Thicket & Bushland etc.
Urban/Built-Up Land
Waterbodies
Wetlands
UW's Claimed Area of Supply
WSAs
Original Scale at 1 : 1 800 000
20 10 0 20 40 60 km
LESOTHO
Ladysmith
Bergville
Tugela Ferry
Nkandla
Melmoth
Empangeni
Eshowe
Estcourt
Greytown
Mooi River
Maphumulo
Mandini
Stanger
New Hanover
Howick
Ndwedwe
Impendle
Pietermaritzburg
Camperdown
Himeville
Richmond
Durban
Creighton
Ixopo
Umzimkhulu
Matatiele
Scottburgh
Kokstad
Harding
Hibberdene
Izingolweni
Port Shepstone
Mount Ayliff
Bizana
Ntabankulu
Flagstaff
Tugela
Mvoti
Tongati
Mdloti
Mgeni
Mlazi
Lovu
Mkomazi
Mzimayi
Mzinto
Fafa
Mtwalume
Mzumbe
Mzimkulu
Mtamvuna
Indian Ocean
N2
N3

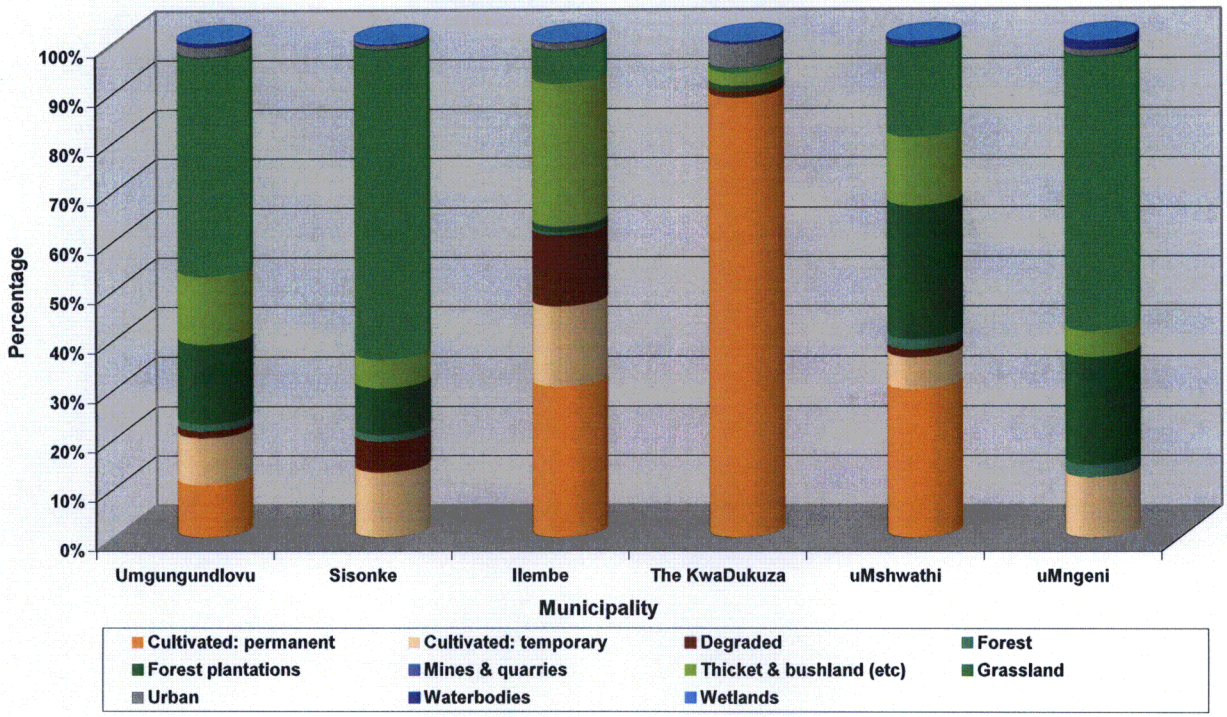


Figure 3.6 Distribution of land cover within sample municipalities (1996).

Table 3.4 Distribution of land cover (1996)

Land Cover Category	The Msunduzi (km^2)	Umgungundlovu (km^2)	Sisonke (km^2)	Ilembe (km^2)	The KwaDukuza (km^2)	uMshwathi (km^2)	uMngeni (km^2)
Cultivated: permanent	14.50	944.24	5.84	992.13	556.82	543.56	0.33
Cultivated: temporary	88.24	854.01	1457.60	524.49	0.31	116.26	188.41
Degraded	0.00	117.64	689.32	468.25	7.29	27.18	0.00
Forest	10.90	123.38	139.61	17.69	0.00	38.12	39.45
Forest plantations	41.37	1436.91	1042.04	31.55	7.24	488.06	339.79
Mines & quarries	0.24	0.32	3.69	7.05	0.25	0.00	0.00
Thicket & bushland (etc)	102.76	1223.50	647.00	938.64	16.13	250.71	80.34
Grassland	242.06	3968.20	6958.59	224.45	6.08	332.09	867.11
Urban	133.40	185.30	94.80	42.84	30.43	4.68	19.23
Waterbodies	0.48	76.09	30.84	7.60	3.72	17.41	31.92
Wetlands	0.00	5.51	41.42	2.07	0.21	0.00	0.30

The location of the surface water resources (viz. rivers and dams) together with the catchments of the major rivers occurring within Umgeni Water's area are shown in Figure 3.7. The capacity of Umgeni Water's operated storage dams are also indicated in this figure. This figure also shows that Umgeni Water's area of operation occurs over undulating terrain, with the elevation ranging from sea-level to 3 360m above sea-level, thereby making pumping costs in the transfer of water an important factor.

The distribution of water resources within the selected municipalities is shown in Table 3.5.

Table 3.5 Distribution of Surface Water Resources

Name	Water Resources
The Msunduzi Municipality	Msunduzi River Henley Dam (not a storage dam)
Umgungundlovu District Municipality	Mooi River; Little Mooi River; Mgeni River; Lions River; Mpofana River; Msunduzi River; Mvoti River (headwaters); Mdloti River (headwaters); Mlazi River; Nungwane River; Lovu River; Mkomazi River Mearns Weir; Midmar Dam; Albert Falls Dam; Henley Dam (not a storage dam); Nagle Dam
Sisonke District Municipality	Mkomazi River; Ixopo River; Nhlavini River; Mpambanyoni River; Mtwalume River; Mzimkulu River; Ngwangwane River; Mzumbe River; Mzintalava River Ixopo Dam
Ilembe District Municipality	Mdloti River; Tongati River; Mvoti River; Tugela River
The KwaDukuza Municipality	Tongati River; Mvoti River
uMshwathi Municipality	Mgeni River; Mvoti River (headwaters); Mdloti River (headwaters) Albert Falls Dam
uMngeni Municipality	Mpofana River; Lions River; Mgeni River Midmar Dam

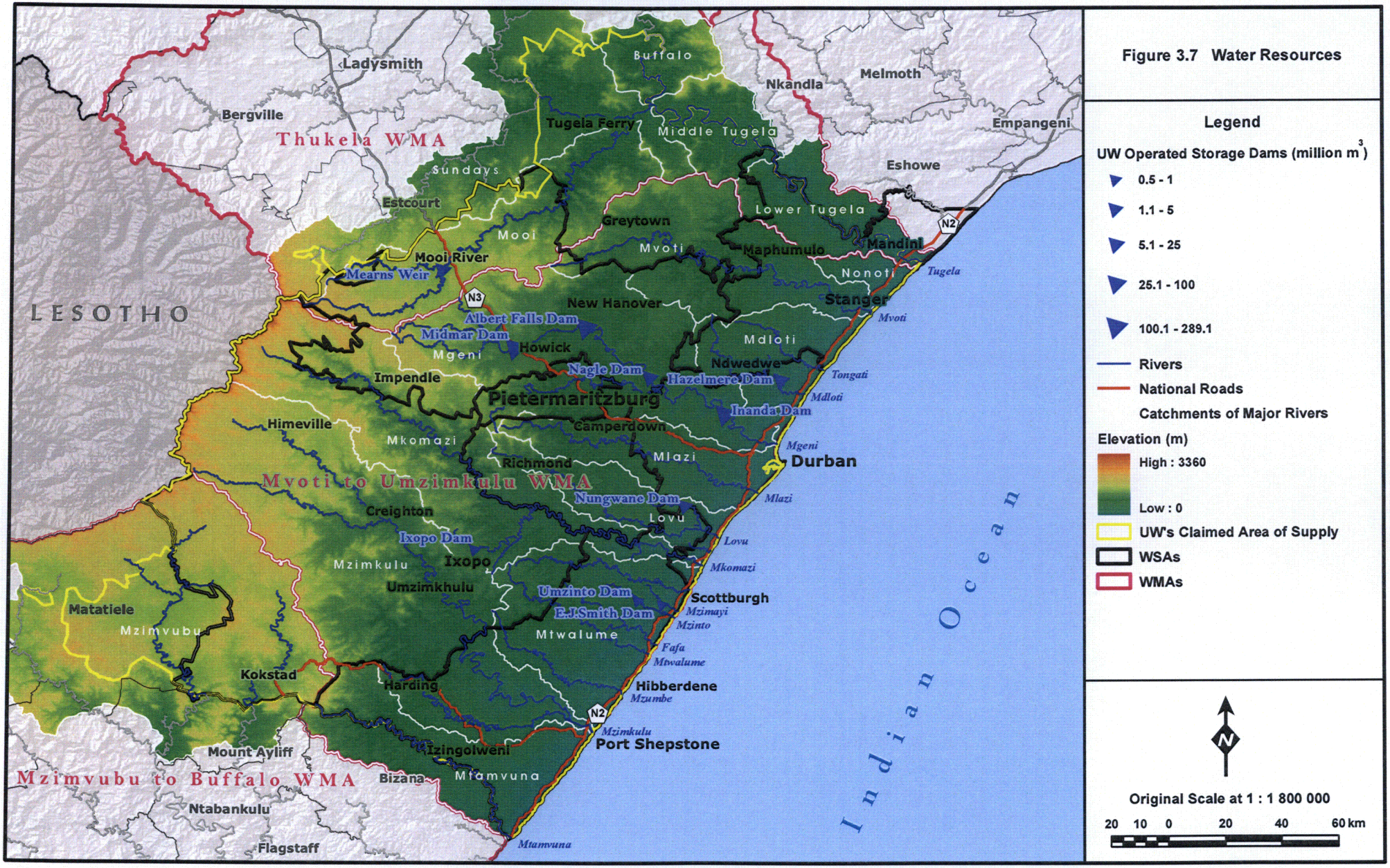


Figure 3.7 Water Resources

Legend

UW Operated Storage Dams (million m^3)

- 0.5 - 1
- 1.1 - 5
- 5.1 - 25
- 25.1 - 100
- 100.1 - 289.1

Rivers

National Roads

Catchments of Major Rivers

Elevation (m)

High : 3360

Low : 0

UW's Claimed Area of Supply

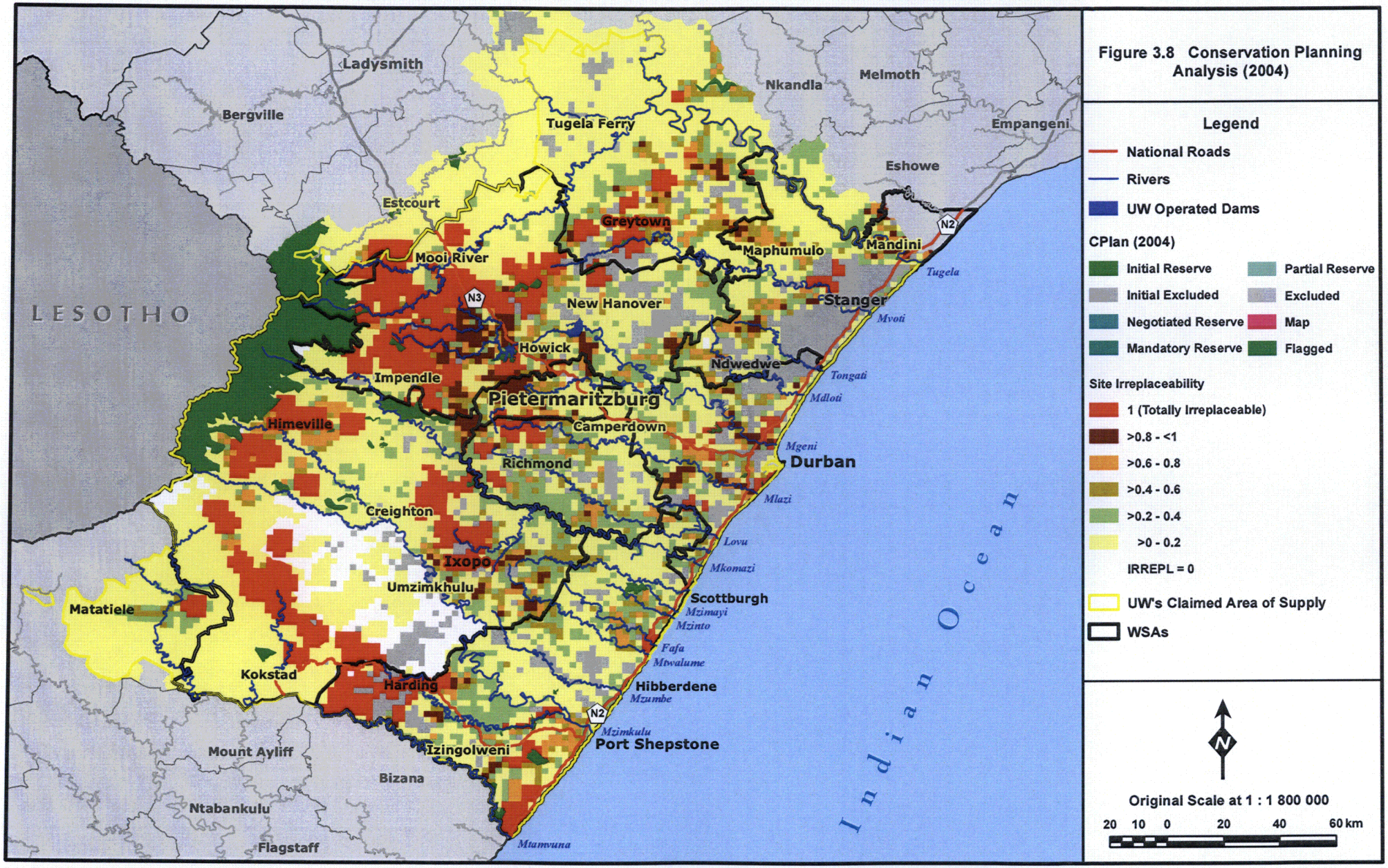
WSAs

WMAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km


Ladysmith
Bergville
Tugela Ferry
Nkandla
Melmoth
Empangeni
Eshowe
Estcourt
Greytown
Mooi River
Maphumulo
Mandini
N2
N3
LESOTHO
New Hanover
Stanger
Howick
Ndwedwe
Impendle
Pietermaritzburg
Himeville
Camperdown
Richmond
Durban
Creighton
Ixopo
Umzimkhulu
Matatiele
Scottburgh
Kokstad
Harding
Hibberdene
Port Shepstone
Izingolweni
Mount Ayliff
Bizana
Ntabankulu
Flagstaff
Tugela
Mvoti
Tongati
Mdloti
Mgeni
Mlazi
Lovu
Mkomazi
Mzimayi
Mzinto
Fafa
Mtwalume
Mzumbe
Mzimkulu
Mtamvuna
Indian Ocean
Figure 3.8 Conservation Planning Analysis (2004)
Legend
National Roads
Rivers
UW Operated Dams
CPlan (2004)
Initial Reserve
Partial Reserve
Initial Excluded
Excluded
Negotiated Reserve
Map
Mandatory Reserve
Flagged
Site Irreplaceability
1 (Totally Irreplaceable)
>0.8 - <1
>0.6 - 0.8
>0.4 - 0.6
>0.2 - 0.4
>0 - 0.2
IRREPL = 0
UW's Claimed Area of Supply
WSAs
N
Original Scale at 1 : 1 800 000
20 10 0 20 40 60 km

The status of biodiversity within Umgeni Water's area of operation is shown in Figure 3.8 which shows the irreplaceability map of the area (this map is the result of the conservation planning or C-Plan study undertaken by Ezemvelo KZN Wildlife in 2004). Those areas demarcated by red have irreplaceability values of 1 and therefore the "conservation of the features within these planning units is critical to meet conservation targets" (Goodman 2004: 3). Those areas demarcated by white have irreplaceability values of 0 and "all biodiversity features recorded here are conserved to the target amount and there is unlikely to be a biodiversity concern with the development of these areas" (Goodman 2004: 3). Those areas demarcated by the colours ranging from pale yellow to brown show that some of these areas are planning units required to meet biodiversity conservation targets (Goodman 2004: 4).

The distribution of the biodiversity conservation targets within the selected municipalities are shown in Figure 3.9.

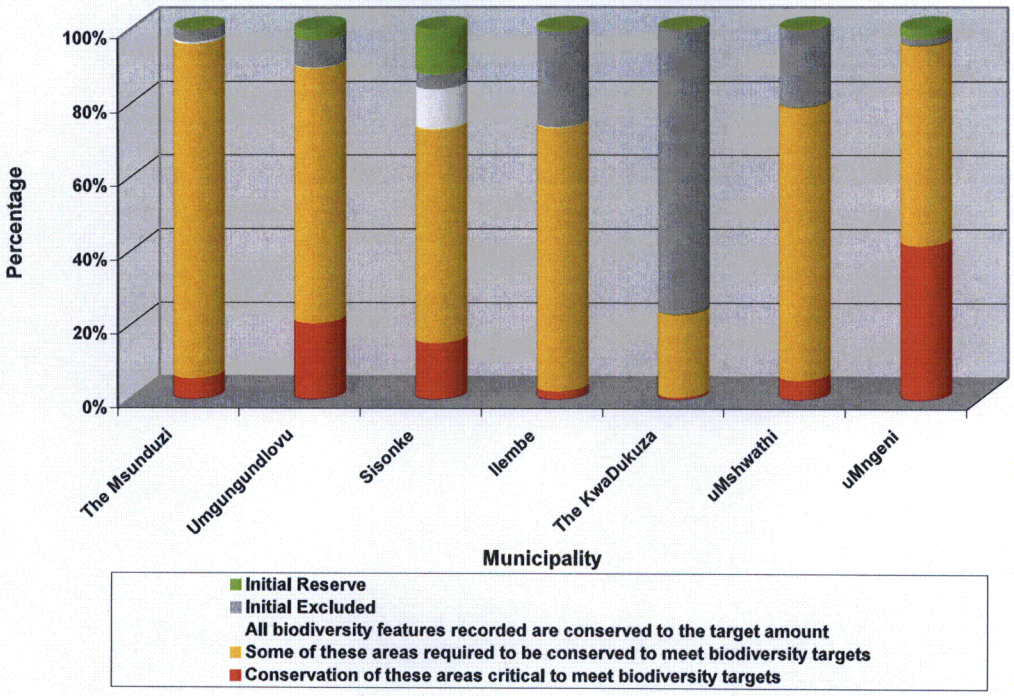


Figure 3.9 Distribution of biodiversity conservation targets within the selected municipalities (2004).

3.2.3 Social/Demographic

The number and distribution of people i.e. the population density (the number of people per square kilometre) is shown in Figure 3.10. This figure, correlating with Figure 3.5 in terms of the location of urban areas, shows that the most people and therefore the highest consumption of potable water occurs within the eThekwini, The Msunduzi and the Ilembe WSAs.

The change in population between the 1996 and 2001 Censuses was calculated using an exponential method and the results of this are displayed in Figure 3.11 (Section 2.3.2 and Appendix B). The areas in this figure which are demarcated by green show those areas in which there was an increase in the population between 1996 and 2001 whilst those areas demarcated by the pale red show a decrease in the population and yellow, no change. This therefore could mean that those areas in green would have experienced an increase in water consumption whilst those areas in red, a decrease in water consumption.

Calitz calculated the population growth rate using the component method for the period 1996 – 2006 and the results of this are displayed in Figures 3.12 and 3.13. These figures show that only considering natural growth and the effect of AIDS (i.e. the effects of migration are not evaluated), the local municipalities within Umgeni Water's area that are experiencing a decrease in population and therefore should experience a decrease in water consumption are uMshwathi, Ndwedwe, Maphumulo, Impendle, KwaSani and Vulamehlo.

The number of people within the selected municipalities are shown in Table 3.6.

Table 3.6 Number of people (Calitz 2006; Statistics SA 2003).

Municipality	2001	Low HIV/AIDS 2006	High HIV/AIDS 2006
The Msunduzi Municipality	553151	568606	554607
Umgungundlovu District Municipality	927712	956309	932796
Sisonke District Municipality	298289	379917	370970
Ilembe District Municipality	560101	574774	560638
The KwaDukuza Municipality	158489	185983	181522
uMshwathi Municipality	108026	93052	90678
uMngeni Municipality	73881	76354	74477

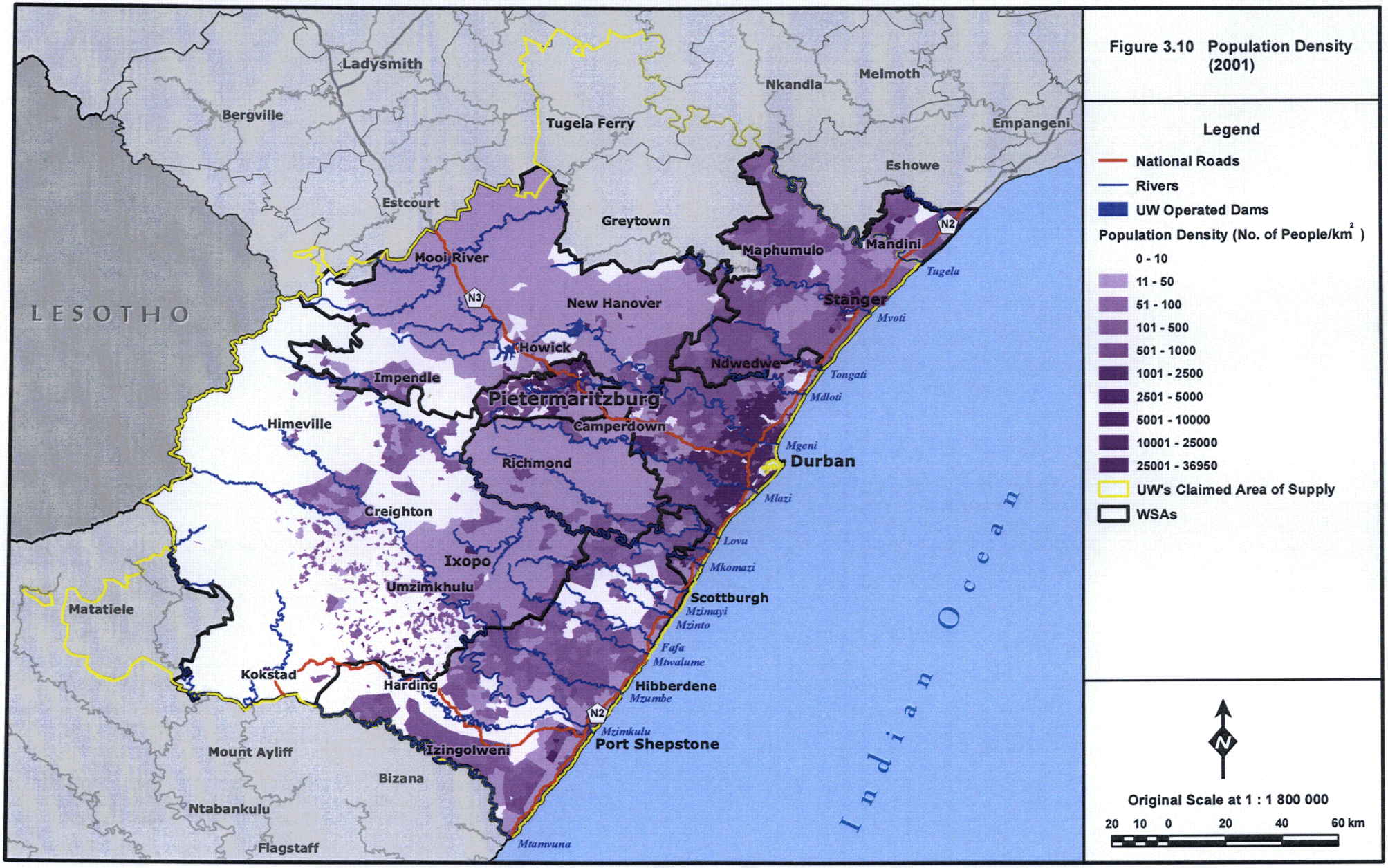


Figure 3.10 Population Density (2001)

Legend

- National Roads
- Rivers
- UW Operated Dams

Population Density (No. of People/km^2)

- 0 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 2500
- 2501 - 5000
- 5001 - 10000
- 10001 - 25000
- 25001 - 36950
- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

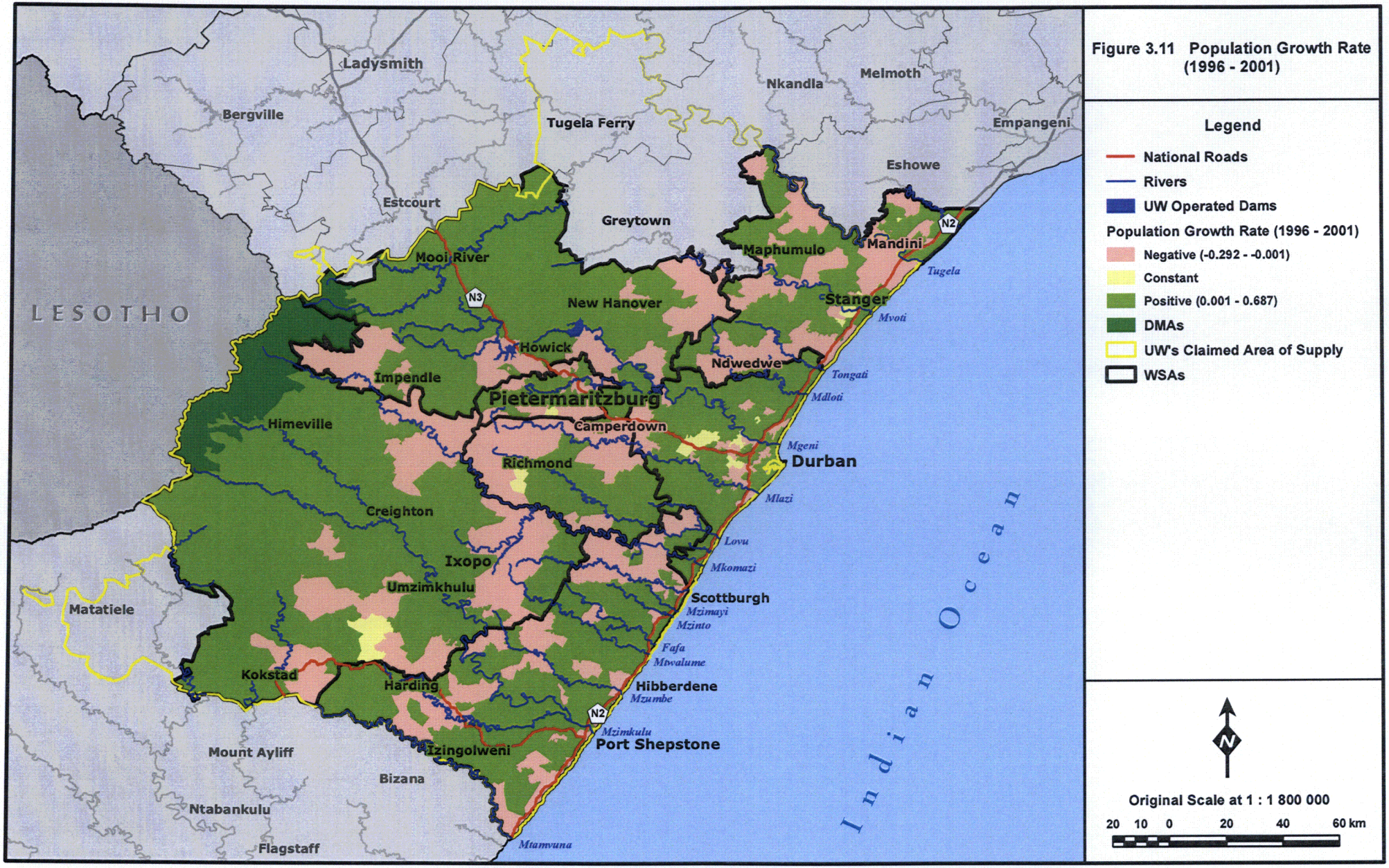


Figure 3.11 Population Growth Rate (1996 - 2001)

Legend

- National Roads
- Rivers
- UW Operated Dams

Population Growth Rate (1996 - 2001)

- Negative (-0.292 - -0.001)
- Constant
- Positive (0.001 - 0.687)
- DMAs
- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

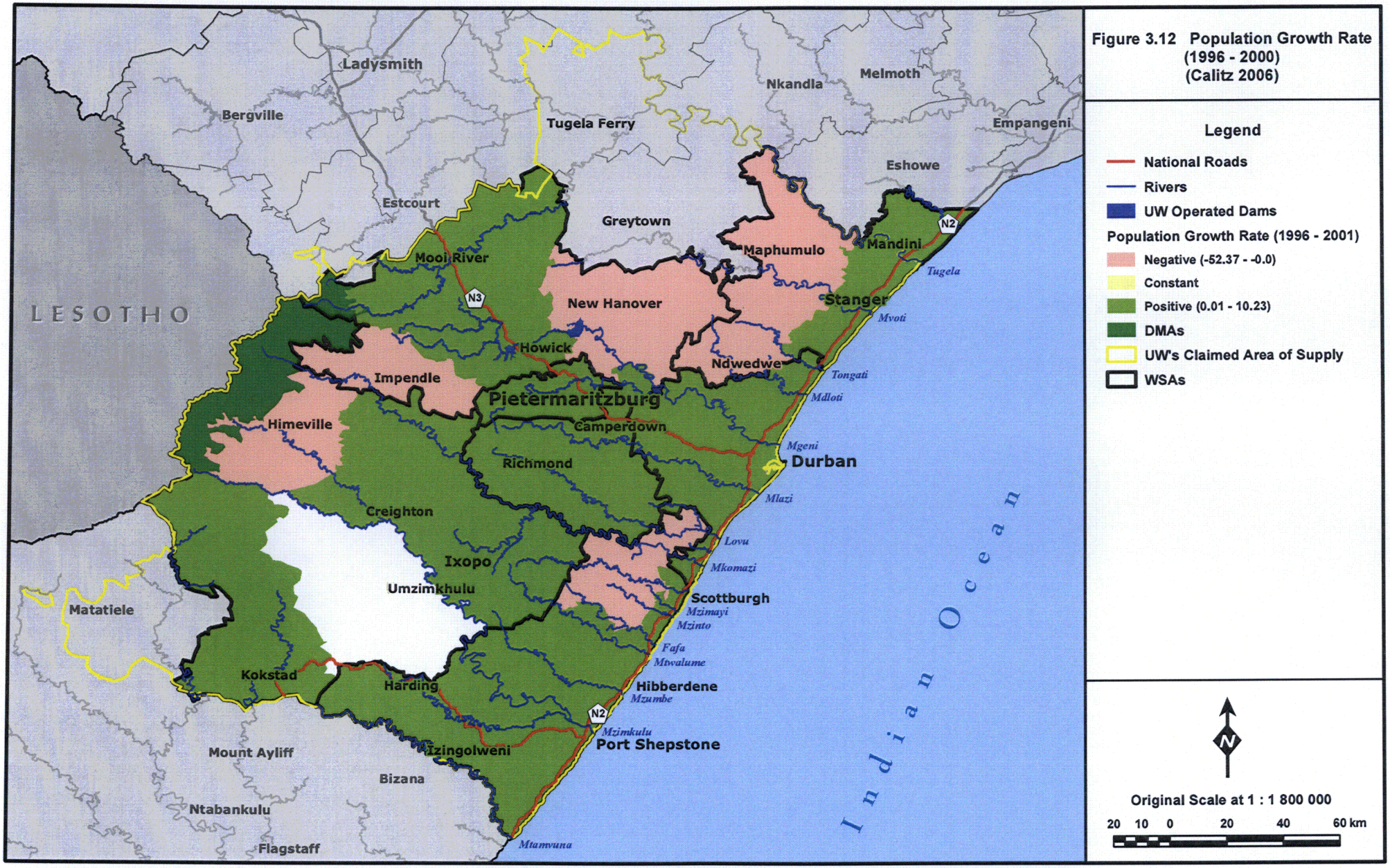


Figure 3.12 Population Growth Rate (1996 - 2000) (Calitz 2006)

Legend

- National Roads
- Rivers
- UW Operated Dams

Population Growth Rate (1996 - 2001)

- Negative (-52.37 - -0.0)
- Constant
- Positive (0.01 - 10.23)
- DMAs
- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

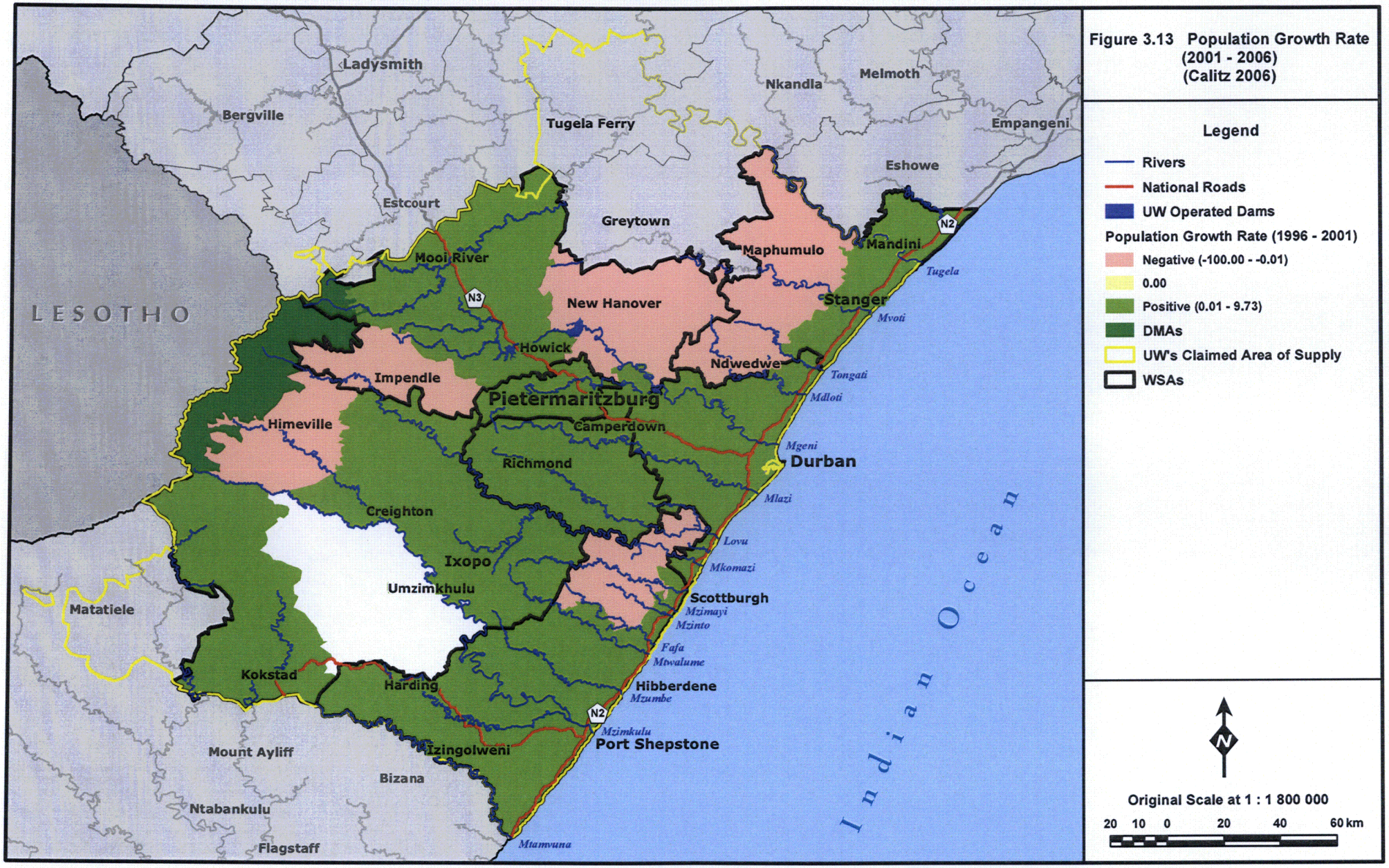


Figure 3.13 Population Growth Rate (2001 - 2006) (Calitz 2006)

Legend

- Rivers
- National Roads
- UW Operated Dams

Population Growth Rate (1996 - 2001)

- Negative (-100.00 - -0.01)
- 0.00
- Positive (0.01 - 9.73)
- DMAs
- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

3.2.4 Economic

The contribution of each local municipality within Umgeni Water's area to KwaZulu-Natal's GDP (2004) are shown in Figure 3.14. These figures show that correlating with the trends in population distribution (Figures 3.10 – 3.13), those areas with the highest contribution to the GDP will also have higher water consumption viz. eThekwini, The Msunduzi, uMngeni, KwaDukuza, Mandeni and The Hibiscus Coast.

The development trends as revealed by the number of development applications processed are shown in Figure 3.15. Correlating this figure with Figures 3.10 – 3.14, shows that those areas with high levels of people and economic activities and therefore high levels of water consumption are being reinforced but there are other areas that are being developed which were not identified in the trends shown in Figures 3.10 – 3.13. Figure 3.15 shows new trends which are a result of the increase in the property market and the results of these trends are an increase in water consumption. These trends are substantiated by the statistics shown in Tables 3.7 and 3.8.

Statistics SA (2006: 1) reports that as "at February 2006 the value of recorded building plans passed by larger municipalities (at current prices) during the first two months of 2006 increased by 29,8% (+R2 158,9 million) compared with first two months of 2005". They note (2006: 1) that "large increases were reported for non-residential buildings (+48,6% or R552,1 million), residential buildings (+30,3% or R1 251,9 million) and additions and alterations (+18,0% or R354,8 million)". They further say that "increases for non-residential buildings were reported for industrial and warehouse space (+70,0% or R270,4 million), other non-residential space (+66,9% or R48,1 million), office and banking space (+39,5% or R132,2 million) and shopping space (+29,5% or R101,5 million)" (Stats SA 2006: 1).

Statistics SA (2006: 21) continue to state that "eight provinces reported increases in the value of recorded building plans passed" (see Table 3.7). KwaZulu-Natal was the third largest contributor to the increase with +2,8 percentage points or R205,8 million (Stats SA 2006: 2).

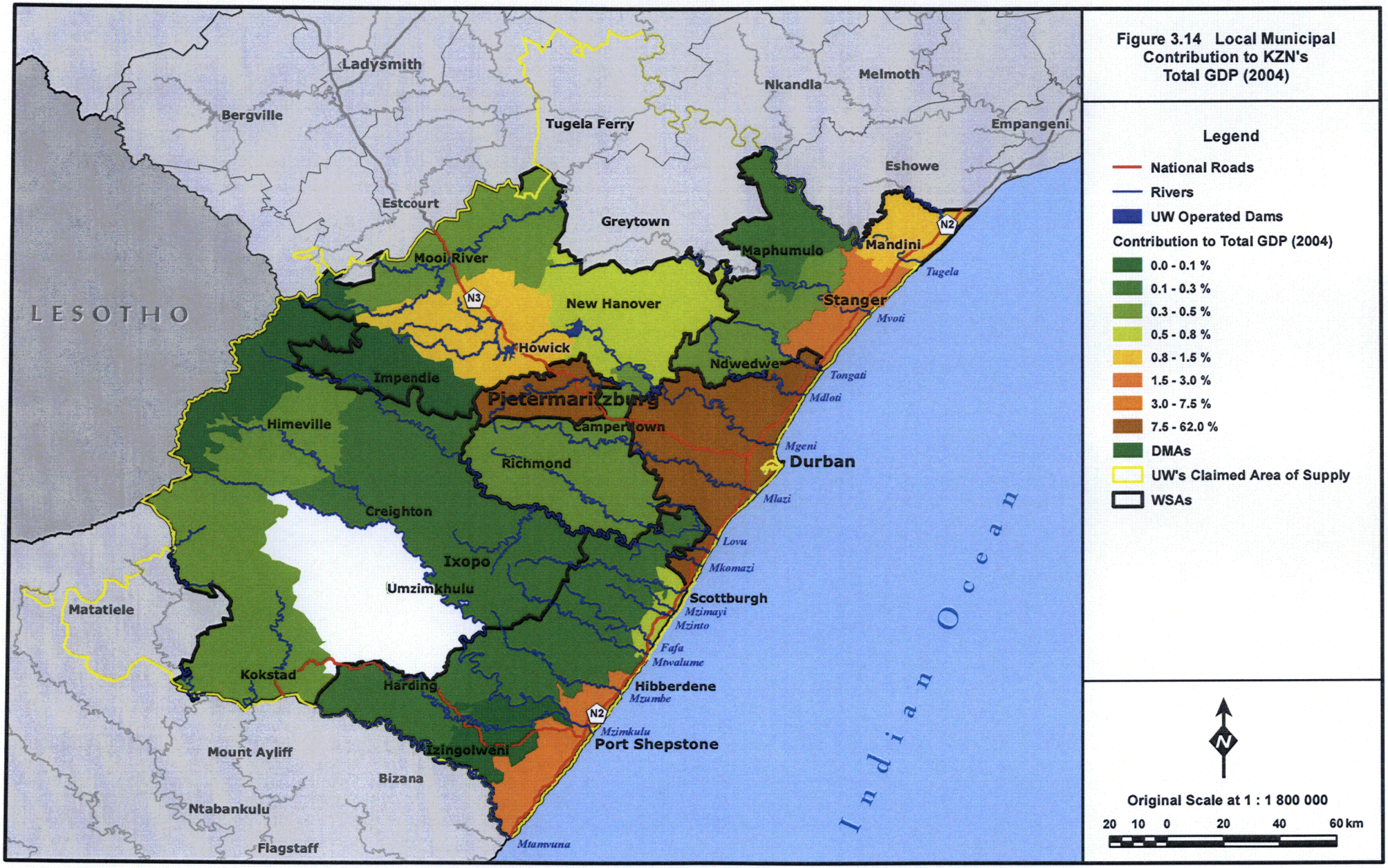


Figure 3.14 Local Municipal Contribution to KZN's Total GDP (2004)

Legend

- National Roads
- Rivers
- UW Operated Dams

Contribution to Total GDP (2004)

- 0.0 - 0.1 %
- 0.1 - 0.3 %
- 0.3 - 0.5 %
- 0.5 - 0.8 %
- 0.8 - 1.5 %
- 1.5 - 3.0 %
- 3.0 - 7.5 %
- 7.5 - 62.0 %
- DMAs
- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km

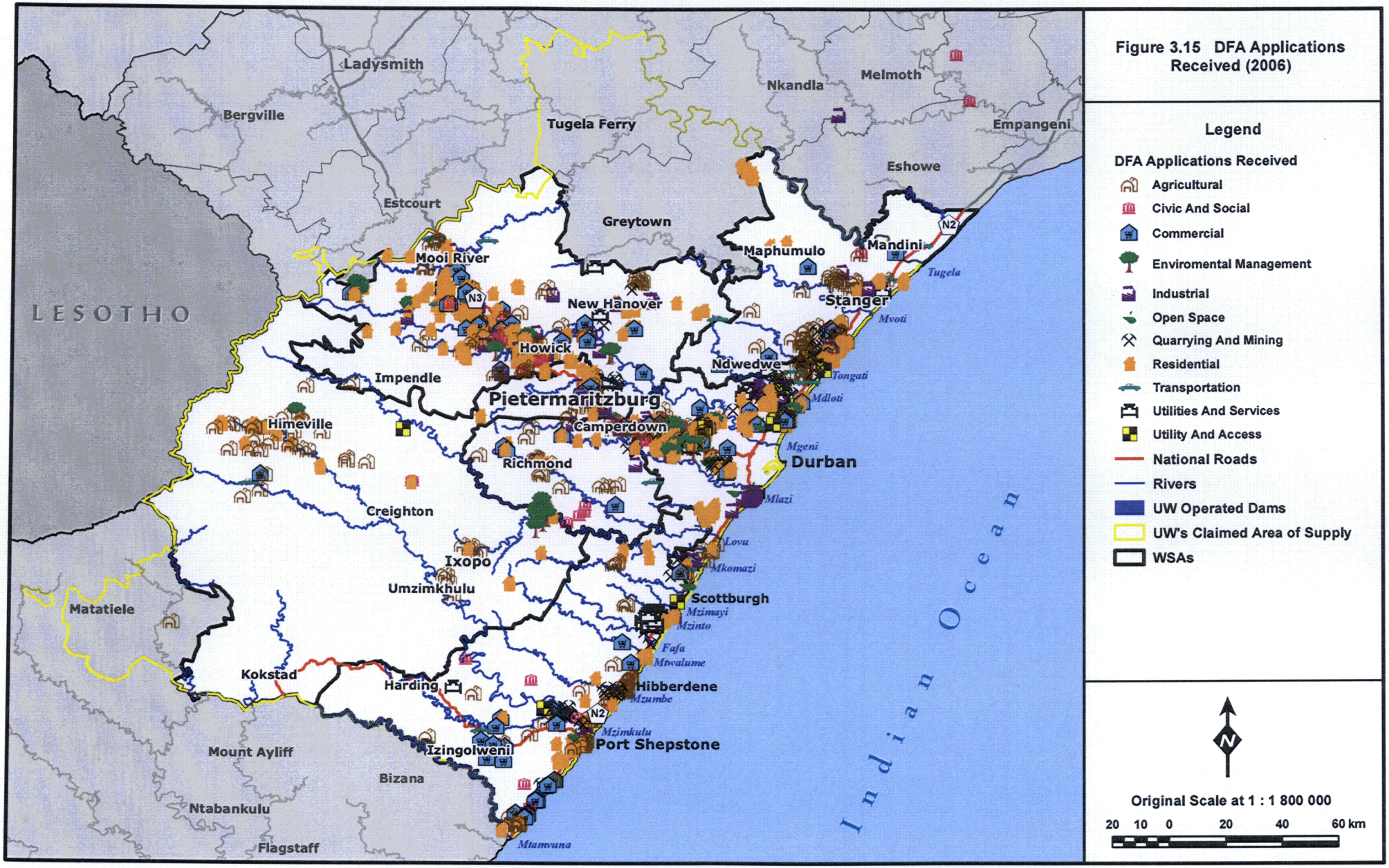

Ladysmith
Bergville
Tugela Ferry
Nkandla
Melmoth
Empangeni
Eshowe
Estcourt
Greytown
Mooi River
Maphumulo
Mandini
Tugela
LESOTHO
New Hanover
Stanger
Mvoti
Howick
Ndwedwe
Tongati
Impendle
Pietermaritzburg
Mdloti
Himeville
Camperdown
Mgeni
Durban
Richmond
Mlazi
Creighton
Lovu
Ixopo
Mkomazi
Umzimkhulu
Scottburgh
Mzimayi
Matatiele
Mzinto
Fafa
Mtwalume
Kokstad
Harding
Hibberdene
Mzumbe
Mzimkulu
Port Shepstone
Izingolweni
Mount Ayliff
Bizana
Ntabankulu
Flagstaff
Mtamvuna
Indian Ocean
N2
N3
Figure 3.15 DFA Applications Received (2006)
Legend
DFA Applications Received
Agricultural
Civic And Social
Commercial
Enviromental Management
Industrial
Open Space
Quarrying And Mining
Residential
Transportation
Utilities And Services
Utility And Access
National Roads
Rivers
UW Operated Dams
UW's Claimed Area of Supply
WSAs
N
Original Scale at 1 : 1 800 000
20 10 0 20 40 60 km

Table 3.7 Recorded building plans passed by large municipalities aggregated to provincial level (Stats SA 2006: 1).

Estimates at current prices	January to February 2005 R'000	January to February 2006 1/ R'000	Percentage contribution to the total value of building plans passed during January to February 2005	Percentage change between January to February 2005 and January to February 2006	Contribution (percentage points) to the percentage change in the value of buildings plans passed between January to February 2005 and January to February 2006 2/	Difference in value between January to February 2005 and January to February 2006 R'000
Western Cape	1 969 984	2 231 800	27,2	+ 13,3	+ 3,6	+ 261 816
Eastern Cape	342 652	461 567	4,8	+ 34,7	+ 1,7	+ 118 915
Northern Cape	65 242	67 295	0,9	+ 3,1	+ 0,0	+ 2 053
Free State	196 267	155 835	2,7	-20,6	-0,5	-40 432
KwaZulu-Natal	1 121 649	1 327 437	15,5	+ 18,3	+ 2,8	+ 205 788
North West	254 807	328 885	3,5	+ 29,1	+ 1,0	+ 74 078
Gauteng	2 833 484	4 228 965	39,2	+ 49,2	+ 19,3	+ 1 395 481
Mpumalanga	285 349	410 360	3,9	+ 43,8	+ 1,7	+ 125 011
Limpopo	168 210	184 403	2,3	+ 9,6	+ 0,2	+ 16 193
Total	7 237 644	9 396 547	100,0	+ 29,8	+ 29,8	+ 2 158 903

1/ Feb. 2006 figures should be regarded as preliminary because of possible backlogs and incomplete reporting by municipalities.
2/ The contribution (percentage points) is calculated by multiplying the percentage change of each province between January to February 2005 and January to February 2006 with the percentage contribution of the corresponding province to the total value of building plans passed during January to February 2005, divided by 100.

The largest municipal contributors to the value of recorded building plans for 2004 in KwaZulu-Natal are shown in Table 3.8.

Table 3.8 The largest municipal contributors to the value of recorded building plans passed for 2004 in KwaZulu-Natal (Statistics SA 2005: v).

Municipality	Value of recorded building plans passed at municipal level R million	Municipal percentage contribution to value of recorded building plans passed aggregated to provincial level
eThekwini Municipality	4 260,3	70,1
KwaDukuza Municipality	492,7	8,1
City of uMhlathuze	377,8	6,2
Hibiscus Coast Municipality	286,7	4,7
Msunduzi Municipality	278,9	4,6

3.2.5 Poverty

Meintjies explains that "poverty is often defined as the lack of resources to meet basic needs, such as for adequate food, clothing, shelter and basic amenities" (2001: 9). Those areas that usually make a low contribution to the GDP (the areas shown in green in Figure 3.14) have high levels of poverty. However the contribution to the GDP is one measure. A more commonly used measure is that of "the level of income earned by the households" (Meintjies 2001: 9). The percentage distribution of the annual household income (2001) for the selected municipalities in shown in Figure 3.16.

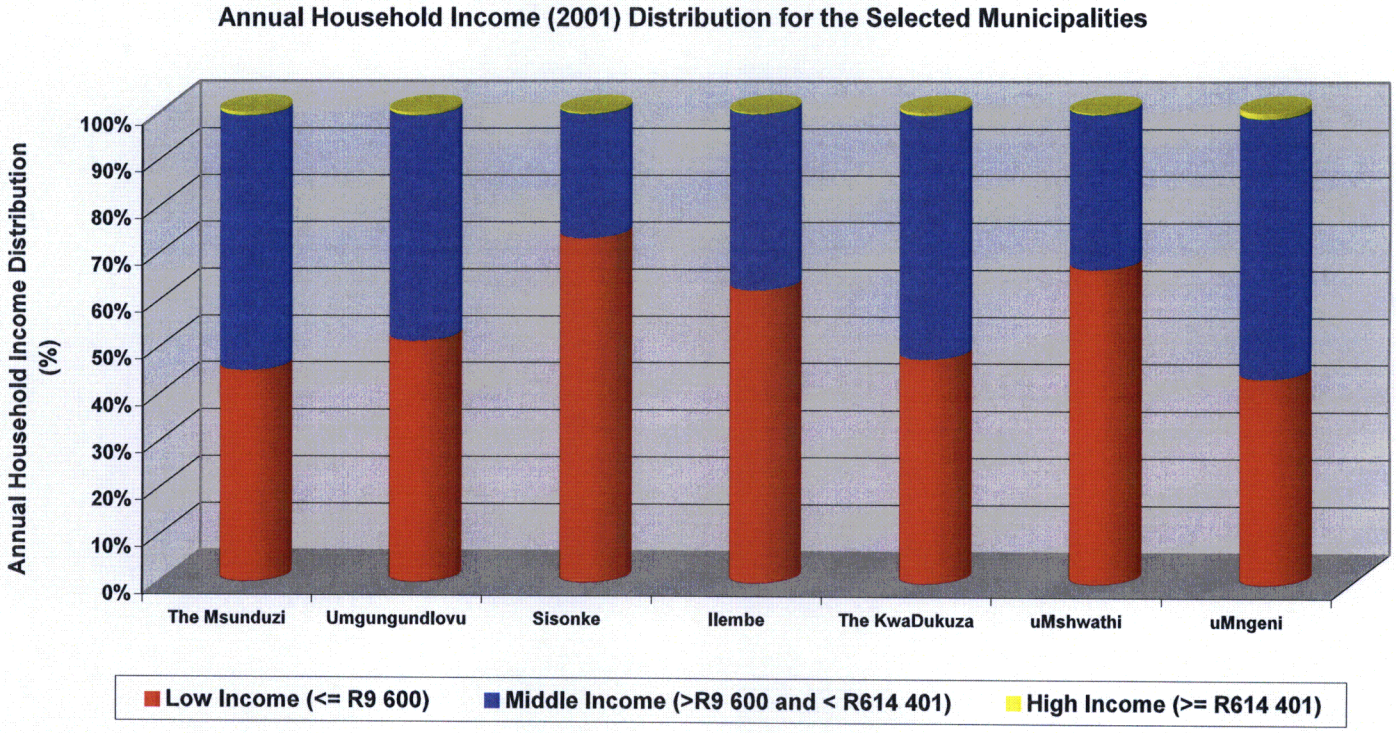


Figure 3.16 Annual household income (2001) distribution for the selected municipalities (Statistics SA 2003; Bureau of Market Research 2005).

Figure 3.16 correlates with that of Figure 3.14 with The Msunduzi Municipality, The KwaDukuza Municipality and uMngeni Municipality having a predominant middle-income category and these municipalities making a significant contribution to the GDP.

However, poverty is made-up of a number of components and therefore analysing poverty from only one dimension may be misleading. Gray, Lyne and Ferrer elaborate on the use of the different poverty measures by noting:

> Poverty lines are commonly used to assess poverty at the household level. Money metric poverty lines are usually determined by some level of consumption, expenditure or income that is adequate enough to meet primary human needs (Woolard and Leibbrandt 1999; Greeley 1994). The most commonly used determinant of poverty lines is income...Multi-faceted indexes of poverty also classify households on the basis of poverty lines.
>
> (Gray et al 2005: 467)

Noble, Babita, Barnes, Dibben, Magasela, Noble, Ntshongwana, Philips, Rama, Roberts, Wright and Zungu (2006) constructed a multi-faceted index of poverty called the "Provincial Index of Multiple Deprivation (PIMD)" for each of the South Africa provinces. This index for those wards within Umgeni Water's area of supply is shown in Figure 3.17.

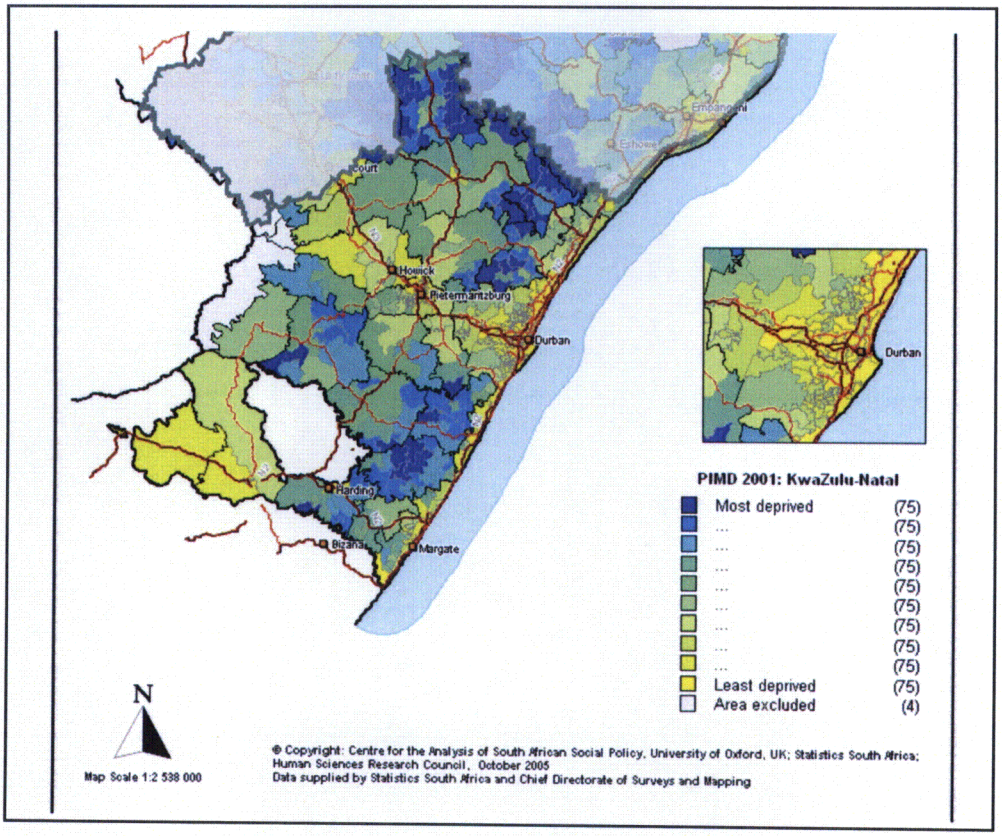


Figure 3.17 KwaZulu-Natal's Index of Multiple Deprivation 2001 at ward level provincial deciles (Noble et al 2006: Map 5).

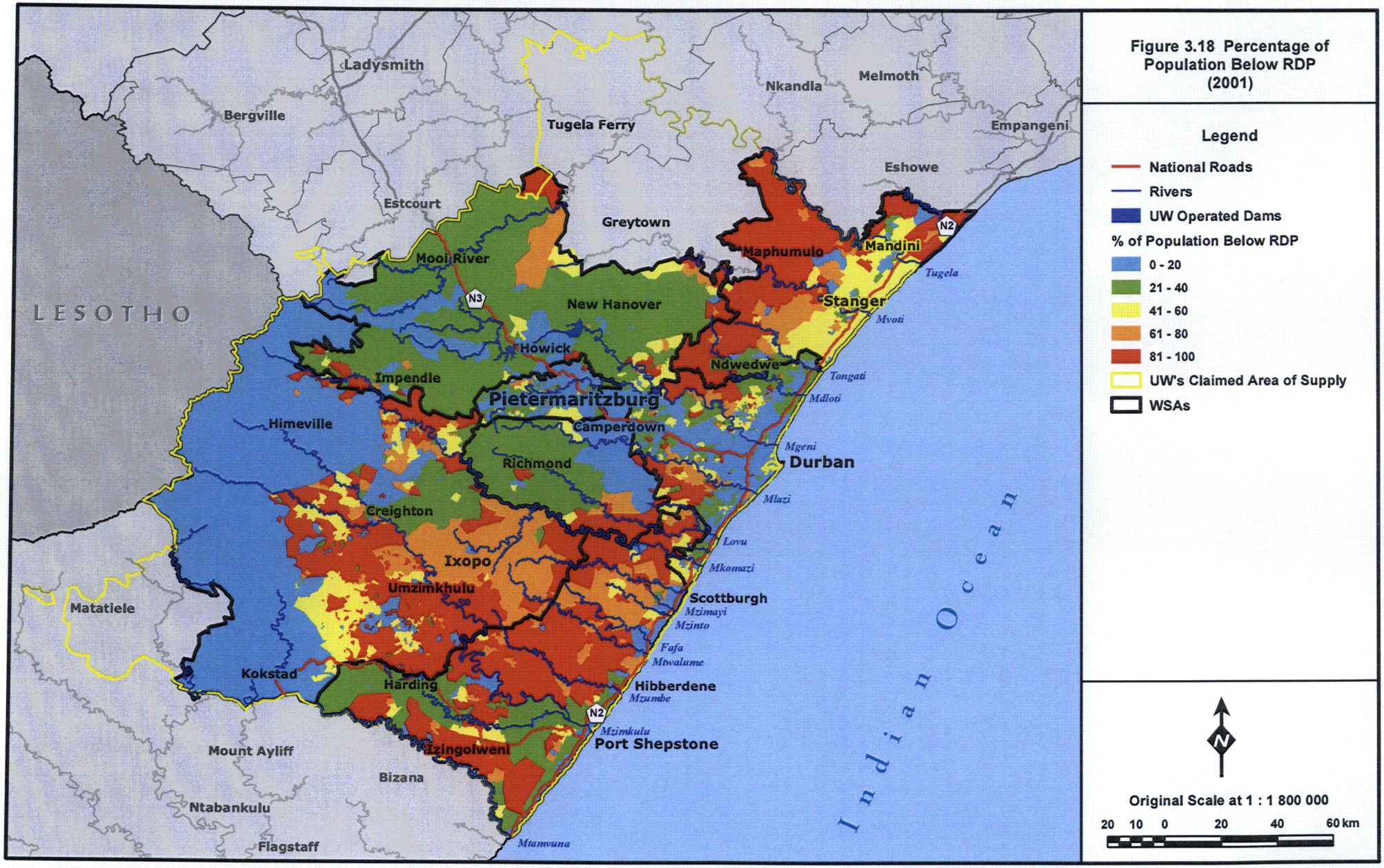
Those areas shown in blue in Figure 3.17 are those areas that are most deprived in terms of "resources to meet basic needs" and therefore include those areas that do not have access to clean, potable water. The next section elaborates on the access to water services within the study area.

3.2.6 Water Services

The percentage of the population within Umgeni Water's area that have water services below that of RDP standards viz. access to water greater than 200m away are shown in Figure 3.18. This has a parallel with that shown in Figure 3.17. Correlating this figure with Figure 3.14 shows that most of the backlogs occur in those areas that do not make a significant contribution to the GDP of the province i.e. there is not much economic activity in these areas. A comparison with Figure 3.7 also shows that the backlogs occur in areas that are steep and therefore the provision of infrastructure becomes difficult. Correlating this with Figure 3.4 further shows that the areas of backlogs are predominantly within the jurisdiction of the Ingonyama Land Trust. The settlement patterns within these areas are scattered and irregular, adding further challenges in the provision of water.

However, the pattern of the density of the backlogs is slightly different from that in Figure 3.18 as shown in Figure 3.19. The highest number of backlogs are shown in Figure 3.19 to be in the eThekwini and The Msunduzi Municipal areas. This pattern correlates with Figure 3.10.

The location of Umgeni Water's infrastructure is shown in Figure 3.20.


Ladysmith
Bergville
Tugela Ferry
Nkandla
Melmoth
Empangeni
Eshowe
Estcourt
Greytown
Mooi River
Maphumulo
Mandini
Stanger
Tugela
Mvoti
LESOTHO
New Hanover
Howick
Ndwedwe
Impendle
Tongati
Mdloti
Pietermaritzburg
Himeville
Camperdown
Mgeni
Durban
Richmond
Mlazi
Creighton
Lovu
Ixopo
Mkomazi
Umzimkhulu
Scottburgh
Mzimayi
Mzinto
Matatiele
Fafa
Mtwalume
Kokstad
Harding
Hibberdene
Mzumbe
Mzimkulu
Port Shepstone
Izingolweni
Mount Ayliff
Bizana
Ntabankulu
Flagstaff
Mtamvuna
Indian Ocean
N2
N3
Figure 3.18 Percentage of Population Below RDP (2001)
Legend
National Roads
Rivers
UW Operated Dams
% of Population Below RDP
0 - 20
21 - 40
41 - 60
61 - 80
81 - 100
UW's Claimed Area of Supply
WSAs
N
Original Scale at 1 : 1 800 000
20 10 0 20 40 60 km

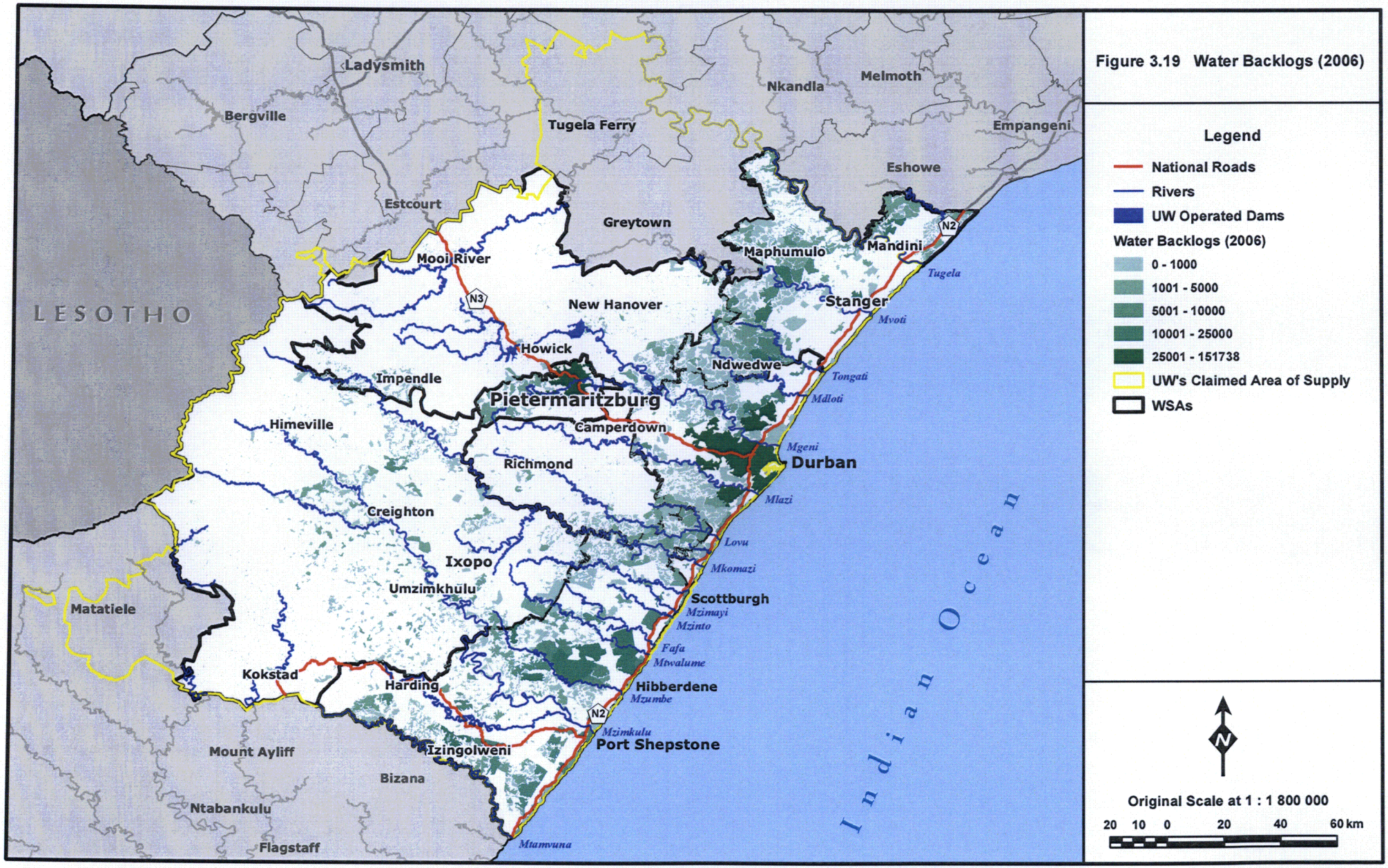


Figure 3.19 Water Backlogs (2006)

Legend

- National Roads
- Rivers
- UW Operated Dams

Water Backlogs (2006)

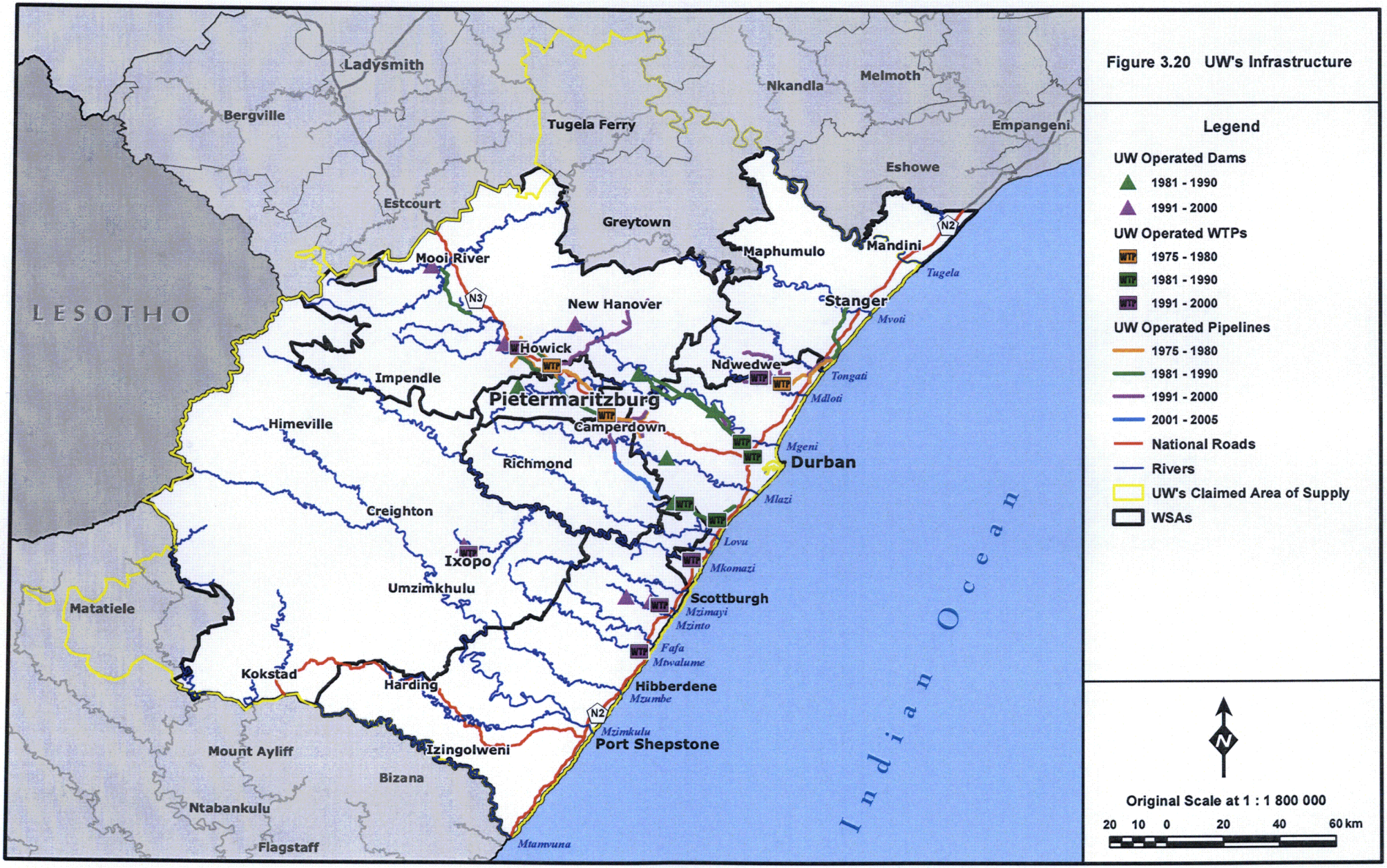
- 0 - 1000
- 1001 - 5000
- 5001 - 10000
- 10001 - 25000
- 25001 - 151738

- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km


Ladysmith
Bergville
Tugela Ferry
Nkandla
Melmoth
Empangeni
Eshowe
Estcourt
Greytown
Mooi River
Maphumulo
Mandini
Tugela
LESOTHO
New Hanover
Stanger
Mvoti
Howick
Ndwedwe
Impendle
Tongati
Mdloti
Pietermaritzburg
Himeville
Camperdown
Mgeni
Durban
Richmond
Mlazi
Creighton
Lovu
Ixopo
Mkomazi
Umzimkhulu
Scottburgh
Matatiele
Mzimayi
Mzinto
Fafa
Mtwalume
Kokstad
Harding
Hibberdene
Mzumbe
Mzimkulu
Port Shepstone
Izingolweni
Mount Ayliff
Bizana
Ntabankulu
Flagstaff
Mtamvuna
Indian Ocean
N2
N3
WTP
Figure 3.20 UW's Infrastructure
Legend
UW Operated Dams
1981 - 1990
1991 - 2000
UW Operated WTPs
1975 - 1980
1981 - 1990
1991 - 2000
UW Operated Pipelines
1975 - 1980
1981 - 1990
1991 - 2000
2001 - 2005
National Roads
Rivers
UW's Claimed Area of Supply
WSAs
N
Original Scale at 1 : 1 800 000
20 10 0 20 40 60 km

4. EVALUATION OF THE PRODUCTS OF THE IRP, IDP AND WSDP PROCESSES

The purpose of this section is to evaluate the IRP, IDP and WSDP products of the study area in terms of spatial developments, implementation, demand projections and stakeholder co-ordination.

4.1 Description of the Products

This section provides an overall description of the products in the study area viz. Umgeni Water's Infrastructure Master Plan, the IDPs and the WSDPs.

4.1.1 Umgeni Water's Infrastructure Master Plan

Although established in 1975, Umgeni Water only produced its first master plan in 1993. The rationale for the master plan was explained as follows:

> The purpose of the report is fourfold. Firstly, to give an overview of the type of approach that is being adopted with regards to infrastructure planning. Secondly, to indicate to management how all the various planning studies being undertaken at the moment fit together into a coherent whole. Thirdly, to make some interim recommendations with regard to infrastructure based on the current knowledge we have of the various systems. Lastly, to elicit response and comment from other Divisions, and in particular Operations, to enable the Master Plan to be improved on an ongoing basis.
>
> The focus of this report is at a strategic level and thus on the major elements in the system.
>
> Historically, the planning emphasis was towards individual elements of the system which tended to be looked at in isolation. As our responsibility and infrastructure have grown, this approach was no longer satisfactory and it has been necessary to move more towards a systems approach[2]. The current trend is to improve flexibility and security of supply by linking various systems and thus in future a multi-systems approach will be necessitated.
>
> (Umgeni Water 1994: 1)

[2] The systems approach was explained in Section 2.2.

A summary of Umgeni Water's master plans is listed chronologically in Table 4.1.

Table 4.1 Summary of Umgeni Water's Master Plans (Umgeni Water 1994, 1996, 1997, 1998, 2004).

Year	Comments
1993	• UW's first infrastructure master plan. • Purpose: – Give overview of the type of approach adopted with regards to system planning. – Indicate to management how all the various planning studies being undertaken presently fit together into a coherent whole. – Make some interim recommendations with regard to infrastructure based on the current knowledge of the systems. – To elicit response and comment from the other Divisions and in particular Operations, to enable the Master plan to be improved on an ongoing basis.
1994	• Three new objectives in addition to those of the 1993 one: – The cost of the infrastructure augmentation proposals. – Scheduling of the different elements required for implementation. – Overall financial and tariff implications for the organisation. • Also changed the projection horizon to a 20 year one compared to the 1993 one of 10 years. • Had "Conclusions and Recommendations" section.
1996	• Framework within which infrastructure investments will be implemented over the projection horizon. • 20 Year horizon. • Documents host of interrelated studies & focuses on major elements of bulk. • Reviewed biennially. • 12 page document. • Had "Road Ahead" section.
1997	• Only found Volume II which contained the appendices. • 1998 one refers to this version.
1998	• Looked at the present and projected bulk water resources and water supply infrastructure, water demands justifying the proposed investments and projected cost of infrastructure for the next 20 years. • Also had a Community Water Supply and Sanitation Master Plan. • Next revision was planned for 2000/2001. • No "Conclusions/Recommendations" chapter.
2004	• Similar format as 1998. • No "Conclusions/Recommendations" chapter.

The reason for the gap between 1998 and 2004 was a result of Umgeni Water's restructuring process which resulted in a dramatic reduction in planning expertises. The water planning process continued but there was no capacity to produce the product hence the gap.

The elements which were identified in Section 2.3.7 were compared with those found in the 2004 Master Plan and the results are displayed in Table 4.2. A comparison of the elements was also undertaken for Umgeni Water's 2005 – 2010 Policy Statement and Corporate Business Plan (Table 4.2).

Table 4.2 Summary of component information in Umgeni Water's Master Plan.

Component	Infrastructure Master Plan 2004	Policy Statement and Corporate Business Plan 2005 - 2010
Maps	Yes	No
Context and Background	Yes	Yes
Status Quo	Yes	Yes
Measuring Progress	No	Yes
Planning Processes and Methodology	Yes	Yes – Corporate Planning Process
Policies & Procedures	No	Yes
Goals	No	No
Demands	Yes	Yes
Systems Analysis	Yes	No
Lists Strategies	Yes	No
Programme Schedule	Yes	No
List of Projects	Yes	Yes
Financial Information	Yes	Yes
Budget	Yes	Yes
Financial Programme	Yes	Yes
Asset Management	No	Yes
Alternative Water Supplies e.g. Recycling	Yes	No
Demand Management	Yes	Yes
Catchment Management	Yes	Yes
Institutional Measures	No	No
Risk Management e.g. Droughts	No	Yes – Corporate Risks
Regulatory Requirement	No	Yes
External Review	No	Yes

The following points were identified from the analysis of the comparison (where the term "business plan" is used, it includes the "policy statement"):

- Firstly, although it is called a "master plan', it contains most of the elements of an IRP. Hence its name is incorrect.
- Secondly, it is called the "2004 Infrastructure Master Plan". Again, this is misleading as it was prepared in 2004 but for the *2005/2006* financial year. Hence, it would be more appropriate to be called the "2005/2006 Infrastructure Master Plan".

- The Master Plan has a 20 year projection horizon whilst that of the Business Plan has a five year horizon.
- The Master Plan is not a regulatory requirement nor is it submitted for external review. This differs from the approach of Rand Water, another water board which submits its Master Plan for external review. The Business Plan is a regulatory requirement and is reviewed by DWAF.
- The Master Plan referred to strategies whilst the Business Plan did not although the DWAF Guidelines (2003: 2) indicate that the purpose of the Policy Statement is to show the main strategies the water board will use to implement its philosophy (Section 2.3.8). However, Umgeni Water does produce a "Strategic Plan" which has a ten year horizon. Umgeni Water's current strategic approach is based on a customisation of Kaplan and Norton's Balanced Score Card (1996) in which the strategy is based on the six pillars of "customer, growth, water and socio-economic development, environment, financial and organisation". The strategic plan describes the "operating environment dictates, the corporate vision and mission, strategic markets, values, corporate strategy, corporate performance measures and targets and strategic objectives" (Umgeni Water 2005).

  The Strategic Plan appears to have the same strategic component characteristics with regard to the IDPs assessed by the DDP for the recommendation identified by the DDP (Section 2.3.9) could also apply to Umgeni Water' strategic plan as it does not have one "grand strategy" (Section 2.2). The plan does not demonstrate any cross-sectoral linkages with objectives placed in only one pillar although they may actually impact on more than one pillar. The Master Plan on the other hand could be said to have the grand strategy of regional schemes with the underlying paradigm of IRP.

  More importantly, similar to the Business Plan, the Strategic Plan does not have any maps and therefore, again demonstrating characteristics similar to those IDPs assessed by the DDP (Section 2.3.9), spatial planning appears to be neglected. This neglect was commented on by DWAF in Umgeni Water's 2004 appraisal where DWAF noted its concern on the lack of mimic diagrams (DWAF 2004). Mimic diagrams as well as maps showing existing and proposed schemes are shown in the Master Plan.

Re-looking at Sections 2.1 and 2.2, it is clear that the Business Plan and Strategic Plan should be aligned. This statement is further supported looking at the projection horizons and the explanation on the different durations provided in Section 2.3.7 i.e. the Business Plan refers to the mid-term and the Strategic Plan to the long-term. However on comparing the content, the alignment between what the Business Plan says will be done and the targets set by the Strategic Plan are not clear.

From Sections 2.3.7 and 2.3.8, it was identified that a master plan could be a strategic plan or a business plan. If so, what then is the difference between Umgeni Water's Infrastructure Master Plan, the Business Plan and the Strategic Plan and if they are different, are they aligned?

The first difference identified is that of the projection horizons and referring to Section 2.3.4, the Master Plan would be the long-term plan. This means that Umgeni Water has one mid-term plan and two long-term plans. The second difference noted was that the Master Plan was the only plan that had a spatial dimension. Does this imply that the only difference between the two long-term plans is the spatial component? A comparison of the Master Plan and Strategic Plan revealed that the content was totally different. However, the Master Plan as the long-term plan and the Business Plan as the mid-term plan had similar information as shown by Table 4.2. Does this mean that the Master Plan and the Business Plan are aligned? Working on the assumption that if they were aligned, they would refer to one another, a check was performed to determine if they referred to one another.

The Master Plan only refers to the Business Plan in the following statement:

> This report focuses on the technical management aspects required for the operational success of the organisation. The business management aspects of the organisation form part of a separate business plan.
>
> (Umgeni Water 2004: 5)

However, the Business Plan does not refer to the Master Plan at all. However, a review of the 1999 – 2004, 2002 – 2007, 2003 – 2008 and 2004 – 2009 Business Plans shows that these Business Plans referred to the corresponding Master Plan. The 2000 – 2005 and 2002 – 2007 had specific sections devoted to the Master Plan, presenting the results of the Master Plan. The 2003 – 2008 Business Plan had a section on the Master Plan which explained the process in which it was undertaken. The 2004 – 2009

Business Plan did not refer to the Master Plan but to Umgeni Water's Regional Water Concept Plan.

This plan was developed in 2003 as one of Umgeni Water's strategies and was initially called Umgeni Water's "Regional Bulk Water Supply Master Plan" (2003: 1) but then renamed a "Concept Plan" as this term was more appropriate as the level of detail contained within the plan was at a concept/reconnaissance level (Section 2.3.3). The 2003 version of the plan demonstrated how Umgeni Water would be able to provide sustainable water to those within its area of supply using regional bulk water supply schemes. In the following year, Umgeni Water's CEO decided that this strategy was a good one and decided that it should be applied to the entire province. A second version of the plan was then developed showing how water may be provided to the entire KwaZulu-Natal using regional bulk water supply schemes (2004). Umgeni Water's CEO then used this plan to lobby the other regional water services providers in KwaZulu-Natal viz. uThukela Water and uMhlathuze Water and the respective government departments viz. DWAF and DLGTA to adopt this strategy. The identified stakeholders agreed to this in principle and further versions of the plan were drafted (January 2005; March 2005) but due to lack of capacity within uThukela Water and uMhlathuze Water and changes in all of the water services providers Executive Committees (EXCOs), the initiative loss momentum. However, the principles provided by the Plan have been used in the Provincial Spatial Economic Development Strategy (KZN Treasury 2006) and Umgeni Water continues to work by the principles put forward in the plan.

The plan could be said to be Umgeni Water's grand strategy and more importantly, shows spatially Umgeni Water's strategy.

The 2004 - 2009 Business Plan referred to the different levels of planning studies for it indicated that "as the planning process gathers momentum and begins to look at detailed feasibilities, then the scope exists to broaden the boundaries of the master plan, where appropriate" (Umgeni Water 2004: 90). This statement would imply that the master plan only shows studies that are at a feasibility level. However, a review of Umgeni Water's Master Plan and of Water Plans in general (Section 2.3.7) shows that this is not true as the different Plans refer to studies in all the different phases of the project life-cycle.

The analysis on the alignment between Umgeni Water's master plans and business plans also revealed that prior to the Water Services Act, Umgeni Water's master plan

provided Umgeni Water with its corporate planning i.e. the master plan was the business plan. The only difference between the master plan and what is commonly found in a business plan was that the master plan only referred to the capital expenditure (CAPEX) whilst the operating expenditure (OPEX) was undertaken separately using the "ALCAR" model. It was only with the Water Services Act in 1997 that Umgeni Water began producing a separate business plan to fulfil the regulatory requirements of Sections 39 and 40 (Section 2.3.4).

Section 2.3.6 and Appendix D also showed that an IRP should be aligned with the business plan. It is therefore recommended that Umgeni Water's Business Plan should be aligned with its Water Plan.

The next section looks the IDPs in the study area.

4.1.2 Status of the IDP Products

The status of the IDP products within the study area are listed chronologically in Table 4.3.

Table 4.3 Status of IDP Products.

Municipality	2002	Reviewed 2003		Reviewed 2004/5		2005/6		2006/7	
	(Original)	Draft	Adopted	Draft	Adopted	Draft	Adopted	Draft	Adopted
Umgungundlovu	Yes	No	Yes	Yes	No		Yes	No	Yes
uMngeni	Yes	No	Yes	No	No	Yes	Yes	No	Yes
The Msunduzi	Yes	No	No	No	No	No	No	No	Yes
uMshwathi	Yes	No	Yes	No	No	No	No	No	Yes
Sisonke	Yes	No	Yes	No	No	No	Yes	No	Yes
Ilembe	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes
KwaDukuza	Yes	No	Yes	No	No	Yes	Yes	No	Yes

A complete review of the IDPs is not provided. Instead, those sections applicable to this study are reviewed in the following sections.

4.1.3 Status of the WSDP Products

The status of the WSDP products for the WSAs in the study area are shown in Tables 4.4 – 4.7.

A summary of the pertinent comments to this study, provided by DWAF in its evaluation of these WSDPs are provided in Appendix K.

Table 4.4 Umgungundlovu WSDP Status (DWAF 2006: website).

Hardcopy Status	Date Received	Relevant Year	Version	Hardcopy Type	Status Comment Date	Status Comment
Draft (Pre public comments)	28 February 2002	2002/03		Electronic document submitted	18 March 2002; 20 May 2002	Alignment of Sector plans with WSDP is not clear. A visit to the DM is to be scheduled soon.
Draft (Post public comments)	15 July 2003	2003/04	Version 1	Hardcopy document submitted	-	-
Draft (Pre public comments)	01 July 2003	2004/05	Draft July 2003	Hardcopy document submitted	11-Nov-04	The WSDP has not been approved by Council. The WSA has to indicate the actions to be taken after receiving the DWAF comments. The WSDP is not in the DWAF guideline format
Draft (Pre public comments)	01 December 2004	2005/06	September 2004, Phase 1 Draft	Hardcopy document submitted	-	-

Table 4.5 The Msunduzi WSDP Status (DWAF 2006: website).

Hardcopy Status	Date Received	Relevant Year	Version	Hardcopy Type	Status Comment Date	Status Comment
Draft (Pre public comments)	28 February 2002	2002/03		Electronic document submitted	22-Feb-01	-
Draft (Pre public comments)	01 September 2004	2004/05	Draft September 2004	Hardcopy document submitted	11-Nov-04	The WSDP document is in DWAF format and the WSA is busy attending to the DWAF comments.
Draft (Pre public comments)	18 May 2004	2003/04			-	-
Draft (Pre public comments)	15 September 2004	2005/06	Draft September 2004	Hardcopy document submitted	04-Oct-05	WSA received funding from DPLG in April 2005 for Quality Revision; WSDP Steering Committee Re-Established in September 2005

Table 4.6 Ilembe WSDP Status (DWAF 2006: website).

Hardcopy Status	Date Received	Relevant Year	Version	Hardcopy Type	Status Comment Date	Status Comment
Draft (Pre public comments)	13 June 2002	2002/03		Electronic document submitted	1 March 2002; 20 May 2002; 16 March 2004	Multi-Consul appointed, and this is the Council appointment; Multi-Consul appointed, and this is the Council appointment; WSDP not in line with DWAF guidelines
Adopted	03 December 2003	2003/04	Phase 1	Hardcopy document submitted	-	-
Adopted	01 December 2003	2004/05	Draft Dec 2003	Hardcopy document submitted	-	-
Adopted	01 December 2003	2005/06	Phase 1, December 2003	Hardcopy document submitted	-	-

Table 4.7 Sisonke WSDP Status (DWAF 2006: website).[3]

Hardcopy Status	Date Received	Relevant Year	Version	Hardcopy Type	Status Comment Date	Status Comment
Draft (Post public comments)	14 April 2002	2002/03		Electronic document submitted	01-Mar-02	WSDP process not yet started, still at the planning phase
Adopted	11 September 2003	2003/04		Hardcopy document submitted	-	-
Adopted	01 September 2003	2004/05	Draft September 2003	Hardcopy document submitted	11-Nov-04	The DWAF comments are being addressed
Adopted	14 October 2003	2005/06	37865	Hardcopy document submitted	4 October 2005; 4 October 2005	WSDP adopted 19 December 2003; Currently in review process

[3] It is noted that although DWAF does not have a record of it in their database as displayed on their website, Sisonke does have a December 2005 WSDP Review document.

4.2 Spatial Developments

KwaZulu-Natal had developed a Provincial Growth and Development Strategy (PGDS) in 2004 but the weakness of this strategy was that it did not have a spatial component (there was however a Spatial Growth and Development Strategy in 1996). This is now being addressed in the PSEDS (2006). However, this document will not be used in the analysis as it was developed after the 2005 – 2006 financial year.

For the 2005 – 2006 financial year, there was no recent regional picture of the desired developments within KwaZulu-Natal except for that which was shown in the KwaZulu-Natal's Bulk Water Supply Concept Plan and which had the water sectoral bias. This bias is also demonstrated in Umgeni Water's Master Plan and is a result of the way in which Umgeni Water undertakes its demand projections which is elaborated in Section 4.3. The spatial result of its methodology is that where people are currently residing, it is assumed that this is where they will be in the future except in greater densities. This is shown in Figure 4.1.

This methodology then runs the risk of what is identified in Section 2.3.9 and Appendix H where Ambert and Feldman state that service providers "have been known to extend services in areas that are in direct conflict with the spatial development rationale and priorities of municipal areas" (2002: 18). Are Umgeni Water's proposed developments in conflict with the respective SDFs?

The respective SDFs (Appendix L) were consolidated to produce one picture showing the desired developments as envisioned by the municipalities within Umgeni Water's operational area (Section 1.4). This is shown in Figure 4.2.

The comparison between Figures 4.1 and 4.2 shows that there is not a significant difference (Figure 4.3) between the two at a conceptual or reconnaissance level. It is noted that not all the corridors and nodes as identified by the municipalities align as shown on the boundary between the Umgungundlovu and Ilembe District Municipalities where Umgungundlovu's secondary corridor overlaps with Ilembe's primary corridor (Figure 4.3 and Figure 4.5). However, the possible water transfers as identified by Umgeni Water align with the identified corridors although in certain cases, the possible bulk pipeline may not be within the primary corridor but instead within the secondary corridor.

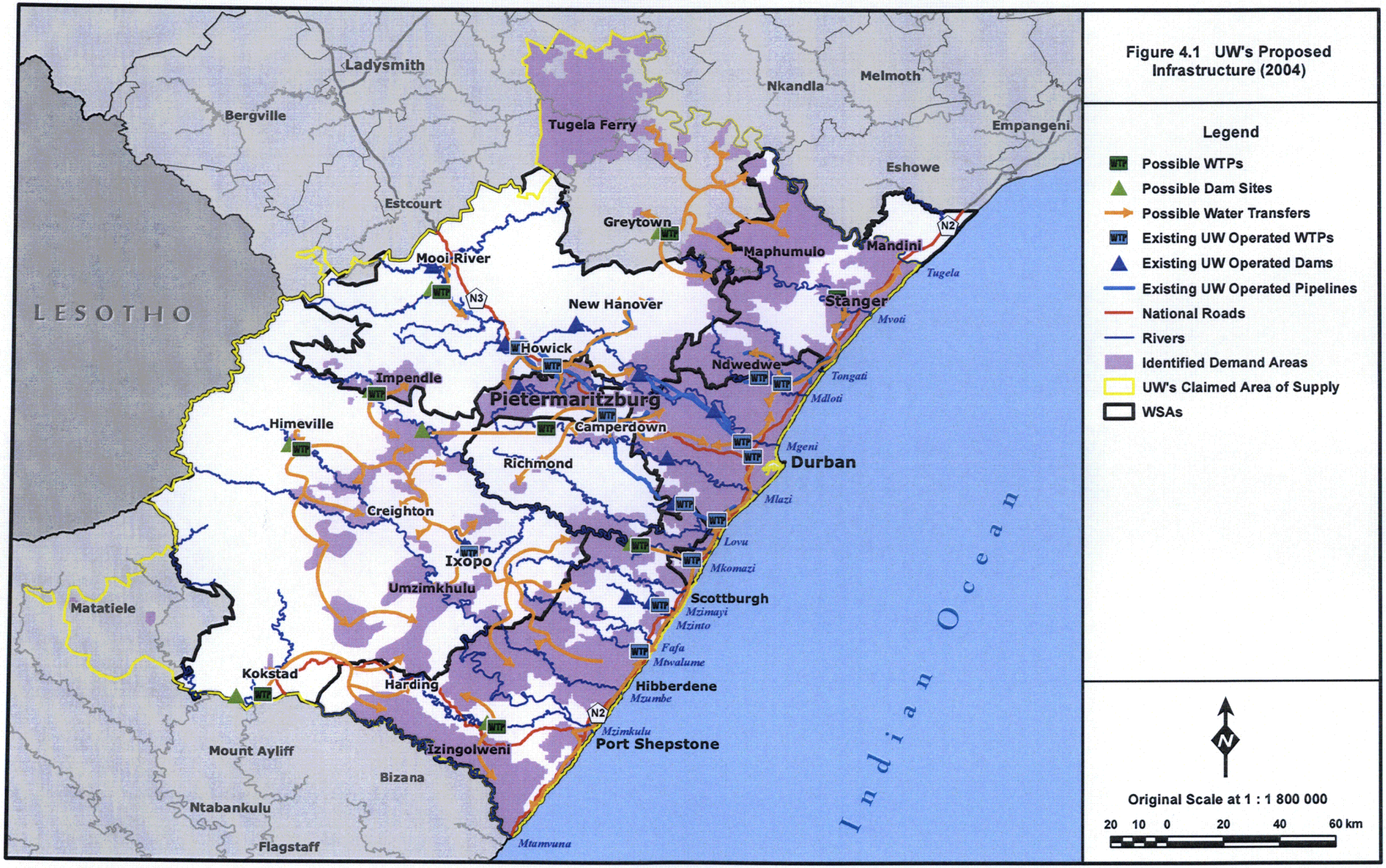


Figure 4.1 UW's Proposed Infrastructure (2004)

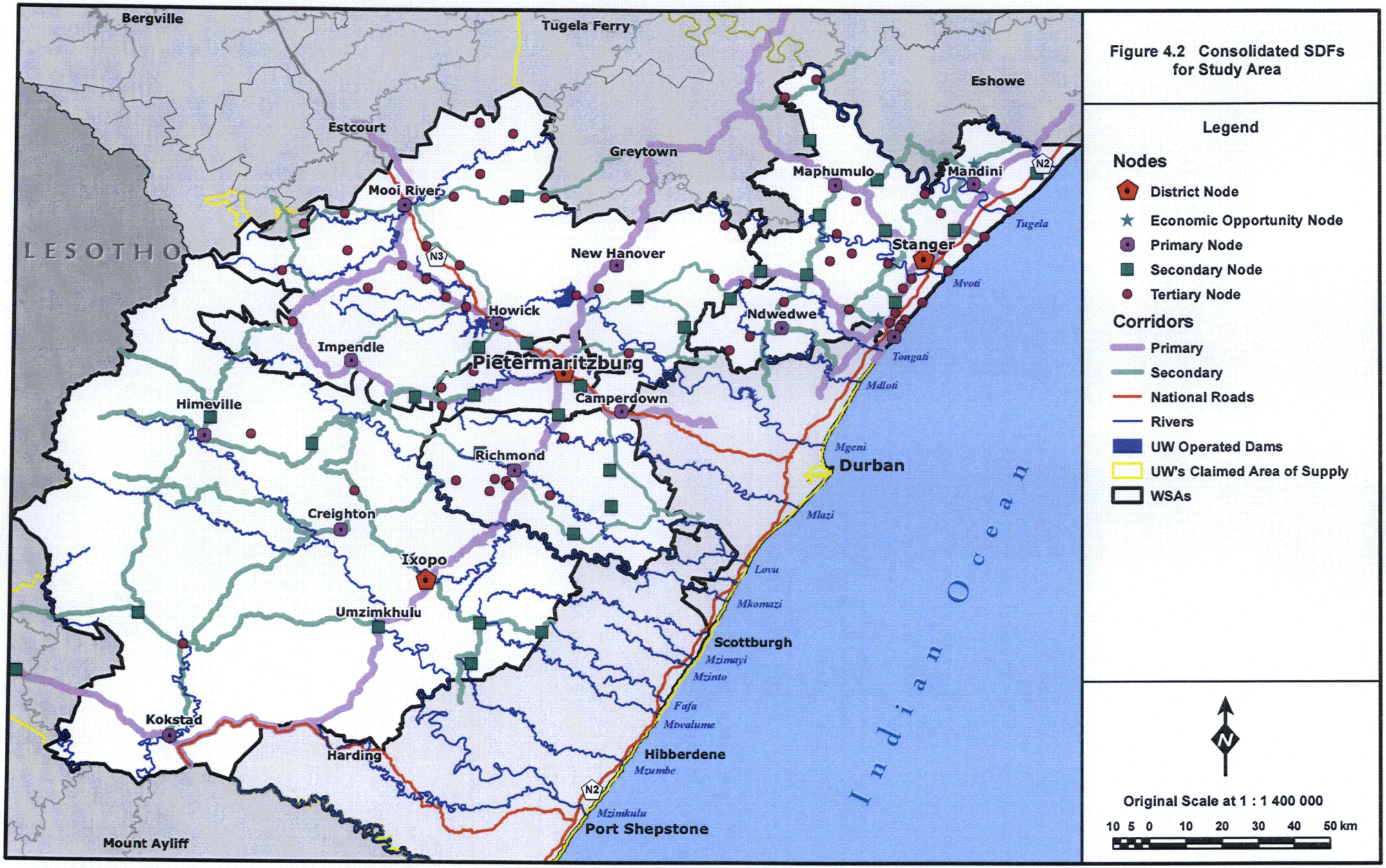
Legend

- Possible WTPs
- Possible Dam Sites
- Possible Water Transfers
- Existing UW Operated WTPs
- Existing UW Operated Dams
- Existing UW Operated Pipelines
- National Roads
- Rivers
- Identified Demand Areas
- UW's Claimed Area of Supply
- WSAs

N

Original Scale at 1 : 1 800 000

20 10 0 20 40 60 km


Bergville
Tugela Ferry
Eshowe
Estcourt
Greytown
Maphumulo
Mandini
N2
Mooi River
LESOTHO
N3
New Hanover
Stanger
Tugela
Mvoti
Howick
Ndwedwe
Impendle
Pietermaritzburg
Tongati
Mdloti
Camperdown
Himeville
Mgeni
Durban
Richmond
Mlazi
Creighton
Ixopo
Lovu
Mkomazi
Umzimkhulu
Scottburgh
Mzimayi
Mzinto
Fafa
Mtwalume
Kokstad
Harding
Hibberdene
Mzumbe
N2
Mzimkulu
Port Shepstone
Mount Ayliff
Indian Ocean
Figure 4.2 Consolidated SDFs for Study Area
Legend
Nodes
District Node
Economic Opportunity Node
Primary Node
Secondary Node
Tertiary Node
Corridors
Primary
Secondary
National Roads
Rivers
UW Operated Dams
UW's Claimed Area of Supply
WSAs
N
Original Scale at 1 : 1 400 000
10 5 0 10 20 30 40 50 km

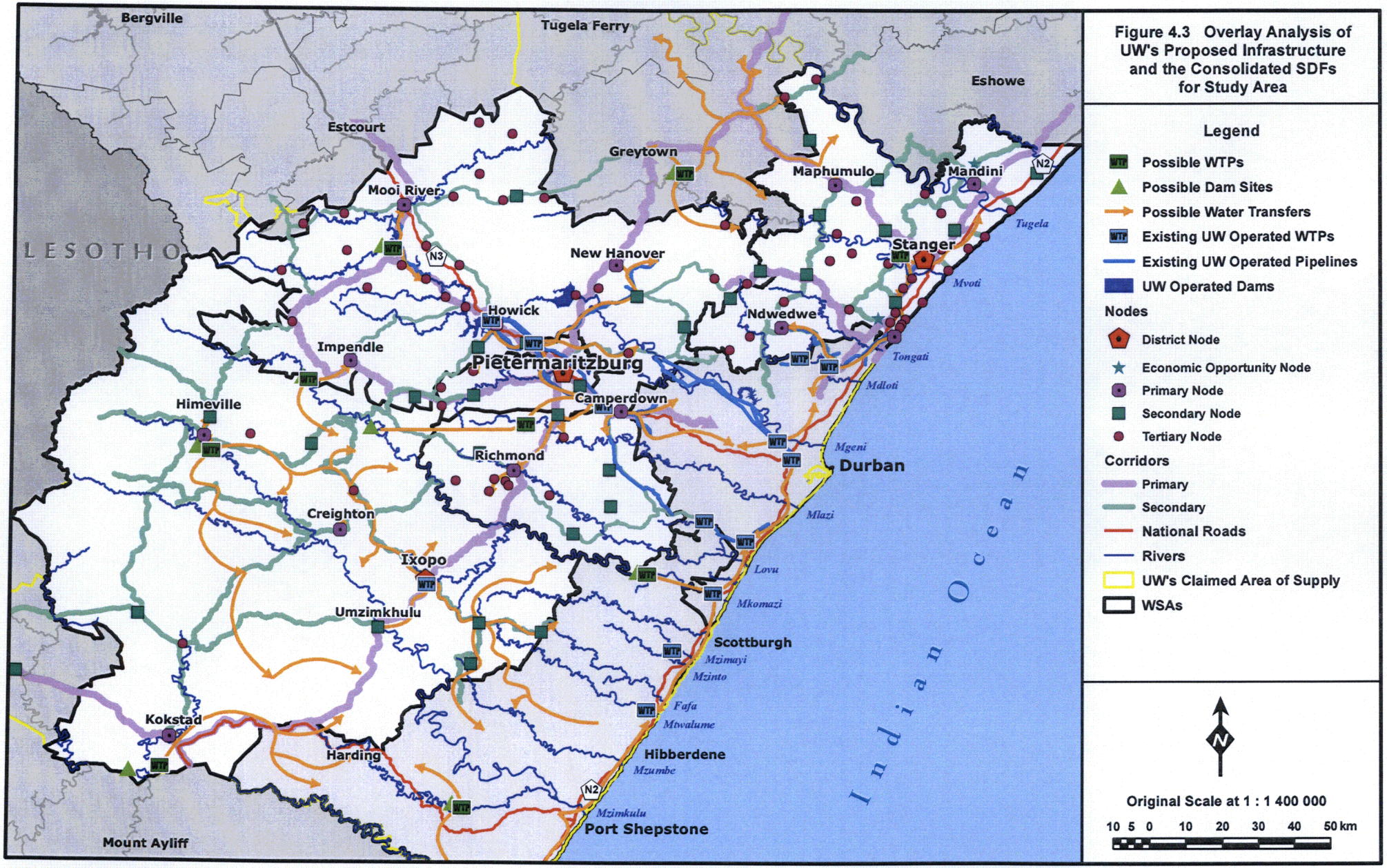


Figure 4.3 Overlay Analysis of UW's Proposed Infrastructure and the Consolidated SDFs for Study Area

This is demonstrated in uMshwathi Municipality where Umgeni Water's proposed bulk pipeline follows the P25-1 road towards the town of Wartburg and Umgungundlovu's secondary corridor whilst the primary corridor as identified by Umgungundlovu follows the P6-1 road adjacent to Albert Falls Dam and going towards New Hanover (Figure 4.4).

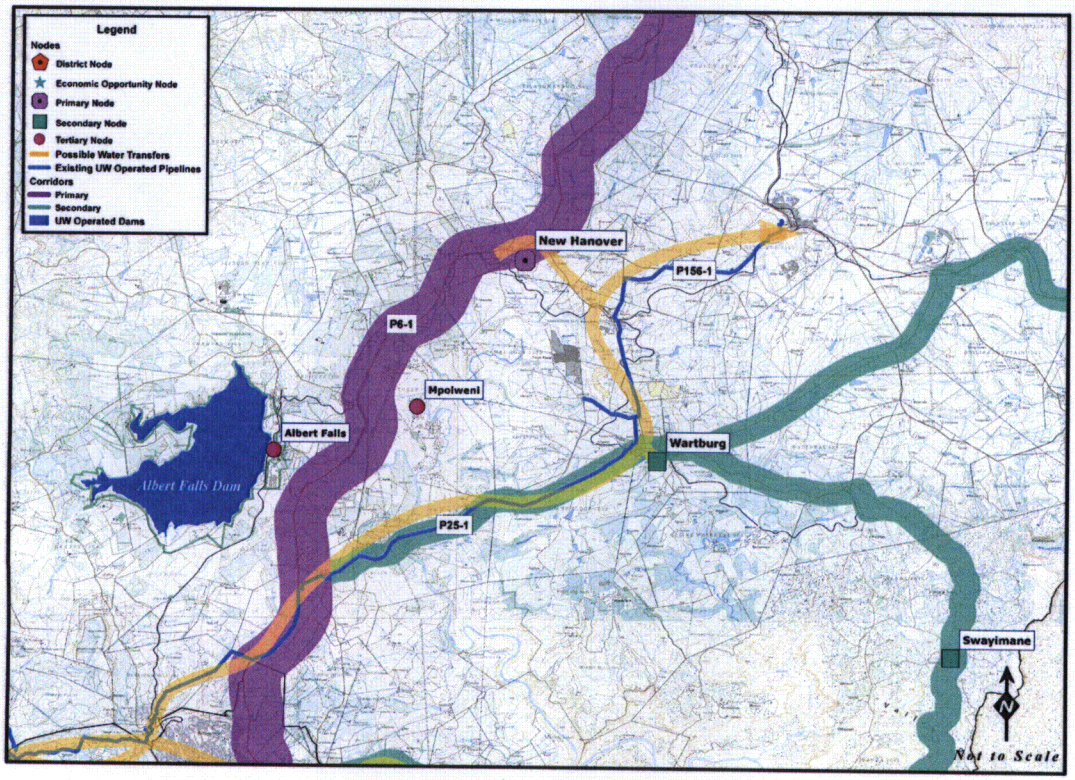


Figure 4.4 Alignment of Umgeni Water's proposed water transfer with Umgungundlovu's proposed corridors in uMshwathi Municipality.

The above section has shown that at a conceptual or reconnaissance level, there appears to be alignment between the municipal and regional water services provider's planning. However, it is important to note that this "alignment" was not due to consultation between the different planners. Does this alignment then continue down to a pre-feasibility and feasibility level and implementation? The next section attempts to answer this question.

4.3 Implementation

Using Sections 2.2, 2.3.3 and Appendix C, the issue of implementation was assessed using the following criteria:

- Is there a list of projects provided?
- Are the project start and end dates provided?
- Is a project sequence and schedule provided for the five and twenty year periods?
- Is the financial programme provided?

To ensure that the different planning products in terms of projects were being compared on a common basis, only the 2005/2006 IDPs were evaluated. The results of this assessment are shown in Table 4.8.

Table 4.8 Evaluation of projects in the different planning products.

Sample Element	Is there a List of Projects Provided?	Are the Project Start and End Dates Provided?	Is there a Project Sequence and Schedule Provided for the 5 and 20 Year Periods?	Is a Financial Programme Provided?	Comments
Umgeni Water	Yes	Yes	Yes	Yes	
The Msunduzi Municipality	No	No	No	No	• Did not have a 2005/2006 IDP. • DWAF's comments on the WSDP indicated: – "The WSDP project currently contains three projects and as stated previously, it *cannot be confirmed that engineering planning has been done to establish the requirements/projects for eradicating the water services backlog.*" – "*No WSA sustainability projects* have been identified or quantified, including the requirements to rehabilitate and replace infrastructure."
Umgungundlovu District Municipality	Yes	No	No	Only for the 2005/2006 financial year.	• List all the projects with a progress note but only for the 2005/2006 financial year. • DWAF's comments on the WSDP indicated: – "Although the WSDP contains a comprehensive strategy on eradicating the water services backlog, including the prioritisation of focus areas, the *capital requirements have been determined on a footprint basis and specific individual projects have not been identified.* Therefore also, the proposed future infrastructure elements to be established have not been specified. – The project list provided for in the WSDP does *not present the complete 5-year picture nor does it sufficiently summarise all projects, including the rehabilitation/retrofit/other sustainability/WSA capacity development projects.* – The present and proposed *method of project implementation with regards to institutional arrangements/financial arrangements etc.* have not been addressed."
Sisonke District Municipality	Yes	No	No	Only for the 2005/2006, 2006/2007 and 2007/2008 financial years.	• List the projects for the 2005/2006, 2006/2007 and 2007/2008 financial years and the anticipated costs. However does not indicate the target completion dates. • DWAF's comments on the WSDP indicated: – "The WSDP contains a comprehensive list of projects. However, it is recommended that *project descriptions should be provided to increase the readers understanding of the extent of each project* (as opposed to a listing of the each footprint name only). – It is uncertain to *what degree the community has been involved/consulted* in establishing the project selection process."
Ilembe District Municipality	Yes	Only target completion date (but for the water projects specifies "ongoing")	No	Only for the 2005/2006, 2006/2007 and 2007/2008 financial years and for the overall strategies and not individual projects.	• For the water projects, does not list the individual projects and instead refers to the WSDP and lists overall water strategies. • DWAF's comments on the WSDP indicated: – "A comprehensive capital list is provided as part of the WSDP. *Additional project descriptions* may further clarify the extent of capital projects to be implemented within Ilembe DM. – The WSDP states that at the present rate of capital funding, the backlog can only be eradicated within the next 15 to 20 years. It is a minimum requirement of the Water Services Act that the number and location of customers which cannot be serviced within the next five years should be identified and that the *time frame in which it may reasonably be expected that a basic water supply and basic sanitation* will be provided to those persons be indicated. It may therefore be necessary that the project list should consider further the proposed time frame for servicing specific communities. – Although Module 7: Water Services Management Plan states additional requirements of the Ilembe DM to fulfil its responsibility as WSA, *additional capacity development or other sustainability projects have not been identified and prioritised.*"
The KwaDukuza Municipality	No	No	No	No	• The 2005/2006 IDP does not list projects or a programme schedule.
uMshwathi Municipality	No	No	No	No	• Did not have a 2005/2006 IDP.
uMngeni Municipality	Yes	No	No	Only estimated cost of project.	• Only two water projects are included. The first is that the "municipal priorities" for water must be included into the District Municipality's WSDP. This is allocated R 5 million and the progress note is shown as "ongoing'. • The second project is listed as the improvement of water supply for the communities of Hilton College, Triandra, Hawkstone, Dunmarie, Curries Post and Hilton. This is allocated R 6 million and is also indicated as "ongoing".

It is shown in Table 4.8 that one cannot easily determine if planning and implementation at the pre-feasibility, feasibility and construction levels are aligned because the information presented in the planning products do not share common criteria. If one looks at the different projects in the pre-feasibility, feasibility and construction levels occurring across different jurisdictions, one can determine that alignment does not always occur. One example illustrating this is the Ozwathini Water Project which straddles the Umgungundlovu and Ilembe District Municipal boundaries (Figure 4.5).

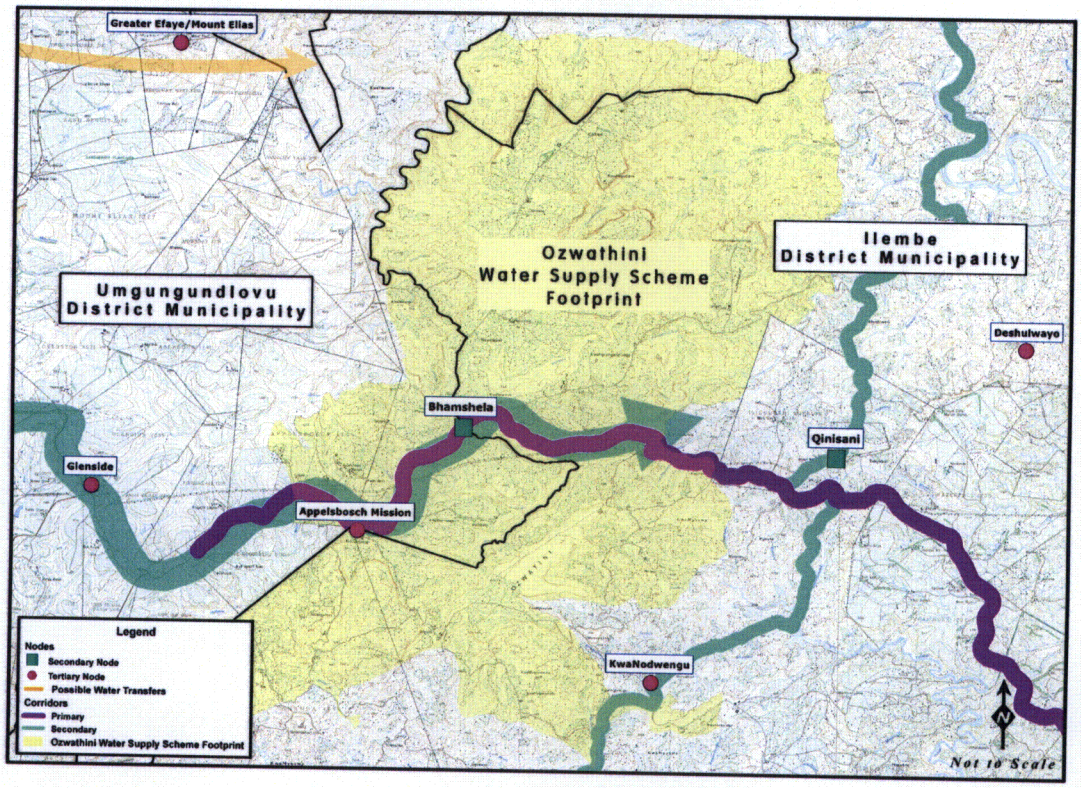


Figure 4.5 Location of the Ozwathini Water Supply Scheme.

The Ozwathini community resides in both municipalities and the planning and construction of this scheme is being undertaken by the respective district municipality for their area of jurisdiction. Umgeni Water on informing the municipalities of their intention to augment the existing bulk pipeline at Wartburg (Figures 4.3 and 4.4), was requested to determine if a sustainable bulk water supply could be provided to the community of Ozwathini. The current scheme which is being implemented is supplied from boreholes. Umgeni Water as part of its planning investigations discovered that the consultants on the Umgungundlovu side had completed construction and the consultants on the Ilembe side were in the process of construction and were laying the

pipe to connect with the pipeline from the Umgungundlovu side except the pipelines were on either side of the road. This misalignment of the pipelines would have been avoided if both parties viz. the clients and the appointed consultants had informed one another of the results of their pre-feasibility and feasibility studies. Furthermore, all parties should have informed one another of the project plans and the progress on the respective projects for the respective components of the scheme i.e. all parties should have participated in the collaborative timing of implementation. Alignment would have been improved if all parties concerned had been part of the same project team and therefore would have worked off one project plan (and the same detailed design drawings) i.e. the level of participation would have been that of collaboration (Section 2.3.11). Nevertheless, the wastage of the time and resources (and therefore costs incurred) spent on the misalignment could have been avoided with the lower levels of participation i.e. if all parties had informed or consulted or involved one another (Section 2.3.11) viz. if knowledge had been shared.

4.4 Demand Projections

The method used by Umgeni Water for water demand projections is described in the Master Plan as a "hybrid" of the judgemental and extrapolative methods which is shown in Section 2.3.2 and Appendix B to not be the best methods. Umgeni Water states its rationale for using this method as follows:

> The three main methods for forecasting water demand are judgemental, causal and extrapolative. From experience and interaction with Umgeni Water's major customers, the most appropriate approach to water demand forecasting is a hybrid of the previously mentioned methods, depending on data availability. Generally, the Planning Services Department considers both the judgemental and extrapolative methods as the most useful. The judgemental forecast is used to adjust the more formal extrapolative forecast, which includes a time series analyses. Causal forecasting requires extensive and accurate data coupled with an in-depth understanding of the drivers of demands in each area analysed.
>
> (Umgeni Water 2004: 19)

The short-term projected sales volumes were calculated as follows:

> ...jointly developed in consultation with the major consumers, viz. eThekwini Municipality, The Msunduzi Municipality, uMngeni Local Municipality, Ugu District Municipality, Siza Water and Ilembe District Municipality. These consumers

account for approximately 97.5 % of Umgeni Water's total bulk water sales. Figure 4.6 shows Umgeni Water's distribution of sales volumes as projected for the F04/05 financial year. With reference to Figure 4.6, eThekwini consumes 81.2% of the total volume of water supplied by Umgeni Water followed by Msunduzi at 12.3%. The North and South Coast regions each only consume approximately 1% of the total volume of water supplied by Umgeni Water.

(Umgeni Water 2004: 20)

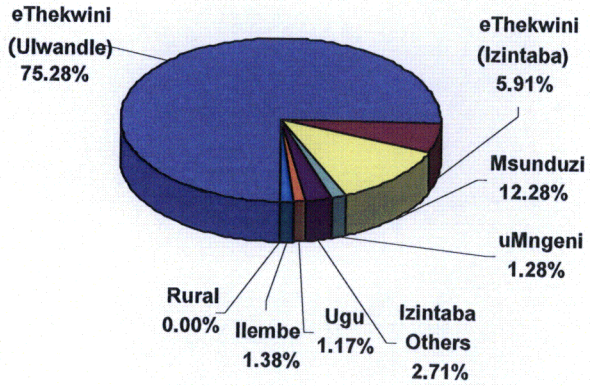


Figure 4.6 Umgeni Water's distribution of water sales volumes (Umgeni Water 2004: 21).

The long-term projection was explained as follows:

The projected sales volumes for the ensuing 20-years are presented. This information was used to adjust the previous long-term projection, provide a 20-year projected revenue for the Umgeni Water tariff model and to assess the timing for the implementation of water service infrastructure. The long-term projected sales volumes were jointly developed in consultation with both the eThekwini Metropolitan and the Department of Water Affairs and Forestry.

Three water demand projections, as illustrated in Figure 4.7 below, depict a range of possible scenarios. The middle projection depicts the growth in demand that is currently expected, as constrained by water demand management initiatives that are taking place within the Mgeni System. Although water demands have increased over the past year, to the maximum level only previously experienced during July 1998, eThekwini Metropolitan is adamant that the demands are expected to stabilise and ultimately decline as a result of their water loss management programme. The long-term growth rate was recently agreed to by

eThekwini Metropolitan, Msunduzi Municipality and uMgungundlovu District Municipality in terms of how it relates to the Mgeni system.

(Umgeni Water 2004: 22)

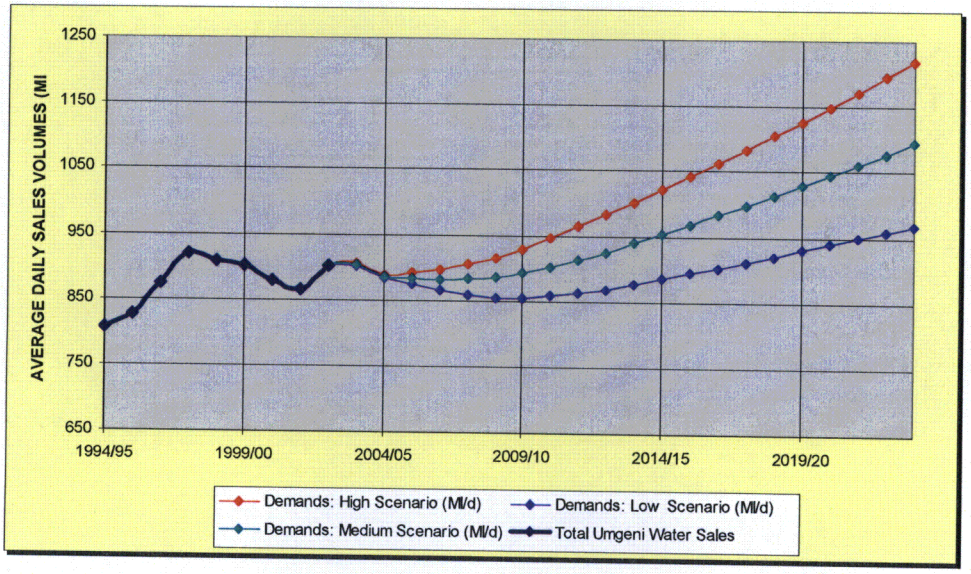


Figure 4.7 Long-term water demand projections 2023/2024 (Umgeni Water 2004: 23).

Referring to Section 2.3.6, it is identified that although Umgeni Water includes the effects of demand management in its projections (which is the recommended way), it uses forecasting both for its short-term and long-term projections, which is not recommended. It should be using backcasting for its long-term projections. The use of backcasting should obtain greater buy-in into the recommendations of the water plan as it would be obtaining consensus from all stakeholders on the desired vision for the area. However, the use of backcasting would also imply that Umgeni Water no longer restricts its liaison to that of the respective Water Sections but also consults with the different Planning Sections. This is addressed further in Section 4.5.

In terms of the growth trends, the review of the IDPs revealed the following:

- Umgungundlovu District Municipality indicated that "its economic performance indicator showed that its local economy was growing" (2005: 16). The implication identified that it "poses a challenge to the District in terms of pressure on space for housing and especially service clusters to support the emerging government precinct" (2005: 16).

- Umgungundlovu also identified that there was a 6.33% positive change in its population between 2001 and 2004 i.e. the population grew by 55 221 (2005: 8).
- In terms of housing structures, there was an overall increase of 16.76% with formal dwelling increasing by 19.21% (Umgungundlovu District Municipality 2005: 11).
- The Ilembe IDP stated that "a comparison of the 1996 and 2001 Census indicates an increase of population of only 0.95% with decreases in population in Ndwedwe and Maphumulo" (2005: 16).
- The KwaDukuza IDP stated "it has a permanent population of approximately 170 000 which during peak holiday seasons, increases to over 200 000" (2005: 14) and "a district node and the fastest growing of all the local municipalities within the Ilembe District...But in reality the population of KwaDukuza is far more than what the statistics are showing" (2005: 18).
- The Sisonke IDP used a projected population growth rate of 2.21% (2005: 10).
- The uMngeni IDP also showed the results of comparing the 1996 and 2001 Censuses (2005: 2 – 3) but did include a list of residential and tourism development units (2005: 4 – 5).
- The uMshwathi IDP did not show any growth rates (2002).
- The Msunduzi IDP did not have any growth rates (2001).

The review of the WSDPs showed the following:

- The Msunduzi WSDP indicated a projected growth rate of 1.1% for the urban population and 0.7% for the rural population (2004: 13).
- The Umgungundlovu WSDP used the following rates:
  - Rural and Farm area's population from 2002 – 2005: population growth at 0.7%.
  - Rural and Farm area's population from 2005 – 2008: population growth rate at 0.3%.
  - Rural and Farm area's population from 2008 onwards: population growth at 0%.
  - Town area's population from 2002 – 2005: population growth at 1.1%.
  - Town area's population from 2005 – 2010: population growth at 1%.
  - Town area's population from 2010 onwards: population growth at 0.9%.

(2004: 22)

- The Sisonke WSDP used the same population growth rates as that of Umgungundlovu (2002: 10).
- For Ilembe, the summary of the WSDP that is in the IDP does not refer to any population projections. In the 2002 WSDP, a growth rate of 2.2% was used to project the 1996 Census and Megasub data to 2000 and a growth rate of 1% to project DWAF's 1995 Communities and Water Supply Sanitation dataset to 2000 which showed that there was a discrepancy between the datasets used (2002: 5).

The above shows that the growth rates for the municipalities do not always correlate between the respective IDP and WSDPs. Allowing for the discrepancy between the dates in which the different plans were released, the growth rates were still calculated using different methodologies. This is substantiated by the above analysis which shows that not all of the plans have used standard projection horizons. This therefore makes it difficult to compare the different results of the projections. Re-looking at Section 2.3.2 and Appendix B, it is deducted that all used a mathematical method of projection.

Important trends noted but not identified in the WSDPs and IDPs are that the number of households are increasing but the household sizes are decreasing (Aliber, Maharaj, Kirsten, Nhlapo-Hlope and Nkoane 2005: 6; Amoateng 2004: 2 – 6; 23; 24) as this has an impact on water consumption.

Umgeni Water's Master Plan stated that "although water demands have increased over the past year...eThekwini Municipality is adamant that the demands are expected to stabilise and ultimately decline as a result of their water loss management programme" (2004: 22). DWAF also commented on the discrepancy between the projections and the actual demands in the 2004 Business Plan Appraisal where it was stated "DWAF raised concern about the major deviation in sales (4% higher than that of the previous year) and asked whether it reflected poor planning by customers" (2004: 5). So, which projections are the closest to the actual values and what is the best way to do the projections?

Projections should reflect what is occurring in the environment. Comparing the above with Sections 3.1.3 and Section 3.1.4 shows that the projections are not correlating with what is happening in reality. DWAF comments on this in their assessment of the different WSDPs (Appendix K) by stating that the WSAs must "project the impact of economic growth patterns" and that it "may be necessary to consider scenarios of economic growth and development and how that would impact on service delivery"

(DWAF 2005; 2004). The process used by Umgeni Water supports the statement that it uses an IRP process as it includes the effects of demand management into its projections (although this is determined by the WSA). However, as noted by DWAF, the weakness of the projection method is that it is not paying attention to current development trends and is biased towards what the WSA specifies.

4.5 Stakeholder Analysis

The key Umgeni Water stakeholders may be identified from Figure 4.6 which shows Umgeni Water's major consumers. A review of Umgeni Water's liaison minutes (2003 – 2006) shows that Umgeni Water does not restrict its liaison to only the WSAs as required by legislation (Section 2.3.8) but to all of its consumers. However, the minutes also show that Umgeni Water only communicates with the Water Sections of the municipalities.

The different stakeholders identified in the sample and their interests in Umgeni Water's planning are shown in Table 4.9.

Table 4.9 Stakeholder identification matrix.

Stakeholder	Stakeholder Interest(s) in the Water Plan	Assessment of Impact (High Medium Low)
The Msunduzi Municipality: WSA	• Water demands projected should influence a favourable tariff. • Umgeni Water pays the costs of projects that will benefit The Msunduzi Municipality.	High (Figure 4.6).
The Msunduzi Municipality: Planning	• No interest displayed.	High impact on long-term projections as effects of desired land uses will not be incorporated (Section 4.4).
Umgungundlovu District Municipality: WSA	• Assist with capacity and expertises. • Assist with funding.	High (Figure 4.6).
Umgungundlovu District Municipality: Planning	• Required to include projects as part of the IDP process.	High as Sections 3.1.2 and 3.2 show that the critical water resources are located here and therefore poor land use planning will lead to the deterioration of these resources thereby impacting the entire region.
Sisonke District Municipality: WSA	• Assist with capacity and expertises. • Assist with funding.	Medium (Figure 4.6).
Sisonke District Municipality: Planning	• No interest displayed.	Medium impact on long-term projections as effects of desired land uses will not be incorporated (Section 4.4).
Ilembe District Municipality: WSA	• Water demands projected should influence a favourable tariff. • Umgeni Water pays the costs of projects that will benefit Ilembe. • Assist with capacity and expertises.	High (Figure 4.6).
Ilembe District Municipality: Planning	• Required to include projects as part of the IDP process.	High impact on long-term projections as effects of desired land uses will not be incorporated (Section 4.4).
The KwaDukuza Municipality: Water Section	• Assist with capacity and expertises.	High (Figure 4.6).
The KwaDukuza Municipality: Planning	• Assist with funding. • Assist with capacity and expertises.	High impact on long-term projections as effects of desired land uses will not be incorporated (Section 4.4).
uMshwathi Municipality: Water Section	• Assist with capacity and expertises.	Medium.
uMshwathi Municipality: Planning	• No interest displayed.	Medium.
uMngeni Municipality: Water Section	• Water demands projected should influence a favourable tariff. • Umgeni Water pays the costs of projects that will benefit uMngeni Municipality. • Assist with capacity and expertises.	High (Figure 4.6).
uMngeni Municipality: Planning	• Required to include projects as part of the IDP process.	High as Sections 3.1.2 and 3.2 show that Midmar Dam is located here and therefore poor land use planning will lead to the deterioration of these resources thereby impacting the entire region.

Using Section 2.3.11, the manner in which the identified stakeholders interact with Umgeni Water was identified and the results of this analysis are shown in the stakeholder participation matrix in Table 4.10.

Table 4.10 Stakeholder participation matrix.

Stakeholder	Inform	Consult	Partnership	Control
The Msunduzi Municipality: WSA				✓
The Msunduzi Municipality: Planning				
Umgungundlovu District Municipality: WSA		✓		
Umgungundlovu District Municipality: Planning	✓			
Sisonke District Municipality: WSA	✓			
Sisonke District Municipality: Planning				
Ilembe District Municipality: WSA		✓		
Ilembe District Municipality: Planning	✓			
The KwaDukuza Municipality: Water Section	✓			
The KwaDukuza Municipality: Planning		✓		
uMshwathi Municipality: Water Section	✓			
uMshwathi Municipality: Planning				
uMngeni Municipality: Water Section		✓		
uMngeni Municipality: Planning	✓			

The results from Tables 4.9 and 4.10 were then used to determine the importance-influence classification for each the stakeholders. The results of this analysis are shown in Figure 4.8.

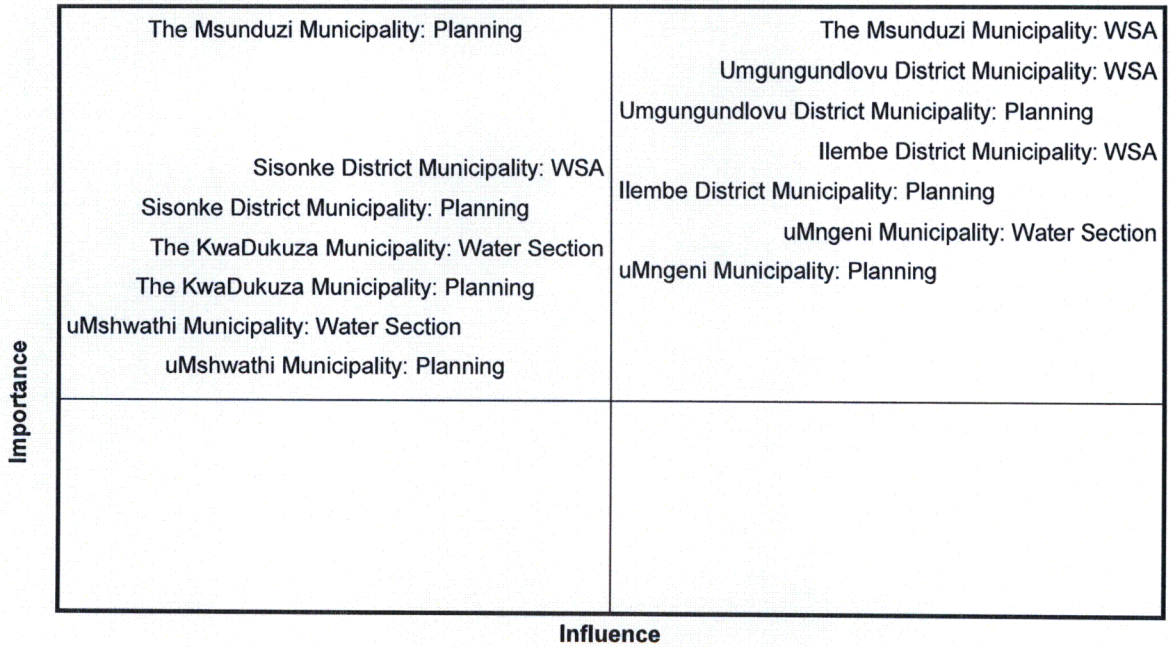


Figure 4.8 Importance-Influence classification.

4.6 Discussion on Overall Assessment of the Products

The assessments provided in Sections 4.1 – 4.5 show that:

- Umgeni Water's Master Plan is actually an IRP.
- However, its Corporate Business Plan is not aligned with the Water Plan.
- The WSDPs are not undertaken on a regular basis as that of the IDPs and this therefore implies that the water sector planning in the IDP may not always be relevant.
- The answer to the subsidiary question of whether the areas of development coincide was provided in Section 4.5 which showed that at a conceptual or reconnaissance level, the planned developments do coincide. This would imply that investments could be shared.
- However, it was shown in Section 4.3 that alignment does not always occur at the pre-feasibility, feasibility or implementation levels i.e. at the operational level with increased costs arising due to poor alignment.
- Alignment was further complicated as the demand projections were undertaken using different factors (all displayed evidence of a mathematical projection method) and the projections did not take cognisance of the current development trends (Section 4.4).
- This was further complicated by the influences of the different stakeholders (Section 4.4 and 4.5). If the relationship is not one of partnership, there is a tendency to ignore the "solid foundations of planning" in the attempt to further the individual stakeholder's agenda e.g. although the current trends may demonstrate that consumption will increase, Umgeni Water is obliged to implement what the WSA says even if this means that they specify that their demand management measures will reduce consumption thereby favouring them with a reduction in tariff.

5. EVALUATION OF THE IRP, IDP AND WSDP PROCESSES

Section 4 identified that alignment is a challenge. The purpose of this section is to evaluate the different processes with the objective of identifying how alignment may be improved.

5.1 Description of the Planning Processes

The planning process for the IRP has been described in Section 2.3.6, the IDP in Section 2.3.9 and that of the WSDP in Section 2.3.10. The next section describes Umgeni Water's Infrastructure Planning process.

5.1.1 Umgeni Water's Planning Process

Umgeni Water illustrates its planning process in Figure 5.1. They believe that the "main deliverables of the planning process are annual demand projections and an annual 30-year capital expenditure (CAPEX) budget" (Umgeni Water 2004: 3). Similar to a traditional supply planning process (Sections 2.3.1, 2.3.2 and 2.3.5), they state that:

> The development of infrastructure proposed in this document is based on the analysis of the existing population and their growth, agricultural and industrial development in the region and the water demands generated by such growth and development over the next 30 years. Where available, historical water demands have been utilised to assist in projecting future demands. The capacity of existing infrastructure has been assessed to arrive at dates where the capacity or design life exceeds that of the projected demands. New infrastructure and development of water resources have been proposed for various planning regions. A programme of implementation and cash flows have been prepared to guide our actions in development of water resources, their treatment and transfer to the consumers in our area of supply.
>
> (Umgeni Water 2004: 6)

They further acknowledge that:

> ...challenges that will need to be included in the master planning process in the future are:
>
> - To consider supply and operational risk in an integrated manner, and

- To further involve the customers in both the master planning and decision making process. The intention is to ensure that all parties are accountable and thereby share the risk associated with decisions.

(Umgeni Water 2004: 6)

Umgeni Water's planning methodology is described in Appendix M.

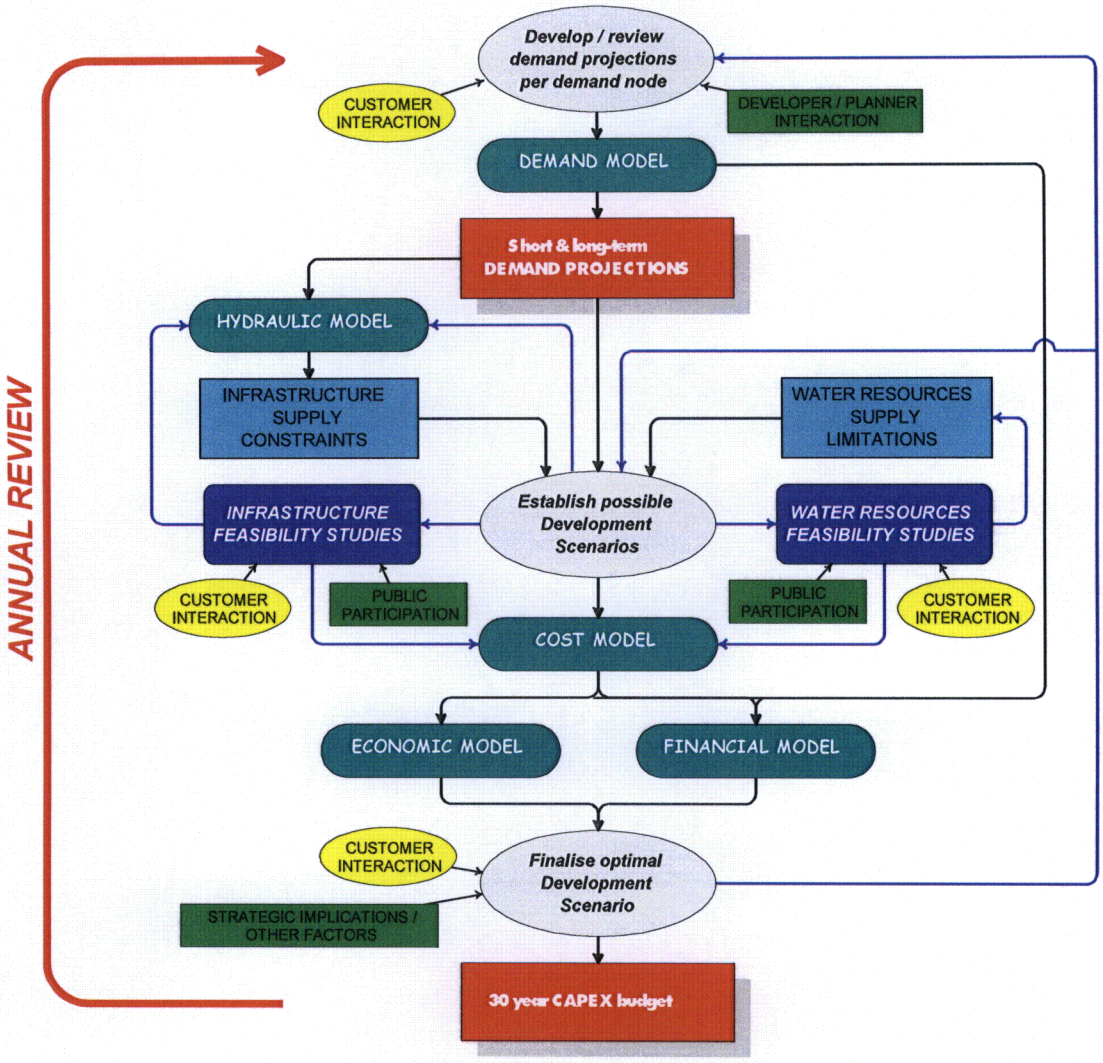


Figure 5.1 The master planning process (Umgeni Water 2004: 5).

5.1.2 Assessment of Umgeni Water's Planning Process

The assessment in Section 4.1.1 identified that Umgeni Water's planning product is not a master plan but an integrated resource plan. Evaluating Sections 2.3.5, 2.3.6, 4.2 –

4.5 and comparing it with the process Umgeni Water describes as using, the following are noted:

- Although Umgeni Water's product refers to demand management and its demand projections include the effects of demand management (Section 4.4), the process does not refer to demand management at all.
- The product referred to Umgeni Water's planning strategy but the process does not refer to the strategy or goals at all.
- The product included projects in all stages of the project life-cycle. However in terms of the process diagram (Figure 5.1), it appears that reconnaissance studies (Table 2.1) i.e. "establish possible development scenarios" lead to pre-feasibility or feasibility studies (Table 2.1) i.e. "infrastructure and water resource feasibility studies". However, the second last step in the process viz. "finalise optimal development scenario" implies that a feasibility study (Table 2.1) is undertaken and it is the results of this which are entered into the 30 year CAPEX budget. The evaluation of the product and the 30 year CAPEX budget indicates that this is incorrect.
- Although the product had a programme schedule which implies a prioritisation of projects and the process text refers to "a programme of implementation", the process diagram does not identify if the prioritisation of projects does occur (not shown in Figure 5.1) and if it does, how.
- Umgeni Water's 2004 Infrastructure Master Plan did have a project plan but this is not referred to in the process or the process diagram. This contrasts with Step 1 in Figure 2.11.

Umgeni Water did acknowledge in the 2004 product that it did have to improve stakeholder co-ordination. With respect to this particular issue, the following are observed:

- The process refers to "customers" and "public participation" but not "stakeholders". As demonstrated in Section 4.5 and the previous sections, regional water planning cannot only be restricted to "customers" and those impacted by a particular project as there are various institutions involved and who have interests in the provision of water. The terms used are therefore misleading.
- The process text states that "the optimal scenario will then be discussed with the customer and the implications thereof highlighted" (Umgeni Water 2004: 6). The

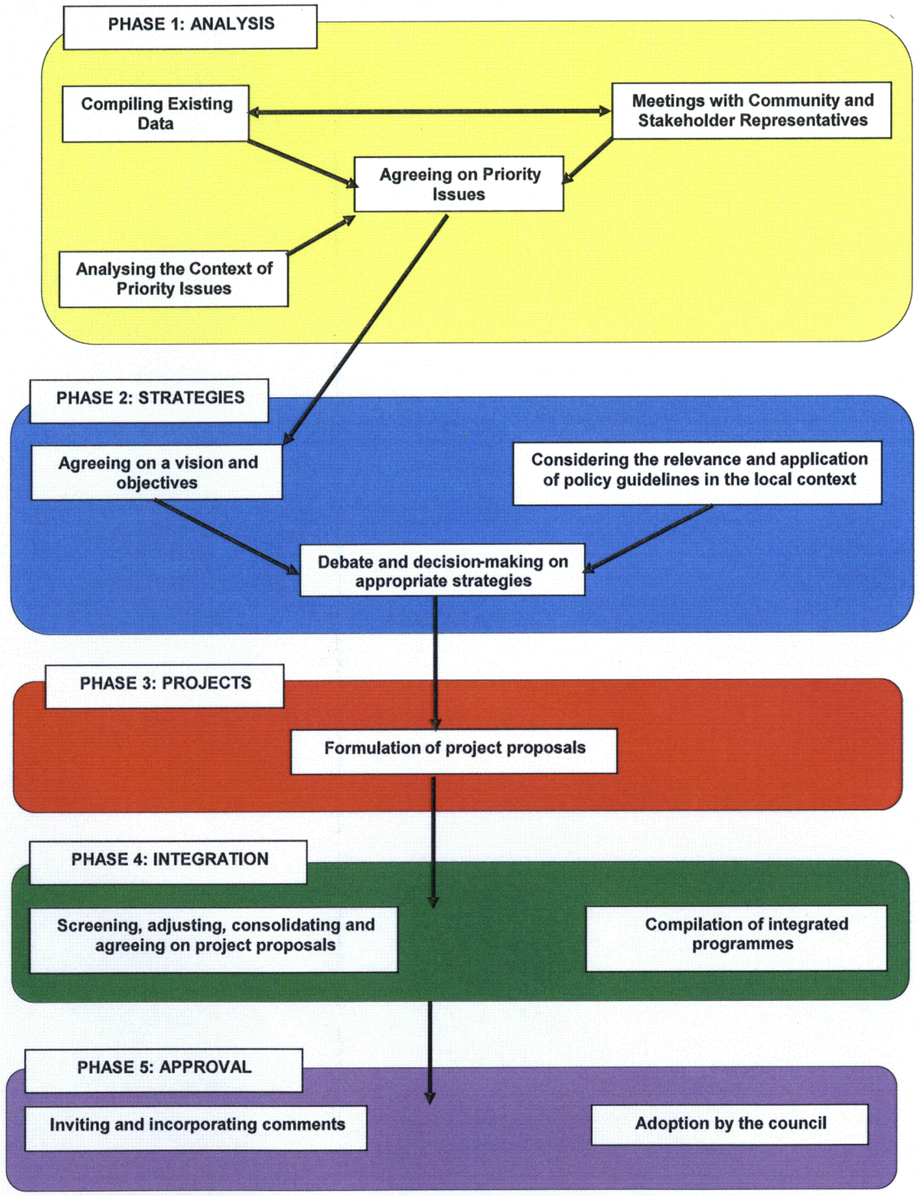
result of this is what Beecher criticised as being "narrowly focussed and exclusionary" (1995: 37) and this is one of the criticisms IRP attempts to address (Sections 2.3.5 and 2.3.6).

It is concluded that Figure 5.1 does not adequately describe Umgeni Water's planning process and could be misleading. A further comparison with Figures 2.10 and 2.11 leads to the conclusion that Figure 2.11 more closely describes Umgeni Water's planning process. It is therefore recommended that a slightly modified Figure 2.11 be used to describe Umgeni Water's planning process.

The next section provides a comparison of the IDP and IRP processes (Umgeni Water's process and WSDP process follow the IRP process).

5.2 A Comparison of the Different Processes

The IDP and IRP processes are presented again in Figure 5.2.



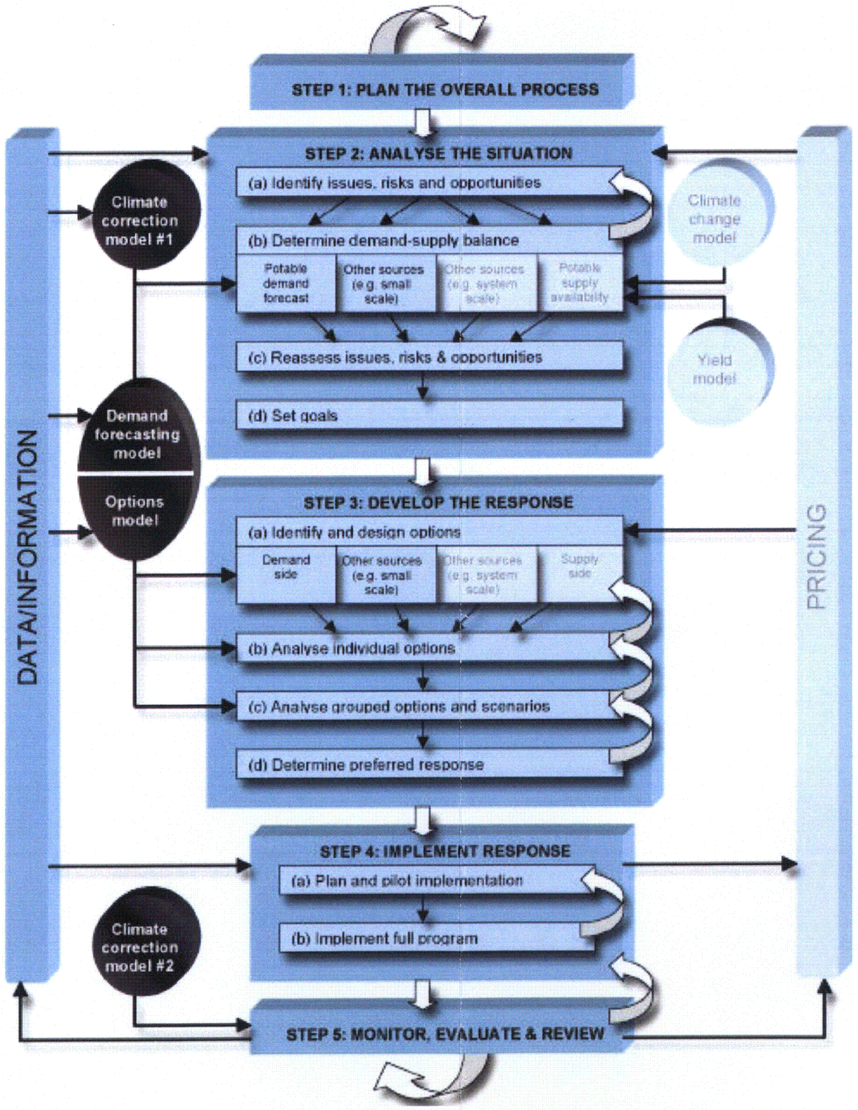


Figure 5.2 IDP vs. IRP.

The first point noted which was highlighted in Section 2.3.9, is that both processes include a stage for "planning the overall process" (Figure 2.11).

As is shown in Figure 5.2, the generic process is common with an analysis phase occurring first, followed by the different strategies, then implementation and the cycle being completed with the monitor, evaluate and review step.

Important components to both processes are the co-ordination with the respective stakeholders.

The key difference between the two processes is the scale at which the planning occurs. The IDP process occurs at the local and district municipal levels. The IRP process for regional water service providers however occurs at regional levels i.e. it crosses both local and district municipal boundaries as well as catchment boundaries (this is important for IRP must not be confused with IWRM – see Section 2.1).

Another important difference is that although both have as their ultimate objective sustainability, it is easier to implement it via the IRP process. This is a result of the process being developed around resources. However, the argument that sustainability neglects the socio-economic development component is negated by the fact the IRP process was predominantly developed in private sector utilities which have to break-even or make a profit to survive and therefore increases in socio-economic development help them survive as businesses.

Other advantages that the IRP process in a regional water services provider has over the IDP process and the WSDP process is a result of time and the fact that the latter two processes are still maturing. One advantage is although both processes recommend stakeholder co-ordination, this tends to become neglected (although it is improving). However, for a regional water service provider, the requirement of good demand projections forces the consultation of all relevant stakeholders. This is becoming more apparent with the realisation that a stakeholder organisation may not always be internally aligned and this has negative impacts on planning if not all relevant parties are consulted.

Another advantage of the IRP process is the use of backcasting. Again, this concept requires stakeholder co-ordination. The IDP process does make use of this concept with the SDF. However the current challenges being faced with the LUMS and the SDF

may be able to learn from how forecasting interacts with backcasting and vice versa and the interaction of these two types of projection methods with end-use modelling.

The IRP process of a regional water services provider also provides a check that alignment is occurring in the IDP process between the different municipalities as shown by Section 4.3.

Processes occur over time with the result being a product. Alignment refers to certain activities occurring at the same time. The following section looks the timing of the different processes with the objective of identifying where alignment may occur.

5.3 The Planning Cycles

A summary of the alignment of the different statutory time-tables is provided in Table 5.1. This shows the ideal situation in which all the different plans are undertaken regularly. This table is important because different organisations work with different financial years and it is easy to forget this.

Table 5.1 Alignment of different statutory time-tables.

Year	Cycle	Period	IDPs	WSDPs	UW
2000	2000 - 2001				
2001	2001 - 2002			2001/02	2001/02
2002	2002 - 2003		2002	2002/03	2002/03
2003	2003 - 2004		2003	2003/04	2003/04
2004	2004 - 2005	Jul 2004 - Jun 2005	2004/5	2004/05	2004/05
2005	2005 - 2006	Jul 2005 - Jun 2006	2005/6	2005/06	2005/06
2006	2006 - 2007	Jul 2006 - Jun 2007	2006/7	2006/07	2006/07

The events that are prescribed by the different pieces of legislation and when they are required is shown in Table 5.2. This table also shows those activities required in order to provide what is required by legislation.

Table 5.2 **Planning time-table (after eThekwini Municipality 2006: 92).**

Month	Integrated Resource Plan		Water Services Act and Public Finance Act: Tariff		Water Services Act and Public Finance Act: CAPEX	Water Services Act and Public Finance Act: Budget		Water Services Act and Public Finance Act: UW's Business Plan		Municipal Systems Act and Municipal Finance Management Act: IDP		Municipal Systems Act and Water Services Act: WSDP		Municipal Finance Management Act: SDBIP (Service Delivery & Budget Implementation Plan)		National & Provincial
JAN			Tariff consultation with clients and Tariff notification to Treasury													
		30	Tariff finalised						30	Final IDP reports presented to Council			30	Draft framework available		
FEB																National/Provincial Tabling of Budgets
MAR										IDPs submitted to DLGTA for review				Prepare first draft		
APR	Drafting of process plan and framework plan					FINCO reviews Final Budget				Public comments on IDPs			30	WSDPs submitted to DWAF	2	Compile the SDBIP	National DOR and Provincial Budgets legislated and DORA Gazette Notices published
							30	Business Plan submitted to DWAF			6	SDBIP submitted to National Treasury, Provincial Treasury & relevant MEC	Departments begin to prepare MTEF Strategic Plans			
MAY	Circulate & collate comment on process plan and framework plan from all stakeholders					Final Budget reviewed by Board									10	Draft submitted to the Mayor
															28	Mayor approves SDBIP
																Mayor makes SDBIP public
							31	Pre-Appraisal of Business Plan by DWAF								
JUN	Present final draft of IMP to UW									Present final draft of IDPs to Councils for adoption						Departments begin to prepare MTEF Budgets
							30	Complete appraisal of Business Plan								

Month		Integrated Resource Plan		Water Services Act and Public Finance Act	Tariff		Water Services Act and Public Finance Act	CAPEX		Water Services Act and Public Finance Act	Budget		Water Services Act and Public Finance Act	UW's Business Plan		Municipal Systems Act and Municipal Finance Management Act	IDP		Municipal Systems Act and Water Services Act	WSDP		Municipal Finance Management Act	SDBIP (Service Delivery & Budget Implementation Plan)			National & Provincial
JUL		Distribute IMP to all stakeholders															Submit IDPs to MEC									
		Begin demand projections and trend analysis																								
AUG		Begin capacity vs. demand analysis																							National Division of Revenue Workshop	
		Re-evaluate water supply scenarios																								
SEP		Workshop water supply scenarios with all stakeholders																								
		Update CAPEX																								
OCT																									Extended National Cabinet to finalise Division of Revenue	
NOV			15	Finance receives the results of the projected water demands													First draft IDPs presented to Council								Provincial Cabinet approves budget proposals - Department allocations	
DEC							15	Finalisation of CAPEX														15	SDBIP outlined			
			25	Tariff Model run																						

5.4 Discussion on Overall Assessment of Processes

Sections 5.1 – 5.3 have shown that:

- Umgeni Water's planning process is not a master planning process but an IRP process.
- The generic steps in the IDP and IRP processes are the same.
- The major difference between the two processes is the scale at which they occur.
- It is easier to implement the goal of sustainability via the IRP process.
- Stakeholder co-ordination is a critical requirement for the IRP process.
- The use of backcasting in the IRP process for the medium to long-term horizons is advantageous and the IDP process may learn from this.
- The IRP process for a regional water services provider provides a check that alignment is occurring between the different municipalities.
- The time-table as required by legislation is provided in Table 5.2 to assist with the process of alignment.

6. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this section is to determine if the hypothesis put forward in Section 2.4 is valid and to present the recommendations arising from this study.

6.1 Conclusions

From the literature reviewed, it was established that no study has investigated the alignment between municipal IDPs and the IRPs of regional water services providers in South Africa. This study therefore contributes to the existing body of knowledge on the alignment between the different types of planning.

The concepts of IRP and IDP and the processes of a master plan, an IDP, a WSDP and a regional water service provider's business plan were unpacked and compared in Sections 2 and 5. It is concluded that the approach to be used in water planning is the IRP approach and that Umgeni Water and the WSDP process use this approach. However, Section 5.1 showed that Umgeni Water's description of its process does not follow the IRP process and therefore Umgeni Water has to update its process diagram to be representative of the water planning it uses. It was further concluded from Section 5 that following the recommended IRP approach, Umgeni Water's corporate business plan should be aligned to its water plan as it is not presently. In terms of similarities and differences, Section 5 further identified that:

- The generic steps in the IDP and IRP processes are the same.
- The major difference between the two processes is the scale at which they occur.
- It is easier to implement the goal of sustainability via the IRP process.
- Stakeholder co-ordination is a critical requirement for the IRP process.
- The use of backcasting in the IRP process for the medium to long-term horizons is advantageous and the IDP process may learn from this.
- The IRP process for a regional water services provider provides a check that alignment is occurring between the different municipalities at all the levels of the project life-cycle.

The evaluation of the study area further showed that:

- The WSDPs are not undertaken on a regular basis as that of the IDPs and this therefore implies that the water sector planning in the IDP may not always be relevant.
- The answer to the subsidiary question of whether the areas of development coincide was provided in Section 4.5 which showed that at a conceptual or reconnaissance level, the planned developments do coincide. This would imply that investments could be shared.
- However, it was shown in Section 4.3 that alignment does not always occur at the pre-feasibility, feasibility or implementation levels with increased costs and differences in the timing of the implementation of projects arising due to poor alignment. It is therefore concluded that forums as a form of an IOC structure (Sections 1.1 and 2.3.11) may assist with alignment at the conceptual/reconnaissance levels but for the pre-feasibility, feasibility and implementation levels, all stakeholders should be part of the project team.
- Alignment was further complicated as the demand projections were undertaken using different factors (all displayed evidence of a mathematical projection method) and the projections did not take cognisance of the current development trends (Section 4.4).
- This was further complicated by the influences of the different stakeholders (Section 4.4 and 4.5). If the relationship is not one of partnership, there is a tendency to ignore the "solid foundations of planning" in the attempt to further the individual stakeholder's agenda e.g. although the current trends may demonstrate that consumption will increase, Umgeni Water is obliged to implement what the WSA says even if this means that they specify that their demand management measures will reduce consumption thereby favouring them with a reduction in tariff.

In terms of the subsidiary question of who should be guiding whom and who is monitoring performance, Sections 2.3.10 and 4.5 indicate that if the planning process can mature towards partnership, this becomes a responsibility for all stakeholders. However, where a stakeholder attempts to control the power (Section 4.4 and 4.5) and if other stakeholders cannot do anything, it becomes important for a mediator to be in place. Section 2.3.10 also identified that there is a gap in terms of water planning at a regional level but the unpacking of the IRP process in Section 2.3.6 identified that this process addresses this gap.

Overall, it is concluded that a regional water service provider's IRP process can contribute to the successful accomplishment of an IDP by not only addressing backlogs in the short-term but by also providing sustainable bulk infrastructure that facilitates the proposed economic developments. However the major benefits of this synergy for those residing in the area viz. that investment costs are shared and the costs associated with a lack of knowledge are eliminated are dependent upon knowledge being shared between the regional water services provider and the municipalities at all phases of the project-life cycle i.e. stakeholder co-ordination which is not only restricted to forums but also includes participation in the project teams. One example of knowledge being shared would be that of the information and methodologies used in the water demand projections. This is also valid for the collaborative timing in the implementation of projects which means that more services are provided at one particular time. The IRP process interacting with the IDP process via backcasting refines the projections in terms of where future development will occur thereby reducing the risk of investing in poor locations.

The following section lists the recommendations arising from this study.

6.2 Recommendations

The following recommendations are put forward:

- There is a lack of understanding on the conceptual approaches in water utility planning in practice with water planners using methods but not fully understanding where they originated from. It is recommended that more exposure is provided on these conceptual approaches as understanding why one plans in certain way assists in the improvement of the planning and facilitates alignment with other planning in different sectors.
- Umgeni Water, using the IRP process diagram (Figures 2.11 and 5.2) as a guideline, should update its own process diagram so that it is not misleading in terms of the water planning approach Umgeni Water uses and it is representative of its planning products.
- It is recommended that Table 5.2 be tested to determine if it does improve alignment.
- End-use models have been developed in certain cases within Rand Water's area. It is recommended that an end-use model is developed within KwaZulu-Natal with the objective of developing such a model that is not costly and can make use of

the limited data that is available. This would require innovative approaches to developing the model.

- It is recommended that a backcasting study be undertaken in KwaZulu-Natal and the results of the study monitored thereafter to determine the applicability of the method used and how it may be improved.

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Appendix A: Infrastructure Planning

A.1 Infrastructure Planning Cost Model

Biermann and Landré (2002: 329) identified that "in practice, infrastructure planning has generally tended to follow land use planning, with infrastructure costs seeming to play no role in the generation of land use strategies". To tackle this dilemma, Biermann and Landré (2002) developed a bulk infrastructure cost model to "provide a tool for planners to ensure the incorporation of bulk infrastructure capacity and cost considerations into the early, land suitability assessment phase of the integrated development planning process" (Biermann and Landré 2002: 329). In developing the model, Biermann and Landré (2002: 330 – 331) explained:

> An overview of the relevant literature reveals a paucity of research on the interrelationship between land use planning and infrastructure planning. In practice, infrastructure planning has generally tended to follow land use planning and plays no role whatsoever in the generation of land use plans. At most, the literature indicates the use of infrastructure cost assessment at the evaluation stage of land use planning, although in practice in South Africa, no evidence has been found of the infrastructural assessment of land use alternatives. The costing of bulk infrastructure has typically been reactive to land use planning, as strategic land use plans are prepared without due consideration of infrastructure costs. Only once a final plan has been selected does bulk infrastructure planning commence relatively, as part of the implementation process, so as to optimise the provision of services in relation to the pattern of employment and population, as set out in the plan.
>
> (Biermann and Landré 2002: 330 – 331)

Biermann and Landré (2002) used threshold analysis as the theoretical basis for the potential cost model for bulk infrastructure. They explained (2002: 337) that:

> ...the theory and technique of threshold analysis originated in Poland from the work of Malisz (1969) in the 1960s, was elaborated on and refined by Kozlowski (1971) and the United Nations (1977) and applied in Scotland (Kozlowski and Hughes 1967, 1972; Scottish Development Department 1973).
>
> (Biermann and Landré 2002: 337)

They noted (2002: 337) that "according to Malisz (1969), threshold theory originated in response to three physical planning problems of the day":

- "The first problem related to the lack of interdisciplinary understanding and co-operation between physical planners and economic planners. Threshold theory attempts to translate qualitative urban design into quantitative factors."
- "The second problem concerns feedback between the different levels of planning. Threshold analysis at the more detailed local level serves as feedback into regional plans regarding the feasibility of regional proposals."
- "Thirdly, threshold theory goes some way in solving the problem of time. Instead of setting artificial time horizons for plans, threshold times, or times at which various thresholds are reached, can be used in planning."

(Malisz 1969 cited by Biermann and Landré 2002: 337)

They continued to describe that:

> The theory of threshold analysis was based on the observation that towns encounter some physical limitation to their spatial growth in the form of natural limitations, such as topography, or in the form of man-made facility limitations, such as public utility network systems (United Nations 1977). These limitations have been called the 'thresholds' of urban development. They are not irremediable, but can be overcome at a high capital investment cost or threshold cost (Kozlowski and Hughes 1967). Threshold analysis concerns those physical characteristics of an area that would cause significant differentiation in the unit cost of future urban development, dealing only with costs that vary with location (Lichfield et al 1975). A threshold occurs when new units of development cannot be constructed and serviced at their previous unit cost levels and significant additional overlays are required. The presence of a threshold is indicated either by a steep rise in the gradient or by a discontinuity in the marginal cost curve of urban development. Changes in the unit cost of development could be caused by a variety of physical factors, ranging from the topography to the physical capacity of the public facility (Lichfield et al 1975).
>
> (Biermann and Landré 2002: 337)

Biermann and Landré (2002: 337) stated that "initially, the methodology of threshold analysis concentrated on three groups of capital costs":

- "First, those costs due to physical constraints imposed by factors such as slopes, liability to flooding and subsistence, were taken into account."
- "Secondly, capacity constraints in engineering infrastructural services were considered."

- "Thirdly, structural constraints were noted when the existing urban structure limited further development, such as when an increased population necessitated the construction of a new public transport system (Simpson 1977)."

(Biermann and Landré 2002: 337)

They reported (2002: 338) that "in further applications of the technique, an attempt was made to include a range of social facilities (Intermet 1973)" and that "the United Nations (1977) included environmental and social considerations" (2002: 338).

The three essential elements of Biermann and Landré's bulk infrastructure cost model viz. threshold, density and cost are illustrated in Figure A.1.

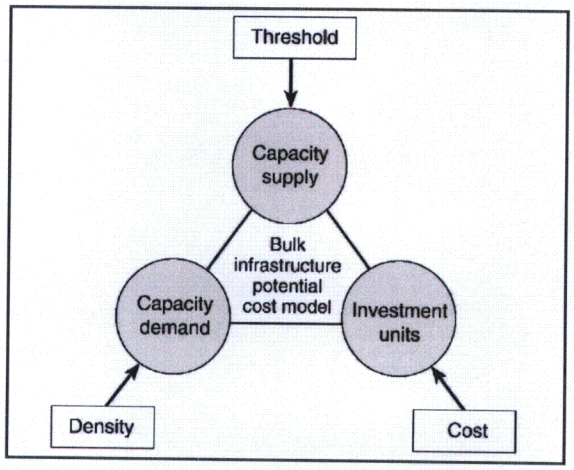

Figure A.1 Mechanisms of interaction between the three elements of the bulk infrastructure potential cost model (Biermann and Landré 2002: 338).

The generic potential costing methodology for the bulk infrastructure potential cost model is shown in Figure A.2.

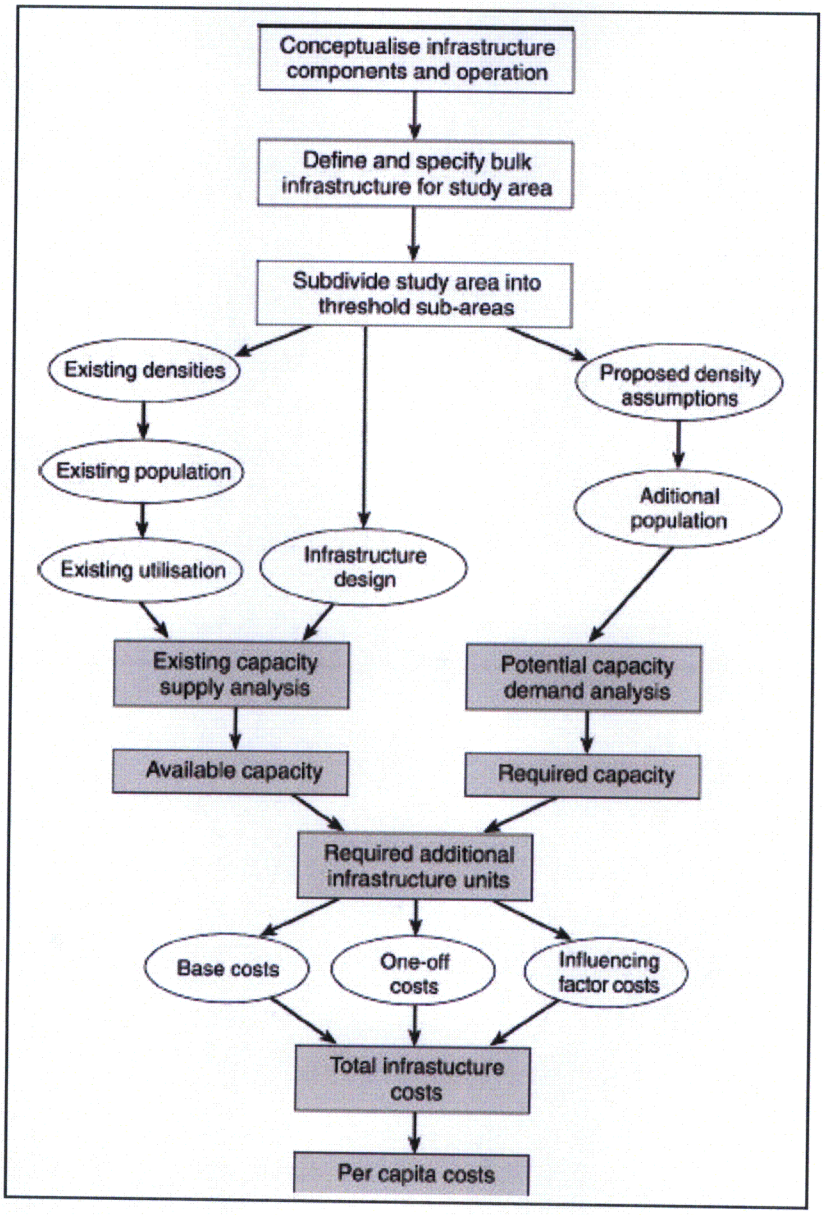

Figure A.2 Overall methodology of the bulk infrastructure potential cost model (Biermann and Landré 2002: 340).

Biermann and Landré (2002: 353) concluded that:

> The potential cost model for bulk infrastructure provides a means for incorporating cost considerations for bulk engineering services into the strategic planning process at an early stage during land suitability assessment. Potential costs are calculated on the basis of capacity in the existing system, and include additional cost factors such as geotechnical, land use and environmental conditions to further enhance cost accuracy. The model can be used to evaluate alternative spatial

development proposals in terms of the cost implications of engineering services. Rather than a particular density scenario being set artificially, as is the case in applying the model in the early, generation phase of the planning phase, actual proposed densities, which may vary with location, are used as model input to determine demand.

A further application of the model is to determine the bulk service contributions that local authorities levy on developers...In many local authorities, service contributions are currently often levied on an average basis. It is argued that this promotes sprawl – on the periphery, where infrastructure costs are usually the highest, development costs to the developer (and eventually to the consumer) are the same as infill development. If real costs were levied, this would contribute to development occurring where it is economically sensible to do so, thus reducing the negative impacts of sprawl. The model can assist in determining a differential levy for various locations that is more reflective of real costs for that particular location.

Ongoing research is investigating linking the bulk infrastructure cost model with other existing models for incorporating transportation costs, local reticulation cost models and financial cost models, so that the affordability aspects of local authorities can be brought into the equation. The bulk infrastructure potential cost model is intended for use at the strategic level of detail where coarse level, relative information is necessary. It by no means replaces the need for more detailed, precise infrastructural optimisation models once a specific spatial development pattern has been agreed upon.

(Biermann and Landré 2002: 353 – 354).

A.2 References

Biermann, S. and Landré, M. 2002. 'The Utilisation of Engineering Services Bulk Infrastructure Components in Integrated Development Planning'. *Development Southern Africa*, Vol. 19, No. 2, pp. 329 – 355.

Appendix B: Water Demand Projections

B.1 Background

Water projecting is a crucial decision support tool (Atsalakis and Ucenic 2005) in water planning and "in particular, supply reliability, facility location and size and the transmission and distribution systems design and phasing depend on the accuracy of the demand projection" (Wessels 2005: 178). Wessels (2005: 178) affirms that "the fundamental basis of any water strategy/planning is water demand projecting, which establishes how much water the planning area will need in the future". Other uses of water demand projections include strategic planning, investment appraisal, operations planning, appraisal of management policies and innovations, demand management in "crisis" periods, calculation of future price trends and supply projecting (Atsalaki and Ucenic 2005).

Uses of demand projections in the short-term, "assuming fixed quantities of water resources and capital investment" (Saleba 1985 cited by Prasifka 1994: 73) include:

- "Financial planning and management – determining how much money is needed and how and when to use it wisely".
- "Projecting revenue receipts at current rates to determine if and when a rate increase is needed".
- "Estimating cost of service and setting rates – figuring how much to charge each customer class".
- "Risk management – assessing how changes in certain factors might affect the utility and its customers".

(Saleba 1985 cited by Prasifka 1994: 73)

For the long-term – "a period during which new sources of supply and new facilities might be called for – demand projecting serves the following purposes" (Saleba 1985 cited by Prasifka 1994: 73):

- "Developing a long-term financial strategy that involves the least cost to the utility".
- "Planning the water system – knowing how much water to deliver and when to deliver it in order to develop the water supply and related system".

- "Setting objectives for rates and policy – using water rates and policies to guide or reflect the use trends of the system and its customers (obtained by developing a good understanding of the types of demands that will be placed on the system)".

(Saleba 1985 cited by Prasifka 1994: 73)

The dilemma is that "no area of water planning is more beset by risk than the projecting of water demands" (Prasifka 1994: 72). Prasifka (1994: 72) notes that if:

> ...future water use exceeds the level projected, the planned facilities will be extended beyond their economic loading and/or service limits and water supply deficits may occur. If future water use fails to reach the level projected, unnecessary economic and environmental costs will have been incurred. In spite of the risks involved, however, attempts at projecting must be made (even in the face of uncertainty) if planners are to have some role in managing the future rather than just witnessing its arrival.
>
> (Prasifka 1994: 72)

DFID (2003: 158) asserts that "for short-term projections it is possible to make assumptions that some factors will not have changed significantly from the present" but "for long-term projections there is a greater degree of uncertainty as to how water demand and use will change" (2003: 158). Prasifka explains that:

> ...since planning, design and construction of water facilities proceed slowly and since most facilities are relatively long-lived, water use is customarily projected over long periods – 20, 30, 50 or even 100 years. Given such a long time frame, errors in water use projections can occur for many reasons. Inappropriate or unintended assumptions may be made in determining the parameters of the projection; for example, future population may be incorrectly projected, changes in the mix of household types may be omitted, or changes in the real level of water prices may be ignored. Other errors may arise in the course of determining the relation between the values of these parameters and the level of water use each implies. For example, conservation efforts may alter the amount of water used in future households, even though all other factors remain the same.
>
> (Prasifka 1994: 72)

Prasifka (1994: 72 – 73) continues to say that:

> As these examples illustrate, a water use projection is a conditional prediction of the level of water use at some future time. Projections are conditional because they contain assumptions regarding future levels of water-using activities, future relationships between water use and these activities, future economic conditions, and so on. Any particular projection provides an estimate of the most likely level of future water use, assuming that all of the underlying assumptions prove correct. Accordingly, projection methodology is as much concerned with finding appropriate assumptions as with calculating expected water use once the assumptions are identified.
>
> (Prasifka 1994: 72 – 73)

DFID therefore concludes that "it is important that uncertainties resulting from a lack of information are explicitly reflected in the demand projections" (2003: 158).

The importance of accurate demand projections is illustrated in Figure B.1. Prasifka (1994: 73 – 75) discusses as follows:

> Average annual water demands are projected by methods and techniques that will be discussed later and seasonal, daily and hourly fluctuations in demand are projected on the basis of observed flow records or studies of other areas. Future facility requirements are then determined from projected peak demands. An operating and capital budget is developed to ensure that additional facilities are constructed as needed to meet increases in peak water demands. Financial guidelines adopted by the utility are used to set rates for each class of service, ensuring that sufficient revenues are generated to finance needed facility improvements.
>
> (Prasifka 1994: 73 – 75)

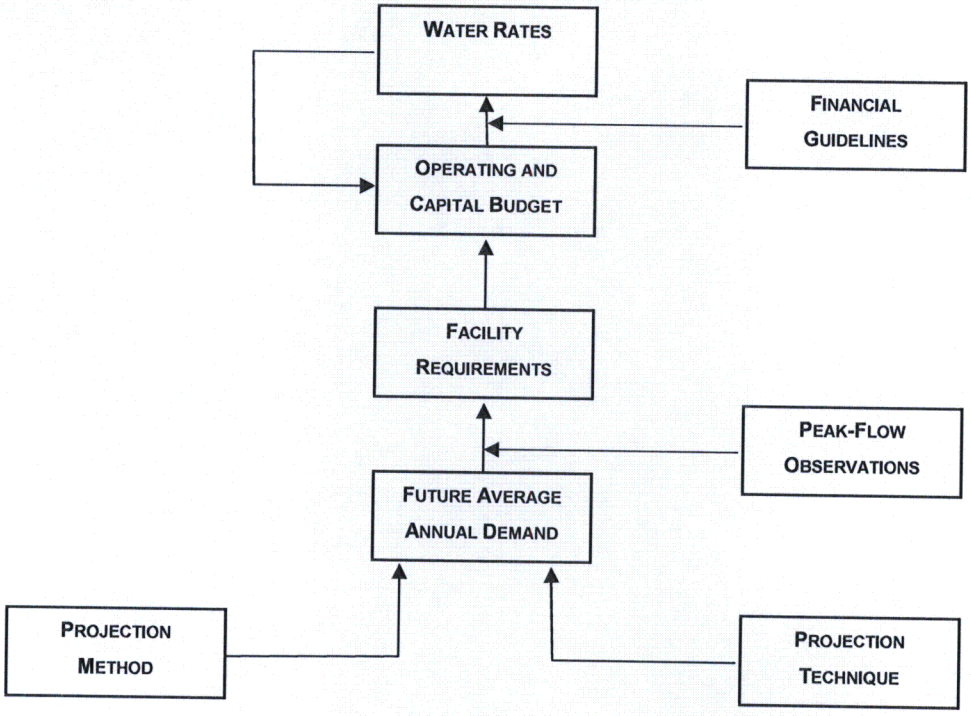

Figure B.1 Flow chart of water demand projecting (AWWA cited by Prasifka 1994: 74).

Fullerton recognises that "given the levels of regional uncertainty surrounding water resources, a question arises in terms of the quantitative tools available to policy analysts and planners" (2001: 167). The next section looks at these tools briefly.

B.2 Different Approaches

Wessels (2005: 178) asserts that "no single method of projecting will satisfy the needs of all water planning and that the projection method used and the data required to correctly apply the method is dependent on the situation". He makes the important note that "the average annual demands projecting method will differ from addressing new capacity issues" (2005: 178). DFID explains that:

> ...there is no absolute level of accuracy that is appropriate in all demand projecting circumstances. As a consequence the level of accuracy of the projection should be sensitive to its purpose. The cost of improving the demand projection should be balanced against the additional benefits that are derived from the greater accuracy.

> The demand projection method that is used will be dependent upon the purpose of the projection and the cost of assembling the data. For example a more accurate and costly projection would be required to justify the construction of a major new piece of infrastructure (e.g. a dam or large pumping station) than for general internal monitoring purposes of a catchment management agency.
>
> (DFID 2003: 158)

Prasifka (1994: 83) acknowledges that "a complete review of water-use projection approaches would reveal a great many individual methods and techniques, ranging from simple to complex". Atsalakis and Uceni's review of the different projection methods found that some authors attempt to explain the variations in water use by such factors as: daylight hours (Hansen and Narayanan 1981 cited by Atsalakis and Uceni 2005: 2) and number of weekend days in a month (2005: 2). They also recorded that "some studies have more than 15 variables, which are regarded as influential factors on water consumption" (Billings 1996 cited by Atsalakis and Uceni 2005: 2).

Atsalakis and Ucenic (2005: 2) indicate that common methods include micro-component analysis, projecting based on socio-economic scenarios, statistical methods and neural networks and that "the models are usually focussed on the relationship between water use and variables, which are able to explain the variations in water consumption".

The different methods include:

- "The general time-series model which was introduced in 1972 by Salas-LaCruz and Yevjevich. In this model, three components of water use were separated: trend (linear or quadratic function of time), seasonality (approximated by Fourier series) and stochastic part (modelled by an autoregressive stochastic model)" (Mizgalewicz 1991; 1997 cited by Atsalakis and Ucenic 2005: 2).
- "Fullerton and Schauer's (2001) application of regional econometric modelling and projection analysis which expanded the traditional modelling framework to include water customer and per capita consumption trends by rate class" (Atsalakis and Ucenic 2005: 2).
- "Cigizoglu et al's (2003) employment of an evolutionary artificial neural network (EANN) in daily flow forecasting" (Atsalakis and Ucenic 2005: 3).

- "Aly and Wanakule (2004) presented an approach for daily and monthly forecasting of municipal water use, which utilised a deterministic smoothing algorithm to predict monthly water consumption" (Atsalakis and Unceni 2005: 3).
- "Bradley (2004) summarised some of the recent trends in domestic water, to better identify the principal factors influencing the demand. It focussed on the adoption of a micro-approach demand forecasting, rather than the traditional use of overall averages" (Atsalakis and Ucenic 2005: 3).
- "Shvartser (1993) forecasted hourly water demand with a model based on a combination of pattern recognition and time-series analysis" (Atsalakis and Ucenic 2005: 3).
- "Ranasinghe et al (1999) estimated willingness to pay 'WTP' for urban water applying artificial neural networks (ANN) and multiple regression (MR)" (Atsalakis and Ucenic 2005: 3).
- Atsalakis and Ucenic (2005) used an Adaptive Neuro-Fuzzy Interferences System (ANFIS) technique for projecting water consumption.
- Judgemental projections are "based on personal or group knowledge" (DFID 2003: 163). They may be "purely subjective or merely an adjustment of a more formal projection" (DFID 2003: 163).
- Simple time extrapolation – Prasifka (1994: 83) states that "some projections attempt to explain water use solely in terms of the passage of time. Simple time extrapolation considers only past water use records: past changes in water use over time are extrapolated into the future" (1994: 83).
- "Single-coefficient methods employ a single explanatory variable and examples of the most commonly used variables are population and service connections, although any factor affecting water use can be used" (Prasifka 1994: 84).
- "Multiple-coefficient methods express future water use as a mathematical function of two or more explanatory variables. The variables are chosen because of their past correlation with water use; any number may be included, although working with more than five or six is unusual" (Prasifka 1994: 86).
- "Micro time-series methods – time series analysis is based on the assumption that future water use can be predicted solely on the basis of past water use patterns. Hence, these models relate future water use only to past levels of water use; no other variables are considered. Some projectors, such as Danielson (1979) use less aggregated data and substitute time-series data for cross-sectional data in estimating individual and household demand relationships (both of which are a function of variables that change over time). This approach, and its

variations, collectively termed *micro time-series methods*, use either single or multiple explanatory variables" (Prasifka 1994: 86).

- "Contingency tree methods – each assumption and explanatory variable projection contained in a water-use projection represents a condition likely to occur in the future. Sets of assumptions and projections are collectively termed *alternative futures*. One of the first applications of the alternative futures approach to water demand projecting was proposed by Whitford (1973). Called the *contingency tree method*, it projects alternative futures on the basis of various non-reversible events that may occur in the future, altering the demand for water" (Prasifka 1994: 90).
- "Statistical techniques used include end-use projecting, time-series projections, econometric projecting, hybrid models and normalisation (Prasifka 1994: 94; 95; 97; 106; 107). Econometric projecting uses regression analysis and economic theory to determine the structural inter-relationships among variables" (Prasifka 1994: 97).

As shown above, one common variable used is that of population where the population is projected and the water consumption then calculated for the projected population. The next section looks briefly at the different methods use in demographic projections.

B.3 Demographic Projections

Widespread methods of projecting population, especially from those coming from a non-demographic background, make use of the exponential and geometric methods. The geometric method assumes that change only occurs once a year whilst the exponential method assumes that change is continuous. These methods which are only recommended for periods less than ten years are based on the extrapolation of past trends into the future. The mathematical methods "do not explicitly include the components of population growth viz. fertility, mortality and migration" (Kpedekpo 1982: 161).

The standard method of demographic projections is referred to as the "Component Method" which was invented by Whelpton (1936) "who applied age-specific fertility rate, death rates and migration rates to determine the population which would result" (Kpedekpo 1982: 161). The effect of HIV/AIDS on a population uses this method. Computer models used in South Africa to model the impacts of HIV/AIDS include the Spectrum Policy Modelling System used by Stats SA to determine the mid-year

population estimates (these estimates include the effects of AIDS) and the Actuarial Society of South Africa's (ASSA) AIDS model (Stats SA 2004; 2005; ASSA AIDS Committee 2006).

Haupt and Kane (2004: 59) define migration as the "movement of people across a specified boundary for the purpose of establishing a new or semi-permanent residence" i.e. migration denotes a move from one *migration-defining area* to *another* that was made during a *given migration interval* and which involves a *change in residence*.

The Balancing Equation Method can be used to estimate the number of net migrants in any given area during an interval between two censuses. The term *net migration* refers to the balance of movements in opposing directions. A migration-defining area can be a net gainer (+) or a net loser (-) or zero.

Net migrants = In-migrants – Out-migrants

The net migration rate refers to the difference between people moving in and those moving out of the migration defining area per 1000 population.

The Balancing Equation is the "fundamental demographic formula used to estimate total population change between two points in time and includes all components of population change: births, deaths, immigration, emigration, in-migration and out-migration" (Haupt and Kane 2004: 55). It is written as:

$$\text{Population Change} = \text{Natural Increase} + \text{Net Migration}$$

$$P_{t+1} = P_t + B - D + IN - OUT \qquad \text{(Equation B.1)}$$

where

P_t = Population at time t
P_{t+1} = Population at time t + 1
B = The number of births
D = The number of deaths
IN = The number of in-migrants
OUT = The number of out-migrants

A literature review undertaken identified that although the former Town and Regional Planning Commission (now called the Provincial Planning and Development Commission) had updated its report on the impact of HIV/AIDS on planning issues in KwaZulu-Natal (HEARD 2001), the projections were only over a 10-year horizon and

that the only recent study undertaken on a provincial basis was Calitz's 2000 study (2000a; 2000b). This study was undertaken over a 25-year horizon. Van Aardt et al's Singular Projection Approach method, also a component method was undertaken for the entire country in 1999.

The next section looks at the recommended approach in projecting water consumption.

B.4 Recommended Approach

The Institute for Futures Research, Ninham Shand (Pty) Ltd and Palmer Development Group believe that:

> ...it is not possible to predict the future i.e. it is **impossible** to foretell what ***will*** happen as a scientific fact. However, by means of the realisation and understanding that the future is closely linked to the present and the past through the roles, relations and processes governing organisations and entities in general, one is led to a search for instruments to measure and understand change, which, in turn, support sound judgement about the possible and likely outcome of current events.
>
> (Institute for Futures Research et al 2000: 1-4)

They continue to explain that:

> ...the most general tool for developing foresight is systems thinking, viz. the understanding of purpose and function, structure, process, context and governance of societal change. Such a framework embraces the following five qualities and methods of inquiry:
>
> **Inertia:** Over the shorter term society will tend to continue on its former course due to structural interdependencies and vested interests. Here, therefore, extrapolative forecasts of the shorter term demand for water may be useful.
> **Purposefulness:** Change is influenced by human beings acting out their purposes. Normative analysis, analysis of intent of major actors and policy analysis are useful forecasting tools. For instance, patterns of water demand in the Western Cape at some future date under an impoverished scenario may differ significantly from the patterns prevailing in a more prosperous scenario. In this case, one would need to reflect upon the ability and desire of society and its decision-makers to act accordingly.

Indivisibility: Change tends to cluster around systemic interdependencies. Therefore, change in one element of a cluster will, of necessity, produce change in other elements.

Analogy: Similar systems behave similarly. Comparisons can be made of the structure of water demand in different communities with different social, economic and physical characteristics.

Dynamic Causality: One thing leads to another and a number of things interacting could produce surprises. Thus, an analysis of future water demand should integrate physical, social, political, institutional, economic and financial relations and processes.

(Institute for Futures Research et al 2000: 1-4)

The Institute for Futures Research et al (2000: 1 - 4) note that "none of the methods specified above, if viewed in isolation, is ideally suited for making a prognosis of water demand". They cite as an example, "that there is a strong temptation, when attempting to forecast a seemingly quantitative variable such as the long-term demand for water, to merely extrapolate into the future from the past" (2000: 1 – 4). This is the recommendation put forward by the Red Book which states:

> Water demand is based on historical consumption. Where consumption records are not available, present consumption per capita can be estimated by consulting the residents...An improved estimate could be obtained by studying existing water supply systems in the same area.
>
> (CSIR 2000: 18)

However, the Institute for Futures Research et al explain that:

> ...this type of approach may be flawed in that it assumes that historical relationships and feedback between the components of a system will be repeated and sustained in the future. This assumption becomes implausible when a society and societal forces are subject to continuous changes and complexities.
>
> (Institute for Futures Research et al 2000: 1 – 4)

Hence, the Institute for Futures Research et al recommend that "all methods, both implicitly or explicitly be used in order to blend sound scientific analysis and reason, with judgement and intuition" (2000: 1 – 4).

This means that one cannot obtain a "one-size fits all" solution for water demand projections. Judgement and intuition are important components of the decision-making process when identifying the methodology to use for the different stages of a project. Judgement and intuition are crucial in acknowledging that places are different and therefore will use water differently. Hence the methods selected need to reflect these differences.

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Appendix C: The Project-Life Cycle

C.1 The Importance of the Project-Life Cycle

Burke (2003: 34) explains that:

> In the 1960s and 1970s project management tools and techniques tended to focus on the implementation phase of the *project life-cycle* which certainly accounted for the greatest level of effort where the majority of the expenses were incurred, but in the 1980s the emphasis began to shift and focus more on the front-end of the project where the design and development decisions were made. This is where the stakeholder's needs are analysed, feasibility studies conducted, value management encouraged, project risk assessed and the product designed. Therefore the initial phases offer the greatest potential to add value, whereas the implementation phase, even though it has the greatest expenditure, should do no more than implement the product as designed. Further the cost of making any changes due to design errors or the client changing the scope, were recognised as becoming increasingly more expensive as the project progressed (see Figure C.1).
>
> As projects become more involved and complex, together with time pressures to shorten the implementation phase (fast track to bring the product to market), so the need to get the design right from the outset becomes more important...The stakeholders level of design influence, or potential to add value to the project reduces as the project progresses. As the design develops, so design freezes must be imposed progressively for the design to progress.
>
> This is clearly illustrated in Figure C.1 where the level of influence and the cost of changes are plotted against the *project life-cycle*. At the outset of the project the potential for adding value and cost savings are at their highest, but steadily reduce as the project progresses – loosely mirroring this curve are the associated cost of any changes. **The financial encouragement is therefore, to spend proportionally more time and effort during the initial phases to get the design right before implementation.**
>
> (Burke 2003: 34 – 35)

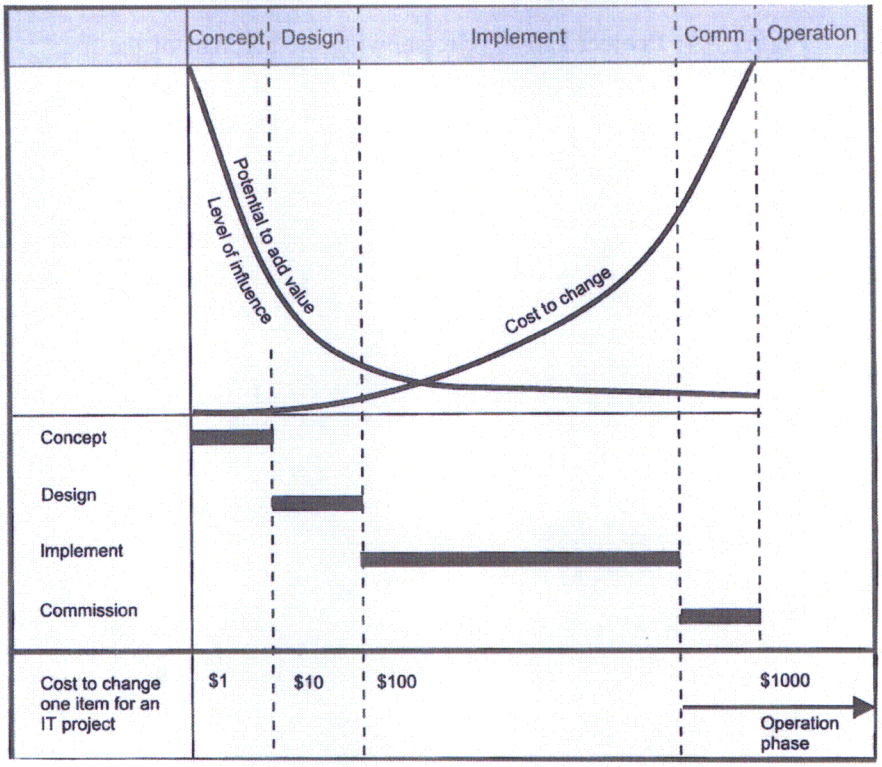

Figure C.1 Potential to add value/cost of changes (showing typical cost of changes in the IT industry) (Burke 2003: 34).

Burke (2003: 43) explains that:

> Ideas, needs and problems crystallise into projects in different ways. The process of project formulation varies in different companies and on different types of projects. However, whichever way your projects develop there should at some point be a *feasibility study* to not only ensure the project is feasible, but also ensure it is making the best use of your company's resources.
>
> (Burke 2003: 43)

Burke (2003: 44) affirms that "the *feasibility study* should be managed as a mini project and therefore will also have its own *project life-cycle*"(see Figure C.2).

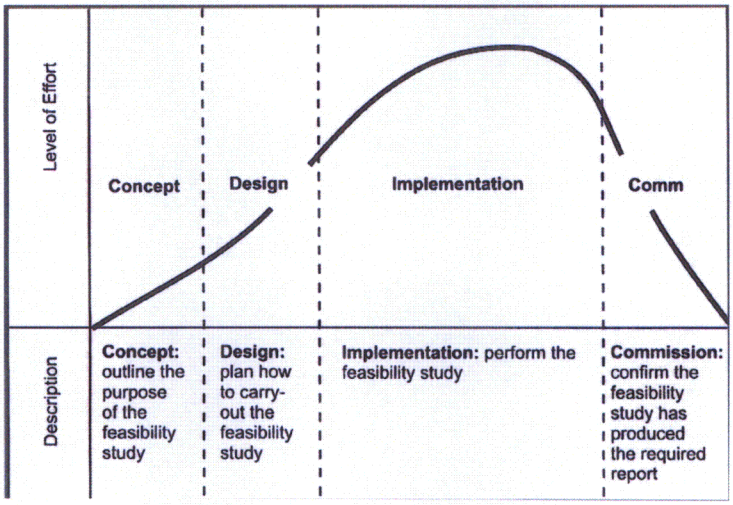

Figure C.2 Project life-cycle of feasibility study (Burke 2003: 44).

C.2 References

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Appendix D: Basic Elements of an IRP (Beecher 1995: 36 - 39)

D.1 Components of an IRP

Beecher (1995: 36 – 39) identifies the fundamental components of an IRP as follows:

> These elements reflect a comprehensive planning approach that could be implemented by very large water systems. Not all water systems can or should invest the same level of resources in their planning processes. Elements of the outline can be adapted to particular needs and circumstances.
>
> **PRELIMINARIES**
>
> **Letter of transmittal and acknowledgements**
>
> - To agency for which planning report was prepared.
> - List of individuals and agencies who helped develop plan.
>
> **Executive Summary**
>
> - Should highlight findings, conclusions and recommendations.
> - Should be specific, orderly and concise.
> - May refer to specific sections of the report.
> - Clearly states requests for agency actions.
>
> **Table of Contents**
>
> - Major headings and subheadings including appendices.
> - List of tables.
> - List of figures.
>
> **Need, Scope and Objectives of the Plan**
>
> - Origins of the plan including statutory and regulatory mandates.
> - Time frame of the plan.
> - What the plan does and does not cover.
> - Objectives of the plan (e.g. reliable service, minimal environmental impact, low costs and reasonable rates, load management, drought management and long-term conservation and wise use).
> - How the study will be used in and adapted to future management and regulatory decision-making.

General and Historical Background

- Location of the system and nearby systems.
- Geography, hydrology, meteorology, geology, surface water and groundwater and so on.
- Soil characteristics and subsurface conditions.
- Demographics (past, present and future population characteristics).
- Employment (industry, commercial, service, government).
- Residential, industrial, commercial, recreational, agricultural and institutional development and redevelopment.
- Land use (present and future, including land use in detail in the vicinity of existing and proposed water supply facilities).
- Drainage, water pollution control and flood control management.
- Wastewater facilities.

STATEMENT OF CONDITIONS

Description of Water Delivery System

- Map of service territory including location of nearby systems.
- Details of location, age, cost and physical condition of source of supply and pumping facilities, transmission facilities, treatment facilities, storage facilities, fire hydrants and administrative offices and all other physical plants.

Description of Rate Structure

- Rate history including regulatory proceedings.
- Current rate structure including fees.
- Metering and billing practices.
- Ancillary services and rates charged.

Water Quality Issues

- Record or certification by state drinking water agency.
- Record of water quality and compliance with water quality regulations.
- Existing contamination issues and potential solutions.
- Potential contamination issues and potential solutions.
- Existing and planned water quality monitoring.

Water Quantity Issues

- Historical supply and reasons for variations.
- Water supply forecasts (for utility and region).
- Description of drought probabilities and occurrence.

- Historical demand; reasons for variations.
- Description of average and peak demand patterns.
- Water demand forecasts (short- and long-term demand by water-use sector).
- Potential for conservation and load management to affect demand.
- Estimates of price elasticities for water demand by water-use sector.

Anticipated Infrastructure Needs

- Replacements.
- Improvements.
- Additions to capacity to meet demand growth.

Description and Pre-Screening of Alternatives to Meet Infrastructure Needs

- Includes both structural (new supply) and non-structural (conservation) options.
- Technical feasibility of each alternative.
- Benefits and costs of each alternative.
- Economic, environmental, societal and regulatory considerations.
- Potential barriers.
- Pre-screening of alternatives for effectiveness and feasibility.

EVALUATION OF ALTERNATIVES

Analysis of Alternatives

- Selection of most promising options for fashioning an effective, flexible and responsive plan based on pre-screening.
- Integration of supply methods with methods for controlling and moderating demand.
- Construction of scenarios pitting selected options against possible economic, environmental, societal and regulatory circumstances.
- Evaluation of economic and technical success of each mix of options under circumstances of the various scenarios.
- Analysis of uncertainties associated with each course of action.
- Screening to eliminate unfeasible alternatives.

Selection of Alternatives for the Plan

- Ranking alternatives according to incremental costs.
- Further testing of each alternative for cost-effectiveness from various viewpoints (including rate-payers, utilities and society).
- Re-evaluation of alternatives considering economic, environmental, societal and regulatory factors.

- Development of rules for selecting the alternative(s) that optimise the plan's objectives.
- Selection of optimal course of action for implementation.

Impact Analysis of Selected Alternatives

- Economic impact analysis (e.g. societal and rate-payer costs).
- Environmental impact analysis (e.g. irreversible effects).
- Societal and cultural impact analysis (e.g. consumer satisfaction).
- Regulatory impact analysis (e.g. regulatory costs).

Drought Contingency and Emergency Management Plan

- Identification of priority uses consistent with appropriate public policies.
- Sources of emergency water supplies and diversions.
- Potential use of pressure reduction.
- Plans for public education and voluntary use reduction.
- Plans for water use bans, restrictions and rationing.
- Plans for pricing and penalties for excess use.
- Co-ordination with other utilities and local authorities.

Co-Ordination and Consistency

- Co-ordination of long-term plan with drought contingency and emergency management plan.
- Relationship of plan to nearby water utilities.
- Regional economic, environmental and societal effects.
- Economic development and land use policy issues.
- Consistency of plan with federal, state, regional and river basin plans and water resource policies.

IMPLEMENTATION

Planned Implementation

- Timetables and organisation charts.
- Anticipated milestones.
- Regulatory filings and anticipated decisions.
- Monitoring and ongoing evaluation.
- Co-ordination with other planning processes.
- Flexibility of plan in meeting changing conditions.

Administration and Financing

- Administrative and associated costs.
- Financing methods.
- Cost allocation.
- Short-term and long-term rate effects.

Public Participation

- Public information and education.
- Opportunities for public comment.
- Identification of likely participants in planning proceedings.

(Beecher 1995: 36 – 39)

D.2 References

Beecher, A. 1995. 'Integrated Resource Planning Fundamentals'. *Journal of the American Water Works Association*, Vol. 87, No. 634, pp. 34 – 48.

Appendix E: Prescribed Planning Elements of a WSDP

E.1 Required Information for a WSDP (DWAF 2006: 1 – 17)

The elements of a WSDP are prescribed in the document entitled "DWAF's Guide Framework and Checklist for the Development of Water Services Development Plans 2006 Draft (Concept Document) Revision 10: 26th January 2006". The prescribed elements are summarised in the table of contents which is presented below:

A INTRODUCTION: STRATEGIC PERSPECTIVE AND METHODOLOGY

- I Roadmap of planning framework
- II Strategic analysis and methodology
- III IDP methodology
- IV Programme interaction and data exchange

B ADMINISTRATION

1. Name of WSA
2. Status of WSDP
3. WSDP drafting team
4. Process followed
5. Comments
6. Adoption record
7. WSDP co-ordinator(s)
8. Project management unit
9. DWAF assets transfer
10. General

C EXECUTIVE SUMMARY

1. Essential questions
2. Water services business element summary

D BACKGROUND TO THE AREA

1. Location
2. Water Services Authority perspective
3. Physical perspective
4. Demographic perspective
5. Regional perspective

E IDP AND WSDP GOALS AND INTEGRATION

1 IDP priority issues related to water services

2 Sustainable water services sub-goals

3 Integrated water resource management sub-goals

4 Efficient and effective water services institutional arrangements sub-goals

F WATER SERVICES BUSINESS ELEMENTS

1 Socio-Economic Profile

1.1 Demographics

1.1.1 Situation Assessment

1.1.1.1 Current consumer profile

1.1.1.2 Poor household definition

1.1.1.3 Present population and projected population growth rates

1.1.1.4 Demographic trends and migration patterns

1.1.1.5 Age and gender profile

1.1.2 Future Trends and Goals

1.1.2.1 Consumer profile

1.1.2.2 Population and projected population growth rates

1.1.2.3 Demographic trends and migration patterns

1.1.2.4 Age and gender profile

1.1.3 Strategic Gap Analysis

1.1.4 Implementation Strategies

1.2 Health

1.2.1 Situation Assessment

1.2.1.1 Health Profile

1.2.2 Future Trends and Goals

1.2.2.1 Health Profile

1.2.3 Strategic Gap Analysis

1.2.4 Implementation Strategies

1.3 Employment and Income

1.3.1 Situation Assessment

1.3.1.1 Employment Profile

1.3.1.2 Household Income

1.3.2 Future Trends and Goals

1.3.2.1 Employment Profile

1.3.2.2 Household Income

1.3.3 Strategic Gap Analysis

1.3.4 Implementation Strategies

1.4 Economics

1.4.1 Situation Assessment

1.4.1.1 Economic Sectors, GGP Contribution and Employment

1.4.1.2 Economic Trends

1.4.2 Future Trends and Goals

1.4.2.1 Economic Sectors, GGP Contribution and Employment

1.4.2.2 Economic Trends

1.4.3 Strategic Gap Analysis

1.4.4 Implementation Strategies
2 Service Level Profile: Technical Option
2.1 Residential Consumer Units
2.1.1 Situation Assessment
2.1.1.1 Residential Consumer Units for Water and Sanitation
2.1.1.2 Residential Consumer Units for Water
2.1.1.3 Residential Consumer Units for Sanitation
2.1.1.4 Grey Water Management
2.1.1.5 Pit Emptying and Sludge Disposal
2.1.2 Future Trends and Goals
2.1.2.1 Residential Consumer Units for Water and Sanitation
2.1.2.2 Residential Consumer Units for Water
2.1.2.3 Residential Consumer Units for Sanitation
2.1.2.4 Grey Water Management
2.1.2.5 Pit Emptying and Sludge Disposal
2.1.2.6 Types of Sanitation Technology Options
2.1.2.7 2010 Target of Basic Sanitation
2.1.3 Strategic Gap Analysis
2.1.4 Implementation Strategies
2.2 Public Institutions and 'Dry' Industries
2.2.1 Situation Assessment
2.2.1.1 Public Institutions and 'Dry' Industries
2.2.2 Future Trends and Goals
2.2.2.1 Public Institutions and 'Dry' Industries
2.2.3 Strategic Gap Analysis
2.2.4 Implementation Strategies
2.3 Wet Industries
2.3.1 Situation Assessment
2.3.1.1 Wet Industries: Urban and Rural
2.3.1.2 Future Trends and Goals
2.3.2 Wet Industries: Urban and Rural
2.3.2.1 Strategic Gap Analysis
2.3.2.2 Implementation Strategies
2.4 'Raw' Water Consumers
2.4.2 Situation Assessment
2.4.2.1 'Raw' Water Consumers: Urban and Rural
2.4.3 Future Trends and Goals
2.4.3.1 'Raw' Water Consumers: Urban and Rural
2.4.4 Strategic Gap Analysis
2.4.5 Implementation Strategies
2.5 Industrial Consumer Units
2.5.1 Situation Assessment
2.5.1.1 Industrial Consumer Units for Sanitation
2.5.2 Future Trends and Goals
2.5.2.1 Industrial Consumer Units for Sanitation
2.5.3 Strategic Gap Analysis
2.5.4 Implementation Strategies

2.6 Industries and their Permitted Effluent Releases

2.6.1 Situation Assessment

2.6.1.1 Industries and their Permitted Effluent Releases

2.6.2 Future Trends and Goals

2.6.2.2 Industries and their Permitted Effluent Releases

2.6.3 Strategic Gap Analysis

2.6.4 Implementation Strategies

3 Water Resource Profile

3.1 Water Source

3.1.1 Situation Assessment

3.1.1.1 Surface Water Source

3.1.1.2 Groundwater Sources

3.1.1.3 Groundwater Monitoring

3.1.1.4 External Sources (Where the WSA Purchase Water from Others)

3.1.1.5 Water Returned to Resources

3.1.2 Future Trends and Goals

3.1.2.1 Surface Water Source

3.1.2.2 Groundwater Sources

3.1.2.3 Groundwater Monitoring

3.1.2.4 External Sources (Where the WSA Purchases Water from Others)

3.1.2.5 Water Returned to Resources

3.1.3 Strategic Gap Analysis

3.1.4 Implementation Strategies

3.2 Water Quality

3.2.1 Situation Assessment

3.2.1.1 Quality of Water Taken from Source: Urban

3.2.1.2 Quality of Water Taken from Source: Rural

3.2.1.3 Reporting on Quality of Water Taken from Source: Urban and Rural

3.2.1.4 Quality of Water Returned to the Resource: Urban

3.2.1.5 Quality of Water Returned to the Resource: Rural

3.2.1.6 Pollution Contingency Measures

3.2.2 Future Trends and Goals

3.2.2.1 Quality of Water Taken from Source: Urban

3.2.2.2 Quality of Water Taken from Source: Rural

3.2.2.3 Reporting on Quality of Water Taken from Source: Urban and Rural

3.2.2.4 Quality of Water Returned to the Resource: Urban

3.2.2.5 Quality of Water Returned to the Resource: Rural

3.2.2.6 Pollution Contingency Measures

3.2.3 Strategic Gap Analysis

3.2.4 Implementation Strategies

3.3 Waterborne Sanitation

3.3.1 Situation Assessment

3.3.1.1 Waterborne Sanitation Plan

3.3.2 Future Trends and Goals

3.3.3 Strategic Gap Analysis

3.3.4 Implementation Strategies

4 Water Conservation/Demand Management (WC/WDM)

4.1 Water Resource Management Interventions

4.1.1 Situation Assessment

4.1.1.1 Targets for Reducing Unaccounted for Water and Water Inefficiencies (Ml/year: Urban)

4.1.1.2 Targets for Reducing Unaccounted for Water and Water Inefficiencies (Ml/year: Rural)

4.1.1.3 Reducing High Pressures for Residential Consumers: Urban

4.1.1.4 Reducing High Pressures for Residential Consumers: Rural

4.1.1.5 Consumer/End-Use Demand Management

4.1.1.6 Leak and Meter Repair Programmes: Urban

4.1.1.7 Leak and Meter Repair Programmes: Rural

4.1.1.8 Working for Water Programme

4.1.1.9 Conjunctive Use of Surface and Groundwater

4.1.2 Future Trends and Goals

4.1.2.1 Targets for Reducing Unaccounted for Water and Water Inefficiencies (Ml/year: Urban)

4.1.2.2 Targets for Reducing Unaccounted for Water and Water Inefficiencies (Ml/year: Rural)

4.1.2.3 Reducing High Pressures for Residential Consumers: Urban

4.1.2.4 Reducing High Pressures for Residential Consumers: Rural

4.1.2.5 Consumer/End-Use Demand Management

4.1.2.6 Leak and Meter Repair Programmes: Urban

4.1.2.7 Leak and Meter Repair Programmes: Rural

4.1.2.8 Working for Water Programme

4.1.2.9 Conjunctive Use of Surface and Groundwater

4.1.3 Strategic Gap Analysis

4.1.4 Implementation Strategies

5 Water Services Infrastructure Profile

5.1 Water Services Infrastructure

5.1.1 Situation Assessment

5.1.1.1 Existing Infrastructure

5.1.1.2 Brief Functional Description of Existing Main Infrastructure Components (Urban and Rural)

5.1.1.3 Existing Groundwater Infrastructure

5.1.1.4 Existing Surface Water Infrastructure

5.1.1.5 Existing Water Treatment Works Infrastructure

5.1.1.6 Existing Pump Stations Infrastructure

5.1.1.7 Existing Bulk Pipeline Infrastructure

5.1.1.8 Existing Reservoir Infrastructure

5.1.1.9 Existing Reticulation Infrastructure (by Supply Zone)

5.1.1.10 Existing Sanitation Infrastructure

5.1.1.11 Existing Asset Management Assessment

5.1.1.11.1 Assessment of Existing Operation

5.1.1.11.2 Assessment of Existing Management

5.1.1.12 Schemes to be Transferred: Water

5.1.1.13 Schemes to be Transferred: Sanitation

5.1.1.14 Schemes to be Rehabilitated

5.1.2 Future Trends and Goals

5.1.2.1 New Infrastructure to be Built

5.1.2.2 Future Internal and Connector Infrastructure

5.1.2.3 Future Bulk Water Supply Infrastructure

5.1.2.4 Future Bulk Sanitation Infrastructure

5.1.2.5 Asset Management Plan
5.1.2.5.1 Operational Plan
5.1.2.5.2 Maintenance Plan
5.1.3 Strategic Gap Analysis
5.1.4 Implementation Strategies
6 Water Balance
6.1 Water Balance
6.1.1 Situation Assessment
6.1.1.1 Amount of Bulk Water Abstracted
6.1.1.2 Amount of Bulk Water Purchased from Other
6.1.1.3 Water Supplied to Consumers – Urban
6.1.1.3.1 Categorisation of Residential Uncontrolled Volume Supply
6.1.1.4 Water Supplied to Consumers – Rural
6.1.1.5 Total Physical Water Losses
6.1.1.6 Total Influent Received at Treatment Works
6.1.1.6.1 Total Returns to the Water Resource System
6.1.2 Future Trends and Goals
6.1.2.1 Amount of Bulk Water to be Abstracted
6.1.2.2 Amount of Bulk Water to be Purchased from Other
6.1.2.3 Water to be Supplied to Consumers – Urban
6.1.2.3.1 Categorisation of Residential Uncontrolled Volume Supply
6.1.2.4 Water to be Supplied to Consumers – Rural
6.1.2.5 Total Physical Water Losses
6.1.2.6 Total Influent Received at Treatment Works
6.1.2.6.1 Total Returns to the Water Resource System
6.1.3 Strategic Gap Analysis
6.1.4 Implementation Strategies
7 Water Services Institutional Arrangements Profile
7.1 Water Services Institutional Arrangements Profile
7.1.1 Situation Assessment
7.1.1.1 WSA Functions and Outputs
7.1.1.2 WSA Capacity Development
7.1.1.3 Bylaws Affecting Water Services
7.1.1.4 Water Services Providers (Retail Water)
7.1.1.5 Water Services Providers (Sanitation)
7.1.1.6 Water Services Providers (Bulk Water)
7.1.1.7 Water Services Providers (Bulk Sanitation)
7.1.1.8 Support Services Agents (Water)
7.1.1.9 Sanitation Promotion Agent
7.1.1.10 Support Services Contracts
7.1.1.11 Water Services Institutions
7.1.1.12 WSP Staffing Levels: Water
7.1.1.13 WSP Staffing Levels: Sanitation
7.1.1.14 WSP Training Programme
7.1.2 Future Trends and Goals
7.1.2.1 Water Services Providers (Retail Water)
7.1.2.2 Water Services Providers (Sanitation)
7.1.2.3 Water Services Providers (Bulk Water)
7.1.2.4 Water Services Providers (Bulk Sanitation)

7.1.2.5 Support Services Agents (Water)
7.1.2.6 Sanitation Promotion Agent
7.1.3 Strategic Gap Analysis
7.1.4 Implementation Strategies
8 Customer Services Profile
8.1 Customer Services Profile
8.1.1 Situation Assessment
8.1.1.1 Quality of Services for Water: Urban
8.1.1.2 Quality of Services for Water: Rural
8.1.1.3 Attending to Complaints for Water: Urban
8.1.1.4 Attending to Complaints for Water: Rural
8.1.1.5 Attending to Complaints for Sanitation: Urban
8.1.1.6 Attending to Complaints for Sanitation: Rural
8.1.1.7 Education for Basic Water Services
8.1.1.8 Pollution Awareness
8.1.2 Future Trends and Goals
8.1.2.1 Quality of Services for Water: Urban
8.1.2.2 Quality of Services for Water: Rural
8.1.2.3 Attending to Complaints for Water: Urban
8.1.2.4 Attending to Complaints for Water: Rural
8.1.2.5 Quality of Sanitation Services
8.1.2.6 Quality of Sanitation Infrastructure (Rural VIP Toilets)
8.1.2.7 Attending to Complaints for Sanitation: Urban
8.1.2.8 Attending to Complaints for Sanitation: Rural
8.1.2.9 Education for Basic Water Services
8.1.2.10 Pollution Awareness
8.1.2.11 Quality of Health and Hygiene Education and Awareness
8.1.3 Strategic Gap Analysis
8.1.4 Implementation Strategies
9 Financial Profile
9.1 Capital Funds
9.1.1 Situation Assessment
9.1.1.1 Capital Expenditure: Water
9.1.1.2 Capital Expenditure: Sanitation
9.1.1.3 Sources of Capital Income: Water
9.1.1.4 Sources of Capital Income: Sanitation
9.1.2 Futures Trends and Goals
9.1.2.1 Capital Expenditure: Water
9.1.2.2 Capital Expenditure: Sanitation
9.1.2.3 Sources of Capital Income: Water
9.1.2.4 Sources of Capital Income: Sanitation
9.1.3 Strategic Gap Analysis
9.1.4 Implementation Strategies
9.2 Operating Cost and Income
9.2.1 Situation Assessment
9.2.1.1 Operating Costs: Water
9.2.1.2 Operating Costs: Sanitation
9.2.1.3 Operating Income: Subsidies

9.2.1.4 Operating Income: Tariffs
9.2.2 Future Trends and Goals
9.2.2.1 Operating Costs: Water
9.2.2.2 Operating Costs: Sanitation
9.2.2.3 Operating Income: Subsidies
9.2.2.4 Operating Income: Tariffs
9.2.3 Strategic Gap Analysis
9.2.4 Implementation Strategies
9.3 Tariffs and Charges
9.3.1 Situation Assessment
9.3.1.1 Fixed Charges: Residential for Water
9.3.1.2 Fixed Charges: Residential for Sanitation
9.3.1.3 Volume Charges or Other Charge Mechanisms
9.3.1.4 Block Tariffs: Residential for Water
9.3.2 Future Trends and Goals
9.3.2.1 Fixed Charges: Residential for Water
9.3.2.2 Fixed Charges: Residential for Sanitation
9.3.2.3 Volume Charges or Other Charge Mechanisms
9.3.2.4 Block Tariffs: Residential for Water
9.3.3 Strategic Gap Analysis
9.3.4 Implementation Strategies
9.4 Free Basic Water and Sanitation
9.4.1 Situation Assessment
9.4.1.1 Subsidy Targeting Approach for Free Basic Water
9.4.1.2 Subsidy Targeting Approach for Free Basic Sanitation
9.4.2 Future Trends and Goals
9.4.2.1 Subsidy Targeting Approach for Free Basic Water
9.4.2.2 Subsidy Targeting Approach for Free Basic Sanitation
9.4.3 Strategic Gap Analysis
9.4.4 Implementation Strategies
9.5 Charges and Block Tariffs
9.5.1 Situation Assessment
9.5.1.1 Fixed Charges and Block Tariffs: Industrial for Water
9.5.1.2 Fixed Charges and Block Tariffs: Industrial for Wastewater
9.5.1.3 Fixed Charges and Block Tariffs: Commercial for Water
9.5.1.4 Fixed Charges and Block Tariffs: Commercial for Wastewater
9.5.1.5 Fixed Charges and Block Tariffs: Other for Water
9.5.1.6 Fixed Charges and Block Tariffs: Other for Sanitation
9.5.2 Future Trends and Goals
9.5.2.1 Fixed Charges and Block Tariffs: Industrial for Water
9.5.2.2 Fixed Charges and Block Tariffs: Industrial for Wastewater
9.5.2.3 Fixed Charges and Block Tariffs: Commercial for Water
9.5.2.4 Fixed Charges and Block Tariffs: Commercial for Wastewater
9.5.2.5 Fixed Charges and Block Tariffs: Other for Water
9.5.2.6 Fixed Charges and Block Tariffs: Other for Sanitation
9.5.3 Strategic Gap Analysis
9.5.4 Implementation Strategies

9.6 Sales and Income

9.6.1 Situation Assessment

9.6.1.1 Total Income and Expenditure: Water

9.6.1.2 Total Income and Expenditure: Sanitation

9.6.1.3 Sales Arrangements

9.6.2 Future Trends and Goals

9.6.2.1 Total Income and Expenditure: Water

9.6.2.2 Total Income and Expenditure: Sanitation

9.6.2.3 Sales Arrangements

9.6.3 Strategic Gap Analysis

9.6.4 Implementation Strategies

9.7 Metering and Billing

9.7.1 Situation Assessment

9.7.1.1 Metering and Billing: Urban

9.7.1.2 Metering and Billing: Rural Dense

9.7.1.3 Metering and Billing: Rural Villages

9.7.1.4 Metering and Billing: Rural Scattered

9.7.1.5 Metering and Billing: Rural Farmland

9.7.2 Future Trends and Goals

9.7.2.1 Metering and Billing: Urban

9.7.2.2 Metering and Billing: Rural Dense

9.7.2.3 Metering and Billing: Rural Villages

9.7.2.4 Metering and Billing: Rural Scattered

9.7.2.5 Metering and Billing: Rural Farmland

9.7.3 Strategic Gap Analysis

9.7.4 Implementation Strategies

10 List of Projects

10.1 Projects

10.1.1 Situation Assessment

10.1.1.1 Annual Water and Sanitation Project List

10.1.1.2 WSA Sustainability Project List

10.1.1.3 Proposed WSDP Projects for Inclusion in IDP

10.1.2 Future Trends and Goals

10.1.2.1 Annual Water and Sanitation Project List

10.1.2.2 WSA Sustainability Project List

10.1.2.3 Proposed WSDP Projects for Inclusion in IDP

10.1.3 Strategic Gap Analysis

10.1.4 Implementation Strategies

(DWAF 2006: 1 – 17)

DWAF has also produced a checklist "to provide the Department with primary information on WSA capacity and on WSA progress towards putting in place key documents and processes which are required by legislation" (DWAF 2005: 2). This checklist further provides the "purpose and explanation of the information required"

(DWAF 2005: 13) for each of the functions. The rationale for the required information for the Planning function is provided in Table E.1.

Table E.1 Purpose and explanation of information required for the Planning function in a WSDP (DWAF 2005: 17 – 19).

	Function	Purpose and Explanation of Information Required
2.	**Planning**	
2.1	**Draft (or final) WSDP**	Section 12(1)(b)(i) of the Water Services Act states that every WSA must prepare a draft WSDP. This question seeks to determine whether the WSA has completed a (draft) WSDP either by themselves or through the appointment of a service provider. If a draft or final WSDP is available, regardless of the quality of the document then, answer 'yes', otherwise answer 'no'. Some WSAs might have a Water Services Master Plan in which they comply with section 13 of the Water Services Act. The master plan is acceptable for this question. Please note this fact in the comments column.
	Does the draft (or final) WSDP contain details:	*Questions 2.1.1 through to 2.1.10 seek to determine whether the (draft) Status Quo or final WSDP contains details of information as specifically required by Section 13 of the Water Services Act. The DWAF WSDP coordinator, prior to the interview with the WSA, must have studied the WSAs WSDP and indicated in the 'performed' column whether the function has been performed or not. The interviewer must then confirm these answers with the WSA. The budget, (office) infrastructure and personnel columns for these 'functions' (from 2.1.1 to 2.1.10) are somewhat of a repetition however, the WSA can provide the same answers to these questions on 'resource availability' through section 2.1.1 to 2.1.10. They have however been left in as the WSA might indeed not have a budget to have collected some of the information requested in section 13 of the Water Services Act.*
2.1.1	of the physical attributes of the area to which it applies	Physical attributes generally include the political boundaries including ward boundaries, topography and hydrology, soils and geography, climate and rainfall and land use types by physical profile, consumer profile and settlement types. Please use your discretion when answering this question, but if physical attributes have broadly been addressed, please answer "yes".
2.1.2	of the size and distribution of the population within that area	Population related information will generally be provided in the IDP and carried over to the WSDP. Population information typically includes the following information **per village, town or settlement**: number of households, present population, projected populations, employment figures and type, age and gender profiles etc.
2.1.3	of a time frame for the plan, including the implementation programme for the following five years	Many municipalities wait for the announcement of their annual grants amount before producing a list of capital projects for a particular financial year. However, this question seeks to inquire if the

	Function	Purpose and Explanation of Information Required
		municipality has a priority list of projects.
2.1.4	of existing water services	This information is extensive but generally includes the quantity of overall water resources available, information on raw water extraction and bulk water volumes, either the pipe network schematics or representative layouts, borehole locations with borehole water yields and quality, environmentally sensitive areas and their water requirements, industrial and domestic demand and discharge, sanitation services etc.
2.1.5	existing industrial water use within the area of jurisdiction of the relevant WSA	This information would take a closer look at major industrial water usage and especially industrial water quality required, which could also be slightly impure water but still fit for industrial use.
2.1.6	existing industrial effluent disposed of within the area of jurisdiction of the relevant WSA	This information would take a closer look at major industrial water users and especially the quality of industrial water being disposed and whether it complies with municipal and DWAF quality standards.
2.1.7	the number and location of persons within the area who are not being provided with a basic water supply and basic sanitation	This information should be provided separately but for both water and sanitation. It should also be provided **per village, town or area** otherwise the location criteria is not fulfilled. Most municipalities use the definition of basic services to mean a tap within 200m of a house and a VIP per household.
2.18	regarding the future provision of water services	Information of future provision would typically include expected growth rates (population and area where growth is expected), the corresponding increases in water demand to specific supply zones, whether the present bulk lines need to be upgraded to cater for increased demand and a recommended capital infrastructure list of projects.
	If the WSDP does contain details regarding future provision, does this detail specifically include the following details:	*If the answer to question 2.1.8 was "no" then the answers to functions 2.1.8.1 to 2.1.8.7 will also have to be "no". If the answer to 2.1.8 was "yes", then study the WSDP to see if the all the following details were provided under information regarding future provision of water services.*
2.1.8.1	the water services providers who will provide those services	This information would invariably discuss the progress with any Section 78 assessment on future WSPs. It could provide a list of more than one WSP who the WSA will contract to provide services. This information should be the provider name and their overall scope of work.
2.1.8.2	the service delivery agreements (or proposed contracts) with those water services providers	This information would merely state whether provider contracts are in place or when they will be put in place. Copies of the actual proposed contracts do not form part of the WSDP. Generic base contracts that might be used (like the DWAF interim water service provider contract) could be referred to.
2.1.8.3	the proposed infrastructure necessary	Future infrastructure must include sanitation infrastructure/VIP programmes. If the future provision of sanitation has been omitted in the WSDP, even though future water infrastructure provision is provided, the answer is "no".
2.1.8.4	the water sources to be used and the quality of water to be obtained from and discharged into each source	This is a complex piece of information and needs an engineering eye. This information would generally provide bulk water quantities from various sources in ML/annum at the raw water

	Function	Purpose and Explanation of Information Required
		extraction points, the water treatment works, zone storages, return volumes to each sewerage works and the quantity of water to be returned to the environment.
2.1.8.5	the estimated capital and operating costs of those water services and the financial arrangements for funding those water services, including the tariff structures	Financial information would be estimates of the costs associated with: (1) the proposed capital infrastructure project list; (2) the expected annual operations costs of purchasing bulk water and paying all services providers to operate, maintain and repair the system; (3) information as to how the municipality will cover these costs i.e. the split between revenue to be collected, the tariffs and equitable share allocations. If all three of these aspects are not covered, the answer is "no".
2.1.8.6	any water services institution that will assist the water services authority	This information does not refer to water services providers that will assist with operations and maintenance. It refers to other public water services institutions, such as a neighbouring WSA and perhaps a water board that will assist the WSA in its **WSA functions**.
2.1.8.7	the operation, maintenance, repair and replacement of existing and future infrastructure	This is a complex piece of information. The information should discuss previous O&M failures and state how the WSA intends ensuring - through its WSP - the improvement of planned maintenance, response times to breakdown maintenance, operational efficiencies/costs etc. Information on an approach to replacement of infrastructure would be useful.
2.1.9	the number and location of persons to whom water services cannot be provided within the next five years	This information can be provided in a table or in a map either by the number of households or persons.
2.1.9.1	the reasons why services cannot be provided within the next five years to those persons	This information should be stated but could be as simple as stating that there are grant limitations, or revenue collection estimates are not being recovered, or the WSA has capacity / staff shortages.
2.1.9.2	the time frame within which it may reasonably be expected that a basic water supply and basic sanitation will be provided to those persons	The timeframe will be a figure of "so many years" depending the amount of total capital funding that the situation requires (taking into account inflation over the years) to deliver basic services to all when considering the general annual capital budget available to the municipality.
2.1.10	of existing water conservation, recycling and environmental protection measures	The WSA should state if they are involved in water recycling projects, although this is not common. Information should also include listings of environmentally sensitive areas and what the WSA will do to protect these areas in terms of meeting their water requirements. Information on water conservation & demand programmes should be provided.
2.2	**Public comment on draft WSDP invited**	The manner in which the WSA invites public comment on the draft WSDP will invariably be the same as its mechanisms, processes and procedures for community participation. This question seeks to determine if the WSA carried out this process to consult the public on the draft WSDP. In WSAs no separate consultation takes place on the WSDP but instead water issues are included in the annual consultation on the IDP revision in June of each year. If this was the case in your municipality, only answer "yes"' if water issues got attention at these IDP meetings.

	Function	Purpose and Explanation of Information Required
2.3	**WSDP adopted by Council**	This question seeks to determine if the WSDP has been adopted by Council through a Council resolution. Adoption of the IDP by a Council resolution does not imply that the WSDP was thereby adopted. If only the IDP has been adopted the answer is 'no'. If a non-WSA DM or LM produced the WSDP on your WSAs behalf, this question seeks to determine if the WSDP was adopted by the WSA municipal council.
2.4	**Mechanisms, processes and procedures for community participation**	Section17(2) of the Municipal Systems Act states that a municipality must establish appropriate mechanisms, processes and procedures to enable the local community to participate in the affairs of the municipality. This question seeks to determine if a written process on this matter is available (not necessarily adopted by Council) and not whether that process was actually followed with the draft WSDP.

E.2 References

Department of Water Affairs and Forestry. 2006. *DWAF's Guide Framework and Checklist for the Development of Water Services Development Plans 2006 Draft (Concept Document)*. Revision 10: 26th January 2006. Pretoria: Department of Water Affairs and Forestry.

Department of Water Affairs and Forestry. 2005. *Water Services Authority Checklist Purpose and Explanation of Information Required Version Draft 29 April 2005*. Pretoria: Department of Water Affairs and Forestry.

Appendix F: Planning Elements of a Water Board's Business Plan (DWAF 2003: 12 – 19)

F.1 Preferred Format of a Water Board's Business Plan

DWAF indicates that the Water Services Act "is not prescriptive as to the format of the business plan" (2003: 12). However, DWAF does have a preferred format for the business plan which is presented below:

7.2 Contents of the Business Plan

The Business Plan must at least contain all of the information required by the Public Finance Management Act and the Water Services Act and subsidiary legislation under these Acts.

In order to guide the organisation towards the goals that it sets for itself over the planning period, the Business Plan should demonstrate:

- What will be done and what will be accomplished;
- The resources to be applied; and
- How progress will be measured.

The planning period refers to the following 5 financial years of the water board. In other words the Board should estimate the year end position for the year in which the plan is being compiled (year 0), prepare a comprehensive forecast for the first year of operation of the business plan (year 1) and project forward for the following 4 years (up to year 5) using best estimate information. The actual financial performance of the board reported in the annual financial statements and annual report at the end of year 1 will be measured directly against the year 1 projection in the business plan.

The Act is not prescriptive as to the format of the business plan. An outline of a preferred format is as follows –

7.2.1 Foreword By Chief Executive And/Or Chairperson Of Board Of Directors

7.2.2 Introduction

- Introduction to organisation, note on establishment and brief history.

7.2.3 Policy Statement

- The policy statement guides the remainder of the business plan. It should thus be bound into the business plan – preferably directly after the introduction as a self contained section.

7.2.4 Self Appraisal of Business Achievements In Previous Year

- Outline of the performance highlighting key achievements or under-achievements of the Water Board during the previous year.

7.2.5 Directives by Minister

- Directives received or likely to be received from Minister (forewarned of):
  - Nature of directives;
  - Implications of directives; and
  - Progress with implementing directives.

7.2.6 Participation in Companies, Trusts or Joint Ventures & Transactions

- Changes in establishment or participation in the establishment of any company, including:

  Approval Required

  - Participation in a significant partnership, trust, unincorporated joint venture or similar arrangement;
  - Approval required
  - Acquisition or disposal of a significant shareholding in a company;
  - Acquisition or disposal of a significant asset;
  - Commencement or cessation of a significant business activity; and
  - A significant change in the nature or extent of its interest in a significant partnership trust, unincorporated joint venture or similar arrangement.
- Information on any new entity which it intends to establish or in the establishment of which it takes the initiative prior to formal establishment.

7.2.7 Water resource development and inter-basin transfer schemes (e.g. dams and raw water pumping schemes)

- The planning for water resource development and inter-basin transfer schemes should address the following aspects:
  - Contractual Obligations with DWAF and other organisations:
    Outline the extent to which the Water Board has appropriate contractual agreements and to what extent it intends to improve these.
  - Projected Demand, including:
    - Description of major consumers or consumer groups supplied;
    - Projections of demand by major consumer or consumer groups (graphs if appropriate);
    - Assurances of supply at which demand is to be supplied; and
    - Impact, if any, of water conservation and demand management.

    (Tabular and or Graphical presentation of demand projections if appropriate.)
  - Projected Water availability and resource development, including:

- Description of major sources of water and abstraction rights;
- Ability of available resources and abstraction rights to meet the demand;
- Impact of reducing water loss or improving unaccounted for water;
- New resource development required or being undertaken as well as applications for water use licences; and
- Consideration, if any, of purchasing water rights.

  (Tabular and or Graphical presentation of water resource availability if appropriate.)

– Water resource or inter-basin transfer scheme supply capacity and development, including:
  - Description of current infrastructure;
  - Ability of current significant infrastructure components to meet demand; and
  - New infrastructure planned (description, timing and cost).

    (Graphical representation either by maps and schematics if appropriate.)
– Status of water resource and inter-basin transfer infrastructure, including:
  - Status/condition of infrastructure; and
  - Any major refurbishment required (description, timing and cost).

    (Graphical representation either by maps and schematics if appropriate).
– Operations and maintenance of water resource and inter-basin transfer infrastructure, including:
  - Current operations arrangements; and
  - Any significant future changes or improvements.

7.2.8 Bulk Potable Water Supply Plan (Primary Activities)

- The planning for bulk potable water supply should address the following aspects:
  – Contractual Obligations with customers:

    Outline the extent to which the Water Board has appropriate contractual agreements with customers and what extent it intends to improve these or provide additional services.
  – Projected Demand (where appropriate, co-ordinated with that discussed under water resource infrastructure and inter-basin transfer scheme development above), including:
    - Description of major consumers or consumer groups supplied;
    - Projections of demand by major consumer or consumer groups (graphs) cross-referenced or reconciled with demand projections by municipal WSDPs;
    - Assurances of supply at which demand is to be met; and
    - Impact, if any, of water conservation and demand management.

(Tabular and or Graphical presentation of demand projections.)

- Projected Water availability and resource development (where appropriate, co-ordinated with that discussed under water resource infrastructure and inter-basin transfer scheme development), including:
  - Description of major sources of water and abstraction rights;
  - Ability of available resources and abstraction rights to meet the demand;
  - Impact of reducing water loss or improving unaccounted for water;
  - New resource development required or being undertaken as well as applications for water use licences; and
  - Consideration, if any, of purchasing water rights.

    (Tabular and or Graphical presentation of water resource availability if appropriate.)
- Bulk infrastructure supply capacity and development, including:
  - Description of current bulk potable water supply infrastructure;
  - Ability of current significant infrastructure components to meet demand; and
  - New infrastructure planned (description, timing and cost).

    (Graphical representation either by maps and schematics if appropriate.)
- Status of bulk potable water infrastructure, including:
  - Status/condition of bulk potable water infrastructure; and
  - Any major refurbishment required (description, timing and cost).

    (Graphical representation either by maps and schematics if appropriate.)
- Operations and maintenance of bulk potable water supply infrastructure, including:
  - Current operations arrangements; and
  - Any significant future changes or improvements.

7.2.9 Bulk Wastewater Treatment and Disposal

- Projected Effluent volumes:

  Projections of discharge volumes by major consumer or consumer groups cross-referenced to demand projections by municipal WSDP.

  (Graphical representation as appropriate.)
- Sufficiency of discharge rights, including:
  - Current authorisations and licensing arrangements; and
  - Proposed applications for additional discharge authorisations.
- Bulk waste water infrastructure, including:
  - Description of bulk waste water infrastructure;
  - Ability of infrastructure to meet discharge volumes; and
  - Significant new infrastructure components to be developed (description, timing, cost).

(Graphical representation using maps or schematics as appropriate)

- Status of discharge infrastructure, including:
  - Status of existing infrastructure; and
  - Major refurbishment planned (description, timing and cost).
- Operations and maintenance, including:
  - Current operations and maintenance arrangements; and
  - Any significant future changes or improvements.

7.2.10 Retail Water Services Plan

This section deals with the situation where the Water Board is fulfilling the role of retail Water Services Provider

- Municipal (WSA) clients and functions performed for each, including:
  - Details of each WSA for which board is acting as retail WSP;
  - Contractual arrangements and contractual obligations/functions provided by board as WSP;
  - Status of each WSA's WSDP; and
  - Status of each WSA's Municipal Bylaws.
- Potential future clients:
  WSA's that have approached WB for assistance and likelihood of involvement or reason not to proceed.
- Projected demand for each Municipality if not dealt with under bulk water supply.
- Reliability and sufficiency of bulk potable water supply if not supplied by board or if not provided by Board and covered under Bulk Water Activity Planning above.
- Current water services infrastructure and current and projected levels of service, including:
  - Description of retail water services infrastructure;
  - Breakdown of levels of service (current and 5 year projection);
  - Number of households (and the municipal area in which located) with full house or yard connection;
  - Number of households (and the municipal area in which located) with RDP water supply;
  - Number of households (and the municipal area in which located) below RDP water supply;
  - Number of households supplied with free basic water;
  - Number of households (and the municipal area in which located) with full water borne sanitation;
  - Number of households (and the municipal area in which located) with RDP sanitation; and

- Number of households (and the municipal area in which located) below RDP sanitation.

  (Graphical representation using maps or schematics as appropriate.)

The areas refer to an aggregated level of detail, i.e. a town or village, not to the location of individual households.
Where appropriate information should be correlated with the municipal WSDPs and the portion to be provided by the Water Board as Water Services Provider and the portion to be provided by other providers should be indicated. Contradictions with projections in the WSDP should also be highlighted.

- New/planned water services infrastructure and new customers to be served, including:
  - New infrastructure planned (description, timing and cost); and
  - New customers to be served.

    (Graphical representation using maps or schematics as appropriate.)
- Status of reticulation infrastructure, including:
  - Current status and supply problems; and
  - Major refurbishment programmes planned (Description, timing and cost.)

    (Graphical representation using maps or schematics as appropriate.)
- Operations and maintenance:
  - O&M arrangements;
  - Significant outsourcing if any; and
  - Any significant future changes to operational arrangements.

7.2.11 Industrial Water Supply and Effluent Disposal

- The current situation and projections for industrial water supply and effluent disposal, including:
  - Approvals of water services authorities authorising the undertaking of these activities as per section 30(2)(d) of the Water Services Act;
  - Contractual arrangements;
  - Institutional arrangements;
  - Key Activities; and
  - Demand for the service offered.

Industrial water supply and effluent disposal are "other activities". A separate category is however provided as this "other activity" represents a significant portion of water board activities.

7.2.12 Other Activities

- The current situation and projections for other activities, including:
  - Contractual arrangements;
  - Institutional arrangements;
  - Key Activities; and
  - Demand for the service offered.

7.2.13 Human Resource Development Plans

- Current breakdown of staff in each functional area and projected growth in staff numbers.
- Employment equity targets.
- Training programmes.
- Projected impact of HIV.

7.2.14 Environmental Management Programme and Plans

- Ongoing and planned environmental programmes and environmental impact assessments (EIA's).

7.2.15 Water Conservation and Demand Management Plans

- Ongoing and planned water conservation and demand management programmes or activities.

7.2.16 Financial Plan

Where appropriate the following financial projections should be done on the pro-forma spreadsheets included on the Compact Disk.

- Financial planning assumptions, including:
  - Consumer Price Index (CPI of CPIx) projections;
  - Salary and Wage increases if different to CPI;
  - Benchmark interest rates for both investments and borrowings; and
  - Benchmark energy costs.

DWAF and Treasury will provide benchmark projections of interest rates and inflation, which can be used as inputs to the development of the water board's own planning assumptions.

- Capital expenditure projections:

  Capital expenditure and refurbishment schedules for each major activity.
- Tariff projections, including:
  - The tariff applicable to each type of service according to activity;
  - Composition of each tariff; and
  - Projected tariff revenue.
- Subsidies, including:
  - Assumptions and projections of explicit subsidies; and
  - Assumptions and projections of implicit subsidies such as non-payment of water resource charges to DWAF, cross-subsidisation from one activity to another.

Subsidies include all funds that have been provided by DWAF or by any other National or Provincial Government institution or any donor agency, including the Water Services Operations Subsidy provided through the Division of Revenue Act.

Subsidies must include all revenue not received from customers or from interest on investments.

- Financial statement Projections-
  - Balance sheet;
  - Income statement;
  - Cash flow statement;
  - Changes in equity statement (changes in reserves); and
  - Financial ratios.

    (See Pro-forma Water Board Business Plan and Annual Report Spreadsheets on Compact Disc.)

The Financial Plan must follow the same format as the Income Statement, Balance Sheet, and Cash Flow Statement and must include a breakdown of revenue as referred to in Item 3 in the Notes to the Financial Statements included in the Pro-forma Water Board Business Plan and Annual Report Compact Disc.

The income statement projections must be shown separately for each primary and other activity (Inter-basin transfer schemes, bulk, retail, other) and must also be consolidated.

- Treasury requirements related to borrowings –
  - Three-year borrowing programme;
  - Terms and conditions on which the money is borrowed;
  - Information on proposed domestic borrowing;
  - Information on proposed foreign borrowing;
  - Short and long-term borrowing;
  - Maturity profile of the debt;
  - Debts guaranteed by the government;
  - Motivations for government guarantees; and
  - Confirmation of compliance with loan covenants.

Approval Required

The borrowing programme is motivated via DWAF to Treasury.

- Self evaluation statement on financial viability of the water board and each activity –
  - Comments on solvency (ability to repay and service debt);
  - Comments on liquidity; and
  - Comment on likely financial impact of "other activities".

7.2.17 Bank Accounts

- List of banking accounts.
- New bank accounts to be opened.

Approval Required

7.2.18 Analysis of Risks

- Assessment of the major risks defined in the Policy Statement.

7.2.19 Key Performance Indicators

- The key performance indicators are included in the Pro-forma Water Board Business Plan and Annual Report Compact Disc and have been aligned with the key performance indicators used in the South African Association of Water Utilities Benchmarking Project.

7.2.20 Declaration that all information is disclosed, correctly disclosed and included

(DWAF 2003: 12 – 19)

F.2 References

Department of Water Affairs and Forestry. 2003. *Guidelines for the Preparation and Evaluation of Water Board Policy Statements, Business Plans and Annual Reports – WB Guidelines (Final Draft) 13 August 2003*. Pretoria: Department of Water Affairs and Forestry.

Appendix G: Results of Analysis of 26 Water Plans

Table G.1 Description of sample.

ID	Service Provider	Area	Term Used	Year	Planning Period	Planning Horizon	Character	Area (Sq.km)	Scale (Sq. km)
1	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Metropolitan Water Plan	2004	2005-2030 (25 year period)	25	Urban; Rural	12145	10000 - 25000
2	Melbourne Water	Melbourne	Water Plan	2005	2005 - 2010 (5 year period)	5	Urban; Rural	8694	5000 - 10000
3	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Metropolitan Water Plan	2006	2006 - 2031 (25 year period)	25	Urban; Rural	12145	10000 - 25000
4	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Waterplan 2021	2002	2002 - 2021 (20 year period)	20	Urban; Rural	12145	10000 - 25000
5	Seattle Public Utilities	Seattle	Water System Plan	2006	2007 - 2030	20	Urban; Rural	217	100 - 1000
6	Seattle Public Utilities	Seattle	Water System Plan	2001	2001 - 2025	25	Urban; Rural	217	100 - 1000
7	Regional Municipality of Halton	Halton	Water and Wastewater Master Plan	2002	2002 - 2016	15	Urban; Rural	967	100 - 1000
8	City of Lawrence	City of Lawrence, Kansas	Water System Master Plan	2000	2000-2025	25	Urban; Rural	74	0 - 100
9	Cambria Community Services District	Cambria Community Services District	Water Master Plan	2005	2005 - 2029	25	Urban	13	0 - 100
10	Carlsbad Municipal Water District	City of Carlsbad, California	Water Master Plan	2003	2001 - 2020	20	Urban; Rural	109	100 - 1000
11	County of Hawai'i	Ka'u and South Kona	Water Master Plan	2004	2000 - 2020	20	Urban; Rural	1036	1000 - 5000
12	City of Longmont	City of Longmont, Colorado	Raw Water Master Plan	2003	2000 - 2048	50	Urban	57	0 - 100
13	American River Basin Regional Water Authority	American River Basin (Sacramento, California)	Integrated Regional Water Management Plan	2006	2005 - 2030	25	Urban; Rural	10927	10000 - 25000
14	West Newbury	West Newbury	Water Master Plan	2001	2000 - 2020	20	Urban	38	0 - 100

ID	Service Provider	Area	Term Used	Year	Planning Period	Planning Horizon	Character	Area (Sq.km)	Scale (Sq. km)
15	City of Yuba City	Yuba City	Water Demand and Infrastructure System Evaluation	2006	2006 - 2020	15	Urban	24	0 - 100
16	City of Yuba City	Yuba City	Master Plan	2004	2004 - 2020	15	Urban	24	0 - 100
17	City of Kirkland	City of Kirkland	Surface Water Master Plan	2005	2005 - 2011	5	Urban	29	0 - 100
18	Nevada Irrigation District	Nevada Irrigation District	Urban Water Management Plan	2006	2005 - 2030	25	Urban; Rural	1162	1000 - 5000
19	City of Greeley	City of Greeley	Water Master Plan	2003	2003 - 2050	50	Urban; Rural	9583	5000 - 10000
20	City of Greeley	City of Greeley	Non-Potable Water Master Plan	2004	2004 - 2020	15	Urban; Rural	9583	5000 - 10000
21	City of Surprise	City of Surprise	Water Infrastructure Master Plan	2004	2005 - 2020	15	Urban	181	100 - 1000
22	City of Surprise	City of Surprise	Water Resources Master Plan	2004	2005 - 2020	15	Urban	181	100 - 1000
23	Regional Municipality of York	Regional Municipality of York	Long Term Water Project Master Plan Update	2004	2006 - 2026	20	Urban; Rural	1776	1000 - 5000
24	San Juan Water District	San Juan Water District	Retail Water Master Plan	2006	2004 - 2025	20	Urban; Rural	44030	25000 - 50000
25	San Juan Water District	San Juan Water District	Wholesale Master Plan and Treatment	2001	2002 - 2030	30	Urban; Rural	44030	25000 - 50000
26	Rand Water	Gauteng Province; Ga-Luka/Rustenburg and Carletonville in the North West; Heilbron in the Free State and Bethal in Mpumalanga	Infrastructure Development Plan	2000	2000 - 2020	20	Urban; Rural	18000	10000 - 25000

Table G.2 Components of sample.

ID	Service Provider	Area	Maps	Context and Background	Status Quo	Measuring Progress	Planning Processes and Methodology	Policies & Procedures	Goals	Demands	Systems Analysis	Lists Strategies	Programme Schedule	List of Projects	Financial Information	Budget	Financial Programme	Asset Management	Alternative Water Supplies e.g. Recycling	Demand Management	Catchment Management	Institutional Measures	Risk Management e.g. Droughts
1	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No
2	Melbourne Water	Melbourne	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
3	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
4	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	No	No
5	Seattle Public Utilities	Seattle	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	Seattle Public Utilities	Seattle	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	Regional Municipality of Halton	Halton	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
8	City of Lawrence	City of Lawrence, Kansas	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No
9	Cambria Community Services District	Cambria Community Services District	No	Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No
10	Carlsbad Municipal Water District	City of Carlsbad, California	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
11	County of Hawai'i	Ka'u and South Kona	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	No
12	City of Longmont	City of Longmont, Colorado	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No
13	American River Basin Regional Water Authority	American River Basin (Sacramento, California)	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
14	West Newbury	West Newbury	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No
15	City of Yuba City	Yuba City	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No	No
16	City of Yuba City	Yuba City	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No

ID	Service Provider	Area	Maps	Context and Background	Status Quo	Measuring Progress	Planning Processes and Methodology	Policies & Procedures	Goals	Demands	Systems Analysis	Lists Strategies	Programme Schedule	List of Projects	Financial Information	Budget	Financial Programme	Asset Management	Alternative Water Supplies e.g. Recycling	Demand Management	Catchment Management	Institutional Measures	Risk Management e.g. Droughts
17	City of Kirkland	City of Kirkland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	No
18	Nevada Irrigation District	Nevada Irrigation District	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes
19	City of Greeley	City of Greeley	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes	Yes
20	City of Greeley	City of Greeley	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No
21	City of Surprise	City of Surprise	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No
22	City of Surprise	City of Surprise	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No	No	Yes	Yes	No	No	No
23	Regional Municipality of York	Regional Municipality of York	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	Yes	No	No	No
24	San Juan Water District	San Juan Water District	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
25	San Juan Water District	San Juan Water District	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
26	Rand Water	Gauteng Province; Ga-Luka/Rustenburg and Carletonville in the North West; Heilbron in the Free State and Bethal in Mpumalanga	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	No	No	No

Table G.3 Regulatory requirements and external review undertaken within sample.

ID	Service Provider	Area	Regulatory Requirement	External Review
1	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	No
2	Melbourne Water	Melbourne	Yes	Yes
3	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes
4	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	No	No
5	Seattle Public Utilities	Seattle	Yes	No
6	Seattle Public Utilities	Seattle	Yes	No
7	Regional Municipality of Halton	Halton	Yes	No
8	City of Lawrence	City of Lawrence, Kansas	No	No
9	Cambria Community Services District	Cambria Community Services District	No	No
10	Carlsbad Municipal Water District	City of Carlsbad, California	No	No
11	County of Hawai'i	Ka'u and South Kona	No	No
12	City of Longmont	City of Longmont, Colorado	No	No
13	American River Basin Regional Water Authority	American River Basin (Sacramento, California)	No	No
14	West Newbury	West Newbury	No	No
15	City of Yuba City	Yuba City	No	No
16	City of Yuba City	Yuba City	No	No
17	City of Kirkland	City of Kirkland	Yes	No
18	Nevada Irrigation District	Nevada Irrigation District	Yes	No
19	City of Greeley	City of Greeley	No	No
20	City of Greeley	City of Greeley	No	No
21	City of Surprise	City of Surprise	No	No
22	City of Surprise	City of Surprise	No	No
23	Regional Municipality of York	Regional Municipality of York	Yes	No
24	San Juan Water District	San Juan Water District	No	No
25	San Juan Water District	San Juan Water District	No	No
26	Rand Water	Gauteng Province; Ga-Luka/Rustenburg and Carletonville in the North West; Heilbron in the Free State and Bethal in Mpumalanga	No	Yes

Table G.4 Services offered by sample.

ID	Service Provider	Area	Service: Bulk Water	Service: Retail Water	Service: Wastewater	Service: Catchment Management	Service: Agricultural
1	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes	Yes	Yes	No
2	Melbourne Water	Melbourne	Yes	No	Yes	Yes	No
3	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes	Yes	Yes	No
4	NWS Department of Infrastructure, Planning and Natural Resources	Sydney	Yes	Yes	Yes	Yes	No
5	Seattle Public Utilities	Seattle	Yes	Yes	Yes	Yes	No
6	Seattle Public Utilities	Seattle	Yes	Yes	Yes	Yes	No
7	Regional Municipality of Halton	Halton	Yes	Yes	Yes	No	No
8	City of Lawrence	City of Lawrence, Kansas	Yes	Yes	No	No	No
9	Cambria Community Services District	Cambria Community Services District	No	Yes	No	No	No
10	Carlsbad Municipal Water District	City of Carlsbad, California	No	Yes	No	No	No
11	County of Hawai'i	Ka'u and South Kona	Yes	Yes	No	No	Yes
12	City of Longmont	City of Longmont, Colorado	Yes	No	No	No	No
13	American River Basin Regional Water Authority	American River Basin (Sacramento, California)	Yes	Yes	No	Yes	Yes
14	West Newbury	West Newbury	Yes	Yes	No	No	No
15	City of Yuba City	Yuba City	Yes	Yes	No	No	Yes
16	City of Yuba City	Yuba City	Yes	Yes	No	No	Yes
17	City of Kirkland	City of Kirkland	No	No	No	Yes	No
18	Nevada Irrigation District	Nevada Irrigation District	Yes	Yes	No	No	Yes
19	City of Greeley	City of Greeley	Yes	Yes	No	No	Yes
20	City of Greeley	City of Greeley	No	No	No	No	Yes
21	City of Surprise	City of Surprise	Yes	Yes	Yes	No	No
22	City of Surprise	City of Surprise	Yes	Yes	No	No	Yes
23	Regional Municipality of York	Regional Municipality of York	Yes	No	No	No	No
24	San Juan Water District	San Juan Water District	Yes	Yes	No	No	No
25	San Juan Water District	San Juan Water District	Yes	No	No	No	No
26	Rand Water	Gauteng Province; Ga-Luka/Rustenburg and Carletonville in the North West; Heilbron in the Free State and Bethal in Mpumalanga	Yes	Yes	No	No	No

Appendix H: A Critique on the Alignment Process within the IDP Using the Intergovernmental Fiscal and Institution System (Ambert and Feldman 2002)

H.1 The Intergovernmental Fiscal and Institutional System

Ambert and Feldman (2002) critiqued the process of alignment by looking at the intergovernmental fiscal and institutional system. First, they explained the overall system of co-operative governance:

> The South African Constitution provides for the establishment of three spheres – rather than tiers- of government, each responsible for specific functions in respect of specific sectors. This approach to intergovernmental relations emphasises distinction within the ambit of co-operative governance. This means practically that while each sphere has jurisdiction over the specific governance aspects attributed to it by legislation it must perform the associated powers and functions in such a way that it co-operates and co-ordinates with other affected spheres.
>
> (Ambert and Feldman 2002: 3)

They continue to note that:

- The national sphere sets the framework for the nationwide development policy and legislation as well as implements particular functions over which it has fairly exclusive competency (e.g. national treasury, the legal system, and defence);
- The provincial sphere sets the framework for the provincial-specific development policy and legislation, as well as implements particular functions over which it has fairly exclusive competency (e.g. welfare, education, and health); and
- The municipal sphere sets the framework for the municipality-specific development policy and legislation, as well as implements particular functions over which it has fairly exclusive competency (e.g. municipal services, local economic development, and spatial planning for its exclusive area of jurisdiction).

This framework is fairly simple and has been institutionalised so that in principle power, and in particular funding, (expressed partially as an apportionment of nationally generated revenue) follows the assignment of functions. Factors that are also taken into consideration include the personnel expenditure required to perform

a function, as well as the function's potential for income generation. Where a service is seen as having limited potential for cost-recovery, then it should be highly subsidised. This occurs through the allocation of nationally generated revenue with framework of a rolling three year horizon by the national Treasury.

(Ambert and Feldman 2002: 5)

Unpacking alignment, they elaborate as follows:

Firstly, each sphere's powers and functions are distinct, yet are all implemented within the areas of jurisdiction of municipalities (i.e. schools or army barracks are built and occupied within municipal areas). This means that in order to perform the functions over which they have fairly exclusive competency, the national and provincial spheres need to co-ordinate with the municipal sphere. This is the most basic level of alignment. Secondly, to achieve integrated settlements where uses and services are multiple and conducive to socio-economic development, co-ordination between all three spheres needs to take place. In a nutshell, this is to ensure that schools and clinics are developed in tandem with new residential and economic uses. This requires that a municipality, being responsible for setting the local/municipal level development agenda in respect of human settlement, can rely on the support of the other spheres in respect of those functions over which it does not have competency.

Thirdly, a further aspect of alignment and co-ordination has been introduced in the South African Constitution. It relates to functions where neither sphere has exclusive competency. These functions are nevertheless defined sectorally in terms of national ministries, departments and budget votes! Although there are variations in the allocation of these shared powers, it is generally defined as follows:

- The national sphere establishes the legal and policy framework and provides sector funding in terms of sector programmes;
- The provincial sphere performs an administrative role over the implementation of programmes and has a distinct strategic planning role in terms of setting sector priorities for the province; and finally
- Municipalities implement multi-sectoral projects identified in the course of the municipal planning process, by drawing on sector funding under the responsibility of the above mentioned programmes.

Sectors which follow this pattern of planning and funding include in particular housing, transportation and bulk services. Together, these three sectors capture the most significant share of government capital investment into municipal areas.

For such budgets to be implemented, in a way that is supportive of locally defined agendas requires that this further aspect of alignment and co-ordination occurs. This aspect of alignment relates to areas of non-exclusive or shared competency. Although it would appear to be facilitated by having departments or directorates of similar sector focus in each sphere, it is also one where competition between the spheres about who has primacy in setting development agendas and priorities is also rife. As a result, municipalities (and their planning process) have been but one of the actors that have influenced capital and operating expenditure in municipal areas.

To summarise then:

- National government's role is foremost one of policy making, with provincial and local governments performing major roles in social and basic service sectors. National functions are mainly targeted at the criminal justice system (police, justice, prisons) and defence, tertiary education transfers and to a lesser extent transport (national roads and rail), water affairs (excluding all grants-in-kind), foreign affairs, administrative functions, home affairs , and revenue services. National education, health, social development and housing departments focus on policy-making and monitoring rather than implementation. National government also has oversight over public entities, including government business enterprises.
- Provincial governments are responsible for the implementation of major social services, including school education, health (including academic and regional hospitals, as well as primary health care), social grants and welfare services, housing and provincial roads.
- Municipalities are responsible for service delivery and achieving the local developmental objectives enshrined in the Constitution. They are seen as the coalface of social and economic upliftment of communities.

(Ambert and Feldman 2002: 6 – 9)

In their assessment, they record that "the legislation implies a top-down planning approach" (Ambert and Feldman 2002: 7). They identify that "there are at least six other national sector departments..., which require municipal planning to be undertaken to inform their programmes and budgets" (Ambert and Feldman 2002: 7). They continue to say that:

> Historically, the sector requirements have placed an onerous burden on municipalities to fulfil them. In municipal contexts with limited planning capacity, these sector requirements pitted themselves in competition against the IDP for the attention and dedication of officials and politicians. In the course of 2000, a process

of negotiation was undertaken with the respective national sector departments to assist in clarifying and rationalising the municipal planning requirements. This process has resulted in agreement that IDP's should be the spine of the municipal planning process, while the sector requirements are being promoted in most cases as being incorporated into it where appropriate, or undertaken in a parallel but aligned fashion.

(Ambert and Feldman 2002: 7 – 8)

The budgetary and fiscal framework affecting the IDP is explained as follows:

- Power and money- in principle- follow functions;
- Where a function is shared, sectorally defined funding is conceptualised into a national programmes, administered provincially, and implemented locally- to ensure not only that locally defined development priorities are met but also that national and provincial-specific priorities are addressed; and
- The primary means to ensure that these two types of priorities are met is through planning: national sector planning and funding programme formulation (for national priorities), provincial sector planning and funding administration (for provincial priorities), and municipal development planning for integrated planning and locally-defined project implementation.

On the surface, this simplified scenario appears to straddle the requirements for balancing the needs of redistributive and efficient funding streams (by the national and provincial spheres) to support locally defined development agendas, while meeting the broader development challenges facing most local situations, by using planning as an instrument for channelling funding and resources.

However, two questions emerge from this scenario:

- What sources of funding can the municipal sphere gain access to, to perform both its exclusive functions and those where it shares competencies with the other spheres?
- How much of the overall financial cake can municipalities expect to meet the development challenges that are identified from their planning process?

A municipality is, in principle, able to access or guide investment resources to perform both its exclusive and shared functions from:

- Its own revenue, generated from service charges, levies and property taxes;
- Transfers from the other spheres of government, in the form of an unconditional formula based equitable share of nationally generated revenue

and condition sector grants. These are aimed at assisting municipalities perform their exclusive and shared competencies;

- The capital and operating investment budgets of other spheres in terms of the performance of the other sphere's exclusive and shared functions.

(Ambert and Feldman 2002: 8)

In evaluating the intergovernmental fiscal framework, they comment that:

> ...for the majority of municipalities, a successful IDP is one where not only revenue, but transfers and the budgets of provincial and national sector departments have come to the party. Indeed, addressing locally defined priorities requires the involvement of more than the local sphere to do justice to co-operative governance and the requirements to plan and implement local development. In terms of implementation orientated investment planning, it requires that priorities, strategies, plans and budgets are mutually aligned.
>
> (Ambert and Feldman 2002: 11)

Ambert and Feldman (2002: 12) explain that the equitable share (which is of an unconditional nature) is "meant to be used to pay for salaries and the equipment of the municipality and the operating costs of basic water and sanitation services, where the socio-economic profile of the residents of the municipal area does not permit cost-recovery". They therefore conclude that "to a large extent the equitable share is not really available to fund the implementation requirements of IDPs, either in the form of capital expenditure or in terms of the increased operating expenditure which comes with it" (Ambert and Feldman 2002: 12).

They put forward that in:

> ...terms of conditional grants...the IDP process is not about securing resources from the other spheres to respond strategically defined solutions for local priorities, but it is about establishing a conduit for national sector programme for national and provincial sector priorities...In these contexts, IDP could be equated with a national and provincial exercise in local diplomacy, especially for those national sector departments that require a sector plan to part of the municipal IDP.
>
> (Ambert and Feldman 2002: 13)

Ambert and Feldman observe that:

> ...the extent of involvement of national and provincial sector department in municipal planning events has been limited. Where it has occurred, it has been often function specific. For instance, the departments of Water Affairs and the Consolidated Municipal Infrastructure Directorate of the Department of Provincial and Local Government who presumably have a direct stake in the municipal planning process, as it affects their own sector planning and funding requirements, were more forthcoming than others. Furthermore, where engagement was most beneficial, it arose out of historical practices of support for planning and co-ordination with the municipalities. The Department of Water Affairs is a case in point. On the whole, though, the participation (as opposed to attendance) of sector officials in municipal planning activities was limited. We unpack below some of the circumstances and implications of this limited participation.
>
> As a rule, a number of departments attended district IDP events. However, this involvement was limited to giving presentations on departmental plans and programmes. This seldom extended to entering into discussions, negotiation on IDP, or participating in strategy making and project formulation activities. It is true that local and district municipalities generally did not necessarily take it upon themselves to do the necessary ground-work to involve external agencies in alignment processes. In the majority of cases, municipalities were confronted with having to squeeze a nine month planning process into five or six (having started late). However, it is also true that to elicit provincial and national sector department participation, the municipalities merely sent faxed invitations to unnamed Heads of Departments. In the absence of preliminary bilateral communication as to the process, intentions and desired outcomes of events, little indication was given of the significance of IDP events as fora for negotiation and problem solving.
>
> ...There is however indication that national and provincial sector departments are not fundamentally unconcerned by the IDP process and its outcome. A number of departments, especially where competencies are shared, are actually actively seeking to extract the information relevant to their functions out of IDP documents, to inform their own plans and budgets. The word seeking is important here because in the absence of a common understanding for IDP products, the "relevant information" is not generally easily accessible. Some municipalities have pre-empted this situation and have made sector-based summaries of their plan precisely for this purpose. This suggests the beginnings of a process of co-ordination of investment. Then what is the problem, one may ask? The problem is that this process is occurring post-facto. That in the absence of negotiated input

> from the other spheres, especially in terms of exclusive provincial and national competencies, municipalities have not been able to constructively engage with and begin to shape the other spheres' strategies and investment priorities. Because of this, municipalities may have been resilient to considering these sector-based functions, even though those functions may be critical to addressing the municipal priorities as articulated in the IDP's. Alternatively, municipalities would have developed wish-lists that are of little use to provincial and national sector agencies.
>
> (Ambert and Feldman 2002: 14 – 15)

Ambert and Feldman further identify that:

> ..it is important to note that although the Systems Act makes provision for at least a level of engagement between the spheres for planning purposes, no such requirement is made of utilities. Secondly, it is also important to consider that although a number of utilities have been created by municipalities or with them, some utilities have no explicit link to them. In the case of the former it is plausible to envisage that at least some level of engagement can taken place in the course of the IDP process. In the case of the latter, there is much greater cause for concern. The modus operandi of these kinds of organisations is not generally supportive of co-operation with municipalities. The national electricity provider and its telecommunication counterpart have been known to extend services in areas that are in direct conflict with the spatial development rationale and priorities of municipal areas. In fact, the corporatised entities are responding to strategies that are presumably supportive of local development but which may not necessarily correspond to local priorities or strategies. If anything, the fact that this trend is gaining momentum suggests that aside from the complexities of alignment between the spheres, a new dimension of alignment is being thrown at the IDP process.
>
> (Ambert and Feldman 2002: 18)

As one of their recommendations, Ambert and Feldman (2002: 20) similar to that of the DDP, state that an intervention "to bind the manner in which provincial and national sector departments plan and budget, through legislating alignment mechanisms with the municipal planning process, to mitigate the degree of fiscal decentralisation needed".

H.2 References

Ambert, C. and Feldman, M. 2002. 'Are IDPs Barking Up the Wrong Tree? A Story of Planning, Budgeting, Alignment and Decentralisation'. *Planning Africa 2002 Regenerating Africa Through Planning 18 – 20 September 2002 International Convention Centre, Durban*. Durban: South African Planning Institute.

Appendix I: Regional Water Services Providers

I.1 The Regional Water Services Providers

The 12 water boards are shown in Table I.1.

Table I.1 South African water boards which are regional water service providers (Directorate: Planning and Information 2004: 3; 5; 7; 10; 12; 14; 17; 20; 22; 24; 26 and 29).

Water Board	Areas of Jurisdiction
Amatola Water	Central coastal areas of the Eastern Cape, which includes most of the Amatole District Municipality and parts of Chris Hani, Ukhahlamba and Cacadu District Municipalities.
Bloem Water	Southern and central parts of the Free State, parts of the Eastern Free State and the Ukhahlamba District Municipality in the Eastern Cape.
Botshelo Water	Entire North West except for the eastern most parts where Magalies Water and Rand Water operate.
Bushbuckridge Water	Bushbuckridge area of the Limpopo.
Ikangala Water	Western Highveld and parts of the Kungwini Local Municipality of Mpumalanga.
Lepelle Northern Water	Most of the Limpopo except for the Kruger National Park, the south-western parts and the Bushbuckridge area.
Magalies Water	North-eastern parts of the North West Province (primarily areas of Bojanala Platinum District Municipality) and the adjoining parts of Gauteng, Mpumalanga and Limpopo.
Mhlathuze Water	North-eastern parts of KwaZulu-Natal, primarily in the Zululand, uMkhanyakude and uThungulu District Municipalities.
Overberg Water	The Western Cape with the following three areas of jurisdiction: the Duivenhoks Scheme, which supplies water to the towns of Heidelberg, Witsand and Slangrivier as well as 294 individual consumers (mostly farmers); the Rûensveld Scheme, which supplies the towns of Waenhuiskrans, Caledon and 530 individual consumers (mostly farmers); and the Klein Karoo Scheme, which is operated on behalf of DWAF and supplies Dysselsdorp, the Oliphants River Valley and the Gamka River Valley in the Klein Karoo.
Rand Water	The entire Gauteng and adjoining areas of Free State, Mpumalanga and North West.
Sedibeng Water	Northern parts of the Free State including QwaQwa and parts of the North West and Northern Cape.
Umgeni Water	Encompasses the central and southern parts of KwaZulu-Natal and include eThekwini Metropolitan, the Ilembe, Sisonke, Umgungundlovu and Ugu District Municipalities and The Msunduzi Local Municipality.

In addition to Umgeni Water and Mhlathuze Water, KwaZulu-Natal has a third regional water service provider viz. uThukela Water. uThukela Water (2006: website) describes itself as follows:

uThukela Water (Pty) Ltd is the first South African municipal entity for the provision of water and sanitation services. The entity was formed in terms of the Municipal Systems Act No. 32 of 2000 and operates in terms of a long term water services provider agreement between uThukela Water and its shareholders. The shareholders of uThukela Water (Pty) Ltd are the four Water Service Authorities of the uThukela catchment basin i.e. Amajuba, Newcastle, Umzinyathi and uThukela Municipalities.

(uThukela Water 2006: website)

The three regional water service providers and the 14 Water Services Authorities in KwaZulu-Natal are shown in Figure I.1.

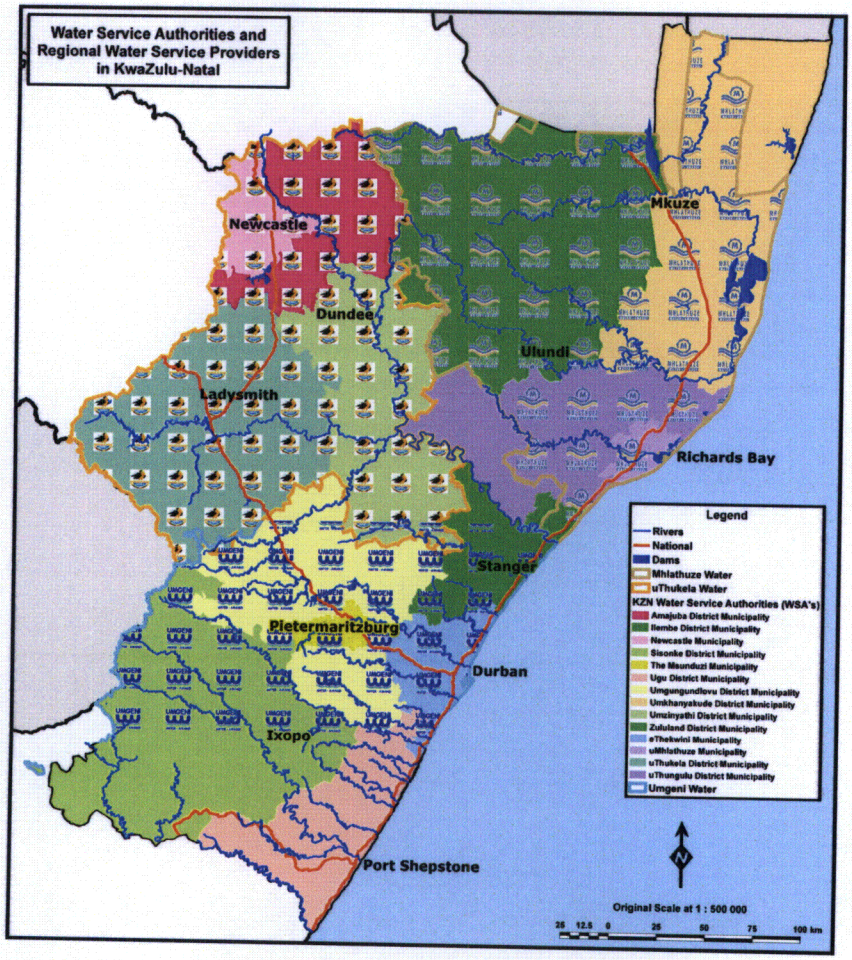

Figure I.1 Regional water services providers and WSAs in KwaZulu-Natal.

I.2 References

Directorate: Planning and Information, Department of Water Affairs and Forestry Chief Directorate: Water Services. 2004. *Business Intelligence Support: Pep 14 Water Board Information and Analysis Final November 2004.* Pretoria: Department of Water Affairs and Forestry.

uThukela Water. "uThukela Water ". *uThukela Water.* 2006. <http://www.uthukelawater.co.za> (2006 – 07 – 20).

Appendix J: Co-Ordinative Planning

J.1 Background

Alexander looked at stakeholders which are organisations. Alexander (1998: 303) states that "implementation is one of the main concerns for co-ordinative planning, which involves interaction between organisations". He explains as follows:

> The 'Transaction Cost Theory of Planning' associates planning with organisation. This highlights an aspect of planning neglected by other planning paradigms: planning as anticipatory co-ordination, as distinct from co-ordinating actions in real time (March and Simon 1958: 158 – 169). In contrast to rational planning focussed on strategic goals, or deciding 'where we want to go', co-ordinative planning concentrates more on means: 'how can we get there?' In contrast to 'classic' and communicative rationality, which both focus on individual or quasi-individual actors, and to 'frame setting', which discusses interaction in the relevant community, the relevant actors in co-ordinative planning are heterogeneous institutions and organisations.
>
> Co-ordinative planning involves organisations interacting to concert their future decisions and actions in pursuit of mutual goals. In this process planners have to identify the agencies, organisations and constituencies participating in the relevant inter-organisational network and define their roles and interactions in the context of developing an agreed implementation strategy. This leads to detailed programme or project design, specifying the necessary resources (funding, incentives, legislation, regulations etc.) to ensure that all the actors perform their prescribed tasks.
>
> Implementation strategies may include creating new organisations or restructuring existing ones, which is how co-ordinative planning subsumes institutional design (Alexander 1995: 51 – 52). At the same time, co-ordinating planning gives planners an active implementation role: interacting with the relevant implementation set of organisational participants and assessing their respective constraints, incentives, goals and values. In acquiring this knowledge and synthesising it into project and programme plans and strategies for effective and timely deployment of participating organisations, co-ordinative planning provides the 'missing link' between planning and implementation (Alexander 1994: 341 – 344).
>
> In contrast to views that see planning as a form of rational choice or as a type of communicative interaction, co-ordinative planning reflects a view in which planning is a form of co-ordination. This aspect of planning is often acknowledged: Faludi

(1996: 70) calls planning "a process of co-ordinating decisions" and Harris has described planning "for...complex systems (as) involv(ing) co-ordinating many interacting decisions" (Harris 1996: 485).

Co-ordinative planning, then, is planning to effect inter-organisational co-ordination (IOC). IOC is the process of concerting the decisions and actions of several (sometimes many) organisations for a purpose that could not be accomplished by any of them acting alone. The need for IOC is the result of organisations' interdependence and IOC is their recognition and management of that interdependence, by creating or using IOC structures to decide on their respective actions (Alexander 1995: 66-75; 271-274).

IOC structures present a typology of the links between organisations that enable them to concert their decisions.

(Alexander 1998: 304 – 306)

Alexander identifies that "as is usual for major sectoral strategic projects, the co-ordination model adopted for planning expansion is the 'lead organisation'" (Alexander 1995: 177 – 182 cited by Alexander 1998: 308). Alexander identifies that:

The 'lead organisation' model works well in a clearly defined field and for well-bounded undertakings e.g. the US space programme (Alexander 1995: 180 – 183). It is less effective for concerting the decisions of diverse stakeholders in less well defined areas characterised by conflicting interests, where the lead organisation's particular task and sectoral concerns are not necessarily paramount. This is where the statutory planning system has to play a critical co-ordinating role.

(Alexander 1998: 307)

In Alexander's case-studies on the expansion of the Schipnol airport in The Netherlands and the development planning of Ben Gurion airport in Israel, he identified the possibility that the different attention paid to consultation and planning participation by all the stakeholders in the institutional design in each case may have had something to do with the different outcomes (1998: 311). He concludes that institutional design of the planning and implementation process is important and that creating and deploying appropriate and well-formed ICO structures can affect the success of implementation (Alexander 1998: 311).

J.2 References

Alexander, E.R. 1998. 'Planning and Implementation: Co-Ordinative Planning in Practice'. *International Planning Studies*, Vol. 3, No. 3, pp. 303 – 321.

Appendix K: DWAF's Comments on the WSDPs

K.1 Summary of DWAF's Comments in its Evaluation of the WSDPs

Table K.1 Summary of comments provided by DWAF in its evaluation of the WSDPs (DWAF 2005: 1 – 42; 2004: 1 – 43; 2005: 1 – 40; 2005: 1 – 42).

Element	The Msunduzi Municipality	Umgungundlovu District Municipality	Sisonke District Municipality	Ilembe District Municipality
Administration	• "From the representation of the WSDP drafting team, it *cannot be concluded that adequate participation of all stakeholders have occurred* and specifically relates to the participation of: the WSA Manager; Portfolio Councillor(s); IDP Manager and officials; development/town planning officials; water services provider officials etc." • "Alignment of the WSDP and IDP processes implies full *participation of the IDP drafting team in the WSDP process and vice versa*. From the representation of the IDP drafting team provided in the WSDP, it cannot be confirmed that such alignment has been achieved." • "According to the WSDP document, the Municipality must *still embark on the participation process and approval process* as defined in the Water Services Act." • "*Responsible officials have not been identified for all areas of expertise* required to be included in the WSDP drafting team."	• "From the representation of the WSDP drafting team it cannot be *concluded that adequate participation of all stakeholders have occurred* and specifically relates to the participation of: the WSA Manager; Portfolio Councillor/s; IDP Manager and officials; development/planning officials; water services provider officials."	• "Although it is stated that the Sisonke WSDP has been prepared on a participatory basis with extensive involvement of key role players in the District, the representation of the WSDP Drafting Team has been limited to the consultants appointed to develop the WSDP. It is required that the *WSDP drafting team should include the actual participation of stakeholders*, specifically that of: WSA Manager; Portfolio Councillor/s; IDP Manager and officials; development/planning officials; water services provider officials. • The WSDP *should be updated with actual public participation activities* which were followed and should specifically document the degree of compliance with the Water Services Act adoption process."	• "It *cannot be concluded that adequate participation of all the stakeholders* have occurred in the water services planning process of Ilembe DM, and specifically relates to the participation of: WSA Manager; Portfolio Councillor/s; IDP Manager and officials; development/planning officials; water services provider officials. The WSDP does however indicate that 'The Council and appropriate staff, as well as other interested and affected parties, have been appraised of the progress and development of the plan through regular meetings, presentations and feedback sessions as deemed necessary by the WSA' and includes proof of presentations made to several stakeholders regarding the WSDP process. It can however not be concluded that the Ilembe DM has taken sufficient ownership of the water services planning process by participating in the planning process and in adopting the findings of the Phase 1 WSDP. • The WSDP is silent on the degree of compliance with the adoption process as outlined in the Water Services Act. The adoption process which may have been followed by the Ilembe DM has not been specifically stated and the *adoption status of the Ilembe DM WSDP can therefore not be confirmed*."
IDP and WSDP Goals	• "The WSDP does not specifically address as sub-goals the *development of the WSA capacity* of Council, nor the *transformation of water services provision* and the establishment of appropriate WSP institutional arrangements."	• "The main concern with regards to the alignment of the IDP and WSDP goals relates to the *timeframe presented in the IDP (and referenced in the WSDP) for the eradication of the water services backlog* and which is stated as 2004/05. • The IDP is silent on the Council's strategy relating to the *improvement of services over time* i.e. the provision of higher levels of service. • It is not evident that the IDP has identified the *WSA capacity* of Council as a priority issue, nor the transformation of water services provision and the establishment of *appropriate WSP institutional arrangements*."	• "The *IDP review should consider and incorporate the particular sub-goals* developed as part of the Water Services Development Plan."	• "It should be noted that the Ilembe DM WSDP states that the alignment with the IDP review process should form part of a next phase of the WSDP. This building block has therefore not been included in the WSDP and *information provided as part of the WSDP does not sufficiently address the alignment of IDP and WSDP goals*, specifically relating to: – The development of sustainable water services sub-goals (as based on the vision, priorities and objectives of the IDP) – The development of integrated water management sub-goals (as based on the vision, priorities and objectives of the IDP) – The development of efficient and effective water services institutional arrangement sub-goals (as bed on the vision, priorities and objectives of the IDP)."
Physical and Socio-Economic Profile	• "The data content of this chapter is mostly sufficient, however, there are specific areas where the content is affected by a lack of sufficient data as	• "The content of this chapter is specifically *affected by the lack of sufficient data* as also mentioned in the WSDP and predominantly relates to:	• "It is perceived that the available information systems do not *hold sufficient details of land use and customers*, specifically in terms of residential	• "Although it is evident that effort has been made to consolidate several data sources in providing the physical and socio-economic profile of the Ilembe

Element	The Msunduzi Municipality	Umgungundlovu District Municipality	Sisonke District Municipality	Ilembe District Municipality
	also mentioned in the WSDP and predominantly relates to: – Land use profile: residential vs. commercial and industrial areas – Identification of specific customers: institutional, industries, resorts and tourism – Categorisation of agricultural activities (present and proposed future) – Topographical profile of area – Consumer profile: households vs. industrial vs. commercial consumers specifically for rural areas – Extent of labour migration and holiday population – Health profile specifically as it relates to water-related diseases – Employment profile: categorisation of present employment to understand the nature of household income and security thereof – Household income profile: updated figures and how it impacts services that can be provided in rural vs. urban areas – Economic profile: GGP profile and economic trends • The *maps as provided in the WSDP do not contain sufficient detail* to enable a complete understanding of the area's characteristics and the water services provided to the consumers. From the maps produced as part of the IDP, it is evident that additional spatial information is available but that this information was not produced as part of the WSDP. • *Mapping of the proposed future situation* and specifically as it relates to proposed developments, services to be provided and infrastructure to be established need to be incorporated into the planning cycle. • The poor household definition provided as part of the WSDP, relates to the Free Basic Water Policy and does not provide the *municipality's definition of a poor household.* • The lack of adequate and current data is perceived to be the reason why a *comprehensive affordability model* could not be established, where the projected income profile of customers can be used as the basis to determine the tariffs and degree of equitable share required. • More attention may be required to *project the impact of economic growth patterns on non-residential growth* and consequent impact on water infrastructure and water resource utilisation. • Since the projection of the future consumer profile specifically in respect of economic growth and development can at best be based on the IDP objectives, it *may be necessary to consider scenarios of economic growth* and development and how that would impact on service delivery. Although the WSDP does mention specific economic growth nodes, it is uncertain whether all the IDP initiatives have been incorporated and taken into account in the planning of the future water services requirements. • It is proposed that the *quantification of the relationship between population density and cost*	– Physical profile: residential versus commercial and industrial areas – Specific customers: institutional, industries, resorts and tourism – Categorisation of agricultural activities (present and proposed future) – Consumer profile: households vs. industrial vs. commercial customers – Population size and specifically the non-alignment with the Census 2001 – Extent of labour migration and holiday population – Health profile specifically as it relates to water-related diseases – Employment profile: categorisation of present employment to understand the nature of household income and security thereof – Household income profile: updated figures including the distribution of the various income groups – Economic profile: updated figures including economic trends and relevance of informal sector • The main purpose of this building block is to ensure that water services planning considers the present consumer profile but also to consider that planning must be adjusted to cater for the future consumer profile in respect of physical as well as socio-economic profile. It is thus important that the impact of the future physical and socio-economic profile on services delivery be addressed in the water services planning process. It is perceived that the lack of adequate and current information has resulted therein that the *future consumer profile could not be adequately projected.* It is perceived that the primary focus of this WSDP is on addressing the needs as it relates to the present consumer profile and that the *water services requirements of potential economic growth areas (agriculture, tourism, industries)* has not adequately been included. • The *definition of poor households varies for each municipal area* and may result in different standards being applied for customers in a similar grouping. • The lack of adequate and current data is perceived to be the reason why a *comprehensive affordability model* could not be established, where the projected income profile of customers can be used as the basis to determine the tariffs and degree of equitable share required. • More attention may be required to *project the impact of economic growth patterns on non-residential consumer growth* and the consequent impact on water infrastructure and water resource utilisation. • Since the projection of the future consumer profile specifically in respect of economic growth and development can at best be based on the IDP objectives, *it may be necessary to consider scenarios of economic growth* and development and how that would impact on service delivery. • It is proposed that the *quantification of the relationship between population density and cost elements* (capital and operating) may support more	versus commercial versus industrial versus agriculture areas/customers. • The WSDP does not indicate whether there are *any physical restrictions to service delivery* and it is assumed that there is none. • It is proposed that the *quantification of the relationship between population density and cost elements* (capital and operating) may support more fully the financial planning for water services. • More attention may be required to *project the impact of economic growth patterns on non-residential consumer growth* and the consequent impact on water infrastructure and water resource utilisation. • The *definition of poor households varies for each municipal area* and may result in different standards being applied for customers in a similar grouping. • It is perceived that the primary focus of this WSDP is on addressing the needs as it relates to the present consumer profile. The *water services requirements of potential economic growth areas (agriculture, tourism, industries)* has not been specifically identified and it is uncertain whether it has been sufficiently included in the water services planning. • Since the projection of the future consumer profile specifically in respect of economic growth and development can at best be based on the IDP objectives, it *may be necessary to consider scenarios of economic growth* and development and how that would impact on service delivery. • Additional information lacking as part of the physical and socio-economic profile, includes: – Categorisation of agricultural activities (present and proposed future). – Extent of labour migration and holiday population. – Health profile specifically as it relates to water-related diseases. – Economic profile: updated figures including economic trends and relevance of informal sector."	DM, it is deemed that there is a *lack of detailed information in certain areas* and predominantly relates to: – Physical profile: specifics of residential, commercial, industrial, agriculture, tourism, etc. areas. – Consumer profile: identification of dry industrial, wet industrial and commercial consumers. – Extent of labour migration and holiday population. – Health profile: specifically as it relates to water-related diseases. – Employment profile: the categorization of present employment to better understand the nature of household income and security thereof. – Economic profile: including economic trends and relevance of the informal sector. • The maps provided as part of the WSDP outlines sufficiently the current situation. However, *more effort may be required to illustrate the proposed future situation*, specifically as it relates to the consumer profile and proposed economic growth areas. • It is proposed that the *quantification of the relationship between population density and cost elements* (capital and operating) may support more fully the financial planning for water services. • It may be required that *more current information be sought to confirm the present household income distribution* in the Ilembe DM. • It is believed that a *well-documented and approved definition of a 'poor household'* in Ilembe DM is required to ensure a standardized approach towards service delivery and the implementation of free basic water. • The WSDP is silent on the *contribution- , state of and proposed trends of the several economic sectors* (agricultural, manufacturing, etc.). The main purpose of this building block is to ensure that water services planning considers the present consumer profile but also to consider that planning must be adjusted to cater for the future consumer profile as impacted by proposed changes in the economic profile of the area. It is perceived that the primary focus of this WSDP is on addressing the needs as it relates to the present consumer profile and that the *water services requirements of potential economic growth areas (agriculture, tourism, industries)* has not adequately been included in this Phase of the WSDP. • More attention may be required to *project the impact of economic growth patterns on non-residential consumer growth* and the consequent impact on water infrastructure and water resource utilisation. • Since the projection of the future consumer profile specifically in respect of economic growth and development can at best be based on the IDP objectives, it *may be necessary to consider scenarios of economic growth* and development and how that would impact on service delivery."

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	elements (capital and operating) may support more fully the financial planning for water services. • More attention may be required to determine and analyse the *environmental aspects as it relates to water services provision* (including an EMP)."	fully the financial planning for water services."		
Service Level Profile	• "The present number of consumer units as reflected in this Section *do not correspond with the consumer profile as represented in the Physical and Socio-Economic Profile*. Furthermore, the values provided in the table do not add up. • According to the values provided as part of this Chapter, the *water services backlog is only 4% of the total consumer profile* (i.e. 4 292 customers). It is uncertain whether this is the correct representation of the situation in Msunduzi. • A minimum requirement of the WSDP is to *propose the level of water services which would be provided to consumers within the next five years and to indicate the proposed rate of backlog eradication*. The Msunduzi WSDP does not propose the future water services profile nor the proposed rate of backlog eradication and therefore does not comply with the minimum requirements as established in the Water Services Act. • Due to the water services profile not provided, it is *not clear from the WSDP whether all customers would be provided with a basic level of water by 2008 and a basic level of sanitation by 2010*. It is a minimum requirement of the Water Services Act, that customers who cannot be serviced within timeshare should be specifically identified (number and location of persons to whom water services cannot be provided). • Due to insufficient information provided in the WSDP, it is perceived that the Municipality *does not have a comprehensive understanding of the consumer profile and water services rendered in the rural areas of the municipality*. • The WSDP does not specify the *service level policy which would be applied to the different settlement types*, i.e. which services would be available in which areas and specifically as it relates to the provision of free basic water and free basic sanitation. • The *extent and impact of industrial consumers (specifically wet industries) and raw water consumers on the water services planning aspects*, such as water resources and water quality has not been considered and is mainly due to a lack of sufficient data concerning these consumers. • The Municipality as a WSA is required to *report on ALL water services activities including services provided by private entities* e.g. services provided on farmland. It is thus necessary that information be sourced of consumers and water services provided by other entities."	• "The content of this chapter is specifically *affected by the lack of sufficient data* as also mentioned in the WSDP and predominantly relates to the profiling of each settlement type (urban / rural dense / rural scattered / farmland / institutions / industries) in terms of level of service. • Although it is evident that the water services planning has considered the level of service for each settlement type and has addressed the requirements for eradicating the water services backlog, the *rate of such backlog eradication and thus the number of consumers to be serviced per year* and per settlement type has not been documented in this chapter. • The WSDP does not specifically *outline the services level policy which will be applied for the different settlement areas*, specifically as it relates to the provision of *free basic water and free basic sanitation*. • Although a comprehensive strategy is proposed for eradicating the water services backlog in the most sustainable, cost-effective manner, it is *not clear from the WSDP whether all customers would be provided with a basic level of water by 2008 and a basic level of sanitation by 2010*. • Since a policy concerning *the provision of services for customers located on 'farmland'*, still needs to be developed and agreed to, the water services planning does not include the specific requirements of these customers. • The *extent and impact of raw water consumers and industrial consumers* (specifically wet industries) on the water services planning aspects, such as water resources and water quality has not been considered and is mainly due to a lack of sufficient data concerning these consumers."	• "Although it is evident that the water services planning has considered the level of service for each settlement type and has addressed the requirements for eradicating the water services backlog, the *rate of such backlog eradication and thus the number of consumers to be serviced per year* and per settlement type has not been documented. • The WSDP does not *specifically outline the services level policy which will be applied for the different settlement areas* and for the different consumer types specifically as it relates to the provision of *free basic water and free basic sanitation* (only the current situation is reflected). • From the WSDP it is evident that not all consumers will be provided with a basic level of service by 2008 and a basic level of sanitation by 2010. It is however a requirement of the Water Services Act that the consumers who will *not be provided with such basic services should be identified and quantified* and that it should be indicated, when these consumers will be provided with adequate water services. • Since a policy concerning *the provision of services for customers located on 'farmland'*, still needs to be developed and agreed to, the water services planning does not include the specific requirements of these customers. The WSDP also states that the current situation with regards to levels of service, need to be ascertained. • The *extent and impact of possible future raw water consumers and industrial consumers* on the water services planning aspects, such as water resources and water quality has not been considered."	• "Although it is evident that the water services planning has considered the level of service for each settlement type and has addressed the requirements for eradicating the water services backlog, the *rate of such backlog eradication and thus the number of consumers to be serviced per year* and per settlement type has not been documented. • It is a requirement of the Water Services Act that *both the number and location of customers which cannot be serviced within the next five years should be identified*. The tables addressing the future water and sanitation needs identifies the number of customers that will not be serviced, but *no indication has been given as to which customers will not be serviced* . • Commercial and industrial needs have only been specified for the Isithebe Industrial Estate. The *needs of other commercial and industrial areas (including rural) to be identified*."
Water Resource Profile	• "From the information provided in the WSDP, it is perceived that the *only water source is from Umgeni Water* and that the Msunduzi Municipality does not abstract water from local surface water sources in either urban or rural areas. • According to the WSDP, *no groundwater is utilised* within the Msunduzi Municipality. It should be	• "Although some of the data tables have been completed where information was available, *the WSDP does not expressly address water quality related issues and the actions/programs which are required to increase the level of water quality compliance* (water taken from source as well as water returned to resource).	• "The WSDP does not sufficiently address the *future water demand* from surface water, external- and groundwater sources (future water demand has not been quantified). • The WSDP does not list the sources where water is returned to the resource and is *silent on the topic of permits*.	• "A minimum requirement of the Water Services Act is that all future water sources to be used should be identified and that the quantity of water to obtained from and discharged to each source should be specified. The Ilembe WSDP states that "Current required abstractions are still being estimated for these schemes. A balance is being done as to

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	understood that groundwater utilisation to be reported on, should include boreholes which have been established to provide a rudimentary level of supply in rural areas. • The WSDP proposes that the volume of water to be purchased from Umgeni Water will decrease slightly and may relate to the proposed water loss reduction. The WSDP *however also states that the volume of supply will remain constant for the next five years*. Based on the above, it is therefore *deemed that no additional water services will be provided to consumers not presently serviced*. From the above and findings of the Service Level Profile, it may be *concluded that the Msunduzi WSDP does not address the very important requirement of 'planning for water services'* and should in fact be viewed as a 'status quo' report. It is a minimum requirement of the Water Services Act that all water sources to be used and the quantity of water to be obtained from each source, must be specified."	• Because of an apparent lack of information, the WSDP does not contain the *specifics required with regard to groundwater as a water source and does not state the quantity of water* to be obtained from groundwater sources for each proposed settlement / scheme. • This chapter only quantifies the present and expected future water demand from the Midmar dam and *does not address the water demand from other water sources, such as Mooi River, etc.* • Additional attention is *required to identify the sources of water returned to the resources* – presently only one wastewater treatment plant noted – and should include industries, where applicable. • Specific *actions and strategies to address pollution* – pollution *contingency measures* – need to be set in place."	• The WSA is responsible to report on all water services matters, even in cases where the service is rendered by a private entity and as such, *additional information concerning industrial/business water usage and wastewater disposal is required*. • It seems that insufficient information is available on the *number, usage and location of groundwater sources*, specifically the production boreholes which are supplying water to rural schemes. • The WSA must consider and *address the monitoring of groundwater sources* including both quantity and quality. The WSA is not able to answer the question 'Is the Water Safe?' for the services provided in the rural areas."	whether these requirements can be met by permitted water abstractions or whether amended licenses are required." The *Phase 1 of the Ilembe WSDP therefore does not sufficiently address the water resource profile*. • As a status quo assessment, it is imperative that the WSDP should quantify the amount of water presently supplied to customers (and discharged into the resource). A high level overview of current utilisation of Water Purification Plants and Wastewater Treatment Plants was provided. *Additional details and breakdown of water used (and discharged) by specific customer groups are required for performing a water balance.* • The *WSDP does not explicitly address water quality related issues and the actions/programmes which are required to increase the level of water quality compliance* (water taken from source as well as water returned to resource). • Because of an apparent lack of information, the WSDP *does not contain the specifics relating to groundwater as a water source* and does *not state the quantity of water* to be obtained from groundwater sources for each proposed settlement/scheme."
Water Conservation/Water Demand Management	• "Some consideration has been given in the WSDP to identify those actions necessary to reduce unaccounted for water in urban areas. *No information has however been provided to allow an assessment of the situation for rural water schemes*. • The *financial implications for implementing action plans required to address water conservation and demand management*, including education programmes, have not been quantified. Furthermore, the effect on and requirements of the institutional framework have not been considered. • Even though proposed activities to eradicate alien vegetation have been identified, the *alignment with the DWAF Working for Water Programme* is not clear from the WSDP."	• "The content of this chapter is specifically *affected by the lack of sufficient data*. The WSDP however expressly states that the addressing of Water Conservation / Water Demand management is regarded as a lower priority due to limited funding. • It is however, *of concern that the present amount of unaccounted for water could not be quantified* due to a lack of information. • The WSDP is *silent on the possible future strategies* in terms of reducing unaccounted for water, reducing high pressures and implementing education programs. No *attempt has been made to quantify the possible financial implications* of implementing such programs nor the institutional arrangements which would be required. • The *alignment with the Working for Water Programme* cannot be assessed since the WSDP is silent on this topic."	• "Due to the lack of information provided in the WSDP, it can be concluded that the *monitoring of water quantity is not performed/recorded sufficiently* to enable the WSA to report on water consumption and the degree of unaccounted for water. Actions should be put in place to manage the distribution and consumption of water, in both urban and rural areas. • The WSDP does not sufficiently address *the future strategies and targets* for reducing unaccounted for water, reducing high pressures and implementing education programs. No *attempt has been made to quantify the possible financial implications* of implementing such programs nor the institutional arrangements which would be required. • It seems that insufficient information is available regarding the *number of customer meters and the readings from such meters*."	• "The content of this chapter is specifically *affected by the lack of sufficient data*. It is deemed that the detail required to report on water conservation and demand management will form part of further stages of the WSDP. It is however, *of concern that the present amount of unaccounted for water could not be quantified* due to a lack of sufficient information. • The WSDP is *silent on the possible future strategies* in terms of reducing unaccounted for water, reducing high pressures and implementing education programs. No *attempt has been made to quantify the possible financial implications* of implementing such programmes nor the institutional arrangements which would be required. • The *alignment with the Working for Water Programme* cannot be assessed since the WSDP is silent on this topic."
Water Services Infrastructure Profile	• "Although not included in the specific tables as per the WSDP Guideline, the full extent of urban water services infrastructure has been annexed to the WSDP. The *extent of infrastructure in the rural areas of the Msunduzi Municipality has however not been identified nor quantified.* • The WSDP states that several of the infrastructure elements are old and would require replacement. The *replacement of these infrastructure elements have however not been quantified nor included in a project list.* • Due to the fact that the WSDP has to a large extent not included consideration of the water services in rural areas, *it is uncertain whether the list of schemes to be transferred is complete*. The WSDP does not specifically outline the proposed action plans and time frames *(management plan) for the transferring of the several water schemes.* • The Msunduzi WSDP does not consider the water services infrastructure requirements for eradicating	• "An attempt has been made to capture the water services infrastructure profile in urban areas, *however as also stated in the WSDP the list is not comprehensive* and leads one to the conclusion that the asset register of the respective WSP's are not adequate to serve as the basis for asset management. • No detail *could be provided of the water services infrastructure in use in rural areas* (a comprehensive list of existing schemes can serve as a starting point) nor of the *wastewater collection and treatment infrastructure* presently in place. • Incomplete information is provided *regarding new infrastructure to be established (only 2004 components listed)*, leading one to believe that the level of water services planning is not such that the required infrastructure elements could be quantified. • It is apparent that *insufficient geographic information is available for all current infrastructure*	• "Although the infrastructure profile is addressed sufficiently for the urban schemes, it can be concluded that *insufficient details are available to compile the asset register for the existing rural schemes*. • It is evident from the WSDP that considerable effort has gone into the identification of future projects including both rural and proposed bulk water schemes. However, it is perceived that the *planning is not at the stage that the various infrastructure elements of future water schemes could be identified.* • A large portion of the existing water infrastructure elements have been indicated *geographically, but the same is not true for existing sanitation infrastructure*, including wastewater treatment plants, bulk outfall sewers, etc. • Due to the non-quantification of future water demand, it cannot be ascertained that the relationship between existing water / sanitation	• "The Water Services Infrastructure Profile of the Ilembe DM is limited to the identification of water purification plants and wastewater treatment plants. The *water services infrastructure profile presented as part of the Ilembe WSDP does not include a comprehensive list of all infrastructure elements*, including for rural schemes and leads one to the conclusion that the asset register of the respective WSP's are not adequate to serve as the basis for asset management. • The Ilembe WSDP identified in broad terms the future water services infrastructure elements for planned projects and unplanned areas. It is however *uncertain whether all required future water services infrastructure elements had been identified at this stage*. A summary list of future infrastructure elements could further support the reader's understanding of the extent of infrastructure proposed. • The *water demand* (both present and future) *has*

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	the water services backlog. The *engineering planning component of the WSDP is therefore considered incomplete* and the WSDP does not meet the minimum requirements of the Water Services Act."	*elements*. Only bulk water pipelines have been geographically represented. • Although it has been stated that spare capacity is available to provide additional water demand, insufficient information is provided to be able to assess the current water demand as it relates to the available capacity of the water services infrastructure. Furthermore, the *water demand has not been quantified sufficiently to ascertain the reliance on present water sources and water services infrastructure.* • It is unclear whether the *schemes to be transferred have been adequately assessed in terms of financial and institutional* implications."	infrastructure and demand has been adequately assessed. Furthermore, the *water demand has not been quantified sufficiently to ascertain the reliance on present water sources and water services infrastructure.* • The WSDP does not *sufficiently address the implications relating to the transfer* of water and sanitation schemes."	*not been quantified sufficiently to ascertain the reliance on present water sources* (including ground water) *and water services infrastructure.* • It is unclear whether the *schemes to be transferred have been adequately assessed in terms of financial and institutional* implications. From the WSDP, it is perceived that the implications on finances and institutional matters still needs to be addressed. • From the proposed future sanitation needs it is evident that additional customers will be serviced by waterborne and onsite sanitation (categorized as 'Wet'). The *extent of additional future sanitation infrastructure for waterborne systems could not readily be determined* from the WSDP (only Stanger WWTP and sewer mains noted)."
Water Balance	• "The *water balance provided in the WSDP is considered incomplete* for two reasons: – The *amount of water supplied to consumers could not be quantified.* – It is considered that the *water supply to rural areas have not been included.* • It is considered that the *physical water losses presented in the WSDP is not based on actual figures* and do not include water losses experienced in rural water supply schemes. • The lack of information provided in the WSDP leads one to the conclusion that the *WSA does not comply with the regulations concerning the measurement and monitoring of water utilisation*."	• "Although an attempt has been made in this section to quantify the present and future water demand, the *water balance was not achieved* (demand in urban areas + demand in rural areas + physical water losses does not equal the stated water purchased + water abstracted). From previous sections, it was clear that water is sourced from sources other than Umgeni Water, but the Water Balance does not extend to include these water sources. • The *physical water losses* as calculated for urban and rural demand have not been summarized and related to unaccounted for water."	• "Although an attempt has been made in this section to quantify the present water demand, the *water balance was not achieved* (demand in urban areas + demand in rural areas + physical water losses must equal the stated water purchased + water abstracted). • The *physical water losses* could not be quantified for the rural areas, whilst the figure presented for the urban area cannot be confirmed as accurate. • The WSDP has *not attempted to quantify the future water demand*, albeit from existing sources or new sources."	• "It is perceived that a lack of information at the appropriate level is the reason why a *water balance could not be attained.* It is concluded that a comprehensive Water Balance would be included in the further stages of the WSDP process. • No attempt has been made to quantify *physical water losses* for the various supply areas."
Water Services Institutional Arrangements Profile	• "Due to general lack of inclusion of the rural areas of the Msunduzi Municipality in the water services development planning presented as part of the WSDP, it is *uncertain whether the WSA functions are equally in place in place in the rural supply area.* • Although it is stated that a water services monitoring and evaluation (M&E) system and WSDP information system are in place, *evidence of the outputs of these systems cannot be seen.* • Although reference has been made to the current WSPs, *these have not been related to the number of consumers being served by WSP.* The *full extent of water services provision is unclear*, specifically as it relates to the responsibility for providing water services in rural areas of the municipality. • It is clear from the WSDP that the *Msunduzi Municipality has still to decide the future water services provision institutional arrangement.* • The WSDP states that presently there are *no support service contracts* in place. It is uncertain whether this is equally true for Umgeni Water as well as for services provided in rural areas. • It is perceived that the WSP staffing levels which have been provided *do not include, as required, the staff appointed by Umgeni Water.* • The WSDP states that additional capacity development initiatives are required for the Msunduzi Municipality to fulfil its function as WSA. The *specific capacity development requirements however, need to be identified and quantified as individual projects* and included in the project lists."	• "The respective water services providers have been listed, but *not related to the number of consumers being served by each water services provider.* • The *lack of information relating to the amount of staffing* by the respective Water Services Providers is of concern. • The proposed strategy for the eradication of the water services backlog has *not been addressed in terms of institutional arrangements* required of such a strategy."	• "The respective water services providers have been listed, but *not related to the number of consumers being served by each water services provider.* • At the time of writing of the WSDP, the Sisonke DM still had to consider the future water services provision arrangements by following the Section 78 process. The WSDP is therefore *silent on future water services provision arrangements.* It is required that the WSDP review should address the decisions and implementation plan for the water service provider arrangements in Sisonke DM. • It is uncertain whether the staff figures which have been provided, includes the *individuals involved in the provision of services to the rural communities.*"	• "From the WSDP it is clear that the *institutional arrangements for water services delivery in the Ilembe DM still needs to be formalised/ finalised.* It is also noted that a next phase of the WSDP should address 'The structure and management functions of the water services authority…' • The WSDP is not clear on the degree of additional *WSA capacity development* requirements (if any). Future capacity development projects have not been identified in the project register (in addition to the Ilembe LG support project). • Although an attempt has been made to identify the various current Water Services Providers, the *number of consumers being served by each WSP* was not indicated. • The *lack of information relating to the amount of staffing* by the respective WSPs is of concern. • The WSDP is silent on the *support service contracts* which are presently in place."

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Customer Services Profile	• "The *customer services profile for the rural customers have not been addressed* and it *cannot be confirmed that the water is safe in rural areas.* • *Targets have not been set for increased quality of service and attending to complaints*, nor has the required institutional arrangements and financial implications of such increased service levels been considered."	• "Targets *have not been set for increasing the present quality of service over time.* In this building block, quality of service relates to both the quality of water being provided as well as the degree in which the complaints of customers are being attended to. • Insufficient information is resulting in the fact that the *question 'Is the Water Safe' cannot be answered* for the respective settlement types (and schemes). • Based on the information which is available, it seems as if *institutional arrangements have not been put in place to attend to the complaints of rural customers.* • The WSDP does not sufficiently explain the *institutional arrangements which are required / to be enacted to increase the quality of service to all customers.* • It is uncertain whether the *capital and operating costs required to increase* the quality of service and the response to complaints have been fully included in the Financial Profile."	• "Although an effort has been made in the WSDP to assess the customer services profile, it is evident that *insufficient information is recorded, specifically regarding the addressing of customer complaints. Additional descriptive information* would be helpful in determining the programs and procedures in place for addressing complaints and improving service quality. • *Targets for increasing the present quality of service over time* has not been set for the entire Sisonke DM area. In this building block, quality of service relates to both the quality of water being provided as well as the degree in which the complaints of customers are being attended to. • The WSDP is silent on the topic of Education for Basic Water Services and it is uncertain what the *WSA's strategy and processes are for awareness promotion, consultation arrangements for projects and general community liaison.* • The WSDP does not sufficiently explain the *institutional arrangements which are required / to be enacted to increase the quality of service to all customers.* • It is uncertain whether the *capital and operating costs required to increase* the quality of service and the response to complaints have been fully included in the Financial Profile."	• "The WSDP is *mostly silent on the quality of service being provided to customers* and which includes both the quality of water being provided as well as the degree in which the complaints of customers are being attended to. • Insufficient information is resulting in the fact that the *question 'Is the Water Safe' cannot be answered* for the respective settlement types (and schemes)."
Financial Profile	• "As previously stated, it is considered that the engineering planning component of the WSDP is incomplete. For this reason the *required capital expenditure to alleviate the backlog and to extend and replace the existing water services system have not been quantified.* The Msunduzi WSDP therefore doe not comply with the minimum requirements of the Water Services Act in as far as determining the capital costs for providing water services. • The WSDP *does not sufficiently assess the future operating costs for providing water services*, as it required by the Water Services Act. The financial implications of new schemes have not been modelled and the *financial viability of water services delivery within the Msunduzi Municipality can therefore not be confirmed* (or extent of non-viability). The above also results in the *required increase in tariffs* not being assessed. • The WSDP furthermore *does not address sufficiently the financial arrangements of funding* of the future provision of water services, as required by the Water Services Act. It is required that the proposed (and required) future funding source should be identified and quantified. • An important factor when considering the financial viability of water services is the *level of non-payment of services.* The WSDP is silent on this topic and it is perceived that the billing systems are not able to provide the required information. • The credit control policy and *additional requirements for credit control and cost recovery, including metering and billing have not been adequately addressed.* • A minimum requirement of the Water Services Act is that the *number AND location of persons to*	• "It is of *concern that the 'actual costs associated with the operation of rural schemes are non-existent'* and also that the *operating costs related to urban areas contain certain gaps.* This may relate to poorly instituted management as well as the lack of ring-fencing of water services costs, which is a requirement in terms of the Water Services Act • The WSDP states that '…the ability of the District Council to address the inadequate levels of service will be curtailed and may, therefore, not be accomplished in the first five year period.' A minimum requirement of the Water Services Act is that the *number AND location of persons to whom water services cannot be provided within the next five years should be indicated including the reasons there for as well as the time frame* within which it may reasonably be expected. The amount of MIG funding has been identified as a risk factor in achieving the above, however, additional consideration needs to be given to the development of scenarios in terms of the above or the acceptance of the 'worst case' scenario, in order to provide the necessary information required to meet the minimum requirements as set by the Water Services Act. • A minimum requirement in terms of the Water Services Act is that the estimated capital and operating costs of providing water services, as well as financial arrangements for funding of those water services, including the tariff structures be addressed. The *WSDP makes no provision for assessing the tariff structures required to deliver the water services, nor provides an indication of present tariff structures.* • Due to a lack of information, the level of non-payment has not been assessed and the *issue of non-payment is therefore not adequately*	• "It is evident that considerable effort has been made to compile the Sisonke DM water services financial profile. *Additional consideration should however be given to the following topics*: – Credit control policy – Metering and billing in rural areas – Key factors of non-payment – Sales arrangements including billing system, metering mechanisms in place, etc. • The *capital income figures do not coincide with the proposed capital expenditure* and it is uncertain whether the proposed capital program will be executed as is."	• "The 'Water Services Financial Model and Financial Projections' section of the WSDP indicates the requirements of a water services financial management plan including the need for cost-effective and efficient financial management systems. *Additional inputs would be required to establish the financial profile of water services within the Ilembe DM* and which should include the assessment of operating costs as well as capital cost implications of water services delivery. • A minimum requirement in terms of the Water Services Act is that the estimated capital and operating costs of providing water services, as well as financial arrangements for funding of those water services, including the tariff structures be addressed. Although the WSDP contains the present tariff structure of the Ilembe DM (as of July 2003), the tariffs charged by other water services providers have not been indicated nor does the *WSDP make provision for assessing the tariff structures required to deliver the water services as proposed by the water services planning.* • The WSDP states the total amount of capital required to eradicate the backlog and to rehabilitate water services infrastructure, however, *the values provided in the Executive Summary does not correlate with the Project List totals included as Appendix 1.* • The WSDP is *silent on the topic of sales arrangements* and additional consideration is required of the present sales arrangements as well as proposed activities to improve metering and billing. • The level of non-payment has not been assessed and the *issue of non-payment is therefore not adequately addressed*, including activities and procedures for improved credit control.

Element	The Msunduzi Municipality	Umgungundlovu District Municipality	Sisonke District Municipality	Ilembe District Municipality
	whom water services cannot be provided within the next five years should be indicated including the reasons therefore as well as the time frame within which it may reasonably be expected. The lack of quantification of capital expenditure required to eradicate the backlog and the non-alignment with proposed capital income sources, is resulting in a situation where *Msunduzi is not able to assess whether all persons will be provided with water services within the next five years.*"	*addressed*, including activities and procedures for improved credit control. • The WSDP is *silent on the topic of sales arrangements* and additional consideration is required of the present sales arrangements as well as proposed activities to improve metering and billing. • *Insufficient information is provided regarding actual metering and billing, specifically in rural areas.* The proposed metering and billing targets have not been set in line with the proposed water services plan."		• *Insufficient information is provided regarding actual metering and billing, specifically in rural areas.* The proposed metering and billing targets have not been set in line with the proposed water services plan."
List of Projects	• "The WSDP project currently contains three projects and as stated previously, it *cannot be confirmed that engineering planning has been done to establish the requirements/projects for eradicating the water services backlog.* • *No WSA sustainability projects* have been identified or quantified, including the requirements to rehabilitate and replace infrastructure."	• "Although the WSDP contains a comprehensive strategy on eradicating the water services backlog, including the prioritization of focus areas, the *capital requirements have been determined on a footprint (area) basis and specific individual projects have not been identified* (to the extent where such can be done for relative short-term projects). Therefore also, the proposed future infrastructure elements to be established have not been specified. • The project list provided for in the WSDP does *not present the complete 5-year picture nor does it sufficiently summarize all projects, including the rehabilitation /retrofit / other sustainability / WSA capacity development projects.* • The present, and proposed *method of project implementation with regards to institutional arrangements/financial arrangements/ etc.* have not been addressed."	• "The WSDP contains a comprehensive list of projects. However, it is recommended that *project descriptions should be provided to increase the readers understanding of the extent of each project* (as opposed to a listing of each footprint name only). • It is uncertain to *what degree the community has been involved/consulted* in establishing the project selection process. • The benefits expected from the *proposed Bulk Water Plan should be confirmed, and to be included in the IDP*, if agreed for go ahead."	• "A comprehensive capital project list is provided as part of the WSDP. *Additional project descriptions* may further clarify the extent of capital projects to be implemented within Ilembe DM. • The WSDP states that at the present rate of capital funding, the backlog can only be eradicated within the next 15 to 20 years. It is a minimum requirement of the Water Services Act that the number and location of customers which cannot be serviced within the next five years should be identified and that the *time frame in which it may reasonably be expected that a basic water supply and basic sanitation* will be provided to those persons be indicated. It may therefore be necessary that the project list should consider further the proposed time frame for servicing specific communities. • Although Module 7: Water Services Management Plan states additional requirements of the Ilembe DM to fulfil its responsibility as WSA, *additional capacity development or other sustainability projects have not been identified and prioritised.*"
Recommendations	• "To note the content assessment as presented in the previous section and to *establish appropriate actions for incorporation of the elements* which were identified as lacking in the content assessment. • To *improve the respective data sets* and to *establish formal procedures* for ensuring that data is received from the respective water services providers on a regular basis (should be a responsibility of water services providers in terms of the water services provider agreement). • To initiate specific activities in order to *establish the water services status quo (as per all the WSDP building blocks) in the rural areas* of the municipality. • To procure and allocate the necessary resources required to do *engineering planning for water services*, specifically with the view to establish the requirements for eradicating the water services backlog. • To determine the *financial viability of water services provision and specifically to model the operating cost* of establishing new schemes/infrastructure necessary to eradicate the water services backlog (including sanitation services). • To plan a *WSDP review cycle in conjunction with the IDP office and to establish a platform to coordinate the activities of the IDP/WSDP stakeholders.* In this respect it is important to note	• "To note the content assessment as presented in the previous section and to *establish appropriate actions for incorporation of the elements* which were identified as lacking in the content assessment. • To *improve the respective data sets* and to *establish formal procedures* for ensuring that data is received from the respective water services providers on a regular basis (should be a responsibility of water services providers in terms of the water services provider agreement). • To plan the *WSDP review cycle in conjunction with the IDP office and to establish a platform to coordinate the activities of the IDP / WSDP stakeholders.* In this respect, it is important to note that the WSDP must form part of the IDP process, must reflect the same information as presented in the IDP and must be based on the priority areas and goals and objectives as set by the IDP. Intensive interaction between the IDP and WSDP stakeholders would be required to ensure process, data and priority alignment between the WSDP and the IDP. • As a matter of urgency, to ensure that *both the WSDP and the IDP correctly portrays all MIG registered projects* and to ensure that *alignment is achieved for presenting the next cycle of MIG projects.* • To establish an *action plan and to commence with*	• "To note the content assessment as presented in the previous section and to *establish appropriate actions for incorporation of the elements* which were identified as lacking in the content assessment. • To *improve the respective data sets* and to *establish formal procedures* for ensuring that data is received from the respective water services providers on a regular basis (should be a responsibility of water services providers in terms of the water services provider agreement). • To plan the *WSDP review cycle in conjunction with the IDP office and to establish a platform to coordinate the activities of the IDP / WSDP stakeholders.* In this respect, it is important to note that the WSDP must form part of the IDP process, must reflect the same information as presented in the IDP and must be based on the priority areas and goals and objectives as set by the IDP. Intensive interaction between the IDP and WSDP stakeholders would be required to ensure process, data and priority alignment between the WSDP and the IDP. • As a matter of urgency, to ensure that *both the WSDP and the IDP correctly portrays all MIG registered projects* and to ensure that *alignment is achieved for presenting the next cycle of MIG projects.* • To ensure that the *revised WSDP is approved by*	• "To note the content assessment as presented in the previous section and to *establish appropriate actions for incorporation of the elements* which were identified as lacking in the content assessment. • To procure the necessary resources (funding) *to embark on the Phase 2 of the WSDP.* • To *improve the respective data sets* and to *establish formal procedures* for ensuring that data is received from the respective water services providers on a regular basis (should be a responsibility of WSPs in terms of the WSP agreement). • To plan the *WSDP cycle in conjunction with the IDP office and to establish a platform to co-ordinate the activities of the IDP/WSDP stakeholders.* In this respect, it is important to note that the WSDP must form part of the IDP process, must reflect the same information as presented in the IDP and must be based on the priority areas and goals and objectives as set by the IDP. Intensive interaction between the IDP and WSDP stakeholders would be required to ensure process, data and priority alignment between the WSDP and the IDP. • As a matter of urgency, to ensure that *both the WSDP and the IDP correctly portrays all MIG registered projects* and to ensure that *alignment is achieved for presenting the next cycle of MIG projects.*

Element	The Msunduzi Municipality	Umgungundlovu District Municipality	Sisonke District Municipality	Ilembe District Municipality
	that the WSDP must form part of the IDP process, must reflect the same information as presented in the IDP and must be based on the priority areas, goals and objectives as set by the IDP. Intensive interaction between the IDP and stakeholders would be required to ensure process, data and priority alignment between the WSDP and the IDP. • As a matter of urgency, to *ensure that both the WSDP and the IDP correctly portrays all MIG registered projects* and to ensure that alignment is achieved for presenting the next cycle of MIG projects. • In as far as it can ascertained, the Msunduzi Municipality has not commenced nor completed the WSDP adoption process as defined in the Water Services Act. Once the WSDP has been updated, it is *imperative that the Municipality must embark on a public consultation process* as outlined in the Water Services Act and other relevant legislation. • To *provide copies of the WSDP to DLGTA and all neighbouring WSAs.* • To *consider all comments received and where applicable, to incorporate such comments in the WSDP* and/or establish the action plans required to incorporate such comments. To report on the extent in which a specific comment has been taken into account with the view to finalise the WSDP. • To present the WSDP to Council and for *Council to approve the WSDP.* • To provide a *copy of the approved WSDP to DWAG, DLGTA and neighbouring WSAs.*"	*activities for the procurement of additional grant funding*, specifically to support the proposed regionalisation of bulk water services delivery. • To establish a *communication platform with the planning/housing department* with the view to strategise the focus of development on areas which can be provided from bulk water pipelines as proposed in the water services development plan. • To *embark on a public consultation process* in terms of the Water Services Act and other relevant legislation. • To *provide copies of the WSDP to DLGTA and all neighbouring WSAs.* • To *consider all comments received and where applicable, to incorporate such comments in the WSDP* and/or establish the action plans required to incorporate such comments. To report on the extent in which a specific comment has been taken into account with the view to finalise the WSDP. • To present the WSDP to Council and for *Council to approve the WSDP.* • To provide a *copy of the approved WSDP to DWAG, DLGTA and neighbouring WSAs.*"	*Council and incorporated into the IDP.* • To give effect to the recommendations of the WSDP, including: – Completion of a *feasibility study to ascertain the benefits of the proposed Bulk Water Plan*, aimed at the centralisation of water services. – Agreeing a *capital roll out programme* and confirming the number and location of customers who will be serviced in each year. – Establishing the most *effective water services provider arrangements* (if not yet completed). • The WSDP *must be updated with the outputs from the consultative and WSDP adoption process.* From the available documentation, it cannot be ascertained that Sisonke DM has complied with the WSDP adoption process as outlined in the Water Services Act. According to the Water Services Act, the WSA must incorporate all comments in the WSDP and must report on the extent in which a specific comment has been taken into account. The resolution in which the WSDP has been adopted, to be attached as an Appendix. • To ensure that copies of the approved WSDP has been provided to the applicable parties including *DLGTA and all neighbouring WSAs* (copies of the reviewed WSDP should also be provided to these parties)."	• To *establish the appropriate institutional arrangements* to support the implementation of the water services development plan. To ensure that all staff is transferred as per the agreed institutional framework and to provide for staff training as part of the O&M budget. • To ensure adequate resources are available to *manage the implementation of the projects* as proposed in the WSDP. In addition, to ensure continuous upkeep of the WSDP project register and appropriate capturing of project-related information, including customers serviced and infrastructure constructed. • To *report on the performance of Ilembe DM in implementing the WSDP* as required by the Water Services Act. • To *embark on a public consultation process* in terms of the Water Services Act and other relevant legislation. • To *provide copies of the WSDP to DLGTA and all neighbouring WSAs.* • To *consider all comments* received and where applicable, to incorporate such comments in the WSDP and/or to establish the action plans required to incorporate such comments. To *report on the extent in which a specific comment has been taken into account* with the view to finalise the WSDP. • To present the WSDP to Council and for *Council to approve the WSDP.* • To *provide a copy of the approved WSDP to DWAF, DLGTA and neighbouring WSAs.*"

K.2 References

Department of Water Affairs and Forestry. 2004. *Department of Water Affairs and Forestry Project Number 2003-229 KwaZulu-Natal Support to the Co-Ordination of the Development of WSDPs Provincially WSDP Review Report for Assessing "The State of Water Services Development Planning of the Umgungundlovu District Municipality" 9 March 2004*, 2003-229. Durban: Department of Water Affairs and Forestry.

Department of Water Affairs and Forestry. 2005. *Department of Water Affairs and Forestry Project Number 2003-229 KwaZulu-Natal Support to the Co-Ordination of the Development of WSDPs Provincially WSDP Review Report for Assessing "The State of Water Services Development Planning of the Ilembe District Municipality" 5 April 2005*, 2003-229. Durban: Department of Water Affairs and Forestry.

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Appendix L: Individual SDFs

L.1 Individual SDFs

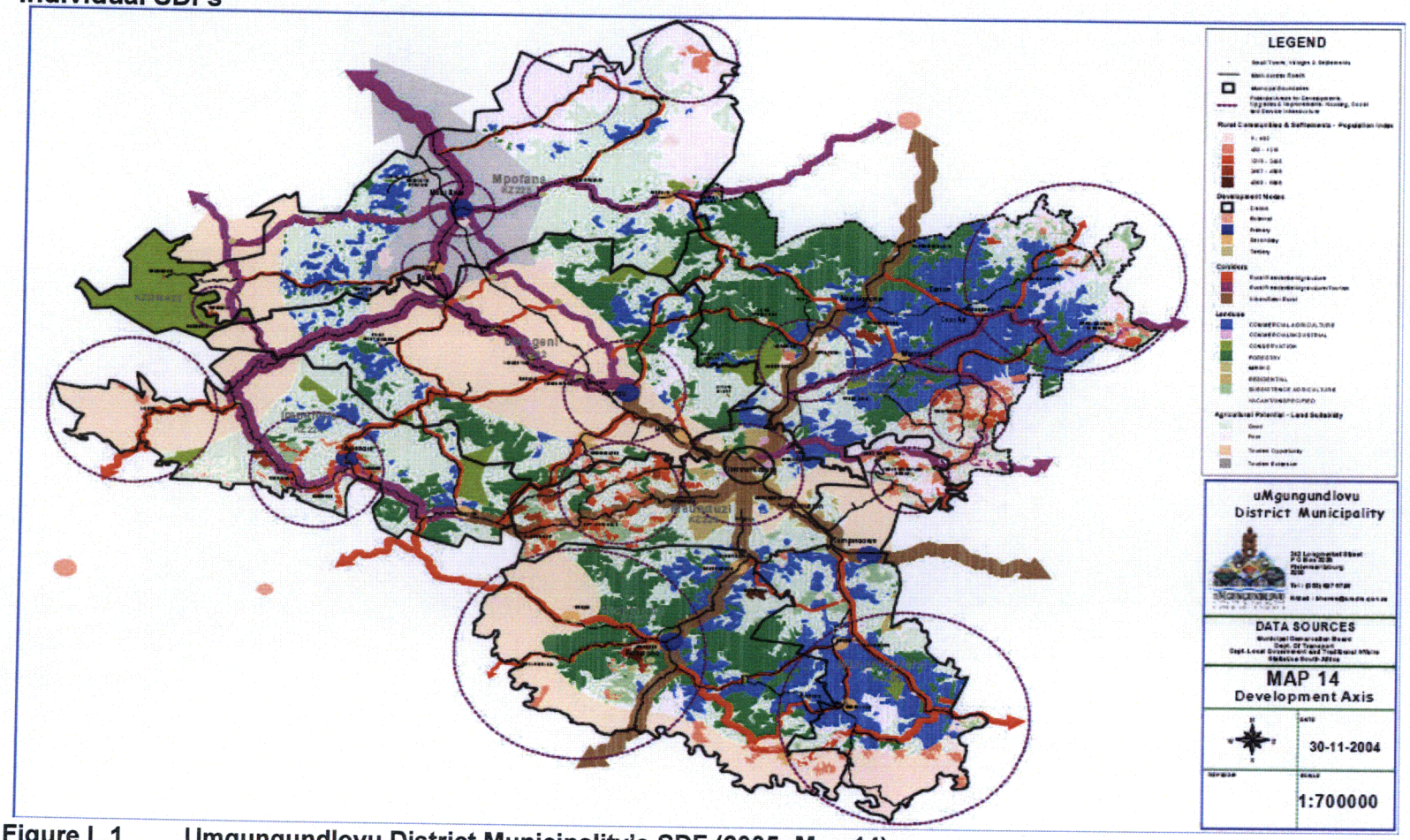

Figure L.1 Umgungundlovu District Municipality's SDF (2005: Map 14).

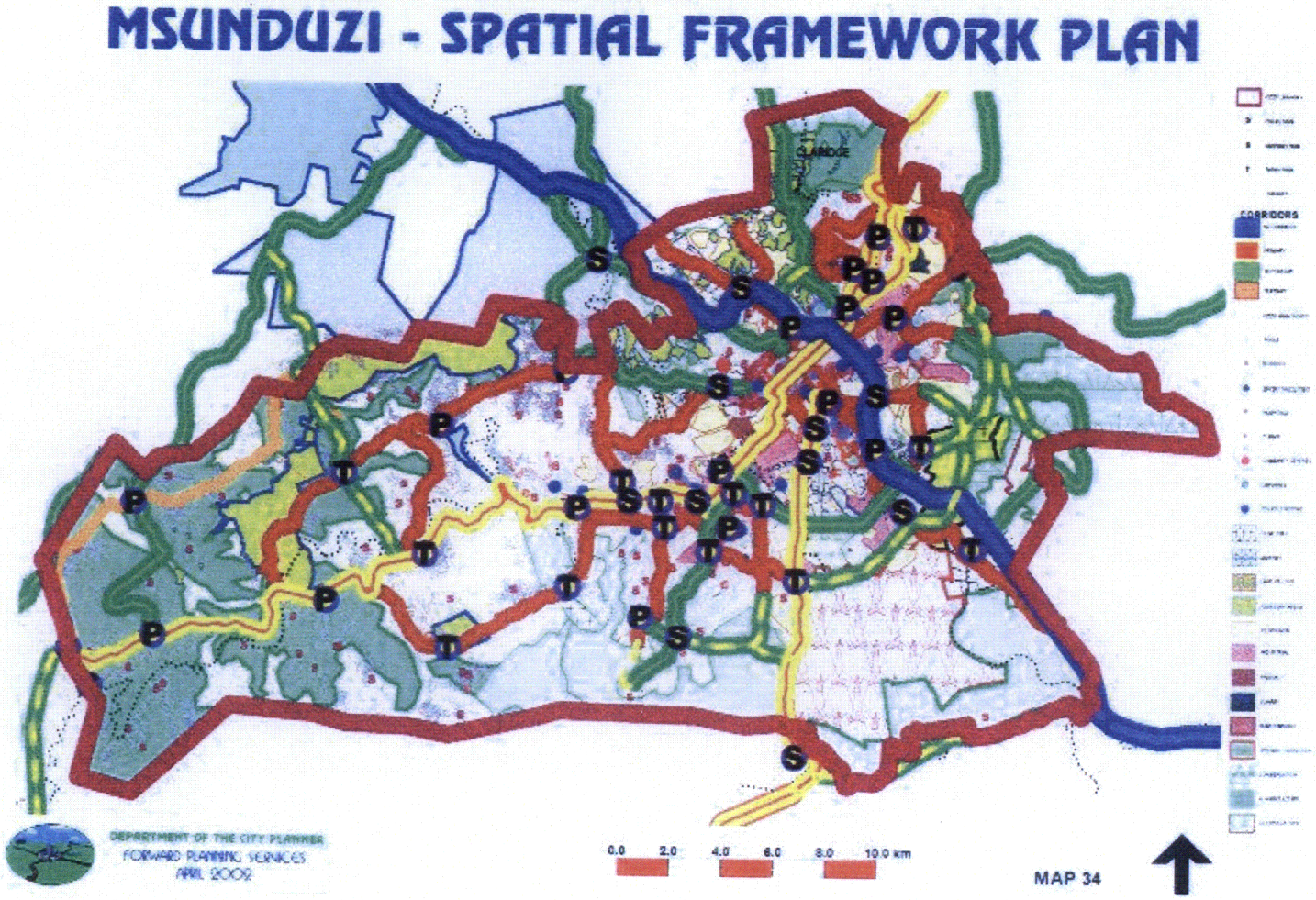

Figure L.2 **The Msunduzi Municipality's SDF (2002: Map 34).**

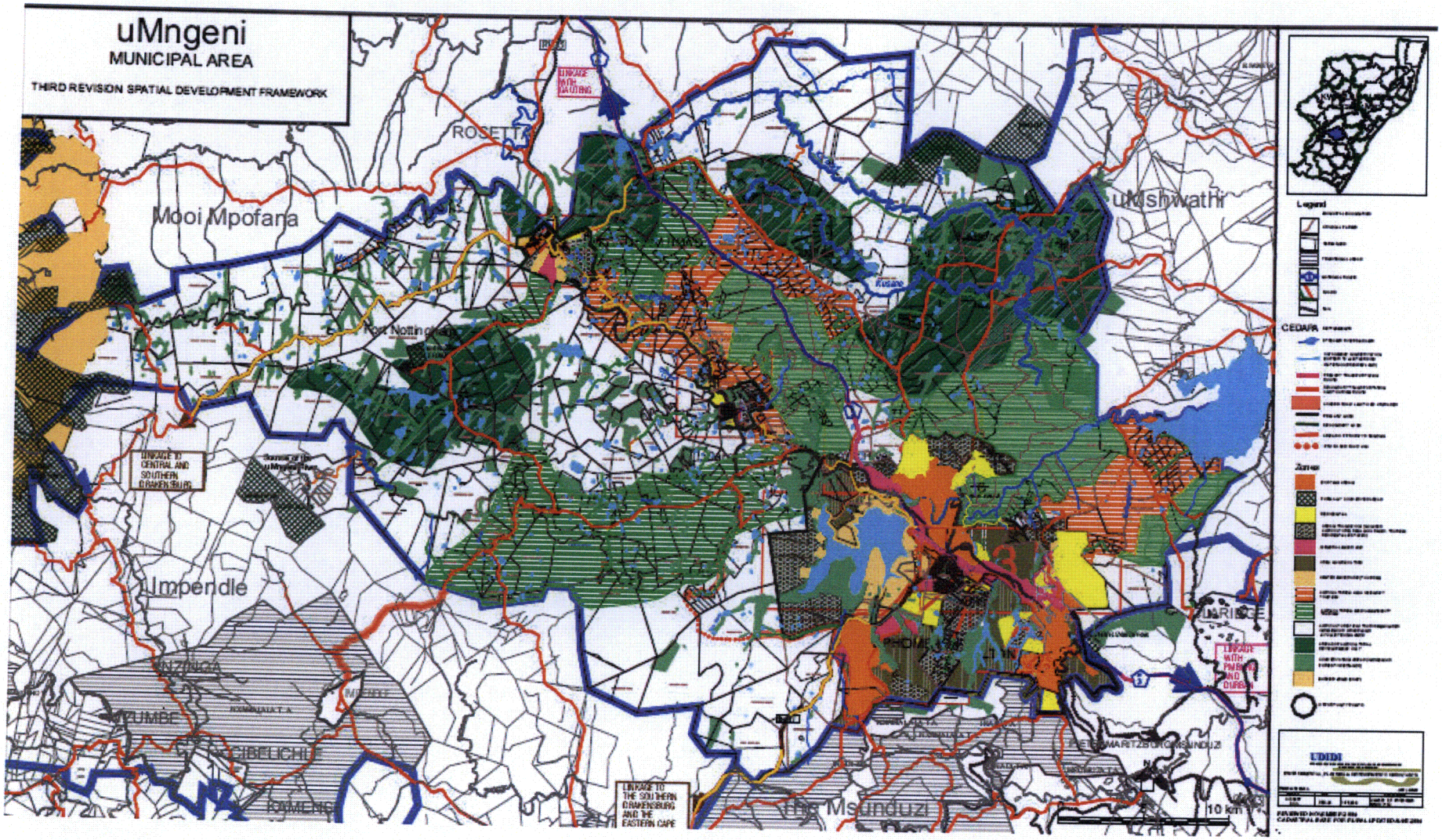

Figure L.3 **uMngeni Municipality's SDF (2005: Appendix 3).**

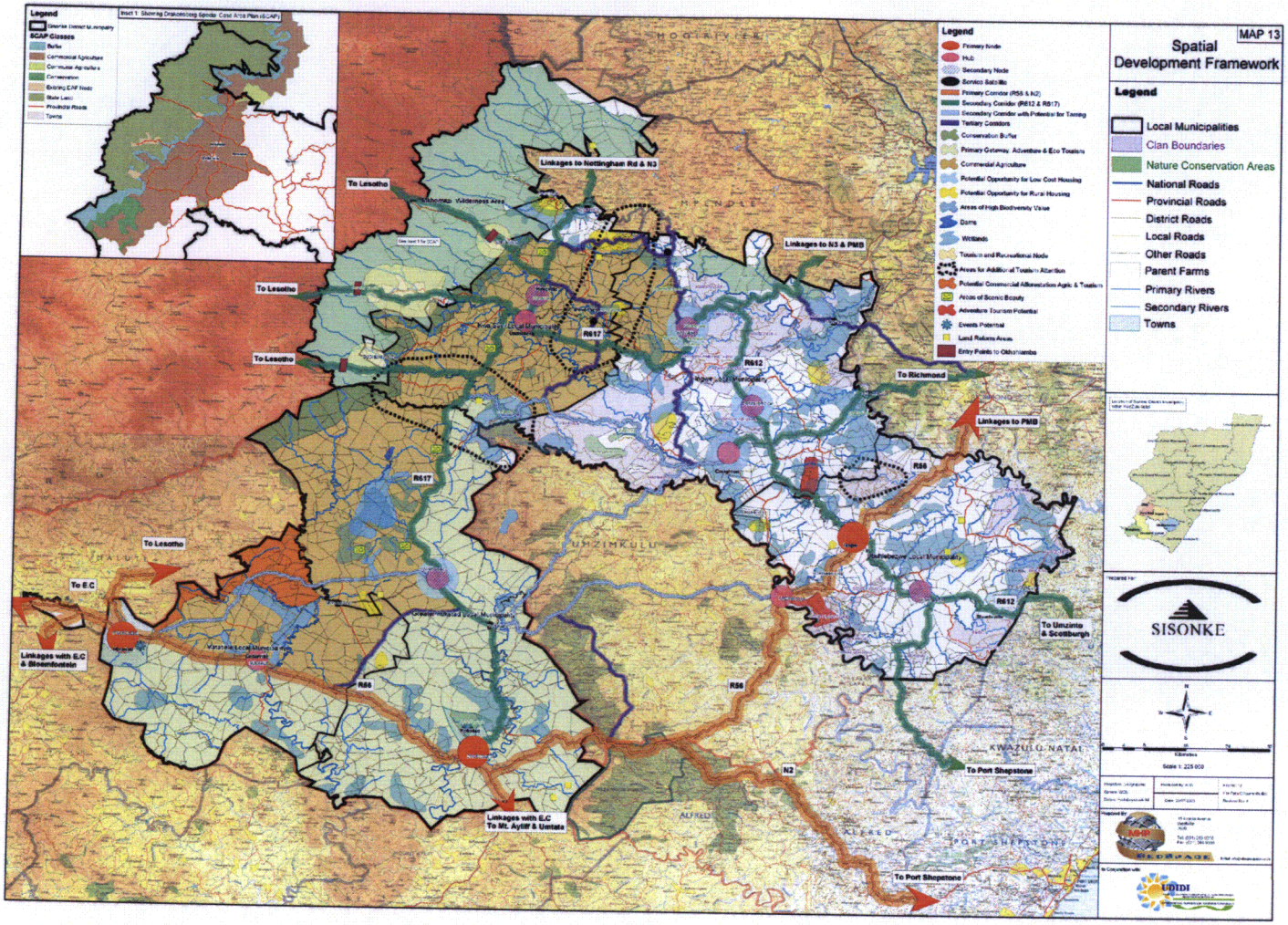

Figure L.4 **Sisonke District Municipality's SDF (2003: Map 13).**



Figure L.5 **Ilembe District Municipality's SDF (2005: 43).**

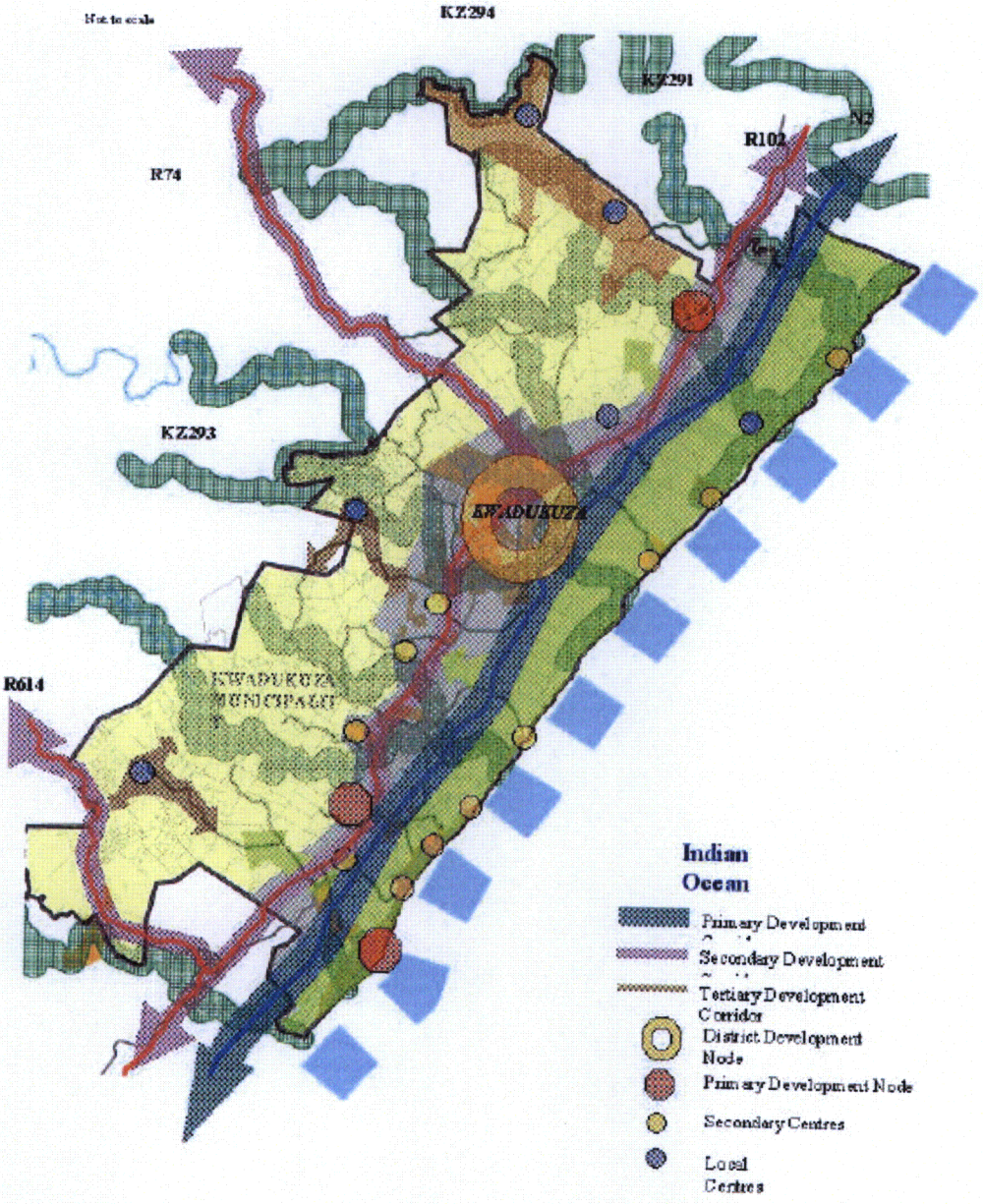

Figure L.6 **KwaDukuza Municipality's SDF (2005: 49).**

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Appendix M: Umgeni Water's Planning Process

M.1 Description of Umgeni Water's Planning Process

The planning methodology used by Umgeni Water is described as follows:

The Planning Services Department has formulated an annual planning process as depicted in Figure M.1. The main deliverables of the planning process are annual demand projections and an annual 30-year capital expenditure (CAPEX) budget. The Infrastructure Master Plan documents the various components within the planning process and assists in highlighting any infrastructure supply constraints or limitations, for future growth.

This process ensures that customer interaction is included at the appropriate junctures, and the steps can be summarised as follows:

- Water demands form the cornerstone for all assessments, thus it is important that these are established upfront and are based on the best information available at the time. These demands are to be established separately for all demand nodes within the region, and short and long-term projections developed in conjunction with the relevant customers.
- A hydraulic network model, which is capable of undertaking extended period simulations, is currently being developed for all of the bulk water networks within the Umgeni Water region. This information also contains the related spatial component through a link to a Geographical Information System (GIS).
- By inputting the water demand projections into the Hydraulic model, it is possible to ascertain not only where the future constraints in the supply system are, but also when they can be expected to occur.
- Possible development scenarios are then formulated to overcome the identified constraints. The Hydraulic model is utilised to define and test these scenarios. Where sufficiently detailed information is lacking, an appropriate infrastructure feasibility study will be instituted to obtain this information. These feasibility studies are often quite extensive, requiring further interaction with the customer and also containing a public participation component.
- In parallel to the determination of the possible water supply development scenarios, it is equally important to compare the water resource availability to the demand projections to determine if there are any limitations and when they are likely to occur.

- Possible development scenarios are then formulated to overcome the identified water resource limitations. These scenarios need to be integrated with the water supply scenarios to provide holistic solutions. Where there is insufficient information pertaining to possible water resource development options, then appropriate water resource feasibility studies will be instituted. These studies require interaction with relevant stakeholders, the customers and other interested and affected parties.
- Once a set of possible development scenarios has been established, these will each be costed and a comparison made in terms of economics and other financial impacts to determine the optimal development scenario.
- This optimal scenario will then be discussed with the customer and the implications thereof highlighted. This scenario will also be reviewed internally in terms of its strategic implications. If this scenario is found to be unacceptable for either reason, the process will move back to either the demand projection step or to the pool of possible options.
- Once the development scenario has been accepted the Capital Expenditure (CAPEX) budget can be prepared, detailing the finance required and the estimated years in which it will be required.
- The intention is that the entire process will occur annually with the programme aligned to the organisational requirements for the demand projections and CAPEX budget. A brief report will be produced at the end of each cycle, detailing the data used and results obtained.

The development of infrastructure proposed in this document is based on the analysis of the existing population and their growth, agricultural and industrial development in the region and the water demands generated by such growth and development over the next 30 years. Where available, historical water demands have been utilised to assist in projecting future demands. The capacity of existing infrastructure has been assessed to arrive at dates where the capacity or design life exceeds that of the projected demands. New infrastructure and development of water resources have been proposed for various planning regions. A programme of implementation and cash flows have been prepared to guide our actions in development of water resources, their treatment and transfer to the consumers in our area of supply.

Two major challenges that will need to be included in the master planning process in the future are:

- To consider supply and operational risk in an integrated manner, and

- To further involve the customers in both the master planning and decision making process. The intention is to ensure that all parties are accountable and thereby share the risk associated with decisions.

(Umgeni Water 2004: 4 -6)

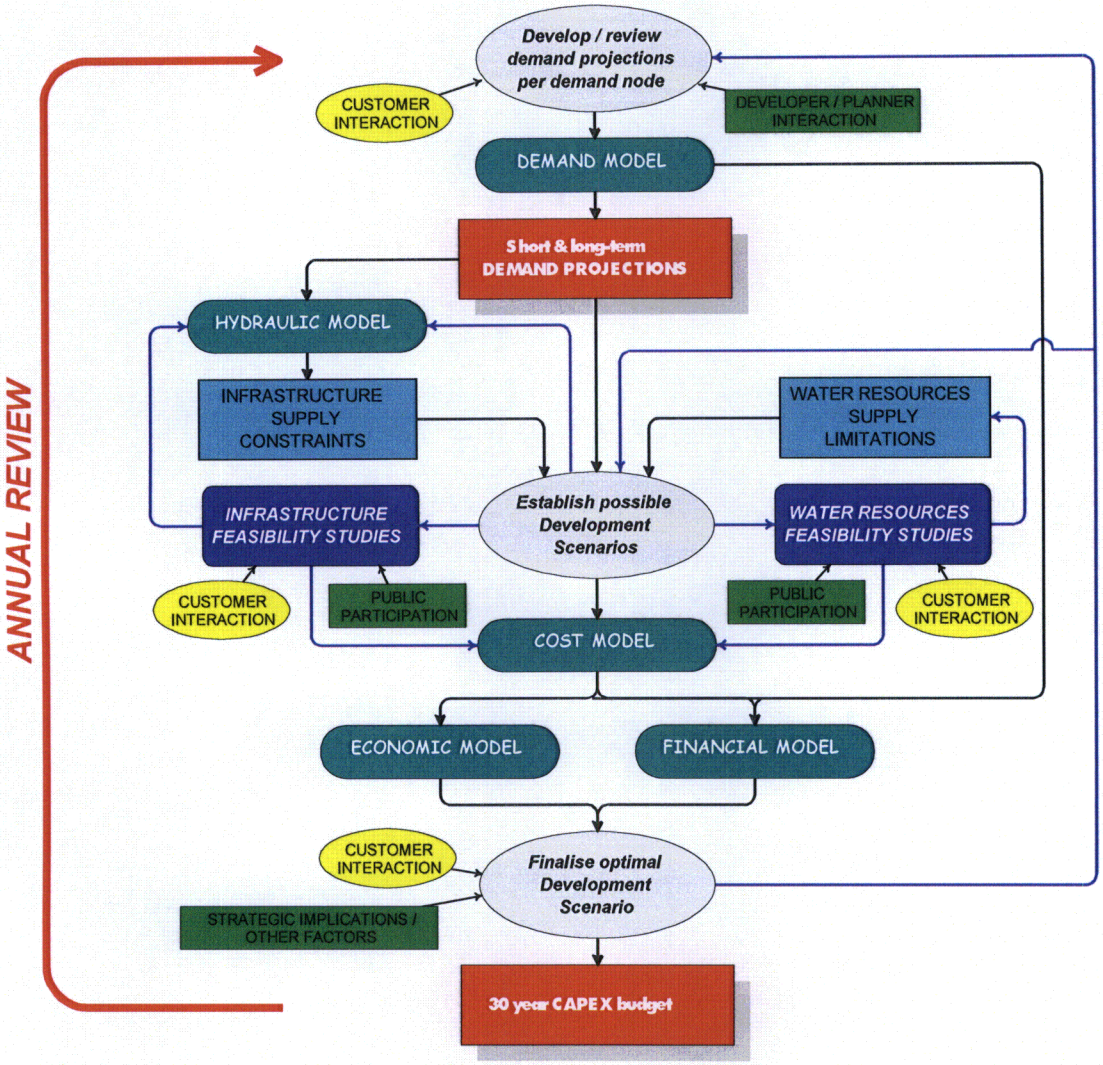

Figure M.1 The master planning process (Umgeni Water 2004: 5).

M.2 References

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A Process for a Synchronised Synergy Between Integrated Development Plans and Regional Water Plans

By

Alka Ramnath

Submitted in partial fulfilment of the requirements for the degree of
Master of Town and Regional Planning
in the
Town and Regional Planning Programme
University of KwaZulu-Natal
2007

Durban
2007

ABSTRACT

Historically and to date, regional water services providers and municipalities have been undertaking their long-term planning in isolation. The only time there is an exchange of information is when water demands need to be met in the short-term and to date this focus has been around backlog alleviation. The fact that the long-term planning is being undertaken in isolation is undermining the objective of the Integrated Development Plan i.e. the co-ordination of development leading to an improvement in the quality of life for all. The purpose of this study was to identify the linkages between regional water service providers' water plans, the municipal Integrated Development Plans (IDPs) and Water Services Development Plans (WSDPs) with the goal of answering the following question: How can a regional water service provider's water planning process improve a municipal IDP process and how can a water service provider's water planning process benefit from a municipal IDP process?

To answer the research question, the study looked at the products and processes of the water plan, the IDPs and the WSDPs for Umgeni Water, The Msunduzi Municipality, Umgungundlovu District Municipality, Sisonke District Municipality, Ilembe District Municipality, The KwaDukuza Municipality, uMshwathi Municipality and uMngeni Municipality. Comparing and contrasting the products of the different planning products for the study area, the following facets were investigated: the spatial location of investments/developments; how implementation was presented; demand projections and stakeholder participation.

The study established that the preferred water planning process is Integrated Resource Planning (IRP) and not traditional water supply planning which has the master plan as its product. It was further established that both the IDP and IRP processes follow the strategic planning approach and therefore the generic steps in these processes are the same. The major difference between the two processes is the scale at which they occur. As the IRP process occurs over different municipal boundaries, it provides a check that alignment is occurring between the different municipalities at all levels of the project life-cycle. It was also established that alignment appears to be occurring at the conceptual/reconnaissance phases of the project life-cycle but it does not extend to the pre-feasibility, feasibility and implementation levels. Hence stakeholder co-ordination is critical for successful alignment but cannot be restricted to only forums; the relevant stakeholders should be part of the respective project teams for meaningful participation to occur.

The overall conclusion was that a regional water service provider's IRP process can contribute to the successful accomplishment of an IDP.

PREFACE

I, Alka Ramnath declare that this dissertation is my own work, carried out under the supervision of Professor Peter Robinson of the University of KwaZulu-Natal and is in accordance with the requirements of the University for the award of the MTRP degree in the branch of Town and Regional Planning. This dissertation has not been submitted in part, or in whole to any other university.

Date 2007-08-27 **Signature** ARamnath

ACKNOWLEDGEMENTS

Thank you to my immediate family.

Thank you to my supervisor, Professor Peter Robinson.

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LIST OF ACRONYMS

CAPEX	Capital Expenditure
CMA	Catchment Management Agency
CWSS	Communities and Water Supply Sanitation project
DDP	Decentralised Development Planning Task Team
DFA	The Development Facilitation Act (65 of 1995)
DLGTA	Department of Local Government and Traditional Affairs KwaZulu-Natal Provincial Government
DM	District Municipality
DMA	District Management Area
DPLG	Department of Provincial and Local Government
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EXCO	Executive Committee
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IDP	Integrated Development Plan
IRP	Integrated Resource Planning
ISP	Internal Strategic Perspective
ITP	Integrate Resource Plan
IWA	International Water Association
IWRM	Integrated Water Resources Management
IWSA	International Water Services Association. Now called "International Water Association".
KZN	KwaZulu-Natal
LM	Local Municipality
LUMS	Land Use Management System
OPEX	Operating Expenditure

PEST	Political, Economical, Sociological and Technological
PGDS	Provincial Growth and Development Strategy
PMI	Project Management Institute
PSEDS	Provincial Spatial Economic Development Strategy
SDF	Spatial Development Framework
STEEPLE	Social/demographic, Technological, Economic, Environmental (Natural), Political, Legal and Ethical
TLC	Transitional Local Council
WBS	Work Breakdown Structure
WCED	World Commission on Environment and Development
WMA	Water Management Area
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider