



Integrated Water Resource Management Plan Guidelines for Local Authorities



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Integrated Water Resource Management Plan Guidelines for Local Authorities



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Preamble

The principle of integrated water resource management is endorsed by the National Water Act, Act 36 of 1998 and the National Water Resource Strategy (2004). Simply put, integrated water resource management in Local Authorities is about striking the right balance between a Local Authority's developmental role and the need to maintain environmental integrity in fulfilling the Constitutional obligations of sustainable development, socioeconomic development and a safe and healthy environment. Striking this balance is a challenge and requires cooperation between all tiers of government as well as between government and the private sector, but there are no hard and fast rules as the environment is a dynamic system, continually adapting itself to a new balance, following the effects of both human and natural influences on it. The time taken to reach a new balance will depend on the severity, frequency and duration of the disturbance and in a worst case scenario, where integrated water resource management is absent, the environment may not be able to recover after a certain threshold is exceeded.

Further challenges facing all three tiers of government in the implementation of integrated water resource management in Local Authorities include establishing funding sources, capacitating local government, clarifying the roles and responsibilities of all sectors involved in integrated water resource management and aligning the various processes underway at national, provincial and local levels in the service delivery and resource protection sectors.

The development of the Integrated Water Resource Management Plan Guideline for Local Authorities provides a tool to assist Local Authorities to meet these challenges, align with the Water Management Area's Catchment Management Strategy and apply for the necessary water use authorisations. An Integrated Water Resource Management Plan aims to provide a Local Authority with an all encompassing Water Management Plan that serves either as a stand alone document or as a supplement to the Water Services Development Plan and Integrated Waste Management Plan, which focus on service delivery and not the full water management package: service delivery **and** resource protection.

Implementation of the Local Authority Integrated Water Resource Management Plan will be a positive step forward in ensuring that Local Authorities achieve sustainable integrated water resource management in line with the catchment vision set by the Catchment Management Agency. In turn, sustainable integrated water resource management will be to the benefit of all communities in the Local Authority, ensuring them of a safe environment and a certain level of dignity.

For ease of reading the Guideline has been divided into three parts:

Part A: An introduction to integrated water resource management from a Local Authority perspective.

Part B: Guideline for the preparation an Integrated Water Resource Management Plan.

Part C: Other useful information

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Abbreviations

BOD	Biological oxygen demand
CMA	Catchment management agency
COD	Chemical oxygen demand
DACEL	Department of Conservation, Environment and Land
DEAT	Department of Environmental Affairs and Tourism
DME	Department of Minerals and Energy
DPLG	Department of Provincial and Local Government
DWAF	Department of Water Affairs and Forestry
EMP	Environmental Management Plan
FOG	Fats, oils and greases
GA	General Authorisation
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plan
IWRM	Integrated water resource management
IWRMP	Integrated Water Resource Management Plan
LA	Local Authority
NEMA	National Environmental Management Act
TDS	Total dissolved solids
TEMP	Temperature
TO	Toxic organics
TSS	Total suspended solids
WRC	Water Research Commission
WRM	Water resource management
WSDP	Water Services Development Plan
WULA	Water use licence application

Glossary of terms

Environmental Implementation Plans and Environmental Management Plans	Environmental Implementation Plans and Environmental Management Plans are required under Chapter 3 of NEMA by all national departments with environmental management functions and functions that impact on the environment, respectively. Each province must prepare an Environmental Implementation Plan. Local Authorities are not required to prepare an Environmental Management Plan at present.
Integrated Development Plans	Integrated Development Plans (IDPs) are a requirement of The Municipal Systems Act and are considered central to the planning process. IDPs are required to incorporate a spatial development framework and guidelines for a land management system.
Integrated Waste Management Plan	An Integrated Waste Management Plan is a sectoral plan required by NEMA, which requires that Local Authorities incorporate measures prescribed in the provincial Environmental Implementation Plans/Environmental Management Plans regarding waste management into an Integrated Waste Management Plan.
Integrated water resource management	Integrated water resource management (IWRM) is an approach that seeks to reach an appropriate balance between the need to protect and sustain water resources on the one hand, and the need to develop and use them on the other
Integrated Water Resource Management Plan	An Integrated Water Resource Management Plan (IWRMP) is a plan aimed at dealing with the socio-economic, technical, financial, institutional and environmental issues as they pertain to management of the water resource.
Water management area	A water management area is an area established as a management unit in the National Water Resource Strategy within which a Catchment Management Agency will conduct the protection, use, development, conservation, management and control of water resources.
Water Services Development Plan	A Water Services Development Plan is a sectoral plan required by the Water Services Act to assist Local Authorities in water services planning and DWAF in water planning and the water allocation process. It deals with the socio-economic, technical, financial, institutional and environmental issues as they pertain to water services. The plan also serves as a framework to ensure efficient, appropriate, affordable, economical and sustainable access to water services

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Integrated Water Resource Management Plan Guidelines for Local Authorities

1 Introduction

This guideline is the final deliverable in a project jointly funded by the Water Research Commission (WRC) and Department of Water Affairs and Forestry (DWAF) to address the need for Local Authorities to participate in the implementation of integrated water resource management (IWRM) and align their water management functions with the Catchment Management Strategy of the water management area(s) within which the Local Authority falls.

The development of the guideline followed a phased approach. Phase 1 took the form of a scoping exercise comprising a literature review, consultation with DWAF and stakeholder participation. Phase 2 included an assessment of the legal issues surrounding implementation of IWRM in Local Authorities, and the development of a framework for an Integrated Water Resource Management Plan (IWRMP). Phase 3 was the technology transfer phase in which the proposed IWRMP Guideline was disseminated as a discussion document at various workshops and conferences around South Africa during 2006. The comments and input received during the technology transfer phase, which included input from the team developing the Guidelines for Catchment Management Strategies¹ (DWAF, 2006), has been incorporated into this IWRMP Guideline for Local Authorities.

A need has been identified to further customise the IWRMP, as set out in this Guideline, for the differently resourced Local Authorities. The WRC has initiated this process by currently piloting the IWRMP in Manaka Local Municipality (a typical small municipality). Further piloting is planned to take place during 2007 through linking to other IWRM initiatives within local government. The findings from the pilot projects will be captured in the Water Information Network² Lessons Learnt Series and will lead to further refinement of the IWRMP Guideline.

There are three categories of Local Authorities:

- 1. metropolitan municipalities (Category A);**
- 2. district municipalities (Category B);**
- 3. local municipalities (Category C).**

District municipalities share responsibilities with several local municipalities within their jurisdiction. The two-tier system of local and district municipalities was promulgated to take advantage of economies of scale, to avoid duplication and to improve coordination between local municipalities (Qomfo, 2005).

¹ Guidelines for Catchment Management Strategies have been developed by DWAF (DWAF, 2006). Each Catchment Management Agency will need to prepare a Catchment Management Strategy through a consultative process.

² The Water Information Network is a learning programme, publishing and distributing lessons learnt in water management. The lessons can be obtained on the website: <http://www.win-sa.org.za/iwrmp>

2 Purpose of the guideline

This guideline is intended for all planners, policy makers, service providers and environmental managers within Local Authorities.

The primary objective of the guideline is to assist a Local Authority to develop an IWRMP that will provide an all encompassing Water Management Plan that serves either as a stand alone report or as a supplement to the Water Services Development Plan and Integrated Waste Management Plan, which focus on service delivery and not the full water management package: service delivery **and** resource protection. An IWRMP should then complement the Water Services Development Plan and Integrated Waste Management Plan but without duplicating the information in either plan. In addition, the IWRMP provides the supporting technical document for a water use licence application and will assist a Local Authority to align its water management functions with the Water Management Area's Catchment Management Strategy, developed by the Catchment Management Agency (CMA) through a consultative process. In instances where a Catchment Management Strategy has not yet been developed, it is envisaged that the IWRMP will provide valuable input into the development of the Catchment Management Strategy.

For the smaller Local Authorities that are not water service authorities and therefore do not require to develop a Water Services Development Plan, although they should participate in the development of the Water Services Development Plan at District Municipality level, the IWRMP can serve as a tool for these Local Authorities to better manage water resources within their area of jurisdiction in conjunction with the District Municipality and Catchment Management Agency. IWRM is defined in Box 1 and the various envisaged inputs into the process of preparing an IWRMP by a Local Authority are schematically depicted in Figure 1.1. IWRM seeks to reach an appropriate balance between the need to protect and sustain water resources on the one hand, and the need to develop and use them on the other i.e. IWRM enables a Local Authority to provide services to all sectors within its area of jurisdiction but without comprising either environmental integrity or human health

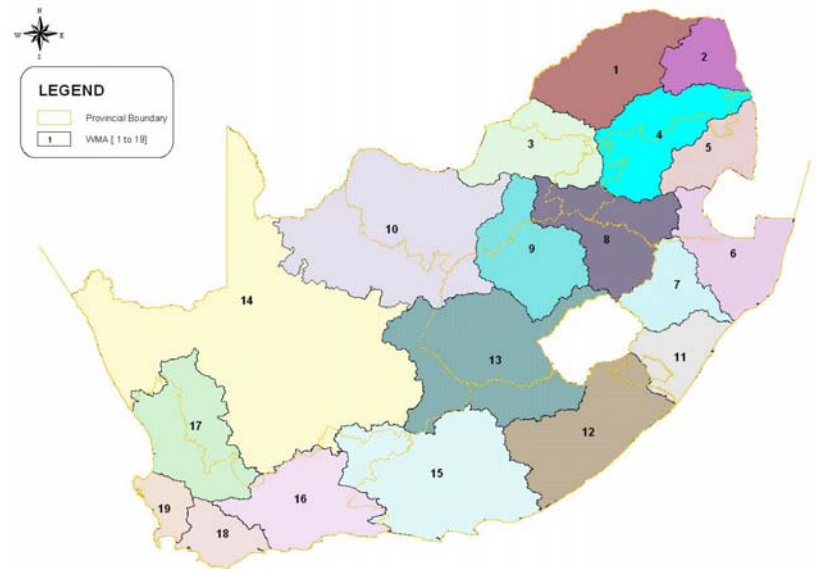
The second objective of the guideline is to provide clarity on the perceived, primary constraint to implementing IWRM in Local Authorities, namely the limited integration between water resource development and land use planning. This constraint was identified during the stakeholder participation process, and is largely due to:

- the different levels of understanding that prevail regarding the concept of IWRM;
- lack of clarity regarding the role of Local Authorities in IWRM;
- no standardised approach to incorporating IWRM principles into the planning and implementation of projects;
- the lack of or limited integration between the various departments responsible for the different components of IWRM, such as stormwater management, water services, billing etc.

This limited integration between local government departments is exacerbated by the limited integration between water resource management and water service provision at Provincial and National level. Water resource management is on a catchment basis but water service provision is on a political boundary basis, which emphasises the need for integration at all levels of government.

The need for such integration has been recognised but the means for achieving it are not yet apparent.

Implementation of IWRM by a Local Authority CANNOT be done in isolation but MUST occur in terms of cooperative governance i.e. in conjunction with other Local Authorities within the water management area or catchment and the Department of Water Affairs and Forestry, until such time as the CMA is fully functional. The crucial role of cooperative governance is emphasised when the mismatch between the political and catchment boundaries is taken into consideration.



There are currently 283 Local Authorities in South Africa, falling within approximately 1 950 quaternary catchments in 19 water management areas

Box 1: Definitions

IWRM: Brings together the principles of social equity, economic efficiency and environmental sustainability (DWAf NWRS, 2004)

GENERAL: an evolving, iterative process which promotes the coordinated planning, development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of ecosystems (DWAf NWRS, 2004, Uys, 2003);

PEOPLE CENTERED: an amalgamation of all use sectors, all stakeholders, all prefectures, all tiers and all institutional constituents, both formal and informal, to make a viable and sustainable management system (Sokhile, 2005);

URBAN FOCUS: water resource management that considers the collective impact of urban-related water processes including sanitation, water supply, water reticulation, waste disposal, urban stormwater, urban runoff and receiving water body ecological integrity (adapted from WRC 2001/2).

IWRMP: Provides a road map for dealing with water-related challenges.

An IWRMP is a plan aimed at dealing with the socio-economic, technical, financial, institutional, political and environmental issues as they pertain to management of the water resource at a local level. The plan also serves as a framework to ensure efficient, appropriate, affordable, economical and sustainable use and development of water resources by local government and includes the management of wastes that have the potential to impact on the water resource.

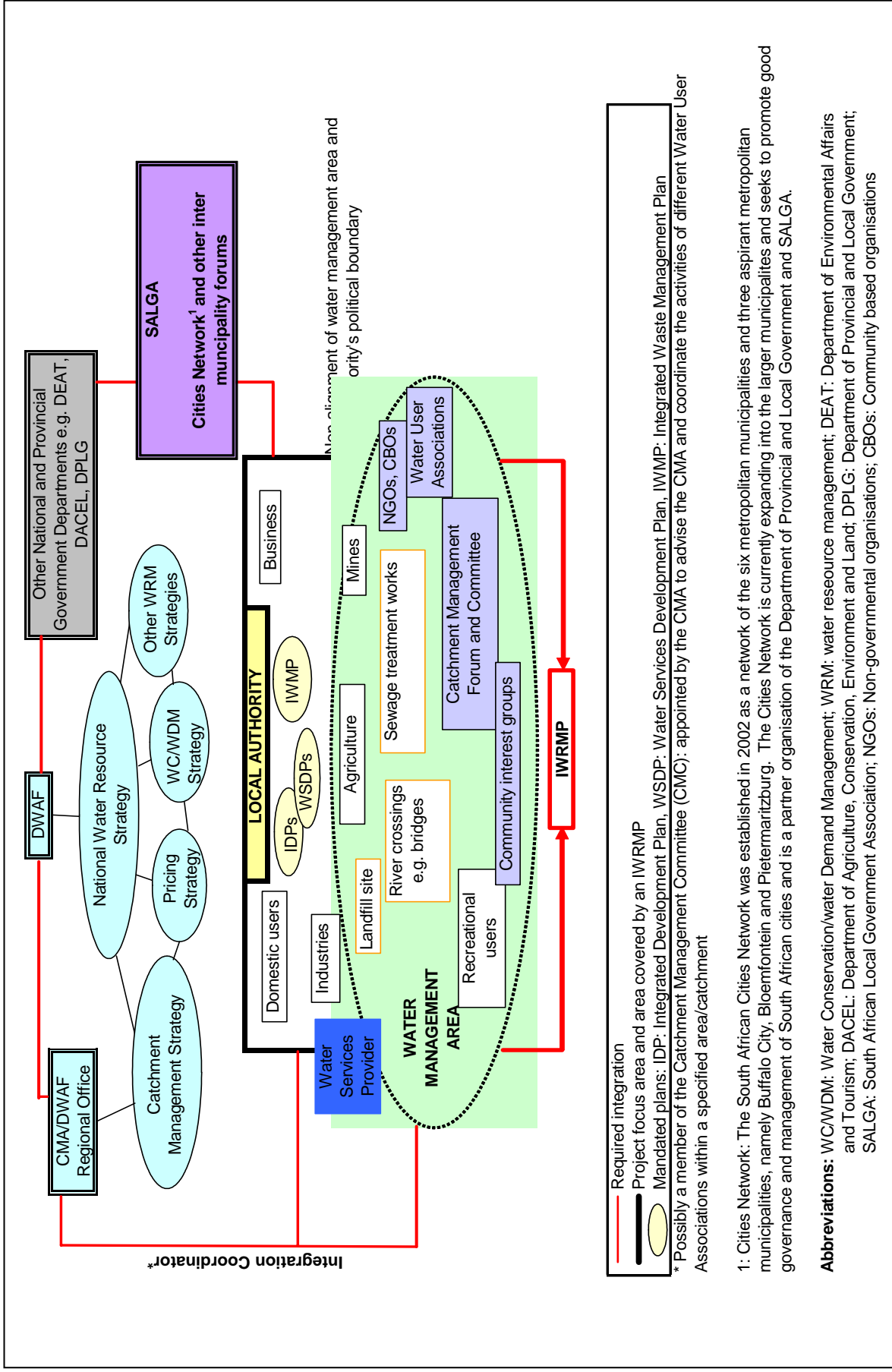
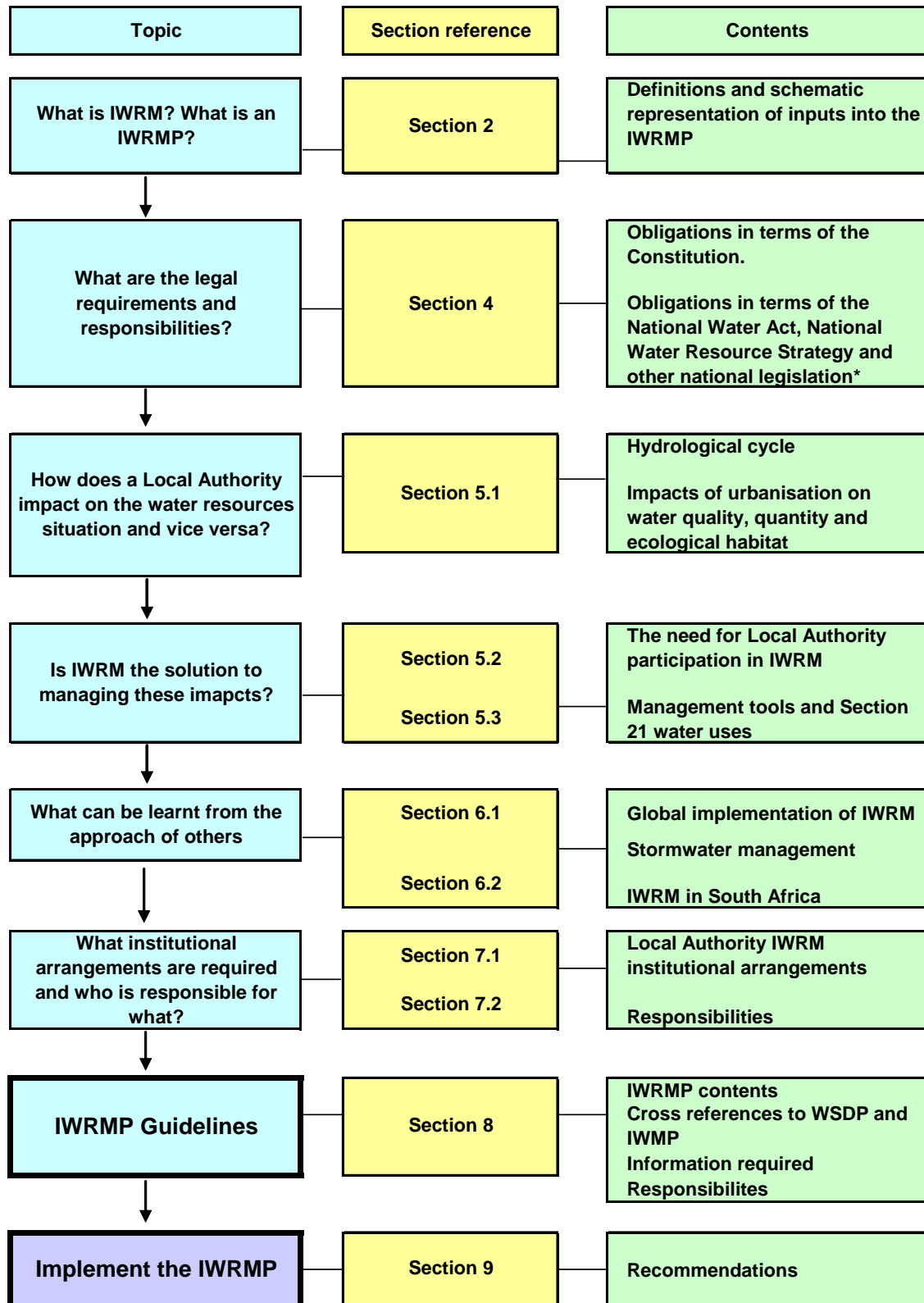


Figure 2.1: Schematic representation of the envisaged inputs into the IWRMP preparation process

3 How to use this guideline

The layout of the guideline is presented in the schematic below. The schematic provides a map to the respective sections dealing with the identified objectives of the guideline.



*Other legislation includes but is not limited to the National Environmental Management Act, Municipal Systems Act and Intergovernmental Relations Framework Act (refer to Appendix C)

4 Legislation and responsibilities

The responsibility for the environment, and hence the water resource, at the local level is not clearly defined in South Africa in any one piece of legislation (DEAT, 2004). However, the Constitution and national environmental and local government legislation lays the foundation for Local Authorities to participate in IWRM although there is not yet any specific legal requirement for the preparation of an IWRMP. The legal obligation for all role players and stakeholders to participate in the preparation of the Catchment Management Strategy requires that all Local Authorities prepare an IWRMP in order to actively participate in the implementation of the Catchment Management Strategy. In certain instances where the establishment of the CMA is delayed, a Local Authority IWRMP may precede the Catchment Management Strategy and will then inform the development of the Catchment Management Strategy at a later stage. The Catchment Management Strategy must (DWAF, 2006):

- be in harmony with the National Water Resource Strategy;
- be reviewed at least every five years;
- include a water allocation plan.

The legally required sectoral plans, namely Integrated Waste Management Plans and Water Services Development Plans have IWRM gaps as they do not deal with the full water management package, namely service delivery and resource protection. These gaps need to be filled if a Local Authority is to simultaneously comply with its constitutional obligations for sustainable service delivery, socio-economic development and a safe and healthy environment. The need to participate in implementation of the Catchment Management Strategy and consider the full water management package lays the foundation for the preparation of an IWRMP, which is presented in Figure 4.1 and briefly discussed below.

4.1 The Constitution

Section 156 of the Constitution, together with Schedules 4 and 5, outlines the powers and functions of national, provincial and local government (Local Authorities).

Schedules 4A and 5A contain national and provincial responsibilities, which can be delegated to Local Authorities if this would be effective and if capacity is available. Delegations, however, are not controlled by legislation and do not necessarily imply the transfer of resources, which potentially leaves the Local Authority at risk legally and financially (Qomfo, 2005). On the other hand, delegations can be viewed as partnerships between two government bodies. The Schedule 4A and 5A responsibilities related to the IWRMP include:

- agriculture e.g. provision of water for irrigation;
- environment;
- nature conservation (excluding national parks and national botanical gardens) e.g. eradication of alien vegetation;
- pollution control;
- soil conservation;

- urban and rural development;
- disaster management.

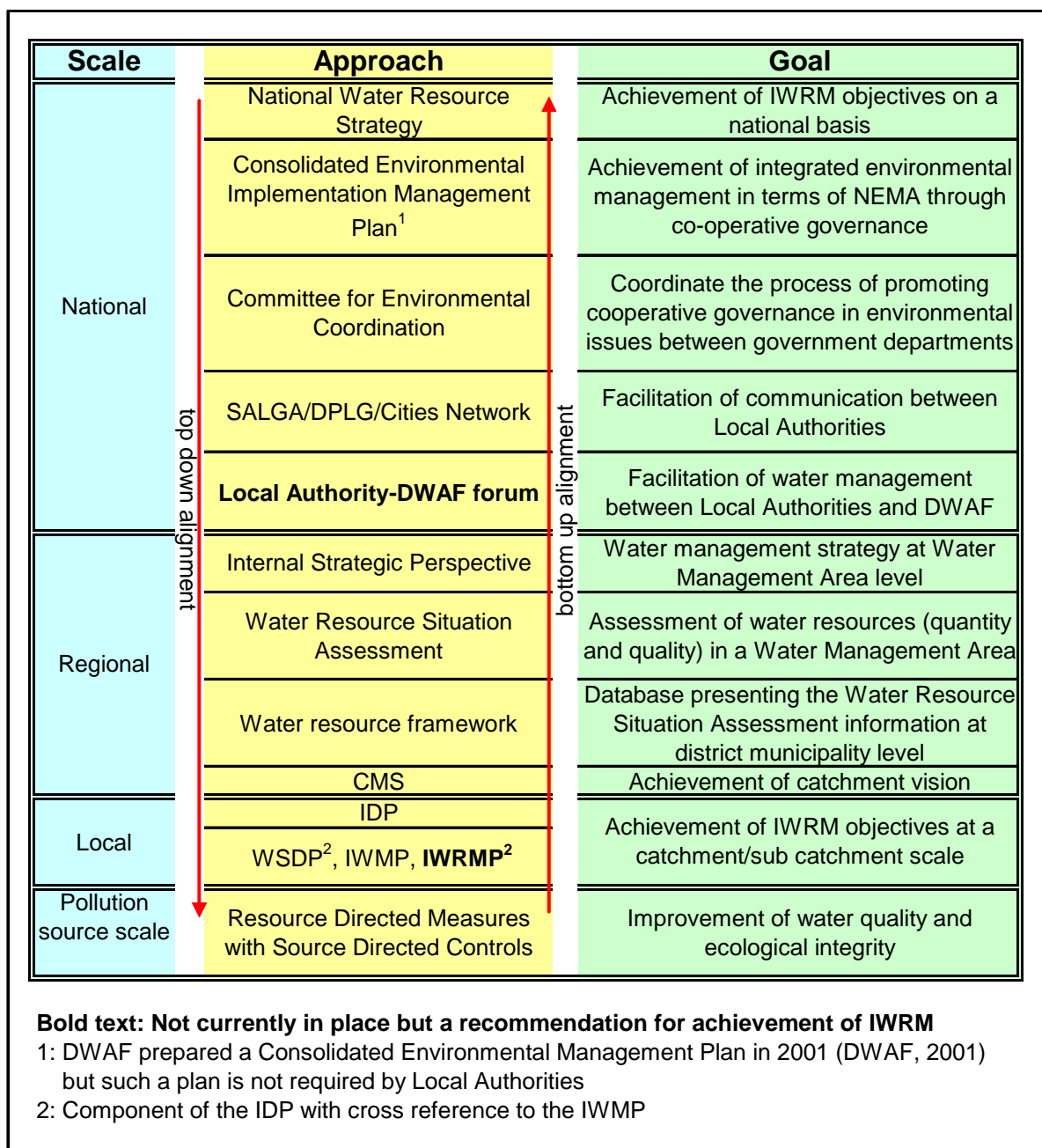


Figure 4.1: The foundation for the preparation of an IWRMP

Schedules 4B and 5B contain 38 Local Authority matters/responsibilities. Those related to the IWRMP include:

- Municipal planning (Category A, B, C Municipalities);
- Municipal health - now defined as environmental health (Category A, B Municipalities);
- Air pollution (Category A, B Municipalities);
- Storm water management in built up areas (Category A, B Municipalities);
- Water and sanitation services (Category A, C Municipalities);

- Municipal parks and recreation (Category A, B Municipalities);
- Beaches and amusement facilities (Category A, B Municipalities);
- Cleansing (Category A, B, C Municipalities);
- Refuse removal (Category A, B Municipalities), refuse dumps and solid waste removal (Category A, C Municipalities).

These responsibilities are not uniformly applied across municipalities due to numerous reasons including lack of clarity, the developmental nature of local government, non uniform delegation by national and provincial departments and sectoral legislation (e.g. Water Services Development Plan and Integrated Waste Management Plan), which assigns functions to local government. Sector regulation of the supply of water and sanitation rests at national level, and defines the policies and procedures for all Local Authorities (Qomfo, 2005).

The Municipal Demarcation Board has identified general responsibilities for provincial and local government for the Schedule 4B and 5B functions, which in terms of IWRM include (DEAT, 2004):

- **Provincial:** pass new legislation, review existing legislation, build capacities of Local Authorities to perform their functions, monitor the performance of Local Authorities and ensure that the delegated functions are addressed in the IDP;
- **Unicities:** not indicated but assumed to be similar to those of the District Municipality except for the direct involvement with Category C municipalities;
- **District Municipality:** pass by-laws, review existing by-laws, build capacities of Local Municipalities (Category C) to perform their functions, monitor the performance of Local Municipalities, include indicators in the performance management system and ensure that the delegated functions are addressed in the IDP;
- **Local Municipality:** pass by-laws, review existing by-laws, include indicators in the performance management system, determine service delivery mechanism and make budget provision.

4.2 Governmental mandates

NEMA

The National Environmental Management Act (NEMA), Act 107 of 1998, imposes a positive duty on everyone to prevent any pollution from occurring and minimise or rectify any pollution that has occurred. Pollution control places administrative duties on users i.e. they must apply for certificates, permits, licences and authorisations. Many activities also require a compulsory environmental impact assessment. The environmental impact assessment requirements are now regulated under NEMA and were published in Government Notices R385, R386 and R387 of 2006.

Local Authorities must adhere to provincial/national Environmental Implementation Plans and/or Environmental Management Plans but there is no requirement for them to prepare their own environmental plans at present.

In terms of the NEMA Amendment of 1 May 2005, environmental management inspectors may be designated among officials employed by national, provincial and local government to monitor compliance with, and enforce, four pieces of national environmental legislation (environment website):

- NEMA;
- Air Quality Act, 39 of 2004;
- Biodiversity Act, Act 10 of 2004;
- Protected Areas Act, 57 of 2004.

Consideration needs to be given to extending the powers of the environmental management inspectors to the National Water Act, Act 36 of 1998.

Water and waste

The IWRM framework and underpinning principles are enshrined in the National Water Act, Act 36 of 1998 and the means by which IWRM can be achieved are set out in the National Water Resource Strategy, developed by DWAF. It is the mandate of DWAF to protect water resources and audit the compliance of Local Authorities in terms of their responsibility to (L. Boyd, DWAF pers. comm., 2005):

- provide water supply and sanitation services in terms of Section 11 of the Water Services Act, Act 108 of 1997 and Sections 84 and 85 of the Municipal Structures Act, Act 117 of 1998;
- prevent pollution and monitor pollution from land based activities i.e. carry out water quality monitoring activities in terms of Part 4 of Chapter 3 and Section 21 of Chapter 4 of the National Water Act.

In terms of water quality, the responsibility lies with the national department (DWAF), although it may be administered at local level via its regional offices. However CMAs, water service authorities and water service providers all have a role to play (DEAT, 2004):

- **CMA:** pollution prevention and taking remedial action;
- **Water Services Authority** (usually the Local Authority although DWAF still fulfils this role for certain local municipalities): promulgate bylaws controlling industrial effluent and control of industrial water pollution (Section 7 of the Water Services Act);
- **Water Services Provider** (nominated by the water service authority): approve the manner for disposal of industrial effluents.

Local Authority key responsibilities, in terms of the Constitution and water legislation that relate to IWRM, include ensuring provision of municipal services, municipal spatial development (land use), infrastructure planning, environmental health, stormwater management and waste management (Mazibuko, 2004). Although environmental management and pollution control are national or provincial mandates, these functions have largely been assumed by Local Authorities where capacity and resources are available.

In terms of waste management, the White Paper on Integrated Pollution Control and Waste Management, March 2000 defines the principles on which a Local Authority is required to develop

an Integrated Waste Management Plan including waste minimisation, environmental remediation and socio-economic development. Province must review Integrated Waste Management Plans, monitor compliance with Environmental Implementation Plans and develop provincial guidelines and standards (DEAT, 2004).

Other acts which may have implications for Local Authorities in terms of IWRM are presented in Appendix C and include the Environment Conservation Act, Act 73 of 1989 and the Municipal Systems Act, Act 32 of 2000 (Sampson, 2005).

4.3 Integration of developmental planning and IWRM

(adapted from Qomfo, 2005)

Integration of developmental planning and IWRM is entrenched in the developmental role of local government, which includes planning for development, governance and administration, regulation, and service delivery to fulfil its constitutional obligations of sustainable service delivery, socio-economic development and a safe and healthy environment. This role is realised through the preparation of Integrated Development Plans (IDPs), which are a requirement of The Municipal Systems Act and are considered central to the planning process. IDPs are required to incorporate a spatial development framework and guidelines for a land management system, which includes the full range of municipal functions and is coordinated and integrated with provincial and private sector initiatives.

Local Authority functions, such as environment, water services and air quality, should be dealt with as part of the IDP process where they are relevant to the local priority issues (DEAT, 2004). The Water Services Development Plan is seen as the water services component of the IDP. In addition, Local Authorities must set key performance indicators and targets related to their IDPs.

Further integration will occur through implementation of the White Paper on Spatial Planning and Land Use Management, which states that the developmental planning responsibility is best exercised on a local scale with the ultimate goal being a legislative framework which allows local government to formulate policies and plans for land use and development that will resolve spatial, socio-economic and environmental issues. These issues can currently be addressed through the decision-making process and legislation in terms of by-laws. In the case of land use change it is the Local Authorities responsibility to ensure that developers comply with environmental impact assessment regulations (DEAT, 2004).

In practice, however, integration will ultimately rely on good governance, no matter how good the developmental framework and legislation is. Good governance is built upon an effective interface between councillors and officials, strong links between financial and technical divisions, and an appropriate organisational structure.

5 IWRM in Local Authorities

This section motivates the need for Local Authorities to participate in IWRM. It also describes the IWRM tools currently available and the status of IWRM implementation in Local Authorities.

5.1 Impacts of urbanisation

Population growth and migration of large numbers to the cities has caused changes in the natural balance of ecological systems, which threatens biodiversity, ecosystem functioning and fitness for use of available resources (Obree, 2000, WISA, 2002; DWAF NWRS, 2004). Impacts related to urbanisation include (Görgens et al., 1998, Obree, 2000):

- increased water demand and industry off-takes;
- sewer spills due to blockages in the sewer system and overloading of sewage works;
- inadequate sanitation and solid waste disposal in informal settlements;
- deterioration in surface water quality and changes in stream morphology, stream corridor utility, river ecology and aesthetics due to:
 - increased discharges (industrial and sewage effluents, mine water and incidental discharges e.g. wash water from an illegal car wash);
 - riparian litter due to litter from inadequately cleansed urban areas entering stormwater drains;
 - settlement in riparian zones;
 - increased stormwater runoff;
 - poorly designed and managed stormwater management facilities e.g. culverts at road crossings causing upstream flooding and downstream erosion due to inadequate capacity, exacerbated by litter and illegal dumping reducing capacity even further;
 - diffuse sources of pollution (irrigation runoff containing fertilisers, grey water etc.);
- deterioration in groundwater quality due to seepage/infiltration (diffuse sources of pollution) from:
 - ponding of contaminated water from leaks, spills and urban runoff;
 - sub-surface leaks from sewerage pipes, fuel tanks and other underground storage facilities;
 - poorly managed on-site sanitation;
 - landfill leachate;
 - mine waste residues.

Increased runoff in urban areas is largely due to the increase in impervious surfaces. Natural water courses/drainage lines have largely been replaced with concrete open channels or subsurface concrete storm drain lines. Other impervious surfaces are motor vehicle infrastructure, rooftops and urban soils, which are natural surfaces that become compacted or otherwise altered and less pervious through human action, for example, suburban lawns (NRDC website).

These impacts are depicted in the urban hydrological cycle in Figure 5.1 and described in the accompanying tables (Table 5.1 – Table 5.5).

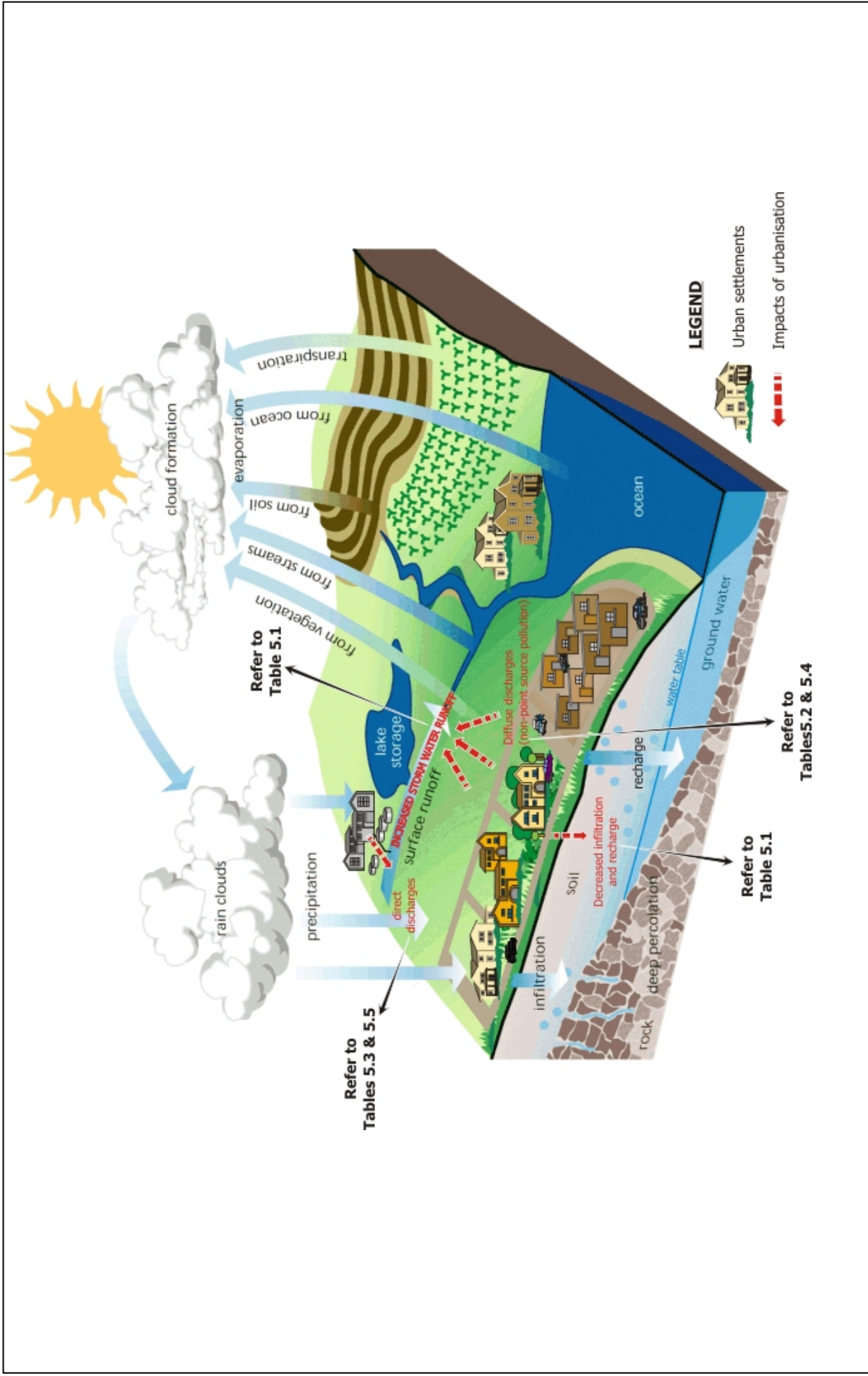


Figure 5.1: The hydrological cycle and influences of urbanisation

Table 5.1: Impacts of increased stormwater runoff due to urbanisation (adapted from NRDC website)

Impact of urbanisation (impervious surfaces) on stormwater runoff	Consequence of impact				
	Flooding	Habitat loss (e.g. inadequate substrate, loss of riparian areas, etc.)	Erosion	Channel widening	Streambed alteration
Increased volume	•	•	•	•	•
Increased peak flow	•	•	•	•	•
Increased peak flow duration	•	•	•	•	•
Increased stream temperature		•			
Decreased recharge causing decreased base flow		•			
Changes in sediment loadings	•	•	•	•	•
Subsequent impacts	The above consequences result in loss of ecological integrity and a significant reduction in the purification ability of natural water systems				



Worldwide, at least one third of all developed urban land is devoted to roads, parking lots, and other motor vehicle infrastructure (NRDC website).

Table 5.2: Pollutants of concern in urban stormwater runoff (adapted from NRDC website)

Pollutant	Source¹	Examples
Heavy metals	<ul style="list-style-type: none"> • Transport 	Refer to Table 5.4
Organic chemicals	<ul style="list-style-type: none"> • Transport. 	Oil, petrol, grease
	<ul style="list-style-type: none"> • Roadsides, homes, golf courses, cemeteries, and public parks. 	Pesticides
Pathogens	<ul style="list-style-type: none"> • Sewage from leaks, inadequately serviced areas and illegal connections. • Pets and wild animals, for example, bird life in parks. 	Viruses, bacteria, protozoa
Nutrients	<ul style="list-style-type: none"> • Sewage from leaks, inadequately serviced areas and illegal connections. • Fertilisers used at home and on golf courses, cemeteries, and public parks. • Decaying garden refuse. • Pets and wild animals, for example, bird life in parks. • Burning of fossil fuel. 	Nitrogen, phosphorus
Biochemical/chemical oxygen demand (BOD/COD)	<ul style="list-style-type: none"> • Road sides, homes, golf courses, cemeteries, and public parks, 	Grass clippings, fallen leaves, human and animal waste
	<ul style="list-style-type: none"> • Transport 	Hydrocarbons
	<ul style="list-style-type: none"> • Sewage from leaks, inadequately serviced areas and illegal connections. 	Human waste
Total suspended solids (TSS)	<ul style="list-style-type: none"> • Inadequately maintained gardens. Unpaved roads. • Construction sites. 	Sand, soil, and silt
Total dissolved solids (TDS)	<ul style="list-style-type: none"> • Mining (including abandoned and derelict sites in urban areas) 	<ul style="list-style-type: none"> • Cations: Sodium, calcium, magnesium and potassium • Anions: chloride and sulfate
Aesthetic	<ul style="list-style-type: none"> • Inadequate street cleansing. • Accepted social behaviour. 	Litter, illegal dumping

1: Industry is a potential source of all pollutants listed (refer to Table 5.3 for details on specific industries)

Table 5.3: Potential pollutants of concern from industry¹ (adapted from Dallas and Day, 1993)

Industry	Pollutant/parameter									
	TDS	TSS	BOD/COD	pH	Heavy metals	TO ²	Colour	Nutrients	FOG ²	Temp ²
Detergents/soaps	•	•	•	•		•		•	•	•
Chemical	•	•	•	•	•	•	•	•		•
China-clay mining)	•	•		•	•					
Dairy	•	•	•	•			•	•	•	•
Fertiliser	•	•		•	•			•		•
Fish processing		•	•					•	•	
Food canning		•	•	•			•	•	•	•
Mining	•	•		• ³	• ³			•		
Oil refinery	•	•	•	•	•	•	•	•	•	•
Poultry	•	•	•	•				•	•	•
Pulp and paper	•	•	•	•	•	•	•			•
Red meat (including processing)	•	•	•	•			•	•	•	•
Sugar	•	•	•	•						•
Tanning/leather	•	•	•	•	•	•	•	•	•	•
Textile	•	•	•	•	•	•	•			•

Shaded cells: the predominant potential pollutant(s)

1: Pollutants from industry may enter the resource from direct discharge of industrial effluent to the water resource, discharge to sewer and subsequent leaks in the sewer network or stormwater runoff from contaminated industrial areas that has not been adequately contained.

2: TO: toxic organics FOG: fat, oil, grease TEMP: temperature

3: largely related to acid mine drainage in the gold mining industry.

Table 5.4: Source of heavy metals from transportation (adapted from NRDC website)

Source	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Zn
Petrol/diesel	•			•				•	•
Exhaust							•	•	
Motor oil & grease		•			•		•	•	•
Antifreeze					•				•
Undercoating								•	•
Brake linings				•	•		•	•	•
Rubber	•			•				•	•
Tarred surfaces				•			•		•
Concrete				•			•		•
Diesel oil	•								
Engine wear					•	•	•	•	•

Cd: cadmium

Co: cobalt

Cr: chromium

Cu: copper

Fe: iron

Mn: manganese

Ni: nickel

Pb: lead

Zn: zinc

Table 5.5: Sources of heavy metals from industry¹ (adapted from Dallas and Day, 1993)

Industry	As	Cd	Cr	Cu	Fe	Mn	Ni	Pb	Hg	Se	Ag	Sn	Zn
Alkalis, chlorine, inorganic chemicals		•	•		•			•	•			•	•
Detergents	•	•	•	•	•		•						•
Fertilisers and herbicides	•	•	•	•	•	•	•	•	•				•
Food processing										•	•		•
Glass, cement, asbestos products			•										
Non-ferrous metal works		•	•	•				•	•				•
Organic and petrochemicals		•	•		•			•	•			•	•
Petroleum refining		•	•	•	•		•		•				•
Photographic		•									•		
Pulp and paper			•	•			•	•	•				•
Steam generation plants			•					•					•
Steel works		•	•	•	•		•	•	•	•		•	•
Tanning/leather			•										
Textile			•										
Vehicle and aircraft plating		•	•	•	•		•		•	•	•		•

As: arsenic Cd: cadmium Cr: chromium Cu: copper Fe: iron Mn: manganese
Ni: nickel Pb: lead Hg: mercury Se: selenium Ag: silver Sn: tin
Zn: zinc

1: Heavy metals from industry may enter the resource from direct discharge of industrial effluent to the water resource, discharge to sewer and subsequent leaks in the sewer network or stormwater runoff from contaminated industrial areas that has not been adequately contained.

Effective management of the above impacts requires recognition that these impacts may be:

- direct as a result of a point source discharge;
- indirect (non-point sources of pollution) due to land based activities that have subsequent impacts on the resource e.g. construction sites may contribute increased sediment loads to surface water resources; landfill sites may contribute leachate to groundwater resources.

5.2 Motivation for IWRM and Local Authority IWRM status

IWRM is intended to enable us to meet the needs of our people for water, jobs and economic growth in a manner that also allows us to protect and, where necessary, rehabilitate our aquatic ecosystems (DWAF NWRS, 2004). IWRM has been declared a goal of water management at national, regional and catchment scales (Görgens, 1998) due to the increasing awareness in South Africa that water is limited and careful management should be applied (Seago et al., 2004). IWRM aims to:

- strengthen the linkages between the Catchment Management Strategy and environmental and social policies (Venter, 2004);
- improve information acquisition, management and dissemination (Venter, 2004);
- consider the direct and indirect effects that actions in one part of the catchment may have on another, as each component of the hydrological cycle (refer to Figure 5.1) must be managed with regard to its inter-relationships with the others (DWAF NWRS, 2004);

- ensure actions taken are not in conflict or in isolation of the actions taken by another agency, including Local Authorities (DWAF & WRC, 1996);
- ensure actions take other stakeholders into account (DWAF & WRC, 1996);
- encourage environmental awareness, participation, empowerment and local decision making, through education and training (Venter, 2004).

It is through IWRM, supported by an IWRMP, that a Local Authority should strive to achieve sustainable service provision and development while at the same time managing the impacts of current developments as described in Section 5.1 (refer to Box 2).

Box 2: The need for implementation of IWRM in and by Local Authorities

Society accepts a certain degree of impact and degradation in selected systems as a trade-off for economic benefits accruing from those activities that are leading to pollution of the resource (DWAF, Nov 2004).

Due to the intimate connection between water resources and land use, the sustainable development of either requires their management to be integrated (Görgens et al., 1998), which creates a dilemma as a different style of management to that traditionally used for resource exploitation is needed for resource protection (Rogers, 2000) i.e. Local Authorities are both impactors and regulators (Van Zyl, 2005).

Water serves many different purposes, functions and services and therefore requires holistic management on demands and threats to it (Mazibuko, 2004).

CONSENSUS

Sustainable development of land and water coupled with mitigation of anthropogenic-related impacts on water resources and requires coordinated and integrated planning within all sectors in Local Authorities, a process that cannot happen unaided i.e. IWRM implementation in Local Authorities is required.

The framework for IWRM in the Unicitys (metropolitan municipalities) and larger Category C municipalities has been established through their participation in Local Agenda 21 and City State of Environment Reports (DMA website). Selected policies and strategy documents that have been developed to operationalise the framework in three of the Unicitys are presented on the CD that accompanies this guideline. The list of documents on the CD is presented in Appendix B. These documents are not in a prescribed format and will facilitate other Local Authorities in the drafting of similar documents.

IWRM in the smaller Local Authorities (Category B and certain Category C municipalities) is not as advanced as that of the larger ones above. A situation assessment in a district municipality cited several reasons for this (Moepe, 2005):

- unclear institutional responsibility leading to unaccountability;
- DWAF still provides the water services provider function due to the state of flux in some municipalities;
- high unaccounted for water coupled with low revenue collection (<15% of water produced generates revenue);

- outdated bylaws still in force.

5.3 Management tools including authorisation of water use

Tools for achieving IWRM are available to the three tiers of government. These tools facilitate to management of pollution at source. Source control is a far more efficient and cost effective way of dealing with pollution e.g. the removal of a greater proportion of heavy metals by industry at source, rather than disposal to sewer for removal by the Local Authority, may result in a Local Authority being able to beneficially use its sewage sludge as opposed to having to dispose of it, which is cost ineffective (Hinsch, 2003). Management tools available to the three tiers of government are presented in Table 5.6. Local Authorities should refer to the Water Management Area based tools and approaches e.g. Internal Strategic Perspective, Catchment Management Strategy etc. (refer to Figure 4.1) in the development of their own tools to ensure alignment with provincial and national government.

Table 5.6: Water use management tools available to the three tiers of government

Tool	National	Provincial	Local
Water use authorisations	Section 21 water use authorisation for all users of the water resource (refer to Table 5.7) - compulsory licensing will come into effect once the CMAs are established.	-	• Industrial effluent permits for discharge to sewer
Standards	Resource Water Quality Objectives - quality and quantity	-	Standards or limits set in the bylaws
Environmental authorisations	-	• Environmental impact assessment process • Environmental Management Programmes for mines	-
Plans/Strategy	• National Water Resource Strategy and associated strategies • Environmental Implementation Plan/Environmental Management Plan ¹	• IDP • Environmental Implementation Plan	• IDP • Water Services Development Plan • Integrated Waste Management Plan • IWRMP
Water use charges	• Water Resource Management charge • Waste discharge charge system	-	• Industrial effluent tariffs • Potable water use and sewer charges • Stormwater management levy ²
Non legally binding measures to enhance voluntary compliance with regulations (DWAF, 2003)	Guidelines, awareness raising and educational programmes	Guidelines, awareness raising and educational programmes	Guidelines, awareness raising and educational programmes

1: Local Authorities are not required to prepare an Environmental Management Plan at present, but some Local Authorities are preparing an Environmental Management Plan and establishing Environmental Management Systems following the ISO14001 standards (DEAT, 2004).

2: Provision for a stormwater management levy can be made in the by-laws but no local authority has yet taken this step.

Authorization of a Local Authority's Section 21 Water Uses gives the Local Authority a legal entitlement to use water and may require registration of the use under the General Authorisations (GA) in terms of Section 39 of the NWA or a water use licence. Certain conditions apply to a water use authorisation, including the period for which the authorisation is applicable and the conditions that will ensure that the activity does not have a negative impact on the resource. Failure to comply with the conditions may result in:

- the issuing of a directive by DWAF/CMA, which will require the necessary action(s) to be taken to ensure compliance with the conditions;
- withdrawal of the licence;
- prosecution, but only as a **last resort**.

Table 5.7: Section 21 Water Uses (DWAF, March 2000 and December 2000, Government Notice No. 399 in Appendix A)

Category	Use	Description (adapted from DWAF, 2000)
Section 21 a	Abstraction of water from a water resource	<ul style="list-style-type: none"> • Usually involves pumping of water from a dam, river or borehole. • Nationwide, the greatest volume of water is taken for the purpose of irrigated agriculture. • The use is covered under the GA if less than 50 cubic metres (m³) are abstracted from surface water on any given day or less than 10 m³ from groundwater on any given day (certain water stressed tertiary/quaternary drainage regions are excluded from the GA – refer to Appendix A).
Section 21 b	Storage of water (not containing waste)	<ul style="list-style-type: none"> • Refers to water that is stored in a dam, reservoir or other impoundment. • The storage dam can be in a watercourse, or off channel. • Commonly the stored water is from natural runoff or river water. • This water use is only applicable to clean water. • Weirs built on rivers may also store water, unless there is an outlet for drainage under low flow conditions. These structures must comply with the Dam Safety Regulations – Section 12 of the NWA: a dam wall height of more than 5 m and storage capacity of more than 50 000 m³ constitutes a safety risk. • The use is covered under the GA if less than 10 000 m³ of water are stored (refer to Appendix A).
Section 21 c	Impeding or diverting the flow of water in a watercourse	<ul style="list-style-type: none"> • Bridges, pipeline crossings and gauging weirs constitute a 21c water use. • If there is storage behind the weir under low flow conditions, then the water use is considered to be a 21b water use. • The use is covered under the GA (refer to Appendix A) if the structure does not exceed a height of 2 m, a foundation width of 15 m or length across the watercourse of 20 m and is not within 500 m of another impedance or diversion.
Section 21 d	Engaging in a stream flow reduction activity	<ul style="list-style-type: none"> • Commercial afforestation is currently the only activity declared to be a stream flow reduction activity. • This use does not currently apply to Local Authorities.
Section 21 e	Engaging in a controlled activity	<ul style="list-style-type: none"> • Currently, the following are controlled activities: <ul style="list-style-type: none"> - irrigating with waste water, for example, treated sewage effluent (this can be a productive use of water if a crop is grown with the wastewater); - modification of atmospheric precipitation (cloud seeding); - power generation which alters the flow regime of a water

Category	Use	Description (adapted from DWAF, 2000)
		<p>resource;</p> <ul style="list-style-type: none"> - intentional recharge of underground water with wastewater. • The use is covered under the GA for variable daily volumes (2000 m³, 500 m³, 50 m³) depending on the quality of the effluent – refer to Appendix A. Areas within the 1:100 year floodline, 100m from the edge of a water resource or overlying a major aquifer are excluded from the GA
Section 21 f	Discharging of waste or water containing waste into a water resource partially through a pipe, canal, sewer, sea outfall or other conduit	<ul style="list-style-type: none"> • Includes waste released into a river or dam at a discharge point such as wastewater from wastewater treatment plants and factories. • The discharge must comply with the General Limit or Special Limit and/or specific licence conditions. • Waste discharged into a municipal sewer is NOT included in this water use: Industrial effluent discharged to sewer is a Schedule 1 activity and no licence is required. • The use is covered under the GA if less than 2 000 m³ of wastewater are discharged, however, the discharge must still be registered and comply with the General or Special Limits (certain water stressed tertiary/quaternary drainage regions are excluded from the GA – refer to Appendix A).
Section 21 g	Disposing of waste in manner which may impact on a water resource	<ul style="list-style-type: none"> • This is typically disposal that takes place into on-site facilities such as: <ul style="list-style-type: none"> - french drains, conservancy tanks, pit latrines and soak-aways. - wastewater treatment systems, such as oxidation ponds that do not have an outlet into a water resource (if the oxidation pond has an outflow into a river or dam, it is defined as a 21f water use). - evaporation dams. • The use is covered under the GA if less than 50 m³ of domestic wastewater or biodegradable industrial wastewater are disposed of on any given day, 500 m³ are stored for re-use or 1000 m³ are stored for disposal.
Section 21 h	Disposing of water which contains waste from, or which was heated in, any industrial or power generation process	<ul style="list-style-type: none"> • Refers specifically to the temperature of the wastewater, which may have a significant effect on the environment. • The discharge must comply to either the General Limit or Special Limit • The use is covered under the GA if less than 2 000 m³ of wastewater are discharged and the temperature of the receiving water resource does not change by more than 3 degrees Celsius or 2 degrees Celsius for a listed resource (refer to Appendix A). • The discharge must still be registered (certain water stressed tertiary/quaternary drainage regions are excluded from the GA – refer to Appendix A).
Section 21 i	Altering the beds, banks, course or characteristics of a watercourse	<ul style="list-style-type: none"> • Refers to the physical changes that are made to a watercourse, for example to widen or straighten the channel of a river. The river channel is usually reconstructed or replaced with a canal that may extend for several kilometres from the original course. • Alteration of the bed and banks is usually needed for construction and infrastructure development near or across a river. • Sand mining is another common example of this water use. • The use is covered under the GA (refer to Appendix A) if the structure does not exceed a height of 10 m, a foundation width of 10 m or a length of 50 m and is not within 500 m of another alteration.
Section 21 j	Removing, discharging or disposing of water found underground if it is necessary	<ul style="list-style-type: none"> • Applicable to construction sites that require underground water to be removed. • Necessary to ensure safety in underground mining.

Category	Use	Description (adapted from DWAF, 2000)
	for the efficient continuation of an activity, or for safety of people	<ul style="list-style-type: none">• The use is covered under the GA (refer to Appendix A) if less than 50 m³ of water are removed on any given day.
Section 21 k	Using water for recreational activities	<ul style="list-style-type: none">• This water use refers to organised water sports, fishing competitions, floating restaurants etc.• The recreational activity of a person who has lawful access to a water resource is defined in Schedule 1 of the NWA as permissible water use and need NOT be registered.

6 Global implementation of IWRM

A summary of the various global IWRM approaches identified in the development of the Guideline is presented in this section for information and as a matter of interest.

IWRM is at various stages of implementation but there are common elements in all the approaches reviewed due to international recognition that water is a finite resource that has to be managed if there is to be adequate supplies of appropriate quality for current and future generations:

- constraints to implementing IWRM and measures identified to resolve the constraints are similar in most countries, a primary constraint being the limited integration between land use planning and water management;
- the widely accepted tools for regulating water use and managing pollution are policies/strategies/plans (voluntary controls), water use charges/levies/taxes (financial controls) and licences/permits (regulatory controls);
- licences are primarily used to control abstraction, and in general licences/permits are for single use, usually abstraction, with conditions attached - this highlights South Africa progressive identification of 11 water uses that require authorisation;
- stakeholder participation is widely practised and encouraged.

Aspects from the different approaches that may be pertinent to Local Authorities in South Africa are presented in **Table 6.1** and two relevant lessons learnt from the implementation of IWRM in Africa are presented in Box 3. Where appropriate, the various aspects have been incorporated into the IWRMP framework in Section 0.

Box 3: Lessons learnt from implementation of IWRM in Africa

IWRM relies heavily on community participation: In Tanzania, recent water reforms tend to bypass and ignore the contribution of customs, norms, traditions and local initiatives in the management of water. This was highlighted by a directive for cutting of alien riparian tree species, especially *Eucalyptus spp.* - cutting of trees is in conflict with the local custom (Sokhile, 2005).

IWRM requires adaptability and change management: This realisation has been aptly described by a local community member involved in community based projects: “For everything we do wrong we do two or more things right and we learn this way. Just like a child who walks for the first time falls down often but then he can run and nobody will catch him he is so fast” (Schoeman, 1997).

Table 6.1: Approaches to IWRM across the globe that are pertinent to Local Authorities in South Africa

Country/region/association	Aspect	Reference
Views/opinions of international association		
The International Association for Water Quality and the World Bank	Critical components for the success of IWRM have been identified as openness, effective communication, a widely accepted goal, integrated planning, sound project management and action in all areas.	IAWQ, 1994, Briscoe, 2003
International Water Association	Regardless of technological advances, the big changes in the sustainable implementation of IWRM are going to be made in the political arena.	Rouse, 2004.
General approaches and stormwater management		
Australia	<ul style="list-style-type: none"> • WRM committees based at catchment level and involving communities, drive IWRM with lead government agencies playing a facilitating role. • Benefits of implementing IWRM derive from a continuous experiment-review-feedback cycle. • Constraints to implementing IWRM have been identified: <ul style="list-style-type: none"> - uncertainty, self-interest and conflicting values; - limited budget, human resources and time; - political pressure applied by all players in the political landscape. • Western Australia has developed a Stormwater Delivery Approach, which includes best management practices (BMPs) for managing quality and quantity of stormwater that make the most of nature's drainage abilities so as to minimise the use of artificial drainage systems. • Stormwater associations and utilities have been established to improve stormwater management (refer to United States below). 	<p>DWAF & WRC, 1996</p> <p>Gilmour, 1999</p> <p>WA government website).</p>
European Union (EU)	<ul style="list-style-type: none"> • An EU Water Framework Directive was designed in 2000 to improve and harmonise water resource management in the EU member countries. • All EU countries are required to align their water management legislation with the Directive. 	Rahaman et al., 2002 Jarvis, pers. comm., 2005
United Kingdom	In addition to WRM strategies, water use licences and charges, government backed public/private/volunteer partnerships have been implemented to achieve IWRM.	Waters Northwest, 2002
Germany	In Germany IWRM is through public agencies at state level. An intensive exchange of information (communication) allows each state to benefit from the experiences of others.	IISD, 1994
United States	<ul style="list-style-type: none"> • IWRM varies in the different states but tools include abstraction permitting/licensing, non-point source control, point source permitting/licensing and user-fee-based revenue generation. • Recommendations for improving IWRM have been made and include a requirement for local governments to rely on the water management district's needs and sources assessments to assure water availability prior to land use commitment (an important point for South African Local Authorities where water services are not necessarily keeping pace with the rapid development that is currently occurring). • Stormwater associations and utilities have been established in Australia and America to promote: <ul style="list-style-type: none"> - the use of more appropriate and effective stormwater management practices; - the adoption of common standards and policies, - to help reduce inequities as well as to minimise the economic, social and environmental costs being borne. • Some success has been achieved to date due to the cooperation between the key players in allocating responsibilities and accountability, and the efficient pooling of available resources. 	<p>WRC/DWAF, 1996; ISSD, 1994</p> <p>Wade, 1996</p> <p>Spitzer 2003, Florida and Stormwater Association websites</p>
United States cont.	<ul style="list-style-type: none"> • A stormwater fee is levied to assist in the management of stormwater systems and lakes and the associated ecology. 	Spitzer 2003
Timor-Leste (Asia)	Timor-Leste is a developing country and is currently not implementing	Asian

Country/region/ association	Aspect	Reference
	IWRM as the focus is on the operational needs of water services and sanitation. However, the Asian Development Bank is assisting Timor-Leste to achieve IWRM through a technical assistance programme whereby appropriate legislation is developed, water use licensing is implemented and capacity is built.	Development Bank, 2002
Sub-Saharan Africa	<ul style="list-style-type: none"> • At the catchment and sub-catchment level, IWRM in the developing world is normally a mix of formal and informal institutions. The informal institutions have largely evolved in local communities in response to the prevailing situations. • The reality of the coexistence and interdependence of formal and informal arms is inescapable, and there is therefore a potential for the forging of partnerships between regulating bodies and local communities. These partnerships may be constrained by institutional contradictions, power struggles, bypass and duplication of activities unless a specific effort is made to foster harmony within and between the multiple institutional frameworks. • The need to build the capacity of water managers, users and other stakeholders on the importance of both formal and informal institutions at the catchment and grassroots level specifically has been identified. 	Sokhile 2005 Breen, 2004
IWRM tools: charges and licences		
France	A compensation system, known as the subsidy for wastewater treatment, was introduced to offset the water pollution charge for those persons or bodies who treat wastewater before discharging it into rivers and lakes. This measure has acted as an economic incentive for polluters to take steps to avoid the deterioration of water quality.	IISD, 1994
Netherlands	<ul style="list-style-type: none"> • A survey carried out among 150 larger companies showed that 66 % of companies took measures to curb discharges due to the water use charge and 24 % due to licence conditions. • Charges have been identified as less labour-intensive than enforcing licence conditions due to the practical difficulty of gathering the necessary evidence to prove non-compliance. 	IISD, 1994
Germany	<p>In Germany success of the water use charges has been limited due to:</p> <ul style="list-style-type: none"> • environmental externalities not being factored into the true value of water resources; • the water use, as opposed to the origin of the water, being used as a basis to determine the rate, thereby reducing the environmental effectiveness of a resource charge. <p>However results indicate that the charges contribute to:</p> <ul style="list-style-type: none"> • capacity building; • prove to be environmentally effective in changing abstraction patterns and reducing the amount of water used; • provide sustainable revenue, thus combining incentive and fiscal functions. 	IISD, 1994
Canada	Water use charges put pressure on municipalities to comply with sustainable development.	Manitoba, 2000

7 Institutional arrangements and responsibilities

The Local Authority functions that require integration for the achievement of IWRM were identified in Phase 1. These functions are presented in Table 7.1.

The functions of the respective departments are not all ring-fenced, resulting in duplication and gaps. For the smaller Local Authorities there may only be a few people carrying out all the IWRM functions and in the larger Local Authorities the institution may be too large for effective internal coordination, a process requiring coordination of general management issues as well as technical issues (Mazibuko, 2004). The solutions proposed for this dilemma include:

- appointment of a dedicated coordinator/champion to ensure that both the necessary integration and stakeholder involvement takes place;
- formation of partnerships with business, industry, non-governmental organisations (NGOs) and communities to facilitate implementation of IWRM within the Local Authority area – examples are presented in Box 4.

Table 7.1: Local Authority functions pertaining to IWRM (adapted from van Zyl, 2005)

Functions where the core concern is largely water	Responsible Department	Integration: Coordinator/champion at upper management level	Functions where the core concern is NOT water	Responsible Department
Water supply	Water Engineering		Environment	Environmental Services/ Planning
Sanitation services	Wastewater Department		Waste management	Waste Division
Water meters	Treasury Department		Health	Health Services
Storm water	Roads		Regulation	Metro Police
River and recreation	Parks and Recreation		Disaster management	Disaster Unit / Fire Brigade
Monitoring systems, including water quality monitoring	Technical Services / Environmental Services		Asset management	Finance
Demand and conservation management	Water and Wastewater/ Environmental Services		Budget, financing, tariffs and cost recovery	Treasury Department
Integrated water quality management	Environmental Services		Decision making and budget allocation	Council
Water resources planning (component of WSDP)	Water and Wastewater/ Environmental Services		Project implementation	Project units
		Economic growth and development	Town and Regional Planning	
		Customer care	Communication	

Selected Local Authority structures incorporating the majority of the above functions are presented in Appendix D. Cape Town has a catchment management team that fulfils the role of co-ordinator to a certain extent. This role however, currently does not extend to all the functions in Table 7.1.

The specific roles and responsibilities of the respective departments in the completion of an IWRMP, and thus their roles in IWRM, are described in Section 0. However, as indicated in Section 4, the

Schedule 4 and 5 responsibilities of Local Authorities are not uniformly applied and inconsistencies exist. Therefore the identified roles in the preparation of the IWRMP will need to be fine tuned for each Local Authority in consultation with the CMA and relevant provincial and national departments. The clarification of roles is considered as one of the primary roles of the coordinator/champion. Other roles of the coordinator/champion include, but are not limited to:

- identification of all the role players within the Local Authority including Councillors and those at CMA, provincial and national level;
- identification of stakeholders, particularly those with whom partnerships could be formed;
- coordinating and facilitating awareness creation and training of officials and Councillors;
- assessing available information – raw data, policies, strategies, plans, projects etc pertaining to IWRM – and identification of gaps;
- coordinating and facilitating communication of information to all role players and stakeholders;
- facilitating involvement of the Local Authority in all forums/committees related to IWRM or establishing such committees where none exist.

Box 4: Partnerships

The formation of partnerships between the Local Authority and business, industry, NGOs or communities has several benefits including the provision of additional resources to the Local Authority for little, if any cost, improved relations with the Local Authority and a sense of ownership by business, industry and communities with the consequent improvement of local areas. The success of these partnerships requires commitment from both sides, clearly defined responsibilities and expectations and open communication channels.

Examples:

Community Improvement Districts are public private partnerships between Local Authorities and communities, including business and industry, in a geographically defined area (Saporta, 2005). Community Improvement Districts operate as non-profit companies (Cape Town website) and are a means for a community to participate in the planning, implementation and management of services supplied by the Local Authority thus creating an improved environment within the community (Saporta, 2005 and Hoppe, 1998). In Cape Town, Joburg, EThekweni and Tshwane growing numbers of Community Improvement Districts are being established, most of which have security, clearing of litter and stormwater management as the main management issues (Kagiso, pers. comm.). The role of Community Improvement Districts in IWRM is yet to be explored.

Community water management partnerships such as that between Sedibeng Water (water service provider), Heuningvlei community and the Local Authority and industry used a participatory approach to transfer skills and knowledge to the community to facilitate the management of their water supply and broader environmental issues (Basson et al., 2004)

Industry/Local Authority partnerships such as that between the metal finishing industry and EThekweni Local Authority enabled industry to comply with the Durban Metropolitan Sewage Disposal Bylaws standards (Braun, 2004). Barriers that had to be overcome included the attitude between the industries and the DMA, which now has a transparent and open door working relationship with the industries, which helps to maintain cooperation and achievement of commonly agreed goals. Success has relied on a hybrid of command and control, financial incentives, cooperation, use of best available technology and cleaner production.

8 IWRMP layout and contents

The required content of the IWRMP is provided in the checklist in Table 8.1. Once each section has been completed according to the guidelines below, the box in the checklist can be ticked. Where overlaps with the Water Services Development Plan and the Integrated Waste Management Plan occur, it is recommended that cross-reference to the Water Services Development Plan or Integrated Waste Management Plan is made. Conversely, during revision of the Water Services Development Plan and Integrated Waste Management Plan appropriate cross-reference to the IWRMP should be made. If, however, any of the information required by the IWRMP is inadequate or missing in the Water Services Development Plan or Integrated Waste Management Plan, it should temporarily be included in the IWRMP until such time as this information has been adequately addressed in the appropriate document, most likely during the revision period.

The IWRMP should be used as the technical supporting document when application for a water use authorisation is made. Alignment with the Catchment Management Strategy is crucial and in the event that the Catchment Management Strategy has not yet been developed, the IWRMP should be aligned with the National Water Resource Strategy with the intention that the IWRMP will inform the future development of the Catchment Management Strategy.

Due to the comprehensive and thus resource intensive nature of the IWRMP, it is recommended that for the less resourced Local Authorities, the checklist be used to identify integrated water resource management priorities for development of a preliminary IWRMP. Time frames should then be set for adding to the preliminary IWRMP until a comprehensive IWRMP has been developed. For example, a Local Authority that has groundwater as the primary water supply source, should initially focus on the groundwater aspects of the IWRMP.

The level of detail in each layer of the IWRMP and the time frame set for the preparation of a detailed, high level IWRMP will depend on both the priorities set and the financial resources available. There should be a clear understanding of the above prior to initiating the IWRMP process to ensure that all parties involved in the preparation of the various components of the IWRMP are working towards a common IWRMP.

Table 8.1: Checklist for the preparation of an IWRMP

Item	Item	Completed ¹	Information source ²	Section ref. To WSDP	Section ref. to IWMP
1	Introduction				
	Local Authority's IWRM objectives				
2	Local Authority details				
2.1	Locality plan				
2.2	Local Authority organogram and contact details of the responsible person/champion/coordinator for IWRM and/or all related functions				
3	Baseline information				
3.1	Topography, climate and environmental setting				
3.2	Layout of the Local Authority showing settlements (formal and informal) and other land uses e.g. commercial, industrial, parks etc				
3.3	Demographics (socioeconomic characteristics of the settlements)				
3.4	Regional (CMA) perspective				
4	Legal framework				
4.1	Summary of all Section 21 water uses within the jurisdiction of the Local Authority				
4.2	Motivation for any exemptions from the requirements of Regulation 704 (mining regulations) or any other applicable regulations				
5	Surface water situation assessment				
5.1	Description of the catchment(s), water management area and resource class				
5.2	Hydrology:				
5.2.1	Flow data				
5.2.2	Mean annual runoff (WR90)				
5.2.3	Dry weather and peak flows (WR90)				
5.2.4	Location of floodlines for the 1:50 and 1:100 year storm events				
5.3	Surface water users				
5.4	Surface water quality				
5.4.1	Surface water monitoring programme				
5.4.2	Biomonitoring programme (river health)				
5.4.3	Air quality monitoring programme				
5.4.4	Description, coordinates and location of monitoring points				
5.4.5	Overview of surface water quality, quantity and river health				
5.4.6	Identification of areas of concern and potential pollution sources				
6	Groundwater situation assessment				
6.1	Overview of geology of the area				
6.2	Database of abstraction and monitoring boreholes				
6.3	Aquifer parameters and aquifer test data				
6.4	Ground water users				
6.5	Groundwater quality				
6.5.1	Groundwater monitoring programme (quality and quantity)				

Item	Item	Completed ¹	Information source ²	Section ref. To WSDP	Section ref. to IWMP
6.5.2	Description, coordinates and location of all groundwater monitoring points				
6.5.3	Overview of groundwater quantity and quality				
6.5.4	Identification of boreholes of concern (quantity and quality) and potential pollution sources				
7	Water use and management				
7.1	Water supply				
7.2	Potable water storage				
7.3	Sewage including industrial effluent discharges to sewer				
7.4	Stormwater				
7.5	Grey water (urban runoff from underserviced/unserved area)				
7.6	Diversions, alterations and river crossings				
7.7	Potential emergency/contingency discharges				
7.8	Removal of underground water from construction sites and basements				
7.9	Recreational water uses				
7.10	Water balance				
8	Waste management				
8.1	Domestic				
8.2	Industrial				
8.3	Hazardous				
8.4	Other wastes				
9	Quantitative risk assessment				
9.1	Possible impacts to the environment				
9.2	Risks to the environment				
9.3	Risks to human health				
9.4	Cumulative risk assessment				
9.5	Key performance areas (KPAs) and indicators (KPIs)				
9.6	Performance monitoring				
10	Management systems and strategies				
10.1	Environmental management				
10.2	Catchment management				
10.3	Water conservation /water demand management.				
10.4	River and wetlands				
10.5	Groundwater recharge and protection				
10.6	Land				
10.7	Pollution control				
10.8	Co-operative governance				
10.9	Community/stakeholder participation				
10.10	Emergencies and contingencies				
11	Prioritisation of projects:				
11.1	Methodology and selection criteria				
11.2	Rehabilitation and mitigatory measures: management options to mitigate impacts and risks (refer to Box 6 in Section 0)				
11.3	Budget provision and alternative funding sources				
11.4	Work creation and poverty alleviation				

Item	Item	Completed ¹	Information source ²	Section ref. To WSDP	Section ref. to IWMP
11.5	Identified projects list				
11.6	Time frames for implementation				
12	Operational management				
12.1	Project planning, implementation and management				
12.2	Operation and management				
12.3	Records of staff training				
12.4	Education and awareness (services and pollution control)				
12.5	Partnerships with residents, NGOs, business etc				
12.6	Communication				
12.7	Records of correspondence with other Regulatory Authorities				
12.8	Recording and reporting of incidents				
12.9	Auditing and reporting (internal and external auditing)				
13	Outstanding information				
	List all items and time frames for inclusion in the IWRMP				

1: List of outstanding information is included under Item No. 13.

2: Identify Local Authority Department or the applicable provincial or national government department, database or document e.g. National Water Resource Framework, Catchment Management Strategy etc.

The guideline format for completion of each section required in the IWRMP is presented below. The format is a guideline only, hence can be adapted to the needs and priorities of each Local Authority allowing for customisation of the IWRMP.

The identified roles and responsibilities will need to be fine tuned for each Local Authority in consultation with the CMA and relevant provincial and national departments as discussed previously in Section 0. In terms of the Constitution, additional roles may be allocated to Local Authorities if resources are available. Under these circumstances the identified roles and responsibilities will need to be revised.

Item No.	Item	Location in WSDP, Revision 9 ¹
		Requirement of IWMP ²
Information source and detail required		
Roles and responsibilities		
	Local Authority (LA) Department	Responsibilities
	CMA	Responsibilities
	Provincial government department	Responsibilities
	National government department	Responsibilities

1: The information required in the WSDP is noted. Where the same or more detailed information is required in the WSDP, the information need not be duplicated in the IWRMP – simply cross reference to the WSDP.

2: The IWMP has no prescribed format so a section reference cannot be given in the guideline. Where the same or more detailed information is required in the IWMP, the information need not be duplicated in the IWRMP – simply cross reference to the IWMP.

8.1 Introduction

8.1.1	Local Authority's IWRM objectives		WSDP: E1-E4 ¹
			IWMP: Yes ²
<ul style="list-style-type: none"> • Consolidate objectives from the IDP related to integrated water resource management i.e. all objectives that relate to water and sanitation service provision, stormwater management, waste management, land use, pollution control and water conservation /water demand management. • Describe the provincial growth and development strategies and/or objectives of the Provincial Environmental Implementation Plan/ Environmental Management Plan incorporated into the IDP that impact on integrated water resource management. • Describe the principles and objectives incorporated into the IDP from the CMA's Catchment Management Strategy (or those of the catchment management forum charter where the CMA is not yet established) or the National Water Resource Strategy and National Waste Management Strategy. • Describe any secondary integrated water resource management objectives that arise from the primary objectives above. • Generic objectives are presented in Box 6 in Section 0. 			
Roles and responsibilities			
LA: Planning with input from Environmental Management		Collate the integrated water resource management objectives from the IDP. Amend the objectives if necessary to align with the Catchment Management Strategy, provincial and national objectives referred to above and include in the IDP during the next revision.	
CMA		Assist in alignment to the Catchment Management Strategy	
Provincial		None	
National		None	

1: WSDP requirements include objectives for water and sanitation service provision, water conservation /water demand management, and resource protection, which could be defined as incorporating the IWRM aspects of stormwater management, waste management, land use and pollution control.

2: As there is no standardised format for the IWMP, objectives related to the IWRMP may vary between Local Authorities or may still need to be included in the IWMP.

8.2 Local Authority's details

8.2.1	Locality Plan	WSDP: D1 ¹
		IWMP: No
<ul style="list-style-type: none"> Show the regional location, water management area and Local Authority boundary. Show neighbouring Local Authorities and the District Municipality, where applicable. 		
Roles and responsibilities		
LA: Planning/GIS	Draft locality plan	
CMA	Provide the plan if available	
Provincial	None	
National	None	

1: Required by the WSDP but include in the IWRMP for reference unless the IWRMP is completed as a chapter of the WSDP.

8.2.2	Local Authority organogram and contact details of the responsible person for each function and the champion/coordinator for IWRM	WSDP: F7.1 ¹
		IWMP: No
<ul style="list-style-type: none"> Show how the IWRM functions in Table 7.1 fit into the overall structure of the Local Authority. Indicate links to other areas with shared responsibility e.g. waste management may fall under several departments depending on where the waste is: streets – Waste Department is responsible; parks – Parks and Recreation is responsible. Indicate staffing levels and vacant posts. 		
<p>The diagram illustrates shared responsibility between two departments. Each department is represented by a table with columns for 'posts filled', 'vacant', and 'Name' (with 'Cell no./email' as a sub-column). A dashed line connects the 'vacant' cells of both departments, labeled 'Shared responsibility e.g. waste removal'. Below this, a 'COORDINATOR (show links with all IWRM departments)' table is shown with columns for 'Name' and 'Cell no./email'.</p>		
Roles and responsibilities		
Human resources	Draft the organogram and include staffing details.	
LA: All departments on the organogram	Indicate links and provide name and contact details of responsible persons. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA	If capacity is lacking in the Local Authority, the coordinator/champion may be located at CMA level	
Provincial: DPLG or DACEL	If capacity is lacking in the CMA, at least one coordinator/champion should be appointed at provincial level. Environmental Management Inspectors could take on the role of coordinator/champion as their mandated role includes many IWRM aspects, although their mandate is under NEMA (refer to 4.2).	
National: DWAF	Train the coordinator in the implementation of IWRM	

1: Name and staffing levels of water services provider, support service agents and sanitation promotion agent is required but not the details of the contact persons.

8.3 Baseline information

8.3.1	Topography, climate and environmental setting	WSDP: D3 ¹
		IWMP: No
<ul style="list-style-type: none"> Describe the topography of the Local Authority area e.g. flat land interspersed with ridges, coastal etc. Include annual rainfall, evaporation, wind and temperature data from the nearest weather station for the period available. Ensure correlation with the Catchment Management Strategy. 		
Roles and responsibilities		
LA: Planning	Describe topography.	
LA: Environment	Obtain and interpret weather station data.	
CMA	Provide information if available.	
Provincial	None	
National	None	

1: WSDP requirements include all of the above except for wind. Wind data is required as wind can carry dust and other air borne pollutants, which can be deposited in surface water resources.

8.3.2	Layout of the Local Authority showing settlements (formal and informal) and other land uses e.g. commercial, industrial, parks etc.	WSDP: D2, D3.4 ¹
		IWMP: No
<ul style="list-style-type: none"> General land use within the Local Authority jurisdiction can be obtained from 1:50 000 maps and the specifics can be obtained from the IDPs and Local Authority databases. Include description of settlements (informal, formal) Include recently rezoned land that has not yet been developed e.g. farmland rezoned as urban development. Include catchments and sub-catchments on the layout, which should be available from the Roads Department through its stormwater management mandate, the CMA or DWAF. Identify land uses that have the potential to generate pollution sources. Include point sources e.g. sewage treatment plants and non point pollution sources e.g. golf courses, mines etc. 		
Roles and responsibilities		
LA: Planning/GIS	Plot the layout.	
LA: Environment	Identify potentially polluting land uses.	
CMA	Provide information if available.	
Provincial	None	
National	None	

1: Land use is required in the WSDP but not catchments.

8.3.3	Demographics (socioeconomic characteristics of the Local Authority)	WSDP: D4, F1 ¹
		IWMP: No
<ul style="list-style-type: none"> • Include number of households per km², approximate number of residents per household and income distribution or poverty levels. • Include broad overview of health status and level of education. • Describe regional and local economy and future predictions. • This information should be available from the IDP, Provincial Growth and Development Strategy, the latest census data, Central Statistical Services or SA Explorer on www.demarcation.org.za. • The demographic data will provide a baseline from which the socioeconomic aspects of IWRM can be addressed, e.g. equitable access to resources, employment creation, empowerment of women, bad buildings, the extent of informal settlements etc. 		
Roles and responsibilities		
LA: Planning	Collate demographic data.	
CMA	Provide information if available.	
Provincial	Provide health statistics if requested (primary health care is now a responsibility of Province although service agreements between Local Authorities and Province require Local Authorities to continue with existing facilities – Qomfo, 2005)	
National	None	

1: The above information is more detailed in the WSDP.

8.3.4	Regional (CMA) perspective	WSDP: D5 ¹
		IWMP: No
<ul style="list-style-type: none"> • Description of the region including neighbouring Local Authorities, towns and villages. • Description of the existing regional cooperative governance relationship in terms of IWRM. • An understanding of the regional perspective is important to ensure alignment with catchment and provincial initiatives/visions. 		
Roles and responsibilities		
LA: Environment, Planning	Collate information from all relevant sources relating to the regional perspective.	
CMA	Provide information if available.	
Provincial	None	
National	None	

1: The above information is included in the WSDP.

8.4 Legal framework

The legal framework for IWRM is discussed in Section 5.3 and Section 4.

8.4.1	Summary of Section 21 water uses		WSDP: F3.1.1.2 ¹												
			IWMP: No												
<ul style="list-style-type: none"> • Tabulate all Local Authority Section 21 water uses as described in Section 4.3, and those falling under the Local Authority jurisdiction e.g. industries, privately operated sewage works, such as on golf estates, mines and specific developments: <table border="1"> <thead> <tr> <th>Section 21 water use</th> <th>Infrastructure</th> <th>Local Authority Department/Sector</th> <th>Status i.e. registered (include registration number), licensed (include licence number), new (include application date)</th> </tr> </thead> <tbody> <tr> <td></td> <td>e.g. sewage works, bridge etc</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Section 21 water use	Infrastructure	Local Authority Department/Sector	Status i.e. registered (include registration number), licensed (include licence number), new (include application date)		e.g. sewage works, bridge etc						
Section 21 water use	Infrastructure	Local Authority Department/Sector	Status i.e. registered (include registration number), licensed (include licence number), new (include application date)												
	e.g. sewage works, bridge etc														
<ul style="list-style-type: none"> • The catchment management forum, CMA or DWAF will have information on the Section 21 water use authorisations of the various sectors falling within the jurisdiction of the Local Authority. 															
Roles and responsibilities															
All Departments with Section 21 water uses, such as Water and Sanitation, Roads, Waste and Parks and Recreation		Collate all Section 21 water uses that have been authorised or for which a water use licence application has been made. Identify any new uses that need to apply for an authorisation. Due to the number of departments involved the coordinator/champion should collate this information.													
CMA		Assist Local authority if capacity is lacking.													
Provincial		None													
National		None													

1: Required for groundwater abstraction.

8.4.2	Motivation for any exemptions from the requirements of Regulation 704		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • All mining quarries, borrow pits and other excavations that do not require an authorisation via the environmental impact assessment process will need to comply with Regulation 704 under the National Water Act, Act 36 of 1998 (GN704, GG20199 of 4 June 1999). • Regulation 704 requires the separation of clean and dirty water, prevention of the use of any substances which may pollute water resources and restricts any mining activities within the 1:50 year floodline or within 100 m from a watercourse, borehole used for monitoring or any ground likely to become waterlogged. • A Local Authority equivalent to Regulation 704 is being considered for development during 2006. 			
Roles and responsibilities			
All Departments with Section 21 water uses, such as Water and Sanitation, Roads, Waste and Parks and Recreation		Identify and motivate for any exemptions from Regulation 704. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		None	
Provincial		None	
National		None	

8.5 Surface water situation assessment

Surface water situation assessments have been undertaken in water management areas, catchments and subcatchments to varying degrees of detail by all three levels of government. DWAF has incorporated much of this information into the Water Resources Framework.

In completing the IWRMP, it is crucial that any additional work undertaken has the objective of filling gaps and not duplicating previous work done. The role of the coordinator in establishing what data is available and identifying duplication and gaps in the available data is crucial. Additional information obtained by the Local Authority should be sent to DWAF for incorporation into the Water Resources Framework.

8.5.1	Description of the catchment(s), water management area and resource class	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> • Component of Water Resource Framework and/or Catchment Management Strategy. • Additional detail on the catchments may be found in previous situation assessments or may be available in house. • The resource class may not yet be available and forms part of DWAF's water resource classification system. 		
Roles and responsibilities		
Environment, Planning, GIS, Water and Sanitation		Source and collate catchment information. Due to the number of departments involved the coordinator/champion should collate this information.
CMA		Assist Local Authority if requested.
Provincial		None
National: DWAF		Assist Local Authority if requested.

8.5.2	Hydrology: flow data	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> • Obtain from WR90 study (Middley, Pitman and Middleton, 1994)³, DWAF monitoring weirs if any fall within the Local Authority area, previous situation assessments or Water Resource Framework. • Include time series plots of the data and identify trends e.g. seasonal variation. • Include contributions to flow from point source discharges e.g. final sewage effluent. 		
Roles and responsibilities		
Environment		Review data received from the CMA/DWAF and once any queries have been satisfactorily dealt with, include the data in the IWRMP.
CMA		Collate and assess flow data within the Local Authority area of jurisdiction.
Provincial		None
National: DWAF		Collate and assess flow data within the Local Authority area of jurisdiction if the CMA is not yet established.

³ The WR90 study is currently being updated as WR2005 by the Water Research Commission

8.5.3	Hydrology: mean annual runoff, dry weather and peak flows	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> Obtain from WR90 study⁴ (Middley, Pitman and Middleton, 1994), Water Resource Framework or previous situation assessments. 		
Roles and responsibilities		
Environment	Review data received from the CMA/DWAF and once any queries have been satisfactorily dealt with, include the data in the IWRMP.	
CMA	Determine values for the catchment areas within the Local Authority area of Jurisdiction.	
Provincial	None	
National: DWAF	Determine values for the catchment areas within the Local Authority area of jurisdiction if the CMA is not yet established.	

8.5.4	Hydrology: location of floodlines for the 1:50 and 1:100 year storm events	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> Floodline determination is required to control development within riparian zones (along watercourses). The floodlines should be reassessed if significant development has occurred within the Local Authority. Indicate 1:100 and 1:50 year floodlines on the Local Authority layout plan. 		
Roles and responsibilities		
Roads/GIS	Present most current floodline determination on the Local Authority layout plan and indicate infrastructure/settlements within the floodlines.	
CMA	None	
Provincial	None	
National	None	

8.5.5	Surface water users	WSDP: 5.1.1.1-4 & 5.1.1.10 ¹
		IWMP: No
<ul style="list-style-type: none"> Surface water users includes all direct users of water in rivers, streams and dams for: <ul style="list-style-type: none"> Domestic use (drinking, bathing and laundry) – likely to be limited to the informal sector except where the Local Authority abstracts water directly and does not rely on a Water Board, Water Services Provider or DWAF to supply water; Industrial use (direct abstractions from surface water); Irrigation (applicable to subsistence irrigation of crops in informal areas); Livestock watering (applicable to livestock in informal areas); Maintenance of aquatic ecosystems. Note the quantity and quality requirements of each user sector. Reference should be made to DWAF's water quality guidelines, 1996 and 1998 and SANS 241: 2005 (previously SABS 241). 		

⁴ The WR90 study is currently being updated as WR2005 by the Water Research Commission

8.5.5	Surface water users		WSDP: 5.1.1.1-4 & 5.1.1.10 ¹
			IWMP: No
Roles and responsibilities			
LA: Water and Sanitation, Environmental Health, Environment.	Identify all surface water users and establish quantity and quality requirements. Due to the number of departments involved the coordinator/champion should collate this information.		
CMA	Assist Local Authority if requested		
Provincial	None		
National	None		

1: Detailed information required for water supply (21a and b) and sewage works (21f and g).

Surface water quality

8.5.6	Surface water quality: surface water monitoring programme		WSDP: F3.2 ¹		
			IWMP: No		
<ul style="list-style-type: none"> Describe the Local Authority's surface water monitoring programme. Note monitoring done by other entities in the area including water service providers, water boards, DWAF and any other entities, such as ratepayers associations. Obtain information for other entities from the Water Resources Framework, CMA or Catchment Management Forum. Identify gaps or overlaps between the monitoring done by Local Authorities and other entities. Note any actions undertaken to address the gaps and overlaps: 					
Standardised monitoring procedure		E.g. SABS			
Sampling done by		E.g. Environmental Health, Water and Sanitation Department			
Data assessment and reporting done by		E.g. Environment, Water and Sanitation Department			
Monitoring point	Location	S, E Coordinates	Responsible entity	Frequency	Parameters monitored
e.g. SW1	e.g. Downstream of informal settlement at bridge	Cape datum Clarke or WGS-84	Environmental Health	e.g. Monthly	e.g. pH, conductivity, nitrate, phosphate, iron etc.
Roles and responsibilities					
Environment	Complete above information.				
CMA	Assist Local Authority to identify all entities undertaking monitoring in the local catchment and subsequent gaps and overlaps.				
Provincial: DACEL	Assess compliance with provincial ordinances in terms of monitoring requirements.				
National: DWAF	Assess compliance with the monitoring requirements included in the water use authorisation conditions.				

1: Water quality information is required for water supply and water returned to the resource e.g. treated sewage effluent discharges. The need for the water services authority to address point and non point sources of pollution is identified but water quality data pertaining to these pollution sources is only required for point sources from the water services authority.

8.5.7	Surface water quality: biomonitoring programme (river health)	WSDP: None
		IWMP: No

• Describe the Local Authority's biomonitoring programme:

Standardised biomonitoring procedure		E.g. SASS5			
Sampling done by		E.g. Environment, external contractor			
Data assessment and reporting done by		E.g. Environment, external contractor			
Monitoring point	Location	S, E Coordinates	Responsible entity	Frequency	Parameters monitored¹
e.g. SW2	e.g. Downstream of informal settlement at bridge	Cape datum Clarke or WGS-84	e.g. DACEL	e.g. Quarterly	e.g. SASS5, IHAS, WET

- Note monitoring done by other entities in the area including water service providers, water boards, DACEL and any other sectors, such as mines.
- Obtain information for other entities from the Water Resources Framework, River Health Programme, CMA or Catchment Management Forum.
- Identify gaps or overlaps between the biomonitoring done by Local Authorities and other entities. Note any actions undertaken to address the gaps and overlaps.

Roles and responsibilities	
Environment	Complete above information.
CMA	Assist Local Authority to identify all entities currently undertaking or required to undertake biomonitoring in the local catchment, and subsequent gaps and overlaps.
Provincial: DACEL	Provide Local Authority with the provincial biomonitoring programme for the local catchment.
National: DWAF	Assist Local Authority to identify all entities currently undertaking or required to undertake biomonitoring in the local catchment and subsequent gaps and overlaps if the CMA is not yet established.

1: SASS5: South African scoring system 5; IHAS: integrated habitat assessment; WET: whole effluent toxicity

8.5.8	Surface water quality: air quality monitoring programme	WSDP: None
		IWMP: No

- Air quality has the potential to impact on surface water quality: dust and other air borne pollutants can be deposited in surface water resources.
- Describe the Local Authority's air monitoring programme:

Standardised air monitoring procedure		E.g. Dust buckets			
Sampling done by		E.g. Environment, Environmental Health			
Data assessment and reporting done by		E.g. Environment			
Monitoring point	Location	S, E Coordinates	Responsible entity	Frequency	Parameters monitored ¹
e.g. Alex 1	e.g. Alexander at Wynberg boundary	Cape datum Clarke or WGS-84	e.g. Environment	e.g. Monthly collection of dust bucket samples	e.g. particulates, PM ₁₀

- Note monitoring done by other entities in the area including DEAT and any other sectors, such as mines.
- Obtain information for other entities from DEAT or DME.
- Identify gaps or overlaps between the monitoring done by Local Authorities and other entities. Note any actions undertaken to address the gaps and overlaps.

Roles and responsibilities	
Environment	Complete above information.
CMA	None
Provincial: DACEL	Assist in alignment with the provincial air quality programme for the region.
National: DEAT	Assist in alignment with national initiatives.
National: DWAF	None

8.5.9	Surface water quality: description, coordinates and location of monitoring points	WSDP: 3.2 ¹
		IWMP: No

- Refer to 8.5.6-8.5.8

Roles and responsibilities	
LA: Environment/GIS	Plot monitoring points of all entities on the Local Authority layout plan. Verify the plotted position of the points against the locality description and sampler knowledge. Make changes and where necessary, recapture the GPS coordinates.
CMA	Refer to 8.5.5-8.5.7
Provincial: DACEL	
National: DWAF	

1: Water quality information is required for water supply and water returned to the resource e.g. treated sewage effluent discharges.

8.5.10	Overview of surface water quality, quantity and river health		WSDP: 3.2.1 ¹
			IWMP: No
<ul style="list-style-type: none"> • All data, for up to a five year period, should be validated and subjected to statistical analysis including count, maximum, minimum, average, median and 95th percentile. • Data should be represented graphically to establish spatial variation in the data and identify problem areas. • Time series graphs to establish trends and seasonal variation should be plotted for selected points. • Evaluate data in terms of water authorisation WQO if an authorisation has been issued, CMA WQO, or if these have not yet been developed Catchment Management Forum WQO, DWAF Water Quality Guidelines, 1996 and 1998 or SANS 241: 2005 drinking water quality standards if communities are drinking directly from surface water sources. 			
Roles and responsibilities			
LA: Environment		Collate all surface water monitoring data into a single database and assess data according to the above.	
CMA		Review data assessment and evaluation of compliance with water use authorisation conditions.	
Provincial: DACEL		Provide Local Authority with biomonitoring report/data for the local catchment and priority areas of concern.	
National: DWAF		Review data assessment and evaluation of compliance if CMA is not yet established.	

1: Water quality data is required preferably in electronic format for water supply and water returned to the resource.

8.5.11	Identification of areas of concern and potential pollution sources		WSDP: F3.2.1.6 ¹
			IWMP: No
<ul style="list-style-type: none"> • Highlight areas of concern, based on the water quality assessment in Section 8.5.9. • Correlate water quality with the Section 21 water uses in Section 8.4.1, the water users identified in Section 8.5.3 and all identified diffuse sources of pollution e.g. runoff from golf courses containing fertilisers. 			
Roles and responsibilities			
LA: Environment/GIS		Plot areas of concern on the Local Authority layout plan.	
CMA		Provide Local Authority with information regarding additional areas of concern, if any	
Provincial: DACEL			
National: DWAF, DEAT			

1: Requires identification of resources that could potentially become polluted and the potential pollution sources.

8.6 Groundwater situation assessment

Groundwater situation assessments have been undertaken within water management areas and catchments to varying degrees of detail by all three levels of government. DWAF has incorporated much of this information into the Water Resources Framework.

In completing the IWRMP, it is crucial that any additional work undertaken has the objective of filling gaps and not duplicating previous work done. The role of the coordinator in establishing what data is available and identifying duplication and gaps in the available data is crucial. Additional information obtained by the Local Authority should be sent to DWAF for incorporation into the Water Resources Framework.

8.6.1	Overview of geology of the area		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Show regional geology on the Local Authority layout plan. • Obtain from previous specialist studies or DWAF's geohydrology section if not already incorporated into the Local Authority database. 			
Roles and responsibilities			
LA: Environment/Planning	Plot regional geology on layout plan. Note areas of concern on the layout e.g. informal settlements in dolomitic areas.		
CMA	Assist Local Authority if requested		
Provincial	None		
National: DWAF	Provide Local Authority with the geology of the area: description and geological map if required.		

8.6.2	Database of abstraction and monitoring boreholes					WSDP: F3.1.1.2 ¹																		
						IWMP: Yes ²																		
<ul style="list-style-type: none"> Assessment of boreholes used for water supply is crucial. Quality, in terms of human health, and quantity, in terms of sustainability of supply must be monitored. The database must be updated on a regular basis and made available to DWAF for inclusion in the Water Resources Framework. Include monitoring and abstraction boreholes of other entities within the Local Authority area of jurisdiction, including DWAF's. Obtain this information directly from the entity e.g. mines or from the Water Resources Framework, CMA or Catchment Management Forum: 																								
<table border="1"> <thead> <tr> <th>Monitoring/abstraction borehole</th> <th>Location</th> <th>Use</th> <th>S, E Coordinates</th> <th>Responsible entity</th> <th>Abstraction volume (m³/annum)</th> </tr> </thead> <tbody> <tr> <td>e.g. BH1</td> <td>e.g. Down gradient of botanical gardens</td> <td>e.g. Abstraction for water supply</td> <td>Cape datum Clarke or WGS-84</td> <td>e.g. Water and Sanitation</td> <td>e.g. 100 00</td> </tr> <tr> <td>e.g. BH2</td> <td>e.g. Landfill site</td> <td>e.g. Monitoring for leachate ingress</td> <td></td> <td>e.g. Waste</td> <td>N/a</td> </tr> </tbody> </table>							Monitoring/abstraction borehole	Location	Use	S, E Coordinates	Responsible entity	Abstraction volume (m ³ /annum)	e.g. BH1	e.g. Down gradient of botanical gardens	e.g. Abstraction for water supply	Cape datum Clarke or WGS-84	e.g. Water and Sanitation	e.g. 100 00	e.g. BH2	e.g. Landfill site	e.g. Monitoring for leachate ingress		e.g. Waste	N/a
Monitoring/abstraction borehole	Location	Use	S, E Coordinates	Responsible entity	Abstraction volume (m ³ /annum)																			
e.g. BH1	e.g. Down gradient of botanical gardens	e.g. Abstraction for water supply	Cape datum Clarke or WGS-84	e.g. Water and Sanitation	e.g. 100 00																			
e.g. BH2	e.g. Landfill site	e.g. Monitoring for leachate ingress		e.g. Waste	N/a																			
Roles and responsibilities																								
Environment, GIS, Water and Sanitation, Waste, Parks and Recreation and Health.		Complete the above table and plot all the boreholes on the Local Authority layout plan. Due to the number of departments involved the coordinator/champion should collate this information.																						
CMA		Assist Local Authority to identify all entities undertaking monitoring within the Local Authority area of jurisdiction if required. Assess compliance with the monitoring requirements included in the water use authorisation conditions.																						
Provincial		None																						
National: DWAF		Fulfil CMA responsibility if the CMA is not yet established.																						

1: The above information is required in the WSDP.

2: Required as part of the leachate detection system under DWAF's Minimum Requirements but not a specific requirement of the IWMP.

8.6.3	Aquifer parameters and aquifer test data	WSDP: F3.1.1.2 ¹
		IWMP: No

- At the very least all abstraction boreholes for water supply must be assessed to ascertain the sustainability of the supply.
- Include borehole yields, rest water levels, aquifer transmissivity, permeability and storativity
- Obtain information from previous specialist studies, DWAF's geohydrology section, the Water Resource Framework or other entities required to do borehole monitoring e.g. mines:

Monitoring/ abstraction borehole	Aquifer type	Yield	Rest water level	Transmissivity	Permeability	Storativity
e.g. BH1	e.g. Granite	e.g. 6 l/s	e.g. 10 mbgl ²	e.g. 50 m ² /day	e.g. 1.0 m/day	e.g. 0.01

Roles and responsibilities

LA: Environment, Water and Sanitation, Waste, Parks and Recreation.	Complete above table. Due to the number of departments involved the coordinator/champion should collate this information.
CMA	Provide available data/specialist reports to the Local Authority.
Provincial	None
National: DWAF	Provide available data/specialist reports to the Local Authority.

1: Only aquifer type is required.

2: metres below ground level

8.6.4	Ground water users	WSDP: F3.1.1.2 ¹
		IWMP: No

- Groundwater users include:
 - Domestic use (drinking, bathing and laundry);
 - Industrial use;
 - Irrigation (gardens and subsistence crops);
 - Livestock watering (applicable to livestock in informal areas).
- Note the quantity and quality requirements of each user sector. Reference should be made to DWAF's water quality guidelines, 1996 and 1998 and SABS 241.

Roles and responsibilities

LA: Water and Sanitation, Parks and Recreation, Health, Environmental Health, Waste, Environment.	Collate all user information. Due to the number of departments involved the coordinator/champion should collate this information.
CMA	Provide Local Authority with all groundwater user information
Provincial	None
National: DWAF	Provide Local Authority with all groundwater user information if the CMA is not yet established.

1: This information is required except for the quality requirements of the respective users.

Groundwater quality

8.6.5	Groundwater quality: groundwater monitoring programme (quality and quantity)	WSDP: F3.1.1.3 ¹
		IWMP: Yes ²

- Describe the Local Authority's groundwater monitoring programme.

Standardised monitoring procedure		E.g. SABS			
Sampling done by		E.g. Environmental Health, Waste			
Data assessment and reporting done by		E.g. Environment			
Monitoring/ abstraction borehole	Location and description	S, E Coordinates	Responsible entity	Frequency	Parameters monitored
e.g. BH1	e.g. Abstraction: Down gradient of botanical gardens	Cape datum Clarke or WGS-84	Water and Sanitation	e.g. Monthly	e.g. rest water levels, pH, conductivity, nitrate, sulfate, iron etc.

- Note monitoring done by other entities in the area including water service providers, water boards, DWAF, private borehole owners and other sectors, such as mines.
- Obtain information for other entities from the Water Resources Framework, CMA or Catchment Management Forum.
- Identify gaps or overlaps between the monitoring done by Local Authorities and other entities. Note any actions undertaken to address the gaps and overlaps.

Roles and responsibilities

LA: Water and Sanitation, Parks and Recreation, Health, Environmental Health, Waste, Environment.	Collate all monitoring information. Due to the number of departments involved the coordinator/champion should collate this information.
CMA	Assist Local Authority to identify all entities undertaking monitoring in the local area and subsequent gaps and overlaps. Assess compliance with the monitoring requirements in the water use authorisation conditions.
Provincial	None
National: DWAF	Fulfil CMA responsibility if the CMA is not yet established.

1: Water quality and water level monitoring is required.

2: Required as part of the leachate detection system under DWAF's Minimum Requirements but not a specific requirement of the IWMP.

8.6.6	Groundwater quality: Description, coordinates and location of all groundwater monitoring points	WSDP: F3.1.1.3 ¹
		IWMP: Yes ²
<ul style="list-style-type: none"> Refer Section to 8.6.2. 		
Roles and responsibilities		
LA: Environment/GIS	Plot monitoring boreholes of all entities on the Local Authority layout plan and describe the location for each borehole. Verify the plotted position of the boreholes against the locality description and sampler knowledge. Make changes and where necessary recapture the GPS coordinates.	
CMA	Refer to Section 8.6.2.	
Provincial		
National: DWAF		

1: Water quality and water level monitoring is required

2: Required as part of the leachate detection system under DWAF's Minimum Requirements but not a specific requirement of the IWMP.

8.6.7	Groundwater quality: Overview of groundwater quantity and quality	WSDP: F3.1.1.3 ¹
		IWMP: Yes ²
<ul style="list-style-type: none"> All data, for up to a five year period, should be validated and subjected to statistical analysis including count, maximum, minimum, average, median and 95th percentile. Data should be represented graphically to establish spatial variation in the data and identify problem areas. Time series graphs to establish trends and seasonal variation should be plotted for selected points. Evaluate data in terms of water authorisation WQO if an authorisation has been issued CMA WQO or if these have not yet been developed, Catchment Management Forum WQO, DWAF Water Quality Guidelines, 1996 and 1998 or SANS 241: 2005 drinking water quality standards. 		
Roles and responsibilities		
LA: Environment	Collate all groundwater monitoring data into a single database and assess data according to the above.	
CMA	Review data assessment and evaluation of compliance with water use authorisation conditions.	
Provincial	None	
National: DWAF	Review data assessment and evaluation of compliance if CMA not yet established.	

1: Water quality and water level information is required. The need for the water services authority to address point and non point sources of pollution is identified but water quality data pertaining to these pollution sources is only required for point sources from the water services authority.

2: Required as part of the leachate detection system under DWAF's Minimum Requirements but not a specific requirement of the IWMP.

8.6.8	Groundwater quality: Identification of boreholes of concern (quantity and quality) and potential pollution sources		WSDP: F3.2.1.6 ¹
			IWMP: Yes ²
<ul style="list-style-type: none"> • Highlight boreholes of concern, based on the water quality and quantity assessment in Section 8.6.7. • Correlate water quality and quantity with the water users identified in Section 8.6.4 and any diffuse sources of pollution e.g. infiltration from on-site sanitation 			
Roles and responsibilities			
LA: Environment/GIS		Plot boreholes of concern on the Local Authority layout plan.	
CMA		Provide Local Authority with information regarding additional boreholes of concern, if any	
Provincial: Health			
National: DWAF			

1: Requires identification of resources that could potentially become polluted and the potential pollution sources.

2: Required as part of the leachate detection system under DWAF's Minimum Requirements but not a specific requirement of the IWMP.

8.7 Water use and management systems

This section describes the Section 21 water uses in Section 0.1. Provision for water management should be made in Local Authority bylaws for water services, stormwater management, pollution control and environmental health.

8.7.1	Water use and management	WSDP: F5.1.1 ¹
		IWMP: No

- For each water services and water management infrastructure unit/system in Sections 8.7.1 – 8.7.9 provide the following:
 - Description and as-built information: drawings, report references, records etc.
 - Operational status and any maintenance/upgrading required or planned, including time frames and budget availability.
 - References for all documented water management procedures, including routine inspection and maintenance, handling of emergency incidents and spills, reporting procedures etc., for ALL water systems in this section.
- Note: the documented procedures will need to be reviewed for gaps based on the outcome of the impact and risk assessment in 9, and if necessary, revised to address the gaps.
- Plot infrastructure locality on Local Authority layout.
- Additional information required for each infrastructure unit or system is given under each water use/system. The Section 21 water use is given in brackets.
- Where it is deemed more appropriate, include the information required below in the respective tables in Sections 8.7.1 – 8.7.9 to avoid duplication of information:

Infrastructure /system, (Section 21 water use)	Number of systems	Description/type	As built information	Status; maintenance required	Documented procedures
e.g. Sewage works (21f and g)	e.g. 2	e.g. Biological nutrient removal	e.g. Drawings no. A001-3, Report nos. B001 and B002	e.g. reaching capacity, to be upgraded in 2006	e.g. O&M ² procedure C001; Sludge handling and disposal D001
e.g. Grey water	e.g. 1	e.g. Constructed wetland	e.g. Drawing no. E001, Report no. F001	e.g. functioning at 80% nitrate removal, litter to be cleared on monthly basis	e.g. O&M ² procedure G001; Harvesting for income generation H001.

Roles and responsibilities

LA: Water and Sanitation, Roads, Waste, Environment, Environmental Health, Parks and Recreation.	Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.
CMA	None
Provincial	None
National	None

1: More comprehensive information is required in the WSDP.

2: Operation and Maintenance

8.7.2	Water supply	WSDP: F2, F3.1, F5.1 ¹
		IWMP: No

- Source and volume of water needed for current and future uses:
 - Domestic – include requirements of residential and commercial areas and dry industries;
 - Industrial – include requirements of all wet industries;
 - Mines – include requirements of mines using the Local Authority supply or recycled water sourced from the Local Authority;
 - Recreation – include requirements of municipal pools;
 - Irrigation/agriculture – include requirements of parks, golf courses, private estates, road verge vegetation and crops.
- Indicate if source is potable water (direct abstractions from surface or groundwater are Section 21a) or recycled water (use of treated sewage effluent for irrigation is Section 21e).
- Volumes must be reflected in the water balances in Section 8.7.10.
- Note: Water use sectors supplied by DWAF or water service providers need not be included in this section e.g. mines and power stations.
- Note: Privately owned water plants require authorisation from DWAF **and** the Local Authority. The Local Authority can refuse to give approval even if DWAF has authorised the plant.
- Describe the different levels of service provided for domestic use and planned upgrades. Service levels are described in Section F2 of the WSDP:

Sector and user	Source	S, E Coordinates	Responsible entity	Volume required	Future requirement	Level of service	Effluent disposal
e.g. Wet industries: metal plating factory	e.g. Surface/ground	Clarke Datum or WGS84	e.g. Water and Sanitation	e.g. 2000 m ³ /m ³ mnth	e.g. 2500 m ³ /m ³ mnth in 2008	e.g. Full	e.g. sewer
e.g. Settlement A (1000 households)	e.g. Surface/ground		e.g. Water and Sanitation	e.g. 25 000 l/d	e.g. 50 000 l/d	e.g. Yard tap, upgrade to Full in 2007	e.g. soak away

Roles and responsibilities	
LA: Water and Sanitation	Provide the information from the Local Authority database.
LA: Roads, Parks and Recreation	Provide the above information where direct abstractions are made from groundwater for irrigation.
CMA	Include volume requirements in water management area situation assessment to facilitate equitable allocation of water
Provincial	None
National: DWAF	Include volume requirements in water management area situation assessment to facilitate equitable allocation of water if CMA not yet established.

1: More comprehensive information is required in the WSDP.

8.7.3	Storage systems for supply of potable water		WSDP: F5.1.1.4, F5.1.1.8 ¹
			IWMP: No
<ul style="list-style-type: none"> • Refer to the main table in Section 8.7. • Include all Local Authority managed dams and reservoirs. • Provide any additional information not provided in the main table in Section 8.7. 			
Roles and responsibilities			
LA: Water and Sanitation	Provide the information from the Local Authority database.		
CMA	None		
Provincial	None		
National: DWAF	None		

1: More comprehensive information is required in the WSDP.

8.7.4	Sewage	WSDP: B10.1, F2, F5.1 ¹
		IWMP: No

- Source and volume of water discharged to sewer (current and future requirements):
 - Domestic – include discharges from residential and commercial areas and dry industries;
 - Industrial – include discharges from all wet industries.
 - Mines – include discharges from mines using the Local Authority sewage works.
- Volumes must be reflected in the water balances in Section 8.7.10.
- Details of sewer networks and sewage plants discharging treated effluent to the watercourse (Section 21f) or storing it for reuse (Section 21g). Include all sewage plants within the Local Authority area of jurisdiction e.g. sewage plants on golf estates and mines.
- Note: Privately owned sewage package plants require authorisation from DWAF **and** the Local Authority. The Local Authority can refuse to give approval even if DWAF has authorised the plant.
- Describe the different levels of service provided for domestic use and planned upgrades. Include on site services installed by Province or NGOs in informal settlements, schools and clinics. Service levels are described in Section F2 of the WSDP:

Sector and user	Volume discharged	Treatment prior to discharge	Sewage plant receiving discharge	S, E coordinates	Responsible entity	Volume of treated effluent discharged	Discharged to	Future requirement	Level of service	Effluent and sludge destination
e.g. Wet industries: metal plating factory	e.g. 2 m ³ /d	e.g. lime dosing to raise pH	e.g. Treatment Plant A, capacity of 80 m ³ , servicing 250 km of sewer network	Clarke Datum or WGS84	e.g. Water and Sanitation	e.g. 2000 m ³ /mth	e.g. River A	e.g. 2500 m ³ /mth in 2008	e.g. Full	e.g. Effluent discharged to River B, sludge composted for Parks and Recreation
e.g. Settlement A		e.g. None	e.g. N/A		e.g. DPLG	e.g. 25l/d	e.g. N/A	e.g. 50l/d	e.g. VIP, upgrade to Full in 2007 by Housing ²	e.g. Desludged every six months by DPLG, sludge treated by LA

- Provide water quality data for industrial effluents discharging to sewer with a comparison to permit limits.
- Provide water quality data for treated sewage effluent discharges with a comparison to Water Use Authorisation conditions.

Roles and responsibilities	
LA: Water and Sanitation	Provide the information from the Local Authority database.
CMA	None
Provincial	Provide information for Provincial installations
National	None

1: More comprehensive information is required in the WSDP.

2: Housing is not a Local Authority function in terms of the Constitution but the role of Local Authorities has increased while that of the provinces has become regulatory and chiefly focused on resource allocation (Qomfo, 2005).

8.7.5	Stormwater	WSDP: F3.2.1
		IWMP: No

- Plot stormwater catchments on Local Authority layouts. These may be more detailed than the natural subcatchments, plotted in Section 8.3.2, if stormwater from specific developments is retained on site.
- Over and above the details in the main table in Section 8.7, describe discharge points and peaks, location of retention ponds and treatment, if any.
- Volumes must be reflected in the water balances in Section 8.7.10:

Stormwater catchment	System	Responsible entity	Retention on site	Treatment	Final discharge point to natural water course	S, E coordinates of discharge point	Peak volume discharged
e.g. catchment A	e.g. concrete lined channels with earth lined channel in park A.	e.g. Roads	e.g. Retention pond in Park B.	e.g. Exposure to UV (sunlight) and settlement of solids	e.g. Overflow from retention pond discharges to River A	Clarke Datum or WGS84	e.g. 8.2 l/s for a 1:2 year event

Roles and responsibilities	
LA: Roads	Maintain a database of the necessary information. Summarise this information for the IWRMP.
CMA	None
Provincial	None
National	None

1: Mentioned in terms of poorly managed stormwater systems contributing to point and non point sources of pollution that need to be addressed by the water services authority although there is no requirement to monitor stormwater in the WSDP.

8.7.6	Grey water (urban runoff from underserved/unserved area)	WSDP: F2.1.1.4 ¹
		IWMP: No

- Over and above the details in the main table in Section 8.7, describe grey water sources, volumes and final destination (potential 21g or 21f). As the quality of the grey water is likely to be poor, any storage of the water will qualify as 21g.
- Volumes must be reflected in the water balances in Section 8.7.10:

Source	S, E coordinates of discharge point	Water supply level	Sanitation system	Responsible entity	Volume generated (estimate)	Treatment system and/or final destination	Status
e.g. Settlement A	Clarke Datum or WGS84	e.g. Yard tap, volume not metered	e.g. Urine diversion	e.g. Environmental Health	e.g. 2000 m ³ /mth	e.g. drainage channels to community garden	e.g. well managed (generates income for three woman in the settlement)

Roles and responsibilities

LA: Water and Sanitation	Provide the information from the Local Authority database.
LA: Roads, Parks and Recreation	Provide the above information where direct abstractions are made from groundwater for irrigation.
CMA	None
Provincial	None
National	Include volume requirements in water management area situation assessment to facilitate equitable allocation of water if CMA not yet established.

1: Required for dense informal settlements that are provided with dry sanitation systems.

8.7.7	Diversions, alterations and river crossings	WSDP: None
		IWMP: No

- Provide number, location and purpose, e.g. road crossing, urban drainage etc (Section 21c and i).
- Plot on Local Authority layout and include infrastructure owned by province and other sectors e.g. road crossings and pipeline crossings.
- Details of infrastructure not owned by the Local Authority are not required.
- Over and above the details in the main table in Section 8.7 name the watercourse and describe the erosion protection measures.

Type and Purpose	Watercourse	Number along watercourse within LA	Location	S, E Coordinates	Responsible entity	Erosion protection measures
e.g. River crossing: bridge	e.g. River B	e.g. 3	e.g. C Street	Clarke Datum or WGS84	e.g. Roads	e.g. Gabion structures

Roles and responsibilities

LA: Roads, GIS	Provide the information from the Local Authority database.
CMA	Provide Local Authority with location of all diversions, alterations and river crossings not owned by the Local Authority but within its area of jurisdiction.
Provincial: Roads/DACEL	Provide Local Authority with location of all provincial road crossings.
National: DWAF, DEAT	None

8.7.8	Potential emergency/contingency discharges	WSDP: None
		IWMP: No

- Include all potential discharges and seepages containing waste to surface and groundwater, respectively e.g
- . untreated sewage from a pump station due to a power failure (Section 21f).
- Potential discharges should include all water use sectors within the Local Authority area of jurisdiction e.g. mines and industry.
- Plot on Local Authority layout.
- Provide a summary of incidents that occurred in the past year:

Potential discharges	Discharge type	S, E Coordinates	Affected water resource	Responsible entity	Incidents	Response
e.g. Pump station A	e.g. Raw sewage	Clarke Datum or WGS84	e.g. River B	e.g. Water and Sanitation	e.g. 2 discharges during 2005 due to power failures.	e.g. Generators to provide backup power on order
e.g. Industrial area C	e.g. metal waste, wash water		e.g. Aquifer D	e.g. Environmental Health	e.g. metal waste seeping to groundwater	e.g. Effluent pond to be lined

Roles and responsibilities

LA: Water and Sanitation, Environment, Environmental Health, Disaster Management ¹ , GIS.	Collate above information including records of incidents for a one year period. Due to the number of departments involved the coordinator/champion should collate this information.
CMA	None
Provincial	None
National	None

1: Inconsistency exists in disaster management because although Local Authorities are required to prepare disaster recovery plans, disaster management is the responsibility of national and provincial government, except for fire fighting.

8.7.9	Removal of underground water from construction sites and basements	WSDP: None
		IWMP: No

- Describe location, volumes, storage facilities, reuse and final destination (Section 21j).
- Plot all removals on Local Authority layout and include any mines removing underground water and discharging it within the Local Authority area of jurisdiction.
- Volumes falling under Local Authority responsibility must be reflected in the water balances in Section 8.7.10:

Location	Reason for removal	S, E Coordinates	Responsible entity	Volume removed	Reuse	Final destination	Preventative measures
e.g. Construction site A	Prevent flooding	Clarke Datum or WGS84	e.g. Environmental Health	e.g. 2000 m ³ /mth	e.g. dust suppression	Evaporated i.e. atmosphere	e.g. cementation of ingress points.

Roles and responsibilities	
LA: Planning, Environmental Health	Collate above information
CMA	Provide details to Local Authorities of existing and planned (water use licence applications) for removal of underground water.
Provincial: DACEL	Provide Local Authority with details of environmental impact assessment s for removal of underground water for review.
National: DEAT	Provide Local Authority with details of environmental impact assessments for removal of underground water for review.
National: DWAF	Provide details to Local Authorities of existing and planned removals of underground water (water use licence applications) if the CMA is not yet functional.

1: More comprehensive information is required in the WSDP.

8.7.10	Recreational water uses	WSDP: None
		IWMP: No

- Plot all water bodies used for organised water sports, fishing competitions, floating restaurants etc. (Section 21k).
- Note the frequency of use and number of users:

Water resource	S, E Coordinates	Use	Responsible entity	Frequency of use	Number of users
e.g. Dam A	Clarke Datum or WGS84	e.g. Boating competitions	e.g. Parks and Recreation	e.g. 3 days per week six months of the year	e.g. 50 per use days

Roles and responsibilities

LA: Parks and recreation, GIS	Collate above information
CMA	Assist Local Authority if requested
Provincial	None
National	None

1: More comprehensive information is required in the WSDP.

8.7.11	Water balance	WSDP: 6 ¹
		IWMP: No

- Provide operational water balance for water supply and sanitation for the entire Local Authority indicating distribution of water supply to the various sectors, water losses, final effluent discharges and reuse. Refer to the water balance in F6 of the WSDP and the International Water Association water balance in Box 5. The International Water Association water balance includes the quantity and revenue aspects of water services, thus integrating water services and water conservation /water demand management. Both formats should be presented in the IWRMP.
- Provide operational water balances for individual water works and sewage works.
- Provide environmental water balance for the average wet and dry season showing rainfall, stormwater and grey water runoff, infiltration and retention, abstractions from and discharges to water resources and removals of underground water. Refer to the water balance in Box 6.

Roles and responsibilities

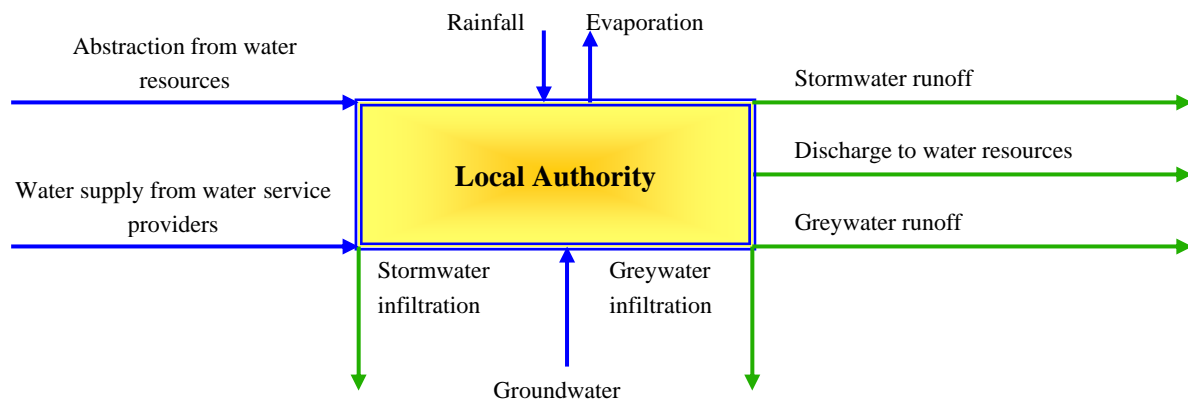
LA: Water and sanitation	Operational water balance.
LA: Environment, Roads	Environmental water balance.
CMA	Assist Local Authority if requested.
Provincial	None
National	None

1: Operational water balances required.

Box 5: Standard International Water Association water balance (International Water Association website)

System input volume	Authorised consumption	Billed authorised consumption	Billed metered consumption	Revenue water
	Water losses	Unbilled authorised consumption	Billed unmetered consumption	
			Unbilled metered consumption	
		Apparent losses	Unbilled unmetered consumption	
			Unauthorised consumption (illegal connections)	
			Meter inaccuracies	
		Real losses	Leakage on transmission and distribution mains	
Leakage and overflow at storage tanks				
Leakage on service connections up to point of customer meter				
				Non revenue water (unaccounted for water)

Box 6: Environmental water balance



8.8 Waste management

The policy framework for waste management is provided by the White Paper on Integrated Pollution and Waste Management and provision is made in Local Authority by-laws. Province must review IWMPs, monitor compliance with Environmental Implementation Plans and develop provincial guidelines and standards (DEAT, 2004).

8.8.1	Domestic							WSDP: F2.1.1.5 ¹																							
								IWMP: Yes ²																							
<ul style="list-style-type: none"> • Provide description and classification (hazard rating) of various waste streams (in accordance with DWAF's Minimum Requirements or the Guideline on Permissible Utilisation and Disposal of Sewage Sludge for sewage sludge), volumes, transportation and disposal procedures (including sewage sludge) (Section 21g). • Include privately operated waste sites e.g. on mines and sewage sludge from privately run sewage works. • Plot waste sites on the Local Authority layout. • Include status of permit applications for waste contractors and waste sites and water use licence application for sewage sludge: 																															
<table border="1"> <thead> <tr> <th>Source</th> <th>Volume</th> <th>Classification</th> <th>Recycling (Yes/no)</th> <th>Disposal site/procedure</th> <th>Responsible entity</th> <th>Contractor</th> <th>Authorisation status of contractor/site</th> </tr> </thead> <tbody> <tr> <td>e.g. Domestic sector</td> <td>e.g. 20 t/day</td> <td>e.g. Non hazardous</td> <td>e.g. No</td> <td>e.g. Landfill A</td> <td>e.g. Waste</td> <td>Contractor B</td> <td>e.g. Both permitted</td> </tr> <tr> <td>e.g. sewage sludge</td> <td>e.g. 1.5 t/day</td> <td>e.g. Category B</td> <td>e.g. Yes</td> <td>e.g. Composted for Local Authority nurseries</td> <td>e.g. Water and Sanitation</td> <td>N/A</td> <td>e.g. Licensed</td> </tr> </tbody> </table>								Source	Volume	Classification	Recycling (Yes/no)	Disposal site/procedure	Responsible entity	Contractor	Authorisation status of contractor/site	e.g. Domestic sector	e.g. 20 t/day	e.g. Non hazardous	e.g. No	e.g. Landfill A	e.g. Waste	Contractor B	e.g. Both permitted	e.g. sewage sludge	e.g. 1.5 t/day	e.g. Category B	e.g. Yes	e.g. Composted for Local Authority nurseries	e.g. Water and Sanitation	N/A	e.g. Licensed
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e.g. Domestic sector	e.g. 20 t/day	e.g. Non hazardous	e.g. No	e.g. Landfill A	e.g. Waste	Contractor B	e.g. Both permitted																								
e.g. sewage sludge	e.g. 1.5 t/day	e.g. Category B	e.g. Yes	e.g. Composted for Local Authority nurseries	e.g. Water and Sanitation	N/A	e.g. Licensed																								
Roles and responsibilities																															
LA: Waste		Collate above information for all waste streams except sewage sludge.																													
LA: Water and Sanitation		Collate above information for sewage sludge.																													
CMA		Provide information if available.																													
Provincial		None																													
National: DEAT		Provide input regarding status of waste site permit applications.																													
National: DWAF		Provide input regarding status of waste site permit authorisations.																													

1: Information required for sludge disposal from VIP toilets.

2: More detail required in the IWMP

8.8.2	Industrial	WSDP: F2.6 ¹
		IWMP: Yes ²

- Provide description and classification (hazard rating) of various waste streams (in accordance with DWAF's Minimum Requirements or the Guideline on Permissible Utilisation and Disposal of Sewage Sludge for sewage sludge containing industrial substances: volumes, transportation and disposal. (Section 21g).
- Summarise wet industry discharges to sewer. Make reference to Section 8.7.3 for details on the individual wet industries discharging to sewer.
- Include status of permit for wet industries and water use licence application for sewage sludge:

Source	Volume	Classification	Disposal site/procedure	Responsible entity	Authorisation status
e.g. Wet industries	e.g. 2000 m ³ /day	e.g. Hazard rating 3 and 4	e.g. Sewage works	e.g. Water and Sanitation	e.g. Both permitted
e.g. Sewage sludge	e.g. 1.5 t/day	e.g. Category C	e.g. Co-disposed to landfill A	e.g. Water and Sanitation	e.g. Licensed

- Province is responsible for industrial waste not discharged to sewer (DEAT, 2004):
 - any wet industries discharging to the water resource e.g. power stations;
 - dry industries generating solid waste that could impact on groundwater;
 - mines (tailings dams and waste rock dumps).
- However the Local Authority should include the above information as provided by province.

Roles and responsibilities	
LA: Waste	Collate above information for waste disposed of at domestic landfill sites.
LA: Water and Sanitation	Refer to Section 8.7.3.
CMA	Provide information on industries directly discharging to the watercourse and all waste generating entities within the Local Authority area of jurisdiction that do not use the Local Authority waste disposal systems, if requested, so that these waste streams can be plotted on the Local Authority layout.
Provincial	None
National: DWAF/DEAT	Provide information on industries directly discharging to the watercourse and all waste generating entities within the Local Authority area of jurisdiction that do not use the Local Authority waste disposal systems, if requested, and the CMA has not yet been established.

1: Quality and quantity information required for wet industries but not sewage sludge.

2: Limited information is required in the IWMP as industrial waste is a provincial mandate.

8.8.3	Hazardous	WSDP: None
		IWMP: Yes ²

- Description and classification (hazard rating) of various hazardous waste streams (in accordance with DWAF's Minimum Requirements): volumes, transportation and disposal procedures (Section 21g).
- Include status of permit applications for hazardous waste contractors and hazardous waste sites.
- Plot waste sites on the Local Authority layout:

Source	Volume	Classification	Recycling (Yes/no)	Disposal site/procedure	Responsible entity	Contractor	Authorisation status of contractor/site
e.g. Battery manufacturer	e.g. 0.20 t/mnth	e.g. Hazardous Rating 2	e.g. No	e.g. Hazardous site A	e.g. Waste	Contractor B	e.g. Both permitted

Roles and responsibilities

LA: Waste	Collate above information based on information received from Province.
CMA	Provide information if available.
Provincial: DEAT	Provide above information to LA and input regarding status of waste site permit applications.
National: DWAF	Provide input regarding status of waste site permit applications in conjunction with DEAT.

2: Limited information is required in the IWMP as industrial waste is a provincial mandate.

8.8.4	Other Wastes e.g. medical and veterinary	WSDP: None
		IWMP: No

- Description and classification (hazard rating) of any other waste streams within the Local Authority jurisdiction not covered above (in accordance with DWAF's Minimum Requirements): volumes, transportation and disposal procedures (Section 21g).
- This information may have been covered in Section 8.4.1.

Roles and responsibilities

LA: Environment	Collate above information for all other waste streams based on information received from Province.
CMA	Provide input regarding other waste streams if requested.
Provincial: DACEL, DME	Provide above information to LA.
National: DWAF/DEAT	Provide input regarding other waste streams if requested.

8.9 Quantitative risk assessment

The Section 21 water uses and water and waste infrastructure described above are as a result of development, which does not occur in isolation but has impacts on the natural, physical and social environment. These impacts and associated risks need to be predicted and quantified before they can be effectively managed. The term risk refers both to the probability of a harm resulting from an activity and to its magnitude. Risk estimation is a quantitative description of the probability or relative magnitude of harm.

Impact and risk assessment forms part of the continuous feedback loop required for IWRM (refer to Figure 2.1).

8.9.1	Possible impacts to the water environment		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Assess impacts of ALL Section 21 water uses in Section 8.7 and land uses according to accepted procedures. • Include Local Authority uses and all sectors falling within the Local Authority area of jurisdiction. • Include identified impacts based on the areas of concern in Sections 8.5.4.6 and 8.6.5.4. • Briefly describe the identified and potential impacts and their significance. • Review the documented procedures included in Section 8.7 for gaps based on the outcome of the impact assessment, and if necessary, revise to address the gap. • Some of this information can be found in the various Environmental Impact Assessments that may have been conducted by the Local Authority. 			
Roles and responsibilities			
LA: Environment		Collate above information.	
CMA		Assist Local Authority if requested.	
Provincial		Provide information for infrastructure falling under province e.g. hazardous waste sites.	
National		None	

8.9.2	Risks to the water environment		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> Assess risk of ALL water systems in Section 8.7 (includes Section 21 water uses) and existing and planned developments (land uses) within sensitive areas and the 1:50 and 1:100 year floodlines, according to accepted procedures. Some of these risks can be found in The Provincial Disaster Management Plan, which should include environmental risks and hazards (DEAT, 2004). Use the impact assessment in Section 8.9.1 to facilitate the risk assessment. Focus on the impacts associated with the areas of concern in Sections 8.5.4.6 and 8.6.5.4. Review the documented procedures included in Section 8.7 for gaps based on the outcome of the risk assessment, and if necessary, revise to address the gap. 			
Roles and responsibilities			
LA: Environment	Collate above information.		
CMA	Assist Local Authority if requested.		
Provincial: DACEL	Facilitate with the risk assessment, if requested, in terms of The Provincial Disaster Management Plan		
National	None		

8.9.3	Risks to human health		WSDP: F1.2 ¹
			IWMP: No
<ul style="list-style-type: none"> Assess risk of all water systems in Section 8.7 based on the findings of the impact assessment. Focus on the health risks associated with the areas of concern in Sections 8.5.4.6 and 8.6.5.4. Make reference to DWAF's water quality guidelines for domestic use (1996, 1998). Obtain statistics from Province (primary health care is now a responsibility of Province although service agreements between Local Authorities and Province require Local Authorities to continue with existing facilities – Qomfo, 2005). Review the documented procedures included in Section 8.7 for gaps based on the outcome of the impact assessment, and if necessary, revise to address the gap. 			
Roles and responsibilities			
LA: Health (if still functioning)/Environmental Health	Collate above information		
CMA	Assist Local Authority if requested.		
Provincial: Health	Provide information/health statistics from provincial clinics.		
National	None		

1: WSDP requires a situation assessment for health but not a risk assessment

8.9.4	Cumulative risk assessment		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> Assess combined risk of all water systems in Section 8.7. The cumulative risk has implications for downstream users, who receive the combined impacts from upstream users e.g. upstream discharges from sewage works, industry and mines may individually comply with water quality limits for the effluent but when combined may pose a health risk to a downstream informal settlements using the water. 			
Roles and responsibilities			
LA: Environment		Collate above information.	
CMA		Assist Local Authority if requested.	
Provincial: DACEL		None	
National: DWAF		None	

8.9.5	Key performance areas (KPA) and indicators (KPI)		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> In order to optimise the monitoring programmes and data assessment, it is necessary to identify KPAs and KPIs for all water systems in Section 7 based on the areas of concern identified in Sections 8.5.4.6 and 8.6.5.4 and the above impacts and risks. Examples are given in Table 8.2 below. Under the local government municipal planning and performance management regulations (no. 796, 2001), Local Authorities must adopt a performance management system and set KPIs and KPAs related to the IDPs (DEAT, 2004). The focus of these KPIs and KPAs is socioeconomic e.g. % households with access to basic level of service, number of jobs created etc. The role of Local Authorities in socio-economic development is to provide an enabling environment, rather than being responsible for economic growth and job creation (Qomfo, 2005). Include socioeconomic and any other IWRM related KPAs and KPIs from the IDP. 			
Roles and responsibilities			
LA: Environment, Planning		Collate the identified KPAs and KPIs.	
CMA		Provide input in terms of the Catchment Management Strategy.	
Provincial: DACEL		Provide input based on river health and review KPAs and KPIs in terms of the Provincial Development Strategy.	
National: DWAF		Review KPAs and KPIs in terms of the National Water Resource Strategy.	

Table 8.2: Specific strategies to address some of the consequences of urbanisation (adapted from Görgens et al., 1998)

Impact/KPA	Operational strategies	Responsibility	KPI
Blockages in the sewer system	Improve sewer maintenance	Local Authority	Reduce number of blockages
	Sanitation education	CMA/Schools	
Inadequate sanitation in informal settlements	Upgrade sanitation	Local Authority	Number of households
Settlement in riparian zone	Relocate people from flood plain	Local Authority	Number of dwellings relocated
	Restrict riparian development	Local Authority	Number of dwellings
Use of rivers while contaminated	Restrict or publicise health risk	CMA	Reported illness
Degradation of rivers and streams resulting in loss of habitat and reduced assimilative capacity	Rehabilitate rivers	CMA/DWAF/ Local Authority	Km of rivers rehabilitated
Urban washoff and riparian litter	Install detention ponds and traps	Local Authority /CMA	Number of ponds/traps
	Anti-litter campaign	Local Authority	Tons of refuse collected
Community disintegration	Waste management strategy	Local Authority /CMA/DWAF	Pollution indicators
	Community social development	Provincial Gov/ Local Authority /NGO's	Social indicators

8.9.6	Performance monitoring	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> Assess performance in terms of the identified KPAs and KPIs. Assessment of Local Authorities is required at national, provincial, CMA, metropolitan and district level. District municipalities are required to monitor local municipalities. These assessments need to be coordinated to avoid gaps and duplication. Review and amend management systems and strategies in Section 8.10 and documented procedures in Section 8.7 in terms of the outcome of the assessment. Review and amend monitoring programmes in Sections 8.5.4 and 8.6.5 on an annual basis in terms of the outcome of the assessment. Identify additional monitoring requirements. 		
Roles and responsibilities		
LA: Environment, Water and Sanitation	Collate the above information	
CMA	Assess Local Authority performance.	
Provincial: DACEL/DPLG	Assess Local Authority performance.	
National: DWAF/DEAT	Assess Local Authority performance.	

8.10 Management systems and strategies

This section goes through the process of translating the IWRM objectives in Section 0 into a general IWRM Strategy (refer to Box 7) and specific strategies for each water use and management system based on the identified impacts and risks in Section 0.

Negative impacts need to be mitigated and positive impacts maximised to realise a safe and healthy environment and promotion of socioeconomic development. Mitigation/maximisation of the impacts identified in Section 8.9.1 and management of the risks assessed in Sections 8.9.2-8.9.4 requires management policies, strategies, plans and procedures. The list of selected documents from 3 Unicitys is presented in Appendix B.

All existing IWRM related policies, plans and strategies should be assessed in relation to the identified impacts and risks and all identified gaps must be addressed as part of the continuous feedback loop required for IWRM (refer to Figure 8.1). Each document needs to include:

- a problem statement;
- principles on which the document is based;
- specific objectives to be achieved;
- background information;
- the details of the policy/strategy or plan;
- recommendations to operationalise the policy/strategy or plan, including communication and distribution of the document, identified projects and focus areas.

DEAT (national level) and DACEL (provincial level) must ensure that Local Authority policies, strategies and plans adhere to the relevant Environmental Implementation Plan/Environmental Management Plan and NEMA principles.

The generic strategy in Box 7 sets out commitments for achieving IWRM. These need to be developed further to be specific for your Local Authority and should be aligned with the IDP, WSDP and IWMP.

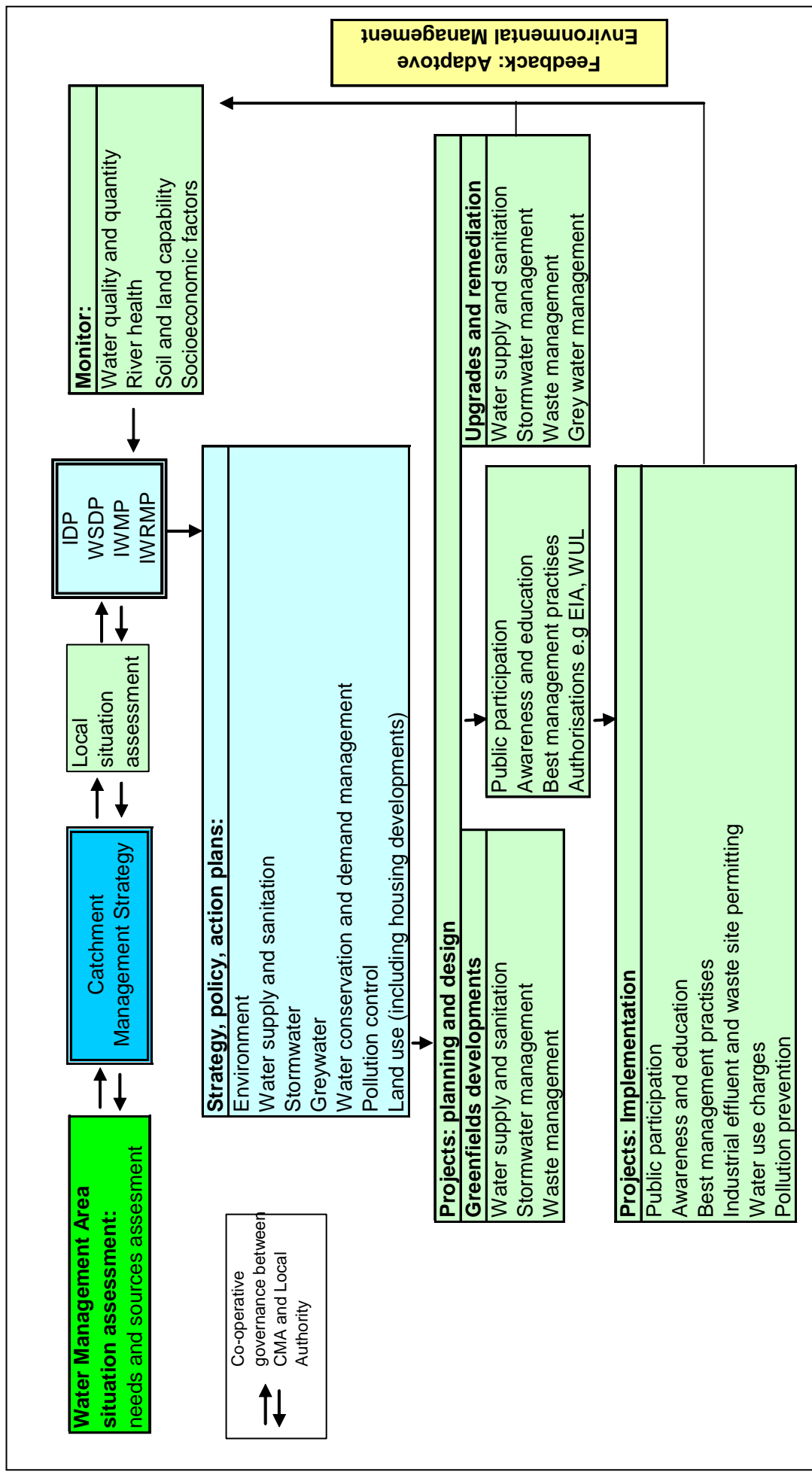


Figure 8.1: Continuous feedback loop for IWRM implementation in a Local Authority area

Box 7: Generic IWRM Strategy for a Local Authority
Objective: To use water effectively
DWAF's water management hierarchy of minimise, reuse/recycle, treat and release will be followed.
Minimise losses of water by careful design and operation and regular inspection, maintenance and feedback to management on the Local Authority water services infrastructure and water management systems.
All potentially polluting water from sewage works, industrial sites, landfill sites and any other land use generating such water will be rapidly collected, contained and re-used where possible e.g. for irrigation of parks.
Opportunities for the recycling of waste materials (domestic and sewage sludge) will be investigated and utilised wherever economically viable.
As small an area as possible will be exposed at any one time during construction activities.
Water and waste management tools (such as water balances and emergency protocols) will be developed and used in the implementation of this water management strategy.
Objective: Manage land use effectively for protection of the riparian zone (green corridors) and water resources and maintenance of biodiversity
Assess all development proposals according to protection of sensitive areas, maintenance of biodiversity and floodline regulations and in terms of available water services capacity – water supply, sewage and stormwater.
Promote creative options for balancing development with maintenance of open space systems, ecosystem integrity and biodiversity.
Objective: Operate and maintain infrastructure and systems to minimise the risk of pollution
Operate in such a way as to prevent uncontrolled releases of potentially polluting material e.g. at the sewage treatment plants and pump stations.
Develop a contamination clean up plan to ensure that any spills are cleared as soon as possible and to ensure disposal of spilt material in an appropriate way.
Spillage from pipelines will be addressed as soon as possible. A contingency plan will be implemented to enable the early detection of broken or burst pipelines.
Ensure equipment is well maintained and fully operational.
Collection and disposal of waste will be in line with legal requirements and carried out by reputable waste contractors, with periodic duty of care inspections by the Local Authority.
Develop and implement an incident reporting system that includes DWAF, for reporting of any polluting or potentially polluting incidents so that appropriate measures can be taken.
Objective: Limit erosion and the consequent degradation of soil and pollution of air and water
The Local Authority should rehabilitate all disturbed council owned land as soon as the disturbing force is removed e.g. after construction of infrastructure, completion of maintenance, following major rainfall events or pipe bursts etc.
The Local Authority should ensure all privately owned land is rehabilitated as soon as the disturbing force is removed e.g. after construction of infrastructure.
Water systems, such as stormwater drains, canals etc. must be designed to prevent pollution and minimise erosion or sedimentation.
Linear infrastructure (roads and pipelines) should be inspected on a regular basis (ideally monthly) to check that the associated water management infrastructure is effective in controlling erosion, especially for untarred roads and after major rainfall events
Energy dissipaters should be constructed at points where there are concentrated discharges of water to the environment that can cause significant erosion e.g. at the exit of a concrete lined stormwater channel to the natural watercourse. Where necessary, energy dissipaters should also be placed within water channels to slow the speed of water. The effectiveness of these dissipaters should be checked on a monthly basis.
If any of the inspections detailed above identify eroded areas, these should be repaired where necessary as soon as practicable.

Objective: Prevent damage to receiving watercourses from runoff arising from urban drainage	
Regulate development (land use) to minimise stormwater volumes generated, velocities and peak flows discharging to natural watercourses e.g. through porous paving, reduction in paved areas, retention on site etc.	
Design and operate stormwater management systems to minimise volumes generated, velocities and peak flows discharging to natural watercourses e.g. earth lined canals, swales, energy dissipation etc.	
Retain stormwater on site wherever possible e.g. retention ponds in parks, large developments etc.	
Manage grey water effectively through containment on site for reuse e.g. irrigation of community gardens and evaporation, or discharge it to sewer where infrastructure and capacity is available.	
Exposed surfaces within dirty areas (such as construction sites, maintenance areas and landfill sites) will be kept to a minimum to minimise the volume of dirty runoff generated (for example by careful design, revegetation, etc) and to minimise the potential loss of 'clean' runoff to the catchment.	
Objective: Prevent damage to groundwater from seepage arising from the Local Authority's activities	
Design, operate, maintain and manage leachate detection and collection systems at landfill sites effectively.	
Monitor pipe infrastructure for subsurface leakages.	
Minimise ponding of potentially contaminated water by appropriate design of infrastructure and cleaning up of spills as soon as possible.	
Objective: Promote socio-economic development	
Identify and assess labour intensive methods for project implementation.	
Identify creative means for community involvement in and remuneration for operation and maintenance of IWRM projects/activities (this will provide communities with a sense of ownership and pride and hence ensure sustainability of projects)	
Objective: Monitor and assess compliance with this strategy	
Monitoring of potentially affected water resources will take place regularly to assess whether the Local Authority is having a negative impact on water resources and users of these water resources.	
The assessment of monitoring results, any changes to the water management strategy and any significant incidents will be reported to stakeholders e.g. through the catchment management forums and DWAF.	
Regular internal reviews and audits will be carried out to ensure the Local Authority is operating in accordance with this strategy and its environmental commitments with respect to the IDP, WSDP, IWMP and IWRMP.	
Objective: Communication and engagement with stakeholders	
Review the Strategy with stakeholders	
Engage stakeholders e.g. through the formation of partnerships (refer to Box 4 in Section 7), in the implementation of this strategy.	

8.10.1	Environmental management	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> • Give an outline of the system in place, such as ISO14000. • Confirm alignment with the national and provincial Environmental Implementation Plans/Environmental Management Plans. • Note the stage of implementation and proposed projects. 		
Roles and responsibilities		
LA: Environment	Provide the above information.	
CMA	None	
Provincial: DACEL, DPLG	Provide input to the alignment confirmation, if requested.	
National: DWAF, DEAT	Provide input to the alignment confirmation, if requested.	

8.10.2	Catchment management	WSDP: None
		IWMP: No
<ul style="list-style-type: none"> • Give an outline of the Local Authority's involvement with the Catchment Management Forum/Committee/Agency⁵. • Describe how the Local Authority water management activities are aligned with the CMAs Catchment Management Strategy or what process is being followed to input the IWRMP into the Catchment Management Strategy if it has not yet been developed. • Note proposed catchment management specific projects. 		
Roles and responsibilities		
LA: Environment, Planning	Provide an overview of the information above	
CMA	Provide input into the development and implementation of the Local Authority IWRMP and ensure it is aligned with the CMA's Catchment Management Strategy or where the Catchment Management Strategy has not yet been developed, ensure that the IWRMP is used as input into the Catchment Management Strategy. Refer to the National Water Act for the CMA's specific legal obligations in this regard.	
Provincial	None	
National: DWAF	Provide input into the development and implementation of the Local Authority Catchment Management Strategy if the CMA is not yet established.	

8.10.3	Water conservation/water demand management	WSDP: E3, F4 ¹
		IWMP: No
<ul style="list-style-type: none"> • Water conservation /water demand management is required by the Water Services Authority as a component of its Water Services Development Plan. • Provide an outline of the water conservation /water demand management strategies/systems in place, such as leak detection, education and awareness. • Summarise the water conservation /water demand management measures implemented by the Local Authority, including water services and irrigation. • Summarise the water conservation /water demand management measures implemented by all sectors within the Local Authority, including golf estates, mines, power stations etc. 		
Roles and responsibilities		
LA: Water and Sanitation, Roads, Parks and Recreation, Environment, Environmental Health.	Collate the information required. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA	Provide input for other sectors within the Local Authority area of jurisdiction.	
Provincial	Include LA measures in Growth and Development Strategy and Environmental Implementation Plan.	
National: DWAF	Provide input for other sectors within the Local Authority area of jurisdiction if the CMA is not yet established.	

1: More detailed information is required in the WSDP. Water conservation /water demand management. includes water services and the Working for Water Programme.

⁵ The Local Authority may fall within more than one catchment and therefore under more than one CMA

8.10.4	River and wetlands		WSDP: F3.2.1.4, F3.2.1.6 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide an outline of the strategies for management, remediation and rehabilitation of rivers and wetlands, including biodiversity, control of alien invasives, floodplains, green corridors and river crossings. • Confirm alignment with the Provincial Environmental Implementation Plan and CMAs Catchment Management Strategy. • Note the stage of implementation and proposed projects. • Provide a summary of projects undertaken over the last year and planned for the following year. 			
Roles and responsibilities			
LA: Environment, Planning, Roads, Parks and Recreation.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Provide input on specific projects being undertaken	
Provincial: DACEL		Provide input on specific projects being undertaken	
National: DWAF		Provide input on specific projects being undertaken	

1: Quality returned to the resource and pollution contingency measures are required.

8.10.5	Groundwater protection and recharge		WSDP: F3.2.1.6 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide a summary of groundwater protection measures e.g. leachate collection systems at landfill sites. • Provide a summary of recharge measures implemented e.g. stormwater retention ponds and earth lined stormwater canals. • This information is crucial for Local Authorities reliant on groundwater for water supply. 			
Roles and responsibilities			
LA: Environment, Water and sanitation, Waste, Roads		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information. Plot land restrictions on the Local Authority floodline layout.	
CMA		Provide input on specific strategies or measures being undertaken.	
Provincial		None.	
National: DWAF		Provide input on specific strategies or measures being undertaken.	

1: Requires identification of resources that could potentially become polluted and the potential pollution sources.

8.10.6	Land use		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Zoning and development is a component of the IDP. Management should include evaluation of zoning, potential restrictions on land use, development and conservation of metropolitan open space¹ and remediation. • Provide a summary of the land use strategy and evaluation procedures and restrictions. • Confirm alignment with the Provincial Development Strategy and Environmental Implementation Plan. • Provide a summary of remediation projects undertaken over the last year and planned for the following year. 			
Roles and responsibilities			
LA: Environment, Planning		Collate above information. Plot land restrictions on the Local Authority floodline layout.	
CMA		None	
Provincial: DACEL, DEAT		Provide input on development and remediation projects being undertaken.	
National: DWAF		None	

1: Metropolitan open space systems create green corridors, which facilitate ecosystem maintenance and the preservation of biodiversity¹.

8.10.7	Pollution control		WSDP: F3.2 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide a summary of the pollution control strategy and bylaw provisions. • Confirm alignment with the CMA's Catchment Management Strategy. • Provide a summary of systems in place to manage pollution from point and non point sources including all technical and social solutions e.g. litter traps and education and training, respectively. • Provide a summary of pollution control projects undertaken over the last year and planned for the following year. 			
Roles and responsibilities			
LA: Environment, Environmental Health, Water and Sanitation, Roads, Parks and Recreation and Waste.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Provide input regarding specific measures to be undertaken by the CMA to avoid duplication.	
Provincial: DACEL		Provide input regarding specific measures to be undertaken by Province to avoid duplication.	
National: DWAF, DEAT		Provide input regarding specific measures to be undertaken by DWAF/DEAT to avoid duplication.	

1: List of potential pollution sources and contingency measures are required.

8.10.8	Cooperative governance		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Provide a summary of the cooperative governance strategy. • Confirm alignment with province and national government. • Provide reference to specific projects in which cooperative governance has been put into practise. • Provide summary of attendance at relevant forums. 			
Roles and responsibilities			
LA: All departments identified in Table 7.1.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Ensure Local Authority is included in all cooperative governance forums.	
Provincial: DPLG		Ensure Local Authority is included in all cooperative governance forums.	
National: DWAF		Ensure Local Authority is included in all cooperative governance forums.	

8.10.9	Community/stakeholder participation		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Provide a summary of stakeholder identification procedures and participation strategies. • Indicate methods of communication and liaison. • Provide a summary of record keeping procedures. • Identify partnerships with communities, NGOs and other sectors (refer to Box 4 for examples). • The catchment management forums should be a source of stakeholder information. 			
Roles and responsibilities			
LA: All departments identified in Table 7.1.		Collate above information. Due to the number of departments involved the Communications Department with the assistance of the coordinator/champion should collate this information.	
CMA		Assist in stakeholder identification if required.	
Provincial		Assist in stakeholder identification if required.	
National: DWAF		Assist in stakeholder identification if required.	

8.10.10	Emergencies and contingencies		WSDP: F5.1.1.11 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide a summary of documented procedures for handling and reporting of incidents. • Provide a summary of IWRM emergencies handled over the last year: brief description of emergency and management outcomes e.g. June 2005: diesel spill into stream was cleared within 12 hours, fish deaths occurred within 200m downstream of incident (refer to 12.8). • Schematic of the response procedure with contact details of core emergency personnel (more detail than that supplied on the organogram in Section 8.2.2). 			
Roles and responsibilities			
LA: Disaster Management ²		Collate above information	
CMA		None	
Provincial: DACEL		Provide input to ensure alignment of Local Authority procedures with Province.	
National: DWAF		None	

1: Required as a component of the asset management assessment.

2: Inconsistency exists in disaster management because although Local Authorities are required to prepare disaster recovery plans, disaster management is the responsibility of national and provincial government, except for fire fighting.

8.11 Prioritisation of projects

Implementation of specific projects to achieve IWRM requires prioritization of projects in terms of the identified impacts and risks, as budget is limited. Cost-benefit analysis, multi-criteria analysis or any other suitable method is essential for this prioritization process, which is essentially the development of a business plan. Examples of operational strategies and projects are provided in Table 8.3 at the end of this section.

8.11.1	Methodology and selection criteria		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Overview of methodology used to assess IWRM projects for implementation within the next financial year. • Overview of selection criteria e.g. return on investment, improvement in water quality etc. • Procedures to standardise approaches used within the Local Authority and between the three tiers of government. 			
Roles and responsibilities			
LA: All departments identified in Table 7.1.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Provide input to Local Authority	
Provincial: DACEL		Provide input to Local Authority	
National: DWAF		Provide input to Local Authority	

8.11.2	Rehabilitation and mitigatory measures: management options to mitigate impacts and risks (refer to Section 0)		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Evaluate short and long term alternatives in terms of applicability to current operations, conformance with legislation, national and provincial developments and budget available for implementation. • Modelled water quality may be useful in the evaluation of different implementation scenarios 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation, Housing and Waste.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Facilitate evaluation process in terms of projects planned by the CMA.	
Provincial: DACEL		Facilitate evaluation process in terms of projects planned by province.	
National: DWAF, DEAT		Facilitate evaluation process in terms of projects planned by national government.	

8.11.3	Budget provision and alternative funding sources		WSDP: F9.1.1 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide a summary of budget provision for identified IWRM projects: capital expenditure and O&M. • Identify alternative financing options e.g. intergovernmental grants, such as the Municipal Infrastructure Grant, donor funding etc. • Provide a summary of funding applications that have been made. 			
Roles and responsibilities			
LA: Finance, Planning		Collate above information	
CMA		Inform Local Authority of budget provisions in the water management area and potential funding sources.	
Provincial: DACEL, DEAT, DPLG.		Inform Local Authority of budget provisions in the Province and potential funding sources.	
National: DWAF, DEAT		Inform Local Authority of budget provisions and potential funding sources in the water management area if the CMA is not yet functional	

1: Required for water services in detail.

8.11.4	Work creation and poverty alleviation		WSDP: F1.3, F1.4 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide an overview of job creation initiatives. • Provide a summary of jobs created over the last year and those planned for the following year. • Confirm alignment with CMA, provincial and national initiatives 			
Roles and responsibilities			
LA: Planning		Collate above information	
CMA		Provide input to Local Authority	
Provincial: DACEL, DPLG		Provide input to Local Authority	
National: DWAF, DEAT		Provide input to Local Authority	

1: Status and type of employment and future and trends and goals.

8.11.5	Identified projects list		WSDP: F10 ¹
			IWMP: No
<ul style="list-style-type: none"> • Provide a list of all IWRM projects undertaken during the previous year and planned for the following year. • Provide a summary of the 5-year project plan for IWRM. 			
Roles and responsibilities			
LA: All departments identified in Table 7.1.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Provide input to the Local Authority on projects planned by the CMA	
Provincial: DACEL, DPLG		Provide input to Local Authority on projects planned by province	
National: DWAF, DEAT		Provide input to Local Authority on projects planned by national government	

1: Required for water service provision projects

8.11.6	Time frames for implementation		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Identify time frames for implementation of one and five year project plans. • Confirm alignment with CMA, provincial and national initiatives 			
Roles and responsibilities			
LA: All departments identified in Table 7.1.	Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.		
CMA	Provide input to Local Authority		
Provincial: DACEL	Provide input to Local Authority		
National: DWAF	Provide input to Local Authority		

Table 8.3: Examples of projects to operationalise IWRM strategies (adapted from Görgens et al., 1998)

Operational strategy	Action/project	Location	Time frame	Responsibility
Upgrade sanitation	Construction of approved on-site sanitation per household, for example, VIP's	Informal settlements	Within 12 months	Province (RDP)
	Replace old trunk sewer mains	Formal settlements	Within 24 months	Local Authority
Improve sewer maintenance	Institute weekly sewer monitoring	All sewered urban areas	Ongoing after 3 months	Local Authority
	Increase maintenance funding	Within the Local Authority	Next financial year	Local Authority
Sanitation education	Conduct 'edutainment' drive	Informal settlements	Next 12 months	CMA
	Implement newspaper campaign	Local paper	Next 6 months	CMA
Restrict or publicise health risk	Signpost results of bacterial monitoring	Along critical river reaches and at critical impoundments	Ongoing after 3 months	CMA & DWAF
Relocate people from floodplain	Provide land and move informal settlements	Floodplain areas	Within 12 months	Province (RDP)
Restrict riparian development	Re-evaluate 50-year flood lines	Throughout urban area	Within 6 months	Local Authority
	Enforce 50-year flood zone by-law	Throughout urban area	Ongoing after 6 months	Local Authority
	Decanalise and vegetate streams	Based on evaluation of priority areas	Within 12 months	CMA & Local Authority
Rehabilitate streams	Revegetate wetland areas	Based on evaluation of priority areas	Within 12 months	CMA
	Develop an artificial wetland system	Based on evaluation of priority areas	Within 18 months	CMA & Local Authority
Install detention ponds and traps	Construct litter trap	Upstream of impoundments and sensitive areas	Within 36 months	CMA & Local Authority
	Increase street sweeping staff and frequency	Commercial districts	Next financial year	Local Authority
Anti-litter and runoff campaigns	Schools, business or community adopt a river programme	Local streams	Biweekly activities	Area schools
	Public litter cleanup day	Local streams and impoundments	Annual	Civics and CMA
	Link into IWRMP action plans	Throughout the Local Authority	Ongoing	CMA and Local Authority
Waste management strategy	Improve waste disposal site management	Landfill sites	Within 24 months	Local Authority
Community social development	Improve social amenities and outreach	Disadvantaged suburbs	Within 24 months	Local Authority/Provincial Gov/NGOs

8.12 Operational management

8.12.1	Project planning, implementation and management		WSDP: none
			IWMP: No
<ul style="list-style-type: none"> • Make reference to identified projects in Section 8.11.5. • List procedures followed from inception to completion. • Summarise management procedures post completion e.g. maintenance procedures (refer to documented procedures in Section 8.7). 			
Roles and responsibilities			
LA: All departments identified in Table 7.1.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Provide input to Local Authority	
Provincial: DACEL		Provide input to Local Authority	
National: DWAF, DEAT		Provide input to Local Authority	

8.12.2	Operation and management		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Include all water management systems and Section 21 water uses. • List of documented operation and management procedures and the responsible department (refer to Section 8.7). 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation, and Waste		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		None	
Provincial: DACEL		None	
National: DWAF		None	

8.12.3	Records of staff training		WSDP: F5.1.1.11 ¹
			IWMP: No
<ul style="list-style-type: none"> • Relate to IWRM in terms of training previously undertaken, current requirements and plans to fulfil requirements. 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation and Waste.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		None	
Provincial: DACE		None	
National: DWAF		None	

1: Required as a component of the asset management assessment.

8.12.4	Education and awareness		WSDP: F4.1.1.5, F8.1.1 ¹
			IWMP: No
<ul style="list-style-type: none"> • Consider all IWRM systems in Sections 8.7 and 8.8 and strategies in Section 8.10. • Provide a summary of education and awareness campaigns/programmes: focus, area targeted e.g. schools, communities etc, and numbers reached as a percentage of residents. 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation and Waste.	Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.		
CMA	None		
Provincial: DACEL	None		
National: DWAF	None		

1: Required for water conservation /water demand management, sanitation promotion, basic water services, health and hygiene, and pollution awareness.

8.12.5	Partnerships with residents, NGOs, business etc		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • List all partnerships (refer to Box 4 in Section 7 for examples). • Describe the partnership and assess its effectiveness in achieving IWRM. 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation and Waste.	Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.		
CMA	None		
Provincial: DACEL	None		
National: DWAF	None		

8.12.6	Communication		WSDP: F8.1 ¹
			IWMP: No
<ul style="list-style-type: none"> Note participation in forums, Describe the method used for distribution of information including proposed projects and monitoring data. Describe or reference the procedure for maintaining record of communication. 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation and Waste.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		None	
Provincial: DACEL		None	
National: DWAF		None	

1: Required indirectly for addressing complaints and pollution awareness.

8.12.7	Records of correspondence with other Regulatory Authorities		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> Summary of correspondence over the last year or longer if it pertains to unresolved issues or projects still in the planning and implementation stages. Note all unresolved issues and actions required by the Regulatory Authorities to resolve the issue 			
Roles and responsibilities			
LA: Environment, Planning, Environmental Health, Water and Sanitation, Roads, Parks and Recreation and Waste.		Collate above information. Due to the number of departments involved the coordinator/champion should collate this information.	
CMA		Provide input to issues that have not resolved.	
Provincial: DACEL		Provide input to issues that have not resolved.	
National: DWAF		Provide input to issues that have not resolved.	

8.12.8	Recording and reporting of incidents		WSDP: F1.1.11 ¹
			IWMP: No
<ul style="list-style-type: none"> Refer to Item 8.10.10 			
Roles and responsibilities			
LA		Refer to Item 8.10.10	
CMA			
Provincial			
National			

1: Required as a component of the asset management assessment.

8.12.9	Auditing and reporting (internal and external auditing)		WSDP: None
			IWMP: No
<ul style="list-style-type: none"> • Include issues in Items 8.9.5 and 8.9.6. • Summarise findings of internal audits and procedures undertaken to address findings in preparation for external audits. • Each national and provincial department involved in IWRM should conduct an audit of the Local Authority. • Note procedures followed to address findings of external audits. 			
Roles and responsibilities			
LA: Environment	Conduct internal audits and collate above information.		
CMA	Provide Local Authority with findings from external audit.		
Provincial: DACEL	Provide Local Authority with findings from external audit.		
National: DWAF	Provide Local Authority with findings from external audit.		

9 Recommendations for implementation

The following are required for successful implementation of the IWRMP:

- availability of adequate resources – financial and human resources;
- appointment of a coordinator or champion to facilitate the necessary integration, communication and collation and dissemination of information;
- support of the coordinator at the managerial and political level, including enabling access to resources to perform functions of the coordinator adequately;
- involvement of the Local Authority in a DWAF-Local Authority Forum dealing specifically with IWRM to facilitate implementation of Local Authority IWRMPs in conjunction with implementation of the Water Services Development Plans and Integrated Waste Management Plans where applicable;
- inclusion of IWRM issues in existing intergovernmental forums established in terms of cooperative governance;
- provision of assistance to Local Authorities from provincial and national government departments;
- development of the optimum approach for implementation will need to be on a case-by-case basis due to the broad variation within Local Authorities and where capacity is lacking, implementation may need to be driven by the CMA/DWAF;
- fine tuning of the IWRMP Guideline will take place during Phase 3 of the project, which will be the piloting of the IWRMP Guideline in selected Local Authorities.

In the spirit of cooperative governance and the recognition that none of the Local Authority's IWRM related responsibilities and impacts on water resources can be effectively managed in isolation, Local Authorities are advised to complete an IWRMP prior to the legal obligation to do so is promulgated.

10 Contact details for more information

DWAF CONTACT DETAILS

Designation	Phone Number	Fax	Postal Address
CHIEF DIRECTOR Southern Cluster	043 604 5400	043 604 5595	Private Bag X7485 King Williams Town 5600
REGIONAL DIRECTOR: Eastern Cape (WRM)	043 604 5400	043 604 5595	Private Bag X7485 King Williams Town 5600
REGIONAL DIRECTOR: Western Cape	021 950 7100	021 946 2664	Private Bag X16 Sanlamhof 7532
CHIEF DIRECTOR Eastern Cluster	031 336 2700	031 304 9546	PO Box 1018 Durban 4000
REGIONAL DIRECTOR: Kwa-Zulu-Natal (WRM)	031 336 2700	031 304 9546	PO Box 1018 Durban 4000
REGIONAL DIRECTOR: Umkomatie Water Management Area (Mpumalanga)	013 759 7300	013 755 7678	Private Bag X11259 Nelspruit 1200
REGIONAL DIRECTOR: Olifant Water Management Area (Mpumalanga)	013 759 7300	013 755 7678	Private Bag X11259 Nelspruit 1200
CHIEF DIRECTOR Central Cluster	012 392 1477/8	012 392 1454	Private Bag X313 Pretoria 0001
REGIONAL DIRECTOR: Free State	051 430 3134	051 430 8146	PO Box 528 Bloemfontein 9300
REGIONAL DIRECTOR: Gauteng	012 392 1300	012 392 1304	Private Bag X995 Pretoria 0001
REGIONAL DIRECTOR: Northern Cape	053 831 4125	053 813 5682	Private Bag X6101 Kimberley 8300
REGIONAL DIRECTOR: North West	018 392 1193/4	018 392 1193/4	Private Bag X5 Mmabatho 2735
CHIEF DIRECTOR Northern Cluster	015 295 9410 015 295 3217	015 295 9410	Private Bag X9506 Pietersburg 0700
REGIONAL DIRECTOR: Limpopo Water Resource Management	015 295 9410	015 295 3217	Private Bag X9506 Pietersburg 0700

11 Further reading

WRC research reports that deal with the issues covered in the development of the IWRMP Guideline are listed below and can be obtained directly from the WRC at 012 330 0340 or via the website: <http://www.wrc.org.za>. DWAF documents dealing with water quality management and water conservation are listed at the end of the table. These can be obtained from DWAF head office or via the website: <http://www.dwaf.gov.za>.

Subject	Project	Ref
Water Research Commission		
Alien invasives	Technique for modelling scenarios for alien plant control to estimate	WRC Report No. 907/1/01
Catchment management	Protocols and models for ICM case studies	WRC Report No. 1062/1/03
Catchment management	Protocols and models for ICM case studies	WRC Report No. 749/1/04
Catchment management	Development of a blueprint for urban catchment management in South Africa	WRC Report No. 864/1/01
Cost benefit analysis	Ecological/economic modelling approach	WRC Report No. 890/1/02
Drainage	Development of general guidelines for the management of urban runoff water quality	WRC Report No. TT 155/01
Governance	Appropriate approaches and mechanisms to foster co-operative governance between WUAs, CMAs and local government	WRC Report No. TT 204/03
		WRC Report No. 1433/1/06
Governance	-Review and evaluation of all relevant governance elements (principles, policy, legislation, regulation and practice) in terms of the hydrological cycle	WRC Report No. 1514/1/06
Groundwater	Groundwater supply in Local Authorities	WRC Report No. 1254/1/05
Groundwater	Earthlined stormwater canals in the Lotus River in Cape Town	WRC Report No. 864/1/01
Groundwater	Groundwater–surface water interactions	WRC Report No. 1093/1/04
		WRC Report No. 1117/1/05
		WRC Report No. 1234/1/03
Groundwater	Mapping of naturally occurring hazardous trace constituents in groundwater	WRC Report No. 1236/1/03
Monitoring	DWAF's national water quality and microbial monitoring programs	WRC Report No. 1118/1/04
Monitoring	Development of an interactive surface water quality information and evaluation system for South Africa (WQ 2000)	WRC Report No. 950/1/04
Monitoring	Development of an integrated information system specifically for water quality (WQIS)	WRC Report No. TT 252/06
Monitoring	Development of a GIS-based modelling system (ACRU)	WRC Report No. 1155/1/04
Participation	Group decision-support methods	WRC Report No. 863/1/01
Participation	Participatory WRM guidelines	WRC Report No. TT 258/06

Subject	Project	Ref
Participation	Development of appropriate tools to support meaningful participation of the public at different levels of decision-making	WRC Report No. 1434/1/07
Quality and quantity	Development of models to integrate water quality and quantity	WRC Report No. 1043/1/04
Sanitation	Development of a sanitation service provider protocol	WRC Report No. 1280/1/04
Waste management	Solid waste sites and leachate generation	WRC Report No. 995/1/02
Water conservation/water demand management	Water conservation and water demand management measures	WRC Report No. 1273/1/02
Water conservation/water demand management	Water demand forecasting	WRC Report No. 905/1/04
Water conservation/water demand management	Trade-off between various water uses and associated socio-economic issues in allocation of a limited water resource and optimisation of land use	WRC Report No. 749/1/04
Water conservation/water demand management	Models to optimise urban water consumption	WRC Report No. TT 152/02
		WRC Report No. TT 184/02
Water conservation/water demand management	BENCHLEAK software to evaluate the levels of leakage and non-revenue water	WRC Report No. TT159/01
Wetlands	The establishment of an urban wetland on Cape Metropolitan Council-owned land	WRC Report No. 1054/1/01
WRM	WRM functions delegation to WUA and CMAs	WRC Report No. TT 204/03
Department of Water Affairs and Forestry: water quality and conservation		
Catchment Management Forums	IWRM Series: Guidelines on the Establishment and Management of Catchment Management Forums	Sub-Series No. MS6.1
Diffuse pollution	Framework for Implementing Non-Point Source Management under the National Water Act	Report No. WQWP 0.1
IWRM	IWRM Series: Guidelines on the Establishment and Management of Catchment Management Forums	Sub-Series No. MS6.1
	Guideline for capacity building; Guideline for stakeholder participation in IWRM; Groundwater management guideline; Water conservation and demand management guideline.	Danida (Danish international development agency) funded IWRM Guidelines, available from DWAF on CD or as executive summaries in booklet form.
Source management	Source management strategy	Number M6.0 First edition, 2003
Water quality	National Water Quality Management Strategy	
Water quality	Water Quality Management and Assessment Component of a Catchment Management Strategy	Sub-Series No. MS8.1-8.3
Water quality	Resource directed water quality management	Sub series WQP 1.5
Water conservation /water demand	National Water Conservation and Demand Management Strategy	DWAF, 2005

Subject	Project	Ref
management.		
Wetlands	Wetland Delineation Guideline	DWAF website
Other		
Tool Box	The Global Water Partnership IWRM Tool Box for worldwide implementation of IWRM	http://gwpforum.org

12 References

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- Breen, C.M. et al., Research projects and capacity building. *Water SA* Vol. 30 No. 4 p429 (October 2004)
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- Dallas, H.F. and Day, J.A., The effects of water quality variables on riverine ecosystems: a review. WRC Report TT 61/93 (University of Cape Town, 1993)
- DEAT, Development of a core set of Environmental Performance Indicators to be integrated into IDP, EIP/EMP and SoE reporting, Situation analysis: Identification of Local Level responsibilities for the environment. Palmer Development Group (March 2004)
- DWAF and WRC, Water Law Review Process: The Philosophy and Practice of Integrated Catchment Management. Department of Water Affairs and Forestry and Water Research Commission, WRC Report No TT 81/96, (Pretoria, 1996)
- DWAF, Water Conservation and Demand Management strategy for the agricultural sector. Department of Water Affairs and Forestry, (Pretoria, 2000)
- DWAF, Registration Guide First Edition. Department of Water Affairs and Forestry (Pretoria, March 2000)
- DWAF, First Edition Environmental Implementation and Management Plan. Department of Water Affairs and Forestry, (Pretoria, 2001)
- DWAF, Source Management in South Africa. Department of Water Affairs and Forestry, Number 6.0, First Edition (Pretoria, 2003)
- DWAF, National Water Resource Strategy. Department of Water Affairs and Forestry, (Pretoria, September 2004)
- DWAF, Guidelines for Catchment Management Strategies, Draft for comment. Department of Water Affairs and Forestry in conjunction with The Association for Water and Rural Development (AWARD), Zinkwazi Consulting and Water for Africa (Pretoria, November 2006)
- Gilmour, A, Walkerden, G and Scandol, J, Adaptive Management of the water cycle on the urban fringe. *Conservative Ecology* 3(1):11 (Australia, 1999)
- Görgens, A. et al., Guidelines for Catchment Management to achieve Integrated Water Resources Management in South Africa. Water Research Commission, WRC Report No. KV 108/98, (Pretoria, 1998)
- Hinsch, M. and van der Westhuizen, J.L.J. The Bigger Picture: Managing water quality impacts in an

urban context. Department of Water Affairs and Forestry, (Pretoria, 2003)

IAWQ, Living with Water International Conference on Integrated Water Resources Management. IAWQ, EWPCA, NVA, (Amsterdam, September 1994)

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Websites

Australian Stormwater Association: <http://www.stormwater.asn.au/national.asp>

Cape Town website: www.capetown.gov.za/policies/pdf/cityimprovement.pdf

DMA: <http://www.ceroi.net/reports/durban/response/envman/locala21.htm>

Environment website:

http://www.environment.gov.za/PolLeg/Legislation/2005Aug12/Explanatory_Memorandum_to_Draft_EMI_Regulations.doc

Florida Stormwater Association: <http://www.florida-stormwater.org/>

Groundwork: groundwork.org.za/Booklets/BK2.pdf

International Water Association website: www.iwapublishing.com/pdf/WaterLoss-Aug.pdf

NRDC website: www.cwn.org/docs/issues/pollutedrunoff/nrdcstormfacts.htm

Western Australia: <http://www.wrc.wa.gov.au>

Appendix A: General Authorisations

26187**GOVERNMENT NOTICE****DEPARTMENT OF WATER AFFAIRS AND FORESTRY****NO 398
2004****26 March****GENERAL AUTHORISATIONS IN TERMS OF SECTION 39 OF THE NATIONAL WATER ACT, 1998 (ACT NO 36 OF 1998)**

I, ARNOLD MICHAEL MULLER, in my capacity as Director General of the Department of Water Affairs and Forestry and duly authorised in terms of section 63 of the National Water Act, 1998 (Act No 36 of 1998), do hereby authorize all or any category of persons to use water in terms of section 39(1) of the National Water Act, read together with section 21, in respect of the General Authorisations contained in the Schedule hereto.

Sgn. A M Muller

DIRECTOR-GENERAL: WATER AFFAIRS AND FORESTRY

DATE: 18 March 2004

SCHEDULE**1. IMPEDING OR DIVERTING THE FLOW OF WATER IN A WATERCOURSE****[Section 21(c)]****Purpose of this authorisation**

1.1. The authorisation permitted in terms of this Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act for a water use provided that the use is within the conditions set out in this Notice.

Exclusion

1.2. This authorisation does not-

- (a) replace or limit any existing authorisation that is recognised under the National Water Act;
- (b) apply to any wetland or any water resource within a distance of 500 meters upstream or downstream from the boundary of any wetland;
- (c) apply to any estuary or any water resource within a distance of 500 meters upstream from the salt water mixing zone of any estuary; or
- (d) allow for storage of water

Note: Information on the delineation of a wetland or the salt water mixing zone of an estuary can be obtained from the Department upon written request

Compliance with National Water Act and other laws

1.3. This authorisation does not exempt a person who uses water from compliance with any provision of the National Water Act unless stated otherwise, or any other applicable law, regulation, ordinance or by-law.

Area of applicability

1.4. This authorisation is applicable throughout the Republic of South Africa except as excluded in

- (a) paragraph 1.2 above; and
- (b) the areas set out in Table 1.1 below.

TABLE 1.1 Areas excluded from General Authorisation

Primary drainage region (*)	Excluded water resources
C	Vaal River downstream of the Kimberley waterworks to the confluence with the Orange River
D	Current well-points in the Orange River downstream of Augrabies Falls
J	Current well-points in the Buffels River
* NOTE: Information regarding the drainage regions can be obtained from the Department upon written request.	

Duration of authorisation

1.5. This authorisation will be valid for a period of five years from the date of publication of this notice, unless-

- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
- (b) the period is extended by a notice in the *Gazette*;
- (c) it is replaced with a General Authorisation in relation to a specific water resource or within a specific area; or
- (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

1.6. In this General Authorisation, unless the context otherwise indicates, any expression to which a meaning has been assigned in terms of the National Water Act, shall have the meaning so assigned, and-

"diverting flow" means the temporary or permanent diversion of flow for-

- a) prospecting, mining and quarrying;
- b) agriculture;
- c) management of waste disposal sites including landfills; and
- d) construction and maintenance purposes of infrastructure such as-
 - i) railways, roads, footpaths, bridges, culverts, and other access routes;

- ii) artificial recharge structures;
- iii) boreholes and well-points;
- iv) structures for water abstraction;
- v) structures for routing water supply and other pipelines and conveyors;
- vi) structures for creation of pools, bays and peninsulas;

- vii) telecommunication or power cables;
- vii) recreational camp sites, mooring sites, other anchorage facilities and slipways; and
- viii) structures for slope stabilisation and erosion protection,

but excludes any structure built for the purpose of storing water in terms of the Schedule to Government Notice No 1199 published in Government Gazette No. 20526, dated 8 October 1999 and as may be amended from time to time;

"hydrological monitoring" means those structures necessary for taking measurements of flow in a water resource according to the norms and standards of practice set down by the Department from time to time (obtainable from the Department upon written request);

"impeding flow" means the temporary or permanent obstruction or hindrance to the flow of water into watercourse by structures built either fully or partially in or across a watercourse including-

- a) bridges and culverts;
- b) weirs which are capable of impounding or storing water;
- c) artificial recharge structures;
- d) boreholes and well-points;
- e) structures for water abstraction;
- f) structures for routing water supply and other pipelines and conveyors;
- g) telecommunication or power cables; and
- h) mooring sites, other anchorage facilities and slipways.

Impeding and diverting the flow in a watercourse

1.7. (1) A person who-

- (a) owns or lawfully occupies property registered at the Deeds Office as at the date of this notice; or
- (b) lawfully occupies or uses land that is not registered or surveyed; or
- (c) lawfully has access to land on which the use of water takes place,

may on that property or land, impede or divert the flow of water in a watercourse, if-

(i) the impeding or diverting of flow-

(aa) does not impact on a water resource or on another person's water use, property or land; and

(bb) is not detrimental to the health and safety of the public in the vicinity of the activity;

(ii) the natural migration patterns of aquatic biota and the sustainable ecological functioning of the system are not interfered with;

(iii) any structure built fully or partially in or across a watercourse does not -

(aa) exceed a foundation width of **15 metres**;

-
- (bb) exceed a length of **200 metres**, measured from one side of the watercourse to the other; or
 - (cc) occur within a distance of **500 metres** upstream or downstream of another structure that impedes or diverts flow on the same watercourse, measured along the watercourse.
 - (iv) the volume of flow is not reduced except for natural evaporative losses;
 - (v) the water quality is not detrimentally affected;
 - (vi) strict erosion control measures are to be taken during and after construction to ensure no erosion of the bed or banks of a watercourse takes place; and
 - (vii) all necessary measures are taken to stabilise the diversion structure and surrounding area,

This will include:-

- (aa) rehabilitation of the riparian habitat integrity by ensuring that during re-habilitation only indigenous shrubs and grasses are used in restoring the bio-diversity;
- (bb) rehabilitation of disturbed and degraded riparian areas to restore and upgrade the riparian habitat integrity to sustain a bio-diverse riparian ecosystem;
- (cc) removal of alien vegetation and all new alien vegetation recruitment must be controlled; and
- (dd) annual habitat assessment must be carried out to monitor the sustainability of the diversion and compliance with the above conditions. Action must be taken to rectify any impacts

1.7. (2) A department of state in the national, provincial or local sphere of government may, for its own purpose and within its area of jurisdiction, impede or divert the flow in a watercourse subject to the conditions set out under paragraph 1.7(1) above for-

- (a) the control of stormwater;
- (b) construction, maintenance and development of infrastructure;
- (c) removal of alien vegetation;
- (d) ensuring the safety of the public , livestock and property;
- (e) hydrological monitoring; or
- (f) flood management and potential damage.

Registration

1.8.(1) A person who uses water in terms of this authorisation must submit a registration form for the registration of the water use if the impedance or diversion occurs within a distance of 1 000 meters from any other impedance or diversion, measured along the watercourse.

(2) A person who impedes or diverts water for hydrological monitoring purposes in terms of paragraph 1.7.(2)(e) above must submit a registration form for the registration of the water use.

(3) On receipt of a registration certificate from the Department, the person will be regarded as a registered water user.

(4) All forms for registration of water use are obtainable from the Regional offices of the Department as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Precautionary practices

1.9.(1) All reasonable measures must be taken to ensure-

- (a) the stability of the watercourse is not detrimentally affected by impeding or diverting the flow;
- (b) scouring, erosion or sedimentation of the watercourse is prevented; and
- (c) rehabilitation of the watercourse, including riparian and instream habitat, is undertaken after any impedance or diversion of flow.

(2) The water user must follow acceptable construction, maintenance and operational practices to ensure consistent, effective and sustainable impedance or diversion flow.

Inspections

1.10. Any property in respect of which a water use has been authorised in terms of this Notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offence

1.11. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

2 ALTERING THE BED, BANKS OR CHARACTERISTICS OF A WATERCOURSE

[Section 21(i)]

Purpose of this authorisation

2.1. The authorisation permitted in terms of this Notice replaces the need for a water user to apply for a licence in terms of the National Water Act for a water use provided that the use is within the conditions set out in this Notice.

Exclusion

2.2. This authorisation does not-

- (a) replace or limit any existing authorisation that is recognised under the National Water Act;
- (b) apply to any wetland or any water resource within a distance of 500 meters upstream or downstream from the boundary of any wetland;

- (c) apply to any estuary or any water resource within a distance of 500 meters upstream from the salt water mixing zone of any estuary;
- (d) allow for water storage; or
- (e) apply to dragline walkways (opencast mining).

Note: Information on the delineation of a wetland or the salt water mixing zone of an estuary can be obtained from the Department upon written request

Compliance with National Water Act and other laws

2.3. This authorisation does not exempt a person who uses water from compliance with any provision of the National Water Act, unless stated otherwise or any other applicable law, regulation, ordinance or by-law.

Area of applicability

2.4. This authorisation is applicable throughout the Republic of South Africa except-

- (a) as set out in paragraph 2.2 above; and
- (b) the areas set out in Table 2.1 below.

TABLE 2.1 Areas excluded from General Authorisation

Primary drainage region (*)	Excluded water resources
C	Riet River downstream of Kalkfontein Dam to Vaal River confluence
C	Vaal River downstream of the Kimberley waterworks to the confluence with the Orange River
D	The whole Kraai River up the Orange River confluence
D	Current well-points in the Orange River downstream of Augrabies Falls
J	Current well-points in the Buffels River
* NOTE: Information regarding the drainage regions can be obtained from the Department upon written request.	

Duration of authorisation

- 2.5. This authorisation will be valid for a period of five years from the date of publication of this notice, unless-
- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
 - (b) the period is extended by a notice in the *Gazette*;
 - (c) it is replaced with a General Authorisation in relation to a specific water resource or within a specific area; or
 - (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

2.6. In this General Authorisation, unless the context otherwise indicates, any expression to which a meaning has been assigned in terms of the National Water Act (Act 36 of 1998), shall have the meaning so assigned, and-

"altering the bed, banks or characteristics of a watercourse" means the temporary or permanent alteration of a watercourse for-

- a) prospecting, mining and quarrying;
- b) agriculture;
- c) management of waste disposal sites including landfills; and
- d) construction and maintenance purposes of infrastructure such as-
 - i) railways, roads, footpaths, bridges, culverts, and other access routes;
 - ii) artificial recharge structures;
 - iii) boreholes and well-points;
 - iv) structures for water abstraction;
- v) structures for routing water supply and other pipelines and conveyors;
- vi) structures for creation of pools, bays and peninsulas;
- vii) telecommunication or power cables;
- viii) recreational camp sites, mooring sites, other anchorage facilities and slipways; or
- ix) structures for slope stabilisation and erosion protection,

but excludes any structure built for the purpose of storing water in terms of the Schedule to Government Notice R.1191 published in Government Gazette No. 20526, dated 8 October 1999 and as may be amended from time to time ;

"hydrological monitoring" means those structures necessary for taking measurements of flow in a water resource according to the norms and standards of practice set down by the Department from time to time (obtainable from the Department upon written request).

Altering the bed, banks or characteristics of a watercourse

2.7.(1) A person who-

- (a) owns or lawfully occupies property registered at the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed; or
- (c) lawfully has access to land on which the use of water takes place,

may on that property or land alter the bed, banks or characteristics of a watercourse, if-

(i) the alteration-

(aa) does not impact on a water resource or on another person's water use, property or land; and

(bb) is not detrimental to the health and safety of the public in the vicinity of the activity;

(ii) the natural migration patterns of aquatic biota and the sustainable ecological functioning of the system are not interfered with;

(iii) the alteration activity does not extend for more than **50 metres** continuously or a cumulative distance of **100 metres** on that property or land, measured along the watercourse;

-
- (iv) the volume of flow is not reduced except for natural evaporative losses;
 - (v) strict erosion control measures are to be taken during and after construction to ensure no erosion of the bed and banks of the river takes place.;
 - (vi) the water quality is not detrimentally affected; and
 - (vii) all necessary measures are taken to stabilize the structure and surrounding area. This will include:-
 - (aa) rehabilitation of the riparian habitat integrity by ensuring that during re-habilitation only indigenous shrubs and grasses are used in restoring the bio-diversity;
 - (bb) rehabilitation of disturbed and degraded riparian areas to restore and upgrade the riparian habitat integrity to sustain a bio-diverse riparian ecosystem;
 - (cc) removal of alien vegetation and all new alien vegetation recruitment must be controlled; and
 - (dd) annual habitat assessment must be carried out to monitor the sustainability of the diversion and compliance with the above conditions. Action must be taken to rectify any impacts
 - (vii) any structure built fully or partially in or across a watercourse does not exceed-
 - (aa) a height of **10 metres**, measured from the natural level of the bed of the watercourse on the downstream face of the structure to the crest of the structure;
 - (bb) a width of **10 metres**, measured at the widest part of the structure; or
 - (cc) a length of **50 metres**, measured from one edge of the watercourse to the other; or
 - (dd) occur within a distance of **500 meters** upstream or downstream of another structure that alters the bed, banks or characteristics of the same watercourse, measured along the watercourse.

2.7.(2) A department of state in the national, provincial or local sphere of government may, for its own purpose and within its jurisdiction, alter the bed, banks or characteristics of a watercourse subject to the conditions set out under paragraph 2.7(1) above for-

- (a) control of stormwater;
- (b) construction, maintenance and development of infrastructure;
- (c) canalisation and dredging of a watercourse;
- (d) removal of alien vegetation;
- (e) ensuring the safety of the public, livestock and property;
- (f) hydrological monitoring; or
- (g) flood management and potential damage.

Registration

2.8. (1) A person who uses water in terms of this authorisation must submit a registration form for the registration of the water use if the alteration involves mining related activities or occurs within a distance of 1 000 meters from any other alteration, measured along the watercourse.

(2) A person who alters the bed, banks or characteristics of a watercourse for hydrological monitoring purposes in terms of paragraph 2.7. (2)(f) above must submit a registration form for the registration of the water use.

(3) On written receipt of a registration certificate from the Department, the person will be regarded as a registered water user.

(4) All forms for registration of water use are obtainable from the Regional offices of the Department as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Precautionary practices

2.9. (1) All reasonable measures must be taken to ensure-

- (a) the stability of the watercourse is not detrimentally affected;
- (b) scouring, erosion or sedimentation of the watercourse is prevented; and
- (c) rehabilitation of the watercourse, including riparian and instream habitat, is undertaken after any alteration of the bed, banks, course or characteristics of a watercourse.

(2) The water user must follow acceptable construction, maintenance and operational practices to ensure consistent, effective and sustainable impedance or diversion flow.

Inspections

2.10. Any property in respect of which a water use has been authorised in terms of this Notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offence

2.11. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

3. REMOVING, DISCHARGING OR DISPOSING OF WATER FOUND UNDERGROUND IF IT IS NECESSARY FOR THE EFFICIENT CONTINUATION OF AN ACTIVITY OR FOR THE SAFETY OF PEOPLE

[Section 21(j)]

Purpose of this authorisation

3.1. The authorisation permitted in terms of this Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act provided that the water use is within the limits and conditions set out in this authorisation.

Exclusion

3.2. This authorisation does not-

- (a) replace or limit any existing authorisation that is recognised under the National Water Act; or
- (b) allow for water storage.

Compliance with National Water Act and other laws

3.3. (1) This authorisation does not exempt a person who uses water from compliance with any provision of the National Water Act unless stated otherwise, or any other applicable law, regulation, ordinance or by-law.

(2) A person who uses water in terms of this authorisation is exempt from compliance with section 22(2)(e) of the National Water Act.

Area of applicability

3.4 This authorisation is applicable throughout the Republic of South Africa.

Duration of authorisation

3.5. This authorisation will be valid for a period of five years from the date of publication of this notice, unless-

- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
- (b) the period is extended by a notice in the *Gazette*;
- (c) it is replaced with a General Authorisation in relation to a specific water resource or within a specific area; or
- (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

3.6. In this authorisation, unless the context indicates otherwise, any word or expression to which a meaning has been assigned in terms of the National Water Act (Act 36 of 1998), shall have that meaning, and-

"**monitoring programme**" means a programme for taking regular measurements of the quantity and/or quality of a water resource and water removed from underground at specified intervals and at specific locations to determine the chemical, physical and biological nature of the water resource and water removed from underground;

"**water found underground**" means water that enters a mine workings, basement, tunnel or other construction through seepage or runoff and does not refer to water found in an aquifer.

Removing water found underground

3.7. (1) A person who-

- (a) owns or lawfully occupies property registered at the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed; or
- (c) lawfully has access to land on which the use of water takes place,

may on that property or land remove up to 100 cubic metres of water found underground on any given day, if-

(i) the removing of water-

- (aa) does not impact on a water resource or on any other person's water use, property or land;
- (bb) is not detrimental to the health and safety of the public in the vicinity of the activity; and
- (cc) does not detrimentally impact the stability of the surrounding or ecological functioning of any linked water bodies.

(ii) the removal of water is not harmful or potentially harmful to human health, or to any water resource.

(2) The water found underground must be-

(a) discharged to-

(i) a waste collection network such as a sewer or stormwater drainage system; or

(ii) a water resource in terms of General Authorisation No. 3 of Government Notice No. 1191 promulgated in Government Gazette No. 20526 dated 8 October 1999 and as may be amended from time to time; or

(b) disposed of in terms of General Authorisation Notice No. 4 of Government Notice No. 1191 promulgated in Government Gazette No. 20526 dated 8 October 1999 and as may be amended from time to time.

Registration of removal of underground water

3.8. (1) A person who uses water in terms of this authorisation must submit a registration form for the registration of the water use if more than **50 cubic metres** of water are removed on any given day.

(2) On receipt of a registration certificate by the Department, the person will be regarded as a registered water user.

(3) All forms for registration of water use are obtainable from the Regional offices of the Department as well as from the Departmental website at <http://www.dwaf.gov.za>

Monitoring requirements

3.9. (1) Where it is deemed necessary, or upon the written request of the responsible authority, the water registered user must ensure the establishment of any monitoring programmes for monitoring the water use.

(2) Upon the written request of the responsible authority the registered user must appoint an external auditor to assess the water use in terms of this General Authorisation, and to submit the findings to the responsible authority for evaluation.

Precautionary practices

3.10.(1) The water user must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the underground water removal system.

(2) Reasonable measures must be taken to provide for mechanical, electrical, or operational failures and malfunctions of the underground water removal system.

(3) The discharged water must not detrimentally impact on the water quality of the receiving water resource.

Inspections

3.11. Any property or land in respect of which a water use has been authorised in terms of this Notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offence

3.12. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

GAZETTE NO 26187**GOVERNMENT NOTICE****DEPARTMENT OF WATER AFFAIRS AND FORESTRY****5.3.1 NO. 399****26 March 2004****REVISION OF GENERAL AUTHORISATIONS IN TERMS OF SECTION 39 OF THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)**

I, ARNOLD MICHAEL MULLER, Director-General of the Department of Water Affairs and Forestry and duly authorised in terms of section 63 of the National Water Act, 1998 (Act No 36 of 1998) have revised and amended General Authorisations No 1191 published in the Government Gazette No. 20526 dated 8 October 1999, as contained in the Schedule hereto.

Sgn. A M Muller

DIRECTOR-GENERAL: WATER AFFAIRS AND FORESTRY

DATE: 18 March 2004

SCHEDULE**1. THE TAKING OF WATER FROM A WATER RESOURCE AND STORAGE OF WATER****[Sections 21(a) and (b)]****Purpose of this authorisation**

1.1. The authorisation permitted in terms of this Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act for the taking or storage of water from a water resource, provided that the taking or storage is within the limits and conditions set out in this authorisation.

Exclusion

1.2. This authorisation does not apply-

- (a) to any lawful taking and storage within a government water control area, a government water work, a catchment control area or an irrigation district as defined in the Water Act, 1956 (Act No. 54 of 1956) prior to its repeal;
- (b) to a person who does not have lawful access to any waterwork or water resource;
- (c) to wetlands, the dewatering of mines or storage of water underground;
- (d) to an exclusion zone of 750 metres inland from the high water mark; and

- (e) to an area where the limits of taking and storage of water were reduced in terms of section 9B (1C) of the Water Act, 1956 (Act No 36 of 1956).

Compliance with National Water Act and other laws

1.3. (1) This authorisation does not-

- (a) apply to any water use under Schedule 1 of the National Water Act;
- (b) replace any existing authorisation that is recognised under the National Water Act; or
- (c) exempt a person who uses water from compliance with any other provision of the National Water Act unless stated otherwise in this notice, or any other applicable law, regulation, ordinance or by-law.

(2) In the case of the taking of water for industrial purposes the provisions of section 7 of the Water Services Act, 1997 (Act No. 108 of 1997), must be met.

(3) A person who uses water in terms of this authorisation is exempt from compliance with section 22(2)(e) of the National Water Act.

Area of applicability

1.4 This authorisation is applicable throughout the Republic of South Africa, except as excluded in paragraph 1.2 above and the areas set out in-

- (a) Table 1.1 for the taking of surface water;
- (b) Table 1.2 for the taking of groundwater; and
- (c) Table 1.3 (a) and (b) for storage of water.

Duration of authorisation

1.5. This authorisation will be valid for a period of five years from the date of publication of this notice, unless-

- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
- (b) the period is extended by a notice in the *Gazette*;
- (c) it is replaced with a General Authorisation in relation to a specific water resource or within a specific area; or
- (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

1.6. In this authorisation unless the context indicates otherwise, any word or expression to which a meaning has been assigned in terms of the National Water Act shall have that meaning, and-

"monitoring programme" means a programme for taking regular measurements of the quantity and/or quality of a water resource, waste or wastewater discharge at specified intervals and at specific locations to determine the chemical, physical and biological nature of the water resource, waste or wastewater discharge;

"small industrial users" means water users who qualify as work creating enterprises that do not use more than twenty cubic metres per day and identified in the Standard Industrial Classification of All Economic Activities (5th edition), published by the Central Statistics Service, 1993, as amended and supplemented, under the following categories:-

- (a) 1: food processing
- (b) 2: prospecting, mining and quarrying;
- (c) 3: manufacturing;
- (d) 5: construction;

"storage" means storing water not containing waste, in a watercourse or off-channel storage;

"taking" means the abstraction of water from a water resource.

Taking and storage of water

1.7. A person who-

- (a) owns or lawfully occupies property registered at the Deeds Office at the date of this notice; or
- (b) lawfully occupies or uses land that is not registered or surveyed; or
- (c) lawfully has access to land on which the use of water takes place,

may:

- (i) on that property or land take groundwater as set out in Table 1.2, outside of the areas set out in paragraph 1.2 above;
- (ii) take surface water for that property or land as set out in Table 1.1, outside of the areas set out in paragraph 1.2 above at a rate of up to 15 litres per second not exceeding 150 000 cubic metres per annum; and
- (iii) subject to Tables 1.3(a) and (1.3(b)) store up to 50 000 cubic metres of water,

if the taking or storing of water-

- (aA) does not impact on a water resource or any other person's water use, property or land;

(aB) is not excessive in relation to the capacity of the water resource and the needs of other users; and

(aC) is not detrimental to the health and safety of the public in the vicinity of the activity.

Registration of water use

1.8.(1) A person who uses water in terms of this authorisation must submit to the responsible authority a registration form or any other further information requested in writing by the responsible authority for the registration of the water use before commencement of-

(a) taking more than 50 cubic metres from surface water or 10 cubic metres from groundwater on any given day; or

(b) a combined storage of more than 10 000 cubic metres of water per property.

(2) On written receipt of a registration certificate from the Department, the person will-

(a) be regarded as a registered water user; and

(b) be liable for water charges as per the Department's pricing strategy.

(3) All forms for registration of water use are obtainable from the Regional offices of the Department, as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Precautionary practices

1.9 (1) The water user must ensure that any dam complies with the requirements of Chapter 12 of the National Water Act.

(2) The water user must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the taking and storage of water.

(3) Where water is stored in a watercourse, the water user must take reasonable measures to ensure that the movement of aquatic species is not prevented, including those species that normally migrate through the watercourse.

(4) Outlet pipes at the lowest practical level must be provided on all storage structures for Reserve releases.

Record-keeping and disclosure of information

1.10. (1) The water user must ensure the establishment of monitoring programmes to measure the quantity of water taken and/or stored, as follows-

(a) the quantity of groundwater or surface water abstracted must be metered or gauged and the total recorded as at the last day of each month;

(b) in the case of irrigation and where no meter or gauge is used, the quantity of water abstracted may be calculated according to methods set by the responsible authority; and

- (c) the quantity of water stored must be recorded as at the last day of each month.
- (2) Upon the written request of the responsible authority the water user must-
- (a) ensure the establishment of any additional monitoring programmes; and
- (b) appoint a competent person to assess the water use measurements made in terms of this authorisation and submit the findings to the responsible authority for evaluation.
- (3) Subject to paragraph 1.10. (2) above, the water user must, for at least five years, keep a written record of all taking and storage of surface or groundwater. This information must be made available upon written request to the responsible authority.

Inspections

1.11. Any property or land in respect of which a water use has been authorised in terms of this notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offences

1.12. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

NOTE: Information regarding the drainage regions referred to in Tables 1.1, 1.2, 1.3 (a) and (b) can be obtained from the Department, upon written request.

TABLE 1.1 Areas excluded from General Authorisation for the taking of surface water

Primary drainage region	Secondary/Tertiary/Quaternary drainage region and excluded resources	Description of main river in drainage region for information purposes
A	All catchments	Limpopo River
B	All catchments	Olifants River
D	Orange River downstream of Gariep Dam	
	D13	Kraai River
E	E10A to K	Olifants River above the confluence with the Doring River
	E21	Groot River
G	G10	Berg River
	G21	Diep River
	G22A, B, F & J	Eerste River
	G30	Verlorevlei River
	G40A to E	Bot River
	G40H	Onrus River (De Bos Dam Catchment)
	G40 J to L	Klein River
	G50B, C, E & F	Nuwejaars River
H	H 10A to L, excluding H10J	All Tributaries, that is, Titus-, Koekedouw-, Dwars-Holsloot, Wabooms and Slang Rivers to confluence with Breede River upstream of Greater Brandvleidam (excluding Molenaars River)
	H20A	Hex River to confluence with Breede River

Primary drainage region	Secondary/Tertiary/Quaternary drainage region and excluded resources	Description of main river in drainage region for information purposes
	H30 H40B to H 40L H50A & B H60 A to F H70 C, D & E H80A to E H90	Kingna River All tributaries to Breede River contributing to and downstream of Greater Brandvlei Dam to confluence with the Kingna River Tributaries to confluence and main stream Breede River to s/e boundaries of Zandrifft & Langeberg WUA's Tributaries of Sonderend River to confluence with the Breede River Tradouws River to confluence with Buffeljags River Duivenhhoks River Goukou River
J	J12 J25 J31 to 35 J40C	Touws River Gamka River Olifants River Langtou and Weyers Rivers
K	K10 K20 K30A K40C K50 & K60 K70A K70B K80A to F K90A to G	Little Brak River Great Brak River Maalgate River Karatara River Knysna, Keurbooms Rivers Buffels River Bloukrans River Lottering, Storms, Sanddrif, Groot, Tsitsikamma, Klippedrif Rivers Kromme, Seekoei, Kabeljous Rivers
L	L81 L82 L90	Baviaanskloof River Kouga River Lower Gamtoos River Tributaries
M	M10 M20 M30	Swartkops River Van Stadens River, Maitland River Coega River, Van Stadens River
N	N11, N12	Sundays River upstream of Vanrynevelds Pass Dam
P	P10 P30 P40	Bushmans River Kowie River Kariega River
Q	Q41A, Q41B, Q41C, Q41D, Q44A, Q44B Q42A & B Q43A & B Q92 Q94	Tarka River Elands River Vlekpoort River Koonap River Kat River
R	R20 R30A, B, C & D R30E & F	Buffalo River Kwenxura, Kwelera, Gonubie Rivers Nahoon River
S	S20A S32A to C S32D & E S40A, B & C S50A, B & C	Indwe River upstream of the Doring River Dam, Swart Kei River upstream of the Klipplaat confluence Klipplaat River upstream of Waterdown Dam Thorn, Thomas Rivers Tsomo, Kwa-Qokwama and Mbokotwa Rivers

Primary drainage region	Secondary/Tertiary/Quaternary drainage region and excluded resources	Description of main river in drainage region for information purposes
	S60A & B S60C & D	Kubusi River upstream of Wriggleswade Dam Toise River Xilinxha River upstream of the Xilinxha Dam
T	T11A & B T35A, B, C, D, F & G	Slang, Xuka Rivers Tsitsa, Pot, Mooi, Inxu, Wildebees, Gatberg Rivers
U	U20 & U40	Mgeni, Mvoti Rivers
V	V11 V20 V31 V32 V60 V70	Upper Thukela River Mooi River Buffels/Slang River Buffels River Sundays River Bushmans River
W	W12 W20 W21A W30 (excluding W 31 [see Table 3.1(a)])	Mhlatuze River Mfolozi River White Mfolozi River upstream of Klipfontein Dam Hluhluwe and Mkuzi Rivers
X	All catchments (excluding X 11, X 12, X 21 A, B, C, F & G [See table 1.3(a)])	Nkomati River

Table 1.2 Groundwater Taking Zones: Quaternary Drainage Regions

The Table refers to the size of the property on which the General Authorisation is applicable

Zone A NO WATER MAY BE TAKEN FROM THESE DRAINAGE REGIONS EXCEPT AS SET OUT UNDER SCHEDULE 1 AND SMALL INDUSTRIAL USERS.	Zone B 45 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone C 75 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone D 150 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone E 400 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.					
A21C,D	F60A-E	A10B,C	E22A,B,E-G	A10A	K10A,B	A21A,B	K10D-F	E10A-D	L82A-H,J
A21E-G,K,L	G21A,B,E,F	A21J	E23A,B,E	A21H	L21D	B20A,B	K20A	G10A,B,G	P20B
A23A,E	G22A-E	A22B-D	E24B,C,E,F	A22AE,G	L70A,B,E	B31B,F-H	K30A-D	G22F	T52L
A24A,B,C,J	G30E	A23D	E32C,E	A23B,C,F-H,J-L	L90B	B32G	K40B,C,D	G40A-E, G,H,I,J,L,M	T60D
A32E	H10C	A31B,F,G-J	E33G	A24D-H	N11A,B	C11A,B,D,F-H,K	K90E-G	G50A,F,J,K	U20M
A41D,E	H70F	A32A-C,D	E40B	A31A,D,E	N12A,B	C12E-G,K	L50A	H10B-F-H,J,K	U30A,C
A42J	J11F,G	A41C	F30C	A41A,B	N21B,D	C23B-E	L70C,F	H20B-G	U40C,E,F,J
A50A-C	J21A-E	A42A-C,D,E,G,H	F50B,C,E	A42F	N40A,B,D,E	C24A	L90A,C	H40B,K	U60C
A50G,H,J	J22D-F,J,K	A50D-F	H40F	A61B,C-E	P10A,B,D-G	C33C	M20B	H60A,C,D	U70C,D
A61J	J23A-D,F,G	A61A,F,G	J11A-E	A61H	P30A-C	C92C	N40F	H80B,C,F	V50C
A63A-E	J24B-F	A62A,E,G,J	J12C,E,J,K	A62B-D,F,H	P40A-D	E10E-H,J,K	P20A	H90C	W11A
A71A-L	J32A-D	A91J,K	J22A-C,G,H	B11A-H,J,K	Q11A-D	E21D,F-H,J,K	T40E-F	J34A,C	W12F,H,J
A72A,B	J33E	B11L	J23H	B12A-E	Q12A,B	E24A,L,M	T52M	J34C	W21K
A80A-F	L11E,G	B20D	J24A	B20E-H,J	Q14D	E40D	T60A,G,H	J40B	W23B-D
A80G-J	L12A-D	B31E	J31D	B31A	Q21A	G10C-E,H	U10L,M	K10C	W31J-L
A91A-H	L22B,C	B41B,D,H,J	J32E	B32A-F,H,J	Q41A-D	G21C-D	U20F,G,K,L	K40A,E	W45A,B
A92A-D	L23A-D	B42C,E,G,H	J33C	B41A,E,K	Q42A,B	G22G,H,I,K	U30D,E	K50A,B	W57K
B20C	L30B,D	B51C	L11A-D,F	B51A,B,F,H	Q91C	G40F	U40D,G,H	K60A-G	W32A,B,H
B31C,D,J	L40B	B52A,B,E	L21A-C,E,F	B52C,D,F-H,J	Q92A,B,D,E,G	G50B-E	U50A	K70A,B	W70A
B41C,F,G	N14B-D	B60G	L22A,D	B60A-D,H,J	Q93A-D	H10L	U60D-F	K80A-F	

Zone A NO WATER MAY BE TAKEN FROM THESE DRAINAGE REGIONS EXCEPT AS SET OUT UNDER SCHEDULE 1 AND SMALL INDUSTRIAL USERS.	Zone B 45 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone C 75 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone D 150 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone E 400 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.
B42A,B	N21A	L30A,C	B71A,H,J	U70B,F
B42D,F	N22A,E	L40A	B72B-D,K	U80B,E,G,J
B51E,G	N23B	L50B	B73B-G	V40D,E
B60E,F	N24B-D	L60A,B	B81H,J	V50A,B
B71B,D,E	N30A-C	L70D	B82G-H	W11B
B72E	N40C	N12C	C11C,E,J,L,M	W12A,B,D
B81A,B,D	Q12C	N13A-C	C12A-D,H,I,L	W13A,B
C51K	Q13B,C	N14A	C13A-H	W21G,H,J
C52L	Q14A-C,E	N21C	C21A-G	W32C,F,G
C91D	Q21B	N22B-D	C22A-G,K	W42D,E,F
C91E	Q22B	N23A	C23A,F,H,I,L	W51C
D31B	Q30B-E	N24A	C24B,C,G,J	W52B,C
D33A,C-E,K	Q44A-C	P10C	C25A-F	W53A,B
D41C-H,J,-M	Q50A,B	Q13A	C31B-E	W54C-E
D42A-E	Q60C	Q22A	C32A-D	W55B,C,D
D51C	Q80A-C,F	Q30A	C33A,B,C	W56A,B
D53D-H,J	U20H	Q43A,B	C41A-H,J	W57J
D54A-G	V11C,D	Q50C	C42A-H,I,J,L	X12C-F
D55L	V70A	Q60A,B	C43A-D	X23A,C,D
D56H,J	W41G	Q70A-C	C51A-G	W43E,F
D57A-E	W42G,J,L	Q80D,E,G	C52A-G,J	
D58A,C	W44D	Q91A,B	C60A-H,J	
D62A-E	W51E	Q92C,F	C70A-C,E-H,J,K	
D73A,C-F	W52D	R10A,B,F	C81A-E,G-H,J-	
		U30B		

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D81A-G	X11D,F	R20A,C	U40B	
D82A-H,J-L	X21A-D,F,G	S31B,C,E	U70E	
E22D	X31F	S32D,E	U80A,C,D,FH, K,L	
E23C,D,F-H,J,K	X32B,E	S60A,B	V11F,K,M	
E24D,G,H	A22H,J	T11A,B,D,E	V12E,G	
E31A-H	A31C	T13D,E	V13B,C,E	
E32A,B,D	C24D-F	T20A-G	V14A-E	
E33A-E,H	C31A	T31J	V20G,H,J	
E40A	G10K-M	T32A-H	V31C-H,J,K	
F10A-C	G30A-H	T33C,E,J,K	V32A-H	
F20A-E	M10A-D	T34A-E,F-H,J,K	V33A-D	
F30A,B,D-G	M20A	T35A-D-H,J-M	V40A-C	
F40A-H	M30A,B	T36A,B	V50D	
F50A,D,F,G		T40A-D	V60C,E-H,J,K	
		T51A-H,J	V70F,G	
		T52A-H,K	W11C	
		T60B,E,F,K	W12E	
		T70A-G	W21A-F,L	
		T80A-D	W22A,F	
		T90B-G	W31A,G,K	
		U10A-H,J,K	W32D,E	
		U20A-E	W41D	
		U40A	W42A-C,E,F	
		U60A,B	W44B,C,E	
		M		
		C82A-H		
		C83A-H,J-M		
		C92A,B,C		
		D12A-F		
		D13A-H,J-M		
		D14A,B,E-H,J,K		
		D15G,H		
		D18K,L		
		D21F,G		
		D22A,B,D,G,H, L		
		D23A,C-H,J		
		D24A-H,J-L		
		D32A-H,J,K		
		D34A-F		
		D35A-H,J,K		
		D41A		
		D71A,B		
		E21A-C,E,L		
		E22C		
		E24J,K		
		E33F		
		E40C		
		G10F,J		
		G40K		

Zone A NO WATER MAY BE TAKEN FROM THESE DRAINAGE REGIONS EXCEPT AS SET OUT UNDER SCHEDULE 1 AND SMALL INDUSTRIAL USERS.	Zone B 45 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone C 75 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone D 150 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.	Zone E 400 M ³ PER HECTARE PER ANNUM MAY BE TAKEN FROM THESE DRAINAGE REGIONS AND SMALL INDUSTRIAL USERS.
	U70A	G50G,H	W51A,B,D,F	
	V11A,B,E,G,H,J,L	H10A	W52A	
	V12A-D,F	H50B	W53C-E	
	V13A,D	H60G,K,L	W54A-B	
	V20A-F	H70A,B,G,H,J	W55A	
	V31A,B	H80D	X11A-C,H,J,K	
	V60A,B,D	H90D,E	X12A,B,H,K	
	V70B-E	J11H,J,K	X13H,J,L	
	W12C,G	J12D,F-H,L,M	X14H	
	W22B-E,G,H,J,L	J13A,B	X21H,K	
	W23A	J23E	X22C,D	
	W31B-F,H	J33B,D	X23B,E,F	
	W41A-C,E,F	J35A	X24A-H	
	W42H,K,M	J40D,E	X31A,K-M	
	W44A		X32C,F-H,J	
	X11E,G		X40C	
	X12G,J		S10A-J	
	X13A			
	X14A,B,D-G			
	X21E,J			
	X22A,B,E-H,J,K			
	X23G,H			
	X31B-E,G,H,J			
	X32A,D			
	X33A-D			
	X40A,B,D			

TABLE 1.3 (a) Areas excluded from General Authorisation for any storage of water

Primary drainage region	Secondary/Tertiary/Quaternary drainage region	Description of main river in drainage region for information purposes
X	X11, X12 X21A, B, C X21F,G	Komati River Catchment upstream of Swaziland Crocodile River Catchment upstream of Kwena Dam Elands River Catchment upstream of Waterval Onder
B	B1 B2 B3 B4	Olifants and Klein-Olifants River Wilge River Elands River Steelpoort River
U	U 20 A to M	Mgeni River
W	W 31 W 51 to 57	Mfolozi River Usutu River

TABLE 1.3 (b) Areas excluded from General Authorisation for storage of water in excess of 10 000 cubic metres and falling outside government control areas proclaimed under the Water Act No 54 of 1956.

Primary drainage region	Secondary/Tertiary/Quaternary drainage region	Description of main river in drainage region for information purposes
A	All catchments	Limpopo River
B	All catchments excluding B1 to B 4 (see Table 1.3(a))	Olifants River and all tributaries
C	C11, C12, C13, C20, C40, C50, C60, C70, C81, C82, C83 & C90	Vaal River and all tributaries
V	V11 V13B	Assegai River Tugela River

2. ENGAGING IN A CONTROLLED ACTIVITY, IDENTIFIED AS SUCH IN SECTION 37(1): IRRIGATION OF ANY LAND WITH WASTE OR WATER CONTAINING WASTE GENERATED THROUGH ANY INDUSTRIAL ACTIVITY OR BY A WATERWORK

[Section 21(e)]

Purpose of this authorisation

2.1. The authorisation permitted in terms of this Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act provided that the irrigation is within the limits and conditions set out in this authorisation.

Exclusion

2.2. This authorisation does not apply to a person who is not the lawful occupier of the land on which the wastewater irrigation takes place.

Compliance with National Water Act and other laws

2.3. (1) This authorisation does not-

- (a) replace any existing authorisation that is recognised under the National Water Act; or
- (b) exempt a person who uses water from compliance with any other provision of the National Water Act unless stated otherwise in this notice, or any other applicable law, regulation, ordinance or by-law.

(2) A person who uses water in terms of this authorisation is exempt from compliance with section 22(2)(e) of the National Water Act.

Area of applicability

2.4. This authorisation is applicable throughout the Republic of South Africa.

Duration of authorisation

2.5. This authorisation will be applicable for a period of five years from the date of publication of this notice, unless-

- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
- (b) the period is extended by a notice in the *Gazette*;
- (c) it is replaced with a General Authorisation in relation to a specific water resource or within a specific area; or
- (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

2.6. In this authorisation, unless the context indicates otherwise, any word or expression to which a meaning has been assigned in terms of the National Water Act shall have that meaning, and-

"biodegradable industrial wastewater" means wastewater that contains predominantly organic waste arising from industrial activities and premises including-

-
- (a) milk processing;
 - (b) manufacture of fruit and vegetable products;
 - (c) sugar mills;
 - (d) manufacture and bottling of soft drinks;
 - (e) water bottling;
 - (f) production of alcohol and alcoholic beverages in breweries, wineries or malt houses;
 - (g) manufacture of animal feed from plant or animal products;
 - (h) manufacture of gelatine and glue from hides, skin and bones;
 - (i) abattoirs;
 - (j) fish processing; and
 - (k) feedlots;

"commercial activity" means those activities identified in the Standard Industrial Classification of All Economic Activities (5th Edition), published by the Central Statistics Service, 1993, as amended and supplemented, under the following categories-

- a) 6: wholesale and retail trade,
- b) 7: transport, storage and communication,
- c) 8: business services,
- d) 9: community, social and personal services,
- e) 0: personal and other services;

"domestic wastewater" means wastewater arising from domestic and commercial activities and premises, and may contain sewage;

"irrigation" means the application of wastewater for the purpose of crop production, and includes the cultivation of pasture;

"monitoring programme" means a programme for taking regular measurements of the quantity and/or quality of a water resource, waste or wastewater discharge at specified intervals and at specific locations to determine the chemical, physical and biological nature of the water resource, waste or wastewater discharge;

"organic waste" means waste of non-anthropogenic origin that is readily biodegradable in the environment and does not contain any toxic substances that may accumulate in the environment;

"primary treatment" means treatment of wastewater by a physical process, which may involve maceration, sedimentation, screening and grit removal;

"**secondary treatment**" means treatment of wastewater by a biological process, through solar and other energy, bacteria, algae and a variety of aquatic biota, to remove organic matter;

"**wastewater**" means water containing waste, or water that has been in contact with waste material.

Irrigation with wastewater

2.7. A person who-

- (a) owns or lawfully occupies property registered in the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed; or
- (c) lawfully has access to land on which the use of water takes place,

may on that property or land

(i) irrigate up to 2000 cubic metres of domestic and biodegradable industrial waste water on any given day provided the-

- (a) faecal coliforms do not exceed 1000 per 100 ml;
- (b) Chemical Oxygen Demand (COD) does not exceed 75 mg/l;
- (c) pH is not less than 5,5 or more than 9,5 pH units;
- (d) Ammonia (ionised and un-ionised) as Nitrogen does not exceed 3 mg/l;
- (e) Nitrate/Nitrite as Nitrogen does not exceed 15 mg/l;
- (f) Chlorine as Free Chlorine does not exceed 0,25 mg/l;
- (g) Suspended Solids does not exceed 25 mg/l;
- (h) Electrical Conductivity does not exceed 70 milliSiemens above intake to a maximum of 150 milliSiemens per metre (mS/m);
- (i) Ortho-Phosphate as phosphorous does not exceed 10 mg/l;
- (j) Fluoride does not exceed 1 mg/l; and
- (k) Soap, oil or grease does not exceed 2,5 mg/l.

(ii) irrigate up to 500 cubic metres of domestic or biodegradable industrial wastewater on any given day, provided the-

- (a) electrical conductivity does not exceed 200 milliSiemens per metre (mS/m);
- (b) pH is not less than 6 or more than 9 pH units;
- (c) Chemical Oxygen Demand (COD) does not exceed 400 mg/l after removal of algae;
- (d) faecal coliforms do not exceed 100 000 per 100 ml; and
- (e) Sodium Adsorption Ratio (SAR) does not exceed 5 for biodegradable industrial wastewater;

(iii) irrigate up to 50 cubic metres of biodegradable industrial wastewater on any given day, provided the-

- (a) electrical conductivity does not exceed 200 milliSiemens per metre (mS/m);
- (b) pH is not less than 6 or more than 9 pH units;
- (c) Chemical Oxygen Demand (COD) does not exceed 5 000 mg/l after removal of algae;
- (d) faecal coliforms do not exceed 100 000 per 100 ml; and
- (e) Sodium Adsorption Ratio (SAR) does not exceed 5 for biodegradable industrial wastewater,

if the irrigation of wastewater-

- (aA) does not impact on a water resource or any other person's water use, property or land; and
- (aB) is not detrimental to the health and safety of the public in the vicinity of the activity.

Registration of irrigation with wastewater

2.8.(1) A person who irrigates with wastewater in terms of this authorisation must submit to the Responsible authority a registration form or any other information requested in writing by the Responsible authority for the registration of the water use before commencement of irrigation.

(2) On written receipt of a registration certificate by the Department, the person will be regarded as a registered water user.

(3) All forms for registration of water use are obtainable from the Regional offices of the Department as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Location of irrigation with wastewater

2.9. Wastewater irrigation in terms of this authorisation is only permitted if the irrigation takes place-

- (a) above the 100 year flood line, or alternatively, more than 100 metres from the edge of a water resource or a borehole which is utilised for drinking water or stock watering, which ever is further; and
- (b) on land that is not, or does not, overlie a Major Aquifer (identification of a Major Aquifer will be provided by the Department, upon written request).

Record-keeping and disclosure of information

2.10. (1) The water user must ensure the establishment of monitoring programmes to monitor the quantity and quality of the wastewater to be irrigated prior to commencement of irrigation and thereafter, as follows-

- (a) the quantity must be metered and the total recorded weekly; and
- (b) the quality must be monitored monthly as at the last day of each month by grab sampling, at the point at which the wastewater enters the irrigation system for all parameters listed in subparagraphs 2.7.(i) and (ii).

(2) The methods for the measurement of specific substances and parameters in any wastewater must be carried out-

-
- (a) by a laboratory that has been accredited under the South African National Accreditation System (SANAS) in terms of SABS Code 0259 for that method; or
- (b) as approved in writing by the responsible authority.
- (3) Upon the written request of the responsible Authority the water user must-
- (a) ensure the establishment of any additional monitoring programmes; and
- (b) appoint a competent person to assess the water use measurements made in terms of this authorisation and submit the findings to the responsible authority for evaluation.
- (4) Subject to paragraph 2.10. (3) above, the water user must keep a written record of the following wastewater irrigation and related activities, for at least three years-
- (a) demarcate the location of the irrigation area on a suitable scale map and the extent of the area under irrigation on a 1: suitable scale map;
- (b) details of the crop(s) and the area under irrigation;
- (c) the irrigation management techniques being practised;
- (d) quantity of wastewater irrigated;
- (e) quality of wastewater irrigated;
- (f) details of the monitoring programme;
- (g) details of failure and malfunctions in the irrigation system and details of measures taken, and
- such information must be made available upon written request to the responsible authority.
- (5) Any information on the occurrence of any incident that has or is likely to have a detrimental impact on the water resource quality must be reported to the responsible authority.

Precautionary practices

2.11. (1) The water user must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the wastewater irrigation system, including the prevention of-

- (a) waterlogging of the soil and pooling of wastewater on the surface of the soil;
- (b) nuisance conditions such as flies or mosquitoes, odour or secondary pollution;
- (c) waste, wastewater or contaminated stormwater entering into a water resource; ,
- (d) the contamination of run-off water or stormwater;
- (e) the unreasonable chemical or physical deterioration of, or any other damage to, the soil of the irrigation site; the unauthorised use of the wastewater by members of the public; and
- (f) preventing of people being exposed to the mist originating from the industrial waste.

- (2) All reasonable measures must be taken for storage of the wastewater used for irrigation when irrigation cannot be undertaken.
- (3) Suspended solids must be removed from any wastewater, and the resulting sludge disposed of according to the requirements of any relevant law or regulation, including-
- (a) "Permissible utilisation and disposal of sewage sludge" Edition 1, 1997. Water Research Commission Report No TT 85/97 as amended from time to time; and
 - (b) "Guide: Permissible utilisation and disposal of treated sewage effluent", 1978. Department of National Health and Population Development Report No. 11/2/5/3, as amended from time to time (obtainable from the Department upon written request).
- (4) All reasonable measures must be taken to provide for mechanical, electrical, operational, or process failures and malfunctions of the wastewater irrigation system.
- (5) All reasonable measures must be taken to collect stormwater runoff containing waste or wastewater emanating from the area under irrigation and to retain it for disposal;

Inspections

2.12. Any property or land in respect of which a water use has been authorised in terms of this notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offences

2.13. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

3 DISCHARGE OF WASTE OR WATER CONTAINING WASTE INTO A WATER RESOURCE THROUGH A PIPE, CANAL, SEWER OR OTHER CONDUIT; AND DISPOSING IN ANY MANNER OF WATER WHICH CONTAINS WASTE FROM, OR WHICH HAS BEEN HEATED IN, ANY INDUSTRIAL OR POWER GENERATION PROCESS

[Sections 21(f) and (h)]

Purpose of this authorisation

3.1. The authorisation permitted in terms of this Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act provided that the discharge is within the limits and conditions set out in this authorisation.

Exclusion

- 3.2. This authorisation does not apply to a person who discharges wastewater-
- (a) through sea outfalls;
 - (b) to an aquifer;
 - (c) any other groundwater resource; or
 - (d) or any water resource with a closed drainage system.

Compliance with National Water Act and other laws

3.3.(1) This authorisation does not-

- (a) apply to any water use under Schedule 1 of the National Water Act;
- (b) replace any existing authorisation that is recognised under the National Water Act;
- (c) exempt a person from compliance with section 7(2) of the Water Service Act, 1997 (Act No. 108 of 1997);
- (d) exempt a person who uses water from compliance with any other provision of the National Water Act unless stated otherwise in this notice, or any other applicable law, regulation, ordinance or by-law; or
- (e) apply to a category A mine .

(2) A person who uses water in terms of this authorisation is exempt from compliance with section 22(2)(e) of the National Water Act.

Area of applicability

3.4 This authorisation is applicable throughout the Republic of South Africa, except as excluded in paragraph 3.2 above.

Duration of authorisation

3.5. This authorisation will be applicable for a period of five years from the date of this notice, unless-

- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
- (b) the time period is extended by a further notice in the *Gazette*;
- (c) it is replaced with an authorization in relation to a specific water resource or within a specific area; or
- (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

3.6. In this authorisation unless the context indicates otherwise, any word or expression to which a meaning has been assigned in terms of the National Water Act shall have that meaning, and-

"category A mine" means-

- (a) any gold or coal mine;
- (b) any mine with an extractive metallurgical process, including heap leaching; or
- (c) any mine where sulphate producing or acid generating material occurs in the mineral deposit;

"commercial activity" means those activities identified in the Standard Industrial Classification of All Economic Activities (5th Edition), published by the Central Statistics Service, 1993, as amended and supplemented, under the following categories-

- a) 6: wholesale and retail trade,
- b) 7: transport, storage and communication,
- c) 8: business services,
- d) 9: community, social and personal services,

e) 0: personal and other services;

"complex industrial wastewater" means wastewater arising from industrial activities and premises, that contains-

- a) a complex mixture of substances that are difficult or impractical to chemically characterise and quantify, or
- b) one or more substances, for which a wastewater limit value has not been specified, and which may be harmful or potentially harmful to human health, or to the water resource (identification of complex industrial wastewater will be provided by the Department upon written request);

"domestic wastewater" means wastewater arising from domestic and commercial activities and premises, and may contain sewage;

"domestic wastewater discharge" means a wastewater discharge consisting of 90% or more domestic wastewater, by volume, that is collected, treated and subsequently disposed of;

"industrial activity" means those activities identified in the Standard Industrial Classification of All Economic Activities (5th Edition), published by the Central Statistics Service, 1993, as amended and supplemented, under the following categories-

- a) 2: mining and quarrying,
- b) 3: manufacturing,
- c) 4: electricity, gas and water supply,
- d) 5: construction;

"industrial wastewater discharge" means a wastewater discharge consisting of more than 10% industrial wastewater, by volume, that is collected, treated and subsequently disposed of;

"intake" is water taken from a water resource, and excludes water taken from any source that is not a water resource;

"monitoring programme" means a programme for taking regular measurements of the quantity and/or quality of a water resource, waste or wastewater discharge at specified intervals and at specific locations to determine the chemical, physical and biological nature of the water resource, waste or wastewater discharge;

"listed water resources" are those water resources listed in Table 3.3 and include any tributary of a listed water resource, and any water resource draining the catchment area of a listed water resource;

"wastewater" means water containing waste, or water that has been in contact with waste material;

"wastewater limit value" means the mass expressed in terms of the concentration and/or level of a substance which may not be exceeded at any time. Wastewater Limit Values shall apply at the last point where the discharge of wastewater enters into a water resource, dilution being disregarded when determining compliance with the wastewater limit values. Where discharge of wastewater does not directly enter a water resource, the wastewater limit values shall apply at the last point where the wastewater leaves the premises of collection and treatment.

Discharging of domestic and industrial wastewater into water resources

3.7. (1) A person who-

- (a) owns or lawfully occupies property registered in the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed, or
- (c) lawfully has access to land on which the use of water takes place.

may on that property or land outside of the areas excluded in paragraph 3.4 above,

(i) discharge up to 2 000 cubic metres of wastewater on any given day into a water resource that is **not** a listed water resource set out in Table 3.3, provided the discharge-

- (a) complies with the general wastewater limit values set out in Table 3.1;
- (b) does not alter the natural ambient water temperature of the receiving water resource by more than 3 degrees Celsius; and
- (c) is not a complex industrial Wastewater.

(ii) discharge up to 2 000 cubic metres of wastewater on any given day into a listed water resource set out in Table 3.3, provided the discharge -

- (a) complies with the special wastewater limit values set out in Table 3.1;
- (b) does not alter the natural ambient water temperature of the receiving water resource by more than 2 degrees Celsius; and
- (c) is not a complex industrial wastewater,

if the discharging of wastewater-

- (aA) does not impact on a water resource or any other person's water use, property or land; and
- (aB) is not detrimental to the health and safety of the public in the vicinity of the activity.

(2) A person may not discharge stormwater runoff from any premises containing waste, or water containing waste emanating from industrial activities and premises, into a water resource.

TABLE 3.1: Wastewater limit values applicable to discharge of wastewater into a water resource

SUBSTANCE/PARAMETER	GENERAL LIMIT	SPECIAL LIMIT
Faecal Coliforms (per 100 ml)	1 000	0
Chemical Oxygen Demand (mg/l)	75 (i)	30(i)
pH	5,5-9,5	5,5-7,5
Ammonia (ionised and un-ionised) as Nitrogen (mg/l)	6	2
Nitrate/Nitrite as Nitrogen (mg/l)	15	1,5
Chlorine as Free Chlorine (mg/l)	0,25	0
Suspended Solids (mg/l)	25	10

SUBSTANCE/PARAMETER	GENERAL LIMIT	SPECIAL LIMIT
Electrical Conductivity (mS/m)	70 mS/m above intake to a maximum of 150 mS/m	50 mS/m above background receiving water, to a maximum of 100 mS/m
Ortho-Phosphate as phosphorous (mg/l)	10	1 (median) and 2,5 (maximum)
Fluoride (mg/l)	1	1
Soap, oil or grease (mg/l)	2,5	0
Dissolved Arsenic (mg/l)	0,02	0,01
Dissolved Cadmium (mg/l)	0,005	0,001
Dissolved Chromium (VI) (mg/l)	0,05	0,02
Dissolved Copper (mg/l)	0,01	0,002
Dissolved Cyanide (mg/l)	0,02	0,01
Dissolved Iron (mg/l)	0,3	0,3
Dissolved Lead (mg/l)	0,01	0,006
Dissolved Manganese (mg/l)	0,1	0,1
Mercury and its compounds (mg/l)	0,005	0,001
Dissolved Selenium (mg/l)	0,02	0,02
Dissolved Zinc (mg/l)	0,1	0,04
Boron (mg/l)	1	0,5

(i) After removal of algae

Registration of discharges into water resources

3.8. (1) A person who discharges wastewater into a water resource in terms of this authorisation must submit a registration form for registration of the water use before commencement of the discharge.

(2) On written receipt of a registration certificate by the Department, the person will be regarded as a registered water user.

(3) All forms for registration of water use are obtainable from the Regional offices of the Department, as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Record-keeping and disclosure of information

3.9. (1) The water user must ensure the establishment of monitoring programmes to monitor the quantity and quality of the discharge prior to the commencement of the discharge, as follows-

- (a) the quantity of the discharge must be metered and the total recorded weekly; and
- (b) the quality of domestic wastewater discharges must be monitored monthly by grab sampling and analysed for specific substances and parameters as required by the responsible authority. as set out in Table 3.2.

TABLE 3.2: Monitoring requirements for domestic wastewater discharges

DISCHARGE VOLUME ON ANY GIVEN DAY	MONITORING REQUIREMENTS
10 to 100 cubic metres	pH Electrical Conductivity (mS/m) Faecal Coliforms (per 100 ml)
100 to 1000 cubic metres	pH

DISCHARGE VOLUME ON ANY GIVEN DAY	MONITORING REQUIREMENTS
	Electrical Conductivity (mS/m) Faecal Coliforms (per 100 ml) Chemical Oxygen Demand (mg/l) Ammonia as Nitrogen (mg/l) Suspended Solids (mg/l)
1 000 to 2 000 cubic metres	pH Electrical Conductivity (mS/m) Faecal Coliforms (per 100 ml) Chemical Oxygen Demand (mg/l) Ammonia as Nitrogen (mg/l) Nitrate/Nitrite as Nitrogen (mg/l) Free Chlorine (mg/l) Suspended Solids (mg/l) Ortho-Phosphate as Phosphorous (mg/l)

- (c) the quality of industrial wastewater discharges must be monitored weekly by grab sampling-
- (i) for all substances which have been added to the water through any industrial activity;
 - (ii) for all substances which have been concentrated in the water through any industrial activity;
 - (iii) for all substances which may be harmful or potentially harmful to human health or to the water resource quality; and
 - (iv) as set out in paragraph 3.9(1)(b) above, if the wastewater contains any domestic wastewater.
- (d) The methods for the measurement of specific substances and parameters in any wastewater must be carried out-
- (i) by a laboratory that has been accredited under the South African National Accreditation System (SANAS) in terms of SABS Code 0259 for that method; or
 - (ii) as approved in writing by the responsible authority .
- (2) Upon the written request of the responsible authority the registered user must-
- (a) ensure the establishment of any additional monitoring programmes; and
 - (b) appoint a competent person to assess the water use measurements made in terms of this authorisation and submit the findings to the responsible authority for evaluation.
- (3) Subject to paragraph 3.9. (2) above, the water user must submit the following information on a monthly basis to the responsible authority -
- (a) the quantity of wastewater discharged;
 - (b) the quality of wastewater discharged;
 - (c) details of the monitoring programme/s;
 - (d) details of failures and malfunctions in the discharge system and details of measures taken, and
- such information must be made available upon written request to the responsible authority.

(4) Any information on the occurrence of any incident that has or is likely to have a detrimental impact on the water resource quality must be reported to the responsible authority.

Precautionary practices

3.10. (1) The water user must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of the discharge.

(2) All reasonable measures must be taken to provide for mechanical, electrical, operational, or process failures and malfunctions of the discharge system.

Inspections

3.11. Any property or land in respect of which a water use has been authorised in terms of this notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offences

3.12. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

TABLE 3.3: Listed Water Resources

	WATER RESOURCE
1	Hout Bay River to tidal water
2	Palmiet River from Kogelberg Dam to its estuary
3	Lourens River to tidal water
4	Steenbras River to tidal water
5	Berg and Dwars Rivers to their confluence
6	Little Berg River to Vogelvlei weir
7	Sonderend, Du Toits and Elandskloof Rivers upstream and inclusive of Thee Waterskloof Dam
8	Witte River to confluence with Breede River
9	Dwars River to Ceres divisional boundary
10	Olifants River to the Ceres divisional boundary
11	Hlsloot and Smalblaar (or Molenaars) Rivers to their confluence with Breede River
12	Hex River to its confluence with Breede River
13	Van Stadens River to tidal water
14	Buffalo River from its source to where it enters the King Williams Town limits
15	Klipplaat River from its source to Waterdown Dam
16	Swart Kei River to its confluence with the Klipplaat River
17	Great Brak River
18	Bongola River to Bongola Dam
19	Kubusi River to the Stutterheim limits
20	Langkloof River from its source to Barkly East limits
21	Kraai River to its confluence with the Langkloof River
22	Little Tsomo River
23	Xuka River to the Elliot limits
24	Tsitsa and Inxu Rivers to their confluence
25	Mvenyane and Mzimvubu Rivers from sources to their confluence
26	Mzintlava River to its confluence with the Mvalweni River
27	Ingwangwana River to its confluence with Umzimkulu River
28	Umzimkulu and Polela Rivers to their confluence
29	Elands River to the Pietermaritzburg-Bulwer main road
30	Umtamvuma and Weza Rivers to their confluence

WATER RESOURCE	
31	Umkomaas and Isinga Rivers to their confluence
32	Lurane River to its confluence with the Umkomaas River
33	Situndjwana Spruit to its confluence with the Umkomaas River
34	Inudwini River to the Polela district boundary
35	Inkonza River to the bridge on the Donnybrook-Creighton road
36	Umlaas to the bridge on District Road 334 on the farm Maybole
37	Umgeni and Lions River to their confluence
38	Mooi River to the road bridge at Rosetta
39	Little Mooi and Hlatikula Rivers to their confluence
40	Bushmans River to Wagendrift Dam
41	Little Tugela River and Sterkspruit to their confluence
42	M'Lambonjwa and Mhlawazeni Rivers to their confluence
43	Mnweni and Sandhlwana Rivers to their confluence
44	Tugela River to its confluence with the Kombe Spruit
45	Inyamvubu (or Mnyamvubu) River to Craigie Burn Dam
46	Umvoti River to the bridge on the Seven Oaks-Rietvlei road
47	Yarrow River to its confluence with the Karkloof River
48	Incandu and Ncibidwane Rivers to their confluence
49	Ingogo River to its confluence with the Harte River
50	Pivaan River to its confluence with Soetmelkspruit
51	Slang River and the Wakkerstroom to their confluence
52	Elands and Swartkoppie Spruit to their confluence
53	All tributaries of the Komati River between Nooitgedacht Dam and its confluence with and including Zevenfontein Spruit
54	Seekoiespruit to its confluence with Buffelspruit
55	Crocodile River and Buffelskloofspruit to their confluence
56	All tributaries of the Steelpoort River down to its confluence with and including the Dwars River
57	Potspruit to its confluence with the Waterval River
58	Dorps River (or Spekboom River) to its confluence with the Marambanspruit
59	Ohrigstad River to the Ohrigstad Dam
60	Klein-Spekboom River to its confluence with the Spekboom River
61	Blyde River to the Pilgrim's Rest municipal boundary
62	Sabie River to the Sabie municipal boundary.
63	Nels River to the Pilgrim's Rest district boundary
64	Houtbosloop River to the Lydenburg district boundary
65	Blinkwaterspruit to Longmere Dam
66	Assegaai River upstream and inclusive of the Heyshope Dam
67	Komati River upstream and inclusive of the Nooitgedacht Dam and the Vygeboom Dam
68	Ngwempisi River upstream and inclusive of Jericho Dam and Morgenstond Dam
69	Slang River upstream and inclusive of Zaaihoek Dam
70	All streams flowing into the Olifants River upstream and inclusive of Loskop Dam, Witbank Dam and Middelburg Dam
71	All streams flowing into Ebenezer Dam on the Great Letaba River
72	Dokolewa River to its confluence with the Politzi River
73	Ramadipepa River to the Merensky Dam on the farm Westfalia 223, Letaba
	LISTED WATER RESOURCES WHERE SPECIAL LIMIT FOR ORTHO-PHOSPHATE AS PHOSPHOROUS IS APPLICABLE (Crocodile (west) Marico Water Management Area)
74	Pienaars River and tributaries as far as Klipvoor Dam
75	Crocodile River and tributaries as far as Roodekopjies Dam
76	Elands and Hex River and tributaries as far as Vaalkop Dam
77	Molopo River and tributaries as far as Madimola Dam

WATER RESOURCE			
	RAMSAR LISTED WETLANDS:	PROVINCE	LOCATION
78	Barberspan	North-West	26°33' S 25°37' E
79	Blesbokspruit	Gauteng	26°17' S 28°30' E
80	De Hoop Vlei	Western Cape	34°27' S 20°20' E
81	De Mond (Heuningnes Estuary)	Western Cape	34°43' S 20°07' E
82	Kosi Bay	Kwazulu-Natal	27°01' S 32°48' E
83	Lake Sibaya	Kwazulu-Natal	27°20' S 32°38' E
84	Langebaan	Western Cape	33°06' S 18°01' E
85	Orange River Mouth	Northern Cape	28°40' S 16°30' E
86	St Lucia System	Kwazulu-Natal	28°00' S 32°28' E
87	Seekoeivlei Nature Reserve	Free State	27°34' S 29°35' E
88	Verlorenvlei	Western Cape	32°24' S 18°26' E
89	Verloren Valei	Mpumalanga	25°14' S 30°4' E
90	Nylsvlei	Northern	24°39' S 28°42' E
91	Wilderness Lakes	Western Cape	33°59' S 22°39' E

4 DISPOSING OF WASTE IN A MANNER WHICH MAY DETRIMENTALLY IMPACT ON A WATER RESOURCE

[Section 21(g)]

Purpose of this authorisation

4.1. The authorisation permitted in terms of this Schedule replaces the need for a water user to apply for a licence in terms of the National Water Act for the disposal of waste, provided that the disposal is within the limits and conditions set out in this authorisation.

Exclusion

4.2. This authorisation does not apply to a person who is not the lawful occupier of the land or who does not have lawful access to the land on which the disposal takes place.

Compliance with National Water Act and other laws

4.3 (1) This authorisation does not-

- (a) replace any existing authorisation that is recognised under the National Water Act;
- (b) exempt a person from compliance with section 7(2) of the Water Services Act, 1997 (Act No. 108 of 1997);
- (c) exempt a person from compliance with the provisions of the National Building Regulations and Building Standards Act, 1977 (Act No. 103 of 1977) for construction, operation and maintenance of any structure used for the collection, treatment or disposal of waste; or
- (d) exempt a person who uses water from compliance with any other provision of the National Water Act unless stated otherwise in this notice, or any other applicable law, regulation, ordinance or by-law.

(2) A person who uses water in terms of this authorisation is exempt from compliance with section 22(2)(e) of the National Water Act.

Area of applicability

4.4 This authorisation is applicable throughout the Republic of South Africa, except for those subterranean government water control areas set out in Table 4.1.

Duration of authorisation

4.5. This authorisation will be applicable for a period of five years from the date of publication of this notice, unless-

- (a) it is amended at any review period, which period shall be at intervals of three years from the date of publication of this notice;
- (b) the period is extended by a further notice in the *Gazette*;
- (c) it is replaced with a General Authorisation in relation to a specific water resource or within a specific area; or
- (d) the water user is required to apply for a licence in terms of the National Water Act.

Definitions

4.6. In this authorisation, unless the context otherwise indicates, any expression to which a meaning has been assigned in terms of the National Water Act shall have that meaning, and-

"biodegradable industrial wastewater" means wastewater that contains predominantly organic waste arising from industrial activities and premises, including-

- (a) milk processing;
- (b) manufacture of fruit and vegetable products;
- (c) sugar mills;
- (d) manufacture and bottling of soft drinks;
- (e) water bottling;
- (f) production of alcohol and alcoholic beverages in breweries, wineries or malt houses;
- (g) manufacture of animal feed from plant or animal products;
- (h) manufacture of gelatine and glue from hides, skin and bones;
- (i) abattoirs;
- (j) fish processing; and
- (k) feedlots;

"category A mine" means-

- (a) any gold or coal mine;
- (b) any mine with an extractive metallurgical process, including heap leaching; or
- (c) any mine where the mineral deposit contains sulphide or where acid-forming minerals occur in the mineral deposit;

"complex industrial wastewater" means wastewater arising from industrial activities and premises, that contains-

- a) a complex mixture of substances that are difficult or impractical to chemically characterise and quantify; or
- b) one or more substances, for which a wastewater limit value has not been specified, and which may be harmful or potentially harmful to human health, or to the water resource-

(identification of complex industrial wastewater will be provided by the Department upon written request);

"domestic wastewater" means wastewater arising from domestic and commercial activities and premises, and may contain sewage;

"evaporation pond" means a dam designed to collect and dispose of wastewater through evaporation, from which any concentrated waste or sludge must be removed and disposed of according to the requirements of any relevant laws and regulations;

"grey water" refers to wastewater generated through domestic activities and premises, including washing, bathing and food preparation, but does not contain sewage;

"monitoring programme" means a programme for taking regular measurements of the quantity and/or quality of a water resource, waste or wastewater discharge at specified intervals and at specific locations to determine the chemical, physical and biological nature of the water resource, waste or wastewater discharge;

"organic waste" means waste of non-anthropogenic origin that is readily biodegradable in the environment and does not contain any substances that may accumulate in the environment;

"on-site disposal" refers to the disposal of wastewater on individual properties not permanently linked to a central waste collection, treatment and disposal system, such as septic tank systems, conservancy tank systems, soakaway systems, french drains and pit latrines;

"primary treatment" means the treatment of wastewater by a physical process, which may involve maceration, sedimentation, screening and grit removal;

"secondary treatment" means the treatment of wastewater by a biological process, through solar energy, bacteria, algae and a variety of aquatic biota, to remove organic matter;

"wastewater" means water containing waste, or water that has been in contact with waste material;

"wastewater pond system" means a dam or system of dams designed to collect wastewater and to conduct primary and secondary treatment, from which treated wastewater is disposed of.

Storage of domestic and/or biodegradable industrial wastewater for the purpose of re-use

4.7. A person who-

- (a) owns or lawfully occupies property registered in the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed, or
- (c) lawfully has access to land on which the use of water takes place,

may on that property or land outside of the areas set out in Table 4.1-

- (i) store up to 5 000 cubic metres of domestic and/or biodegradable industrial wastewater for the purpose of re-use,

if the storing of the wastewater-

- (aa) does not impact on a water resource or on any other person's water use, property or land; and
- (bb) is not detrimental to the health and safety of the public in the vicinity of the activity.

Storage of domestic and/or biodegradable industrial wastewater for the purpose of disposal

4.8. A person who-

-
- (a) owns or lawfully occupies property registered in the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed, or
- (c) lawfully has access to land on which the use of water takes place,
- may on that property or land outside of the areas set out in Table 4.1-

(i) store domestic and/or biodegradable industrial wastewater for the purpose of disposal of-

(aa) up to 10 000 cubic metres per property or land; or

(bb) up to 50 000 cubic metres in a wastewater pond system per property or land,

if the storing of the wastewater-

(aA) does not impact on a water resource or on any other person's water use, property or land; and

(aB) is not detrimental to the health and safety of the public in the vicinity of the activity;

Disposal of domestic and/or biodegradable industrial wastewater

4.9. A person who-

- (a) owns or lawfully occupies property registered in the Deeds Office as at the date of this notice;
- (b) lawfully occupies or uses land that is not registered or surveyed, or
- (c) lawfully has access to land on which the use of water takes place,
- may on that property or land, outside of the areas set out in Table 4.1, dispose of –

(i) up to 1 000 cubic metres of domestic and/or biodegradable industrial wastewater, on any given day-

(aa) into a wastewater pond system; or

(bb) into an evaporation pond system;

(ii) domestic wastewater or biodegradable wastewater into a wastewater irrigation system as set out under General Authorisation 2 above;

(iii) wastewater to an on-site disposal facility -

(aa) for grey water generated by a single household;

(bb) up to one cubic metre of biodegradable industrial wastewater on any given day; or

(cc) domestic wastewater to a communal conservancy tank serving no more than 50 households;

(iv) domestic wastewater generated by a single household not permanently linked to a central waste collection, treatment and disposal system to an on-site disposal facility; and

(v) stormwater runoff from any premises not containing waste or wastewater from industrial activities and premises,

if the disposing of wastewater-

- (aA) does not impact on a water resource or on any other person's water use, property or land; and
- (bB) is not detrimental to the health and safety of the public in the vicinity of the activity.

Disposal of mine waste or residue

4.10. A person may dispose of mine residue into mine residue deposits provided that-

- (a) the mine residue is not from a Category A mine;
- (b) the disposal is in accordance with Government Notice No. 704, dated 4 June 1999; and
- (c) the disposal is in accordance with SABS Code 0286, as amended from time to time.

Registration of wastewater storage

4.11.(1) A person who stores wastewater in terms of this authorisation must submit a registration form for registration of the water use before commencement of storage if more than 1 000 cubic metres are stored for disposal or if more than 500 cubic metres are stored for re-use.

(2) On written receipt of a registration certificate from the Department, the person will be regarded as a registered water user.

(3) All forms for registration of water use are obtainable from the Regional offices of the Department as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Registration of wastewater disposal

4.12(1) A person who disposes of wastewater in terms of this authorisation must submit a registration form for registration of the water use before the commencement of the disposal if more than 50 cubic metres of domestic wastewater or biodegradable industrial wastewater is disposed of on any given day.

(2) The responsible local authority must submit a registration form obtained from the Department, to register the water use for disposal of domestic wastewater in-

- (a) areas where more than 5 000 households are served by on-site disposal sites;
- (b) areas where the density of on-site disposal sites exceeds 10 per hectare; or
- (c) areas served by communal septic tanks.

(3) On written receipt of a registration certificate from the Department, the person will be regarded as a water user.

(4) All forms for registration of water use are obtainable from the Regional offices of the Department as well as from the Departmental web-site at <http://www.dwaf.gov.za>

Location of wastewater storage dams and wastewater disposal sites

4.13. Wastewater storage dams and wastewater disposal sites must be located-

-
- (a) outside of a watercourse;
 - (b) above the 100 year flood line, or alternatively, more than 100 metres from the edge of a water resource or a borehole which is utilised for drinking water or stock watering, whichever is further; and
 - (c) on land that is not, or does not, overlie, a Major Aquifer (identification of a Major Aquifer will be provided by the Department upon written request).

Record-keeping and disclosure of information

4.14. (1) The water user must ensure the establishment of monitoring programmes to monitor the quantity and quality of the wastewater prior to storage or disposal, as follows-

- (a) for the storage of wastewater, the quantity must be recorded monthly; or
 - (b) for the disposal of wastewater, the quantity must be gauged or metered and recorded monthly.
- (2) Upon the written request of the responsible authority, the water user must-
- (a) ensure the establishment of any additional monitoring programmes; and
 - (b) appoint a competent person to assess the water use measurements made in terms of this authorisation, and to submit the findings to the responsible authority for evaluation.
- (3) Subject to paragraph 4.14 (2) above, the water user keep a written record of the following wastewater storage or wastewater disposal and related activities-
- (a) the location of the storage dam or wastewater disposal site;
 - (b) the quantity of wastewater stored or disposed of or re-used;
 - (c) the quality of wastewater stored or disposed of, where applicable;
 - (d) details of the monitoring programme;
 - (e) details of failures and malfunctions of any wastewater disposal system or wastewater storage dam that the registered user is responsible for, and

such information must be made available upon written request to the responsible authority.

(4) Any information on the occurrence of any incident that has or is likely to have a detrimental impact on the water resource quality must be reported to the responsible authority.

Precautionary practices

4.15. (1) The water user must follow acceptable construction, maintenance and operational practices to ensure the consistent, effective and safe performance of any wastewater disposal system or wastewater storage dam.

(2) All reasonable measures must be taken to prevent wastewater overflowing from any wastewater disposal system or wastewater storage dam.

(3) All reasonable measures must be taken to provide for mechanical, electrical or operational failures and malfunctions of any wastewater disposal system or wastewater storage dam.

(4) Sewage sludge must be removed from any wastewater and the resulting sludge disposed of according to the requirements of any relevant law and regulation, including-

- (a) "Permissible utilisation and disposal of sewage sludge" Edition 1, 1997. Water Research Commission Report No TT 85/97 and Addendum thereto Edition 1, July 2002, and as amended from time to time; and
- (b) "Guide: Permissible utilisation and disposal of treated sewage effluent", 1978, Department of National Health and Population Development Report No. 11/2/5/3, as amended from time to time (obtainable from the Department upon written request).

Inspections

4.16. Any property or land in respect of which a water use has been authorised in terms of this notice must be made available for inspection by an authorised person in terms of section 125 of the National Water Act.

Offences

4.17. A person who contravenes any provision of this authorisation is guilty of an offence and is subject to the penalty set out in section 151(2) of the National Water Act.

NOTE: Information regarding the drainage regions referred to in Table 4.1 can be obtained from the Department, upon written request.

TABLE 4.1 Subterranean government water control areas excluded from General Authorisation for disposal of waste

Primary drainage region	Tertiary/ Quaternary drainage region	Description of subterranean government water control area	Government Notice No.	Government Gazette Date
H	H30	Baden	136	1967-06-16
A	A30	Bo-Molopo	1324	1963-08-30
C	C30	Bo-Molopo	1993	1965-12-17
D	D41	Bo-Molopo	R634	1966-04-29
A	A24	Crocodile River Valley	208	1981-10-23
A	A21	Crocodile River Valley	18	1983-02-18
A	A21, A22	Kroondal-Marikana	180	1963-06-17
G	G10,G30	Lower Berg River Valley/Saldanha	185	1976-09-10
A,B	A60,B50,B31	Nyl River Valley	56	1971-03-26
G	G30	Strandfontein	2463	1988-12-09
M	M10,M20,M30	Uitenhage	260	1957-08-23
G	G30	Wadrif	992	1990-05-11
G	G20	Yzerfontein	27	1990-02-09
G	G30	Graafwater	1423	1990-06-29
A	A70	Dendron-Vivo	813	1994-04-29
A	A60	Dorpsrivier	312	1990-02-16
C	C24	Ventersdorp	777	1995-06-02

Appendix B: Selected IWRM policies and strategies from three Unicities

City of Joburg

Topic	Document	Main objectives in terms of IWRM
Air	Air Quality Management Plan, 2003	To promote cleaner production and energy efficiency within all sectors, and continuous improvement in best practice as it pertains to air pollution prevention and minimisation.
Integrated Environmental Management	Integrated Environmental Management Plan, 2005	Provide a framework for the development of sectoral policies and programmes, management and regulatory instruments, the setting of standards and for forging effective partnerships for the successful identification and implementation of environmental sustainability projects.
Urban greening	Joburg Metropolitan Open Space, 2002	The open space system is an important step in maintaining ecological balance within the city through exploiting the potential of the site to improve the microclimate, air and water quality, recharge the groundwater regime, prevent flooding, reduce the impact of stormwater run-off and increase biological diversity.
	Public Open Spaces By-laws, 2003	To provide, in conjunction with other applicable legislation, an effective legal and administrative framework to ensure that the way in which the Council controls, manages and develops public open spaces is environmentally sustainable, and is in the long-term interests of the whole community of Johannesburg, including future generations.
Waste	Waste Management Plan, 2003	To integrate, improve and optimise waste management in order to maximise efficiency by providing an adequate service to residents and businesses and, minimise the associated environmental impacts and financial costs.
	Waste Management By-laws, 2003 (supported by Waste Management Policy and Status Quo Report)	To regulate the collection, disposal, treatment and recycling of waste to enhance sustainable development.
Water services	Sanitation Policy, 2002	The sanitation policy provides a framework for addressing the sanitation backlog within low income and under serviced areas in the short to intermediate term.

eThekwini

Topic	Document	Reference on CD
Environmental Management	Environmental management policy for the Durban Metropolitan Area	Env pol
	Institutional and procedural framework to support an environmental management system for the Durban Metropolitan Area	EMS
Industrial effluent disposal	Guidelines for the management of metal finishing industry effluent developed by the Durban Chamber of Commerce Bylaws Working Group	17873
Reuse	Reuse of treated effluent from sewage treatment works	17860
Sludge disposal	Treatment and disposal of sludge at wastewater treatment works	17862
Water services	Guidelines for developers in respect of sewer connections to subdivisions in the Durban Metropolitan Area	17854
	Policy Guidelines on water supply and sanitation provision to communities	17855
	Monitoring and control of sewage disposal and treatment	17856
	Guidelines for processing of subdivision approval for wastewater disposal	17863
	Policy Guidelines for the submission of alternative on-site waterborne sanitation systems	17865
	The use of structured all uPVC sewer pipes in the Durban Metropolitan Area	17866
	Guidelines regarding application for road tanker discharges to sea outfall at Southern Wastewater Treatment Works	17868
	Guidelines for privately owned package sewage on-site systems for the treatment of domestic sewage in the EThekwini Municipal Area where the treated wastewater is to be discharged to a natural surface water course or through surface irrigation	17870
	Guidelines for the design and approval of site (sub surface) disposal of domestic sewage	19504

City of Cape Town

Topic	Document
Catchment management*	Catchment, Stormwater and River Management Strategy (2002 – 2007)
Fauna and flora	Aquatic Weed Guide
General	Guidelines for Good Practice
Grey water	Grey Water Guidelines
Integrated Environmental Management	CCT's Integrated Metropolitan Environmental Policy (IMEP)
River/wetland*	Floodplain Management Guidelines
	Wetland Buffer Zones
	Ecological Guidelines for River/Wetland Upgrading
	River Maintenance
Stormwater*	Storm Water Planning and Design Guidelines for New Developments
	Storm Water Management on Slopes adjacent to Natural Area
	By-Law for Stormwater Management
Water Management Planning (IWRMP)	WSDP
Water conservation water demand management.	Water Demand Management Strategy

* Refer to additional planning documents below

City of Cape Town
Catchment, Stormwater and River Management PLANNING DOCUMENTS

Note: Where a lower level plan is to be prepared in the absence of a higher level plan (e.g. Stormwater Management Plan in absence of Catchment and River Management Plan) then the lower level plan should include relevant higher level issues as required.

		Catchment and River Management Plan (CRMP)	Stormwater Master Plan (SIWRMP)	Local Stormwater Plan (LSWP)	
				Local Development Plan	Local Management Plan
SCOPE	Intent	Sets overall management objectives and recommends key actions with respect to runoff quantity, quality and associated environmental and social issues	Identifies bulk infrastructure required for an ultimate development scenario	A detail plan showing how stormwater is to be provided and managed to meet CRMP and SIWRMP objectives within proposed or existing developments, focussing on localised issues of quantity and quality	Sets objectives and management actions
	Geographical Extent	Entire catchment area (with focus on portion of catchment and watercourses managed by the City of Cape Town)	Entire catchment area or sub-catchment (priority/focus on developing areas) prior to development where possible	New developments	Where required, for local existing and township developments, or reach of river, waterbody or estuary

		Local Stormwater Plan (LSWP)		
		Stormwater Master Plan (SIWRMP)	Local Development Plan	Local Management Plan
DELIVERABLES	Land Management (Use, planning, developments)	<p>Compile information:</p> <ul style="list-style-type: none"> • Existing and future land use • Structure plans / Spatial Dev. Frameworks • Urban renewal proposals • Regional growth and development strategies • MOSS Proposals • Proposed major developments • Develop/determine • Broad guidelines for future land use/property development 	<p>Compile information:</p> <ul style="list-style-type: none"> • Local structure plans • Information supplementary to CRMP as required • 	<p>Compile information:</p> <ul style="list-style-type: none"> • Information supplementary to CRMP as required
		<p>Compile information:</p> <ul style="list-style-type: none"> • Information supplementary to CRMP as required 	<p>Compile information:</p> <ul style="list-style-type: none"> • Information supplementary to CRMP and specific to local situation. 	

		Local Stormwater Plan (LSWP)	
		Stormwater Master Plan (SIWRMP)	Local Development Plan
		Stormwater Master Plan (SIWRMP)	Local Management Plan
Catchment and River Management Plan (CRMP)	Stormwater Drainage and Flooding	Stormwater Master Plan (SIWRMP)	Local Development Plan
<p>Literature and historical review</p> <p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Overall Drainage Plan of Catchment • Hydrological Model (>1m dia) • Flows and floodlines on all major watercourses for current and ultimate development scenarios • Primary drainage and flood attenuation needs and opportunities • Flood management options • Sub-catchment flood attenuation requirements (outflow hydrographs) • Sediment sources, erosion issues and management options • Catchment Monitoring requirements • Management objectives and strategies • Flood warning requirements 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Hydrological model (>525 mm dia) • Flows and floodlines on significant tributaries • Significant local and regional drainage and flood attenuation needs and opportunities • Sediment sources, erosion issues and management proposals • Major stormwater conduit sizes, levels, grades, and hydraulic grade lines • Local source control strategies • Regional attenuation facilities, including controlling W/Ls • Flood warning proposals • Prioritised remedial requirements for existing drainage problems 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Detailed hydrological model (to include all catchments upstream of the lowest connection into the SIWRMP or existing system) • Flows and floodlines • Drainage and flood attenuation solutions • Sediment sources, erosion issues and management solutions • Local source control measures • Local stormwater conduit sizes, levels, grades, and hydraulic grade lines on main collectors • Stormwater attenuation details • Implementation plans • 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Water level and flow requirements • Special operation and maintenance requirements • Special flooding/disaster management requirements
DELIVERABLES	DELIVERABLES		

		Local Stormwater Plan (LSWP)	
		Stormwater Master Plan (SIWRMP)	Local Management Plan
Catchment and River Management Plan (CRMP)		<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Significant pollution (incl. litter) sources • Pollution Abatement Plan • Regional treatment facilities and sites (reedbeds, litter /sediment traps, low flow diversions) • Local ecological buffer widths and corridor requirements • Rehabilitation opportunities • Management objectives, strategies and site specific proposals 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Local water quality objectives • Flow abstraction and discharge management measures • Implementation and operation of monitoring systems • Special routine water quality management requirements • Special requirements for management of pollution incidents
Stormwater Master Plan (SIWRMP)		<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Local aquifer status and groundwater behaviour • Recharge sites • Pollution Abatement Plan 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Local quality objectives • Abstraction and recharge management measures • Monitoring systems
Catchment and River Management Plan (CRMP)		<p>Literature review</p> <p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Baseline information: water quality status, abstractions, and discharges • Primary pollution (incl litter) sources (Environmental hazard rankings) • Ecological status of watercourses • Ecological buffer width requirements • Ecological corridors • River rehabilitation opportunities • Management objectives and strategies 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Local aquifer status and groundwater behaviour • Appropriate infiltration mechanisms • Water quality control measures at recharge points
Catchment and River Management Plan (CRMP)		<p>Literature review</p> <p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Aquifer mapping & flow directions • Existing & anticipated abstraction • Abstraction and recharge management plans 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> • Local aquifer status and groundwater behaviour • Appropriate infiltration mechanisms • Water quality control measures at recharge points
Water quality and ecological	DELIVERABLES		
Groundwater	DELIVERABLES		

		Local Stormwater Plan (LSWP)		
		Stormwater Master Plan (SIWRMP)	Local Development Plan	
		Catchment and River Management Plan (CRMP)	Local Management Plan	
DELIVERABLES	River Corridor / Social	<p>Literature Review</p> <p>Compile/develop/determine:</p> <ul style="list-style-type: none"> Existing ownership of land and servitudes Identify other major services (sewers, water etc) Assess social, aesthetic and other uses Identify opportunities for further use. General strategy for further development and maintenance (e.g. council, private, partnerships, communities) Stormwater Land ID 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> Existing ownership and servitudes Identify and locate other services (sewers, water etc) Social, aesthetic and other use opportunities and proposals Servitude requirements Ownership and maintenance responsibilities and agreements: (council, private, partnerships, communities) 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> Information as for Local Development Plan if no LDP.
DELIVERABLES	General	<p>Literature Review and Historical perspective</p> <p>Compile/develop/determine:</p> <ul style="list-style-type: none"> Catchment and River Vision Integrated management strategy and priorities Key stakeholders Apportionment of responsibilities for implementation of plan Review current maintenance practices and recommendations for improvements Implementation and review process 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> Project specifics Local guidelines for future land use/property development Integrated management strategy, priorities and responsibilities Implementation and review process 	<p>Compile/develop/determine:</p> <ul style="list-style-type: none"> Special security and safety requirements Public participation and education programmes Funding issues River Maintenance activities and practices Determine implementation and review process

Appendix C: IWRM legislation

South African legislation pertaining to IWRM

Section/principles/ strategies	Detail	Reference
Constitution		
Bill of rights environmental clause	<ul style="list-style-type: none"> • Everyone has the right: • to an environment that is not harmful to their health or well-being; • to have an environment protected for the benefits of present and future generations through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	DEAT, 2004
Section 3: co-operative governance	<ul style="list-style-type: none"> • Entrenches the notion of co-operative governance between the three tiers of government: • metropolitan councils (category A), of which there are six. • district municipalities (category B) cover fairly large areas, and often include several towns and rural areas that fall outside of towns. • local councils (Category C) cover smaller cities and towns but they do not operate completely independently as they also fall under district municipalities; 	Sampson, 2001 The Star article no. 2080860
Section 27	Rights to sufficient water	Sampson, 2001
Section 156, together with Schedules 4 and 5: powers and functions of national, provincial and local government	<ul style="list-style-type: none"> • Responsibilities assigned to municipalities are: • Municipal planning (category A, B, C²) • Air pollution (A, B) • Storm water management in built up areas (A, B) • Water and sanitation services (A, C) • Municipal parks and recreation (A, B) • Cleansing (category A, B, C) • Refuse removal (A, B), refuse dumps and solid waste removal (A, C) 	DEAT, 2004
National Environmental Management Act (NEMA), Act 107 of 1998		
The broad environmental policy of government and the framework of environmental legislation	NEMA imposes a positive duty on everyone to prevent any pollution from occurring and minimise or rectify any pollution that has occurred. Pollution control places administrative duties on users i.e. they must apply for certificates, permits, licences and authorisations. Many activities also require a compulsory environmental impact assessment.	NWRS, 2004; Sampson, 2001
National environmental standard: Best Practicable Environmental Option (BPEO)	BPEO is defined as involving a "selection of the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as the short-term.	Sampson, 2001

Section/principles/ strategies	Detail	Reference
Other principles that have been given legal effect in NEMA include polluter pays, cradle-to-grave and waste prevention and minimisation	All responsible parties are liable on a joint and several basis (NEMA and the National Water Act entitle the enforcement authority to recover its labour, administrative and overhead costs associated with investigation, clean-up and prosecution of pollution offences), and consequently the authority can select the party which is the easiest to find and has the 'deepest pocket'.	Sampson, 2001
Environment Conservation Act (ECA), Act 73 of 1989: those parts of the that have not yet been repealed by the more recent legislation		
Local Government: Municipal Planning and Performance Management Regulations (No R796, August 2001)	A "strategic assessment of the environmental impact of the spatial development framework" of the IDP prepared by a municipality must also be carried out.	NWRS, 2004; DEAT, 2004
National Waste Management Strategy (NWMS), 1999	NWMS has 8 action plan documents: NWMS, capacity building, education, awareness and communication; general waste collection; implementing instruments; integrated waste management planning; waste treatment and disposal; waste information systems; waste minimisation and recycling. Regulations to give force to the strategy have been developed under the ECA and NEMA.	Sampson, 2001
National Water Act, Act 36 of 1998		
Overall purpose	<ul style="list-style-type: none"> • The Act: • Gives effect to the Constitutional right of access to water and the environmental right ensuring its protection and conservation. • Provides for an integrated, adaptive process of WRM thus assisting South Africa to take a further step towards achieving Integrated Environmental Management. 	
Chapter 2: National Water Resource Strategy	<ul style="list-style-type: none"> • The National Water Resource Strategy: • is the national framework for managing water resources; • is the framework for the preparation of catchment management strategies; • provides for identification of development opportunities and constraints; • aims to provide sufficient information about water resources to facilitate coherent and holistic planning, as well as establishing a platform for informed interactions between water resource managers and development planners in other sectors. 	
Section 19 and 20: Pollution prevention and emergency incidents	A directive (notice to pollution offenders) to take necessary steps to prevent or stop an activity causing pollution is a potentially powerful tool as a breach of a directive is far easier to prove than the pollution incident itself.	
Chapter 4: use of water Section 21: water uses Section 27: motivation for a licence in terms of equity, sustainability and efficiency. Section 29: licence conditions	<p>Definition of Section 21 Water Use is very broad. It relates to the consumption of water as well as to activities that may affect water quality and the condition of the resource itself. The water uses for which a licence is required are as follows:</p> <ol style="list-style-type: none"> a) abstraction; b) storage of clean water; c) impeding/diverting the flow in a watercourse; d) stream flow reduction, for example, forestry; e) engaging in a controlled activity, for example, irrigation; f) discharging; 	

Section/principles/ strategies	Detail	Reference
	g) disposing of waste; h) disposing of heated waste; i) altering a watercourse; j) removing water from underground; k) recreation.	
Section 30 of the National Water Act: financial security by licence applicant	A licence applicant may be required to give financial security in respect of any obligation or potential obligations which may arise from the licence to a relevant authority	
Section 56: Pricing strategy for water use charges (GNR 1353, GG20615 of 12 November 2000)	Includes: <ul style="list-style-type: none"> • pricing of first tier water, namely use of raw water from surface and groundwater resources to achieve equitable and efficient allocation; • water resource management charges, which relate to all the water utilised within the water management area, and as such, the costs are borne by all the users within that area. 	
Sections 77 -78: Catchment Management Agency (CMA) establishment	Responsibility for pollution prevention and taking remedial action lies with the CMA. Establishment of the 19 water management areas forms part of the CMA strategy and water use registration programme.	
Water Services Act, 108 of 1997 (the Act is under review as it is not adequately aligned with DWAF's IWRM approach -DWAF, Boyd pers. comm.)		
All water services authorities ³ are required to prepare a Water Services Development Plan (WSDP)	The Act prescribes the contents of a WSDP, which is a: <ul style="list-style-type: none"> • business plan setting out the way in which the water services authority plan and deliver services to individuals and businesses in its area of jurisdiction • water services component of the IDP where relevant to the IDP priority issues, or if not, as a parallel legal process. 	DEAT, 2004 DWAF Regional, 2001
Section 7: control of industrial water pollution	Disposal of industrial effluent (IE) is according to the manner approved by the water service provider (WSP) nominated by the water services authority. The water services authority must make bylaws controlling IE and set norms and standards for tariffs. IE discharged to sewer is a Schedule 1 activity and no water use licence is required by the industry but the Local Authority issues sewage disposal permits with pollution prevention or waste minimisation conditions.	WISA, 2002; Sampson, 2001 Cape Town website
Section 11: water services authority duties	Every water services authority has a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services. Provides the foundation for serious water conservation interventions	Sampson, 2001 Cape Town website

Section/principles/ strategies	Detail	Reference
Municipal Systems Act, Act 32 of 2000		
Development of a water demand management policy	In conjunction with the National Water Act and Water Services Act	Cape Town website
Section 5: legislative framework for Integrated Development Plans (IDPs)	IDP's play a key role in co-ordinating the range of municipal functions and linking with Provincial planning initiatives. An IDP should contain a spatial development framework, including basic guidelines for land use management, an air quality management plan, and environment and water where relevant to the local priority issues.	DEAT, 2004
	Municipalities must set key performance indicators and targets related to their IDPs	DEAT, 2004
Section 73(1): general duties of a municipality	<p>A municipality must</p> <ul style="list-style-type: none"> • give effect to the provisions of the Constitution; • give priority to the basic needs of the community; • promote the development of the local community; • ensure that all members of the local community have access to at least a basic municipal services that must be: <ul style="list-style-type: none"> - equitable and accessible; - be provided in a manner that is conducive to: <ul style="list-style-type: none"> i. the prudent, economic, efficient and effective use of available resources; ii. the improvement of standards of quality over time; - be financially sustainable; - be environmentally sustainable; - be regularly reviewed with a view to upgrading, extension and improvement. 	DEAT, 2004
Municipal Structures Act (act 117 of 1998)		
'Two tier' local government	<p>Assigns the Schedule 4B and 5B functions to Category A and B Municipalities as laid out in the Constitution with the provision that Category C Municipalities may be authorised to carry out the following functions:</p> <ul style="list-style-type: none"> • potable water supply; • domestic waste water and sewerage disposal systems; • municipal health (environmental health). 	DEAT, 2004

Section/principles/ strategies	Detail	Reference
Municipal Demarcation Board	<p>Identified responsibilities for each tier of government for the Schedule 4B and 5B functions, include:</p> <ul style="list-style-type: none"> • provincial: pass new legislation, review existing legislation, build capacities of municipality to perform the functions, monitor performance of municipalities and ensure performance of the function is addressed in the IDP; • district: pass by-laws, review existing by-laws, build capacities of local municipality to perform the functions, monitor performance of municipalities and ensure performance of the function is addressed in the IDP, include indicators in the performance management system; • local: pass by-laws, review existing by-laws, include indicators in the performance management system, determine service delivery mechanism and make provision in budget. 	DEAT, 2004
Intergovernmental Relations Framework Act, Act 13 of 2005		
Chapter 2: cooperative governance	Lays out the mechanisms for cooperation between the different spheres of government through the formation of intergovernmental and where required, the development of an implementation protocol, which includes among others legal requirements, roles and responsibilities and the parameters of operation and cooperation.	
Section 45(1): intergovernmental disputes	No government or organ of state may institute judicial proceedings in order to settle an intergovernmental dispute unless the dispute has been declared a formal intergovernmental dispute and all efforts to settle the dispute in terms of the Act were unsuccessful.	The IGRF Act
White paper on local government		
Developmental local government	Definition: "local government that is committed to working with citizens and groups within the community to find sustainable ways to meet their social, economic and material needs and improve the quality of their lives". Expands local government mandate to include environmental management responsibilities and adopting sustainable approaches in performing its functions and inclusion of environmental considerations in the IDP process	DEAT 2004
White paper on Integrated Pollution and Waste Management		
Assigns responsibilities to three tiers of government	Province must review/assist with integrated waste plans from municipalities and municipalities must implement and enforce appropriate waste minimisation and recycling initiatives	DEAT, 2004
Provision of Access to Information Act, Act 2 of 2000		
Other: Biodiversity Act, Act 10 of 2004	Enables government authorities as well as the general public greater access to information held by the state or any individual required for the exercise or protection of any rights	Sampson, 2001

1: The National Water Act defines pollution as the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it-

- (a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- (b) harmful or potentially harmful-
- (aa) to the welfare, health or safety of human beings;
- (bb) to any aquatic or non-aquatic organisms;
- (cc) to the resource quality; or
- (dd) to property.

2: Municipality may be category A: metropolitan, B: district or C: local

3: Water Services Act defines water services authority as any municipality, including district or rural council, responsible for ensuring access to water services i.e. statutory responsibility. Water Service Provider (WSP) is the body actually responsible for operating the service. District municipalities may appoint a local municipality as the WSP if it has capacity, or become the WSP itself under the Municipal Systems Act (Section 78). Currently the situation is one of considerable flux (DEAT, 2004).

Appendix D: Local Authority IWRM structures

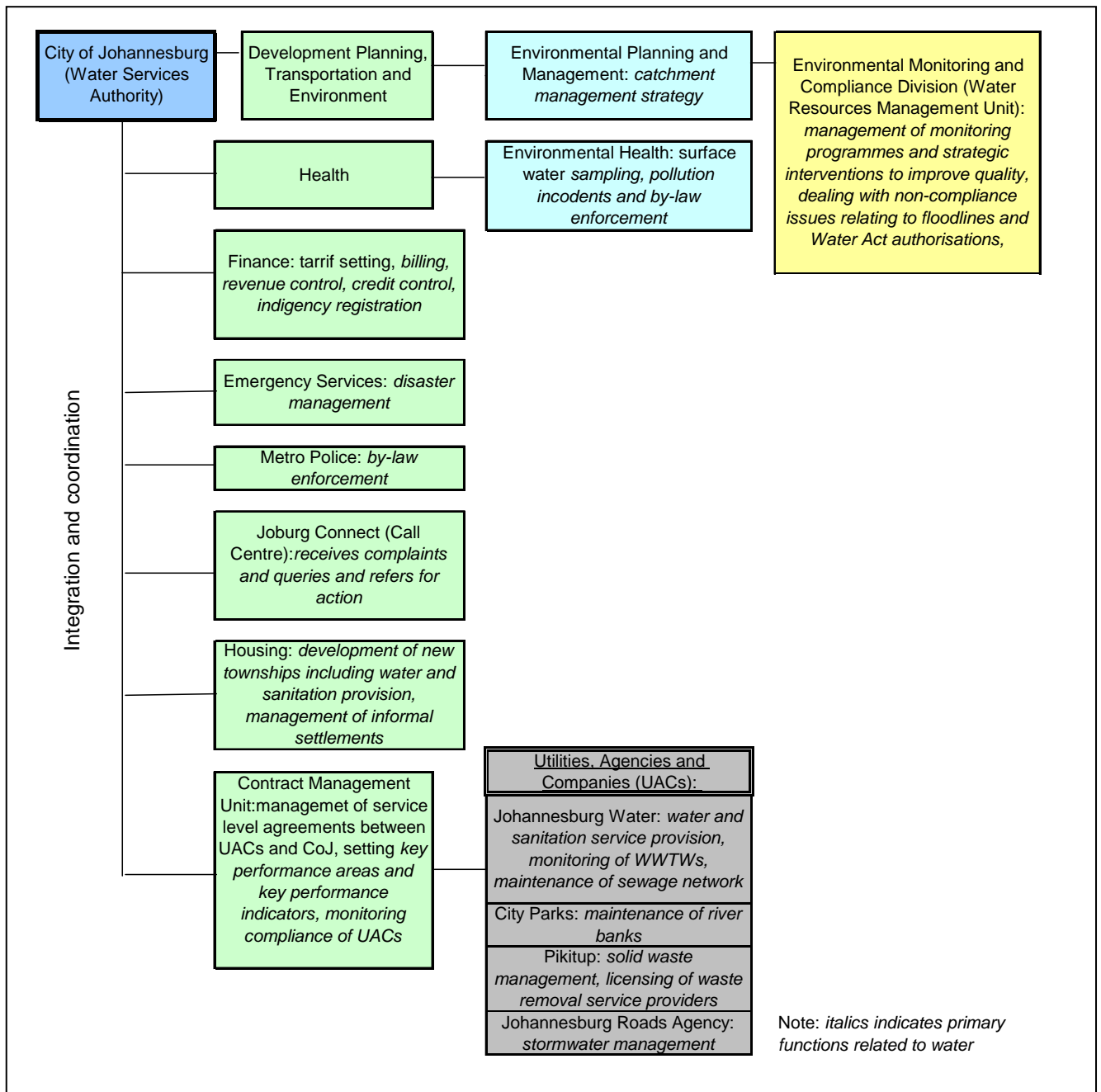


Figure 1: Institutional arrangements for IWRM in City of Joburg

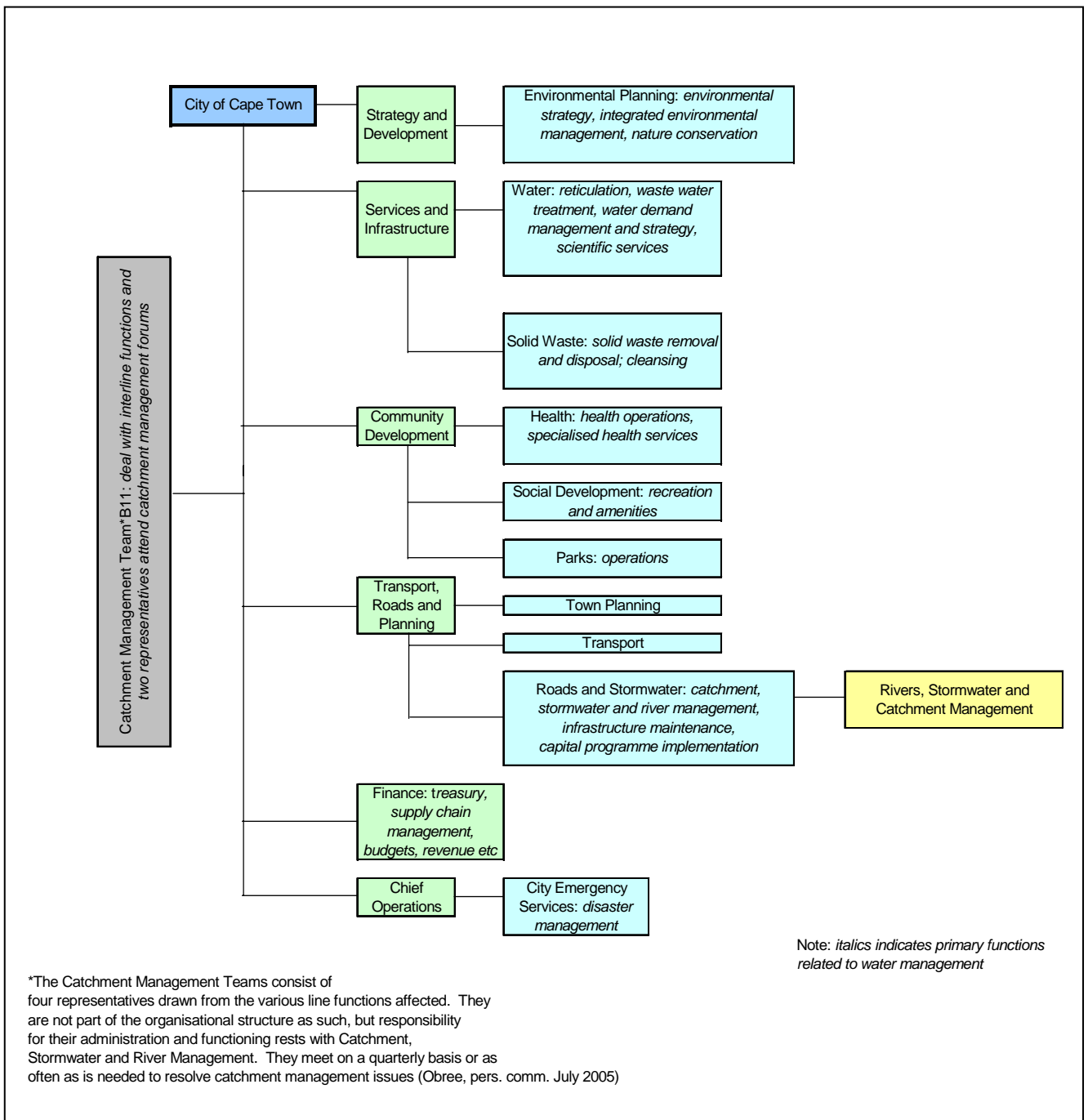


Figure 2: Institutional arrangements for IWRM in City of Cape Town

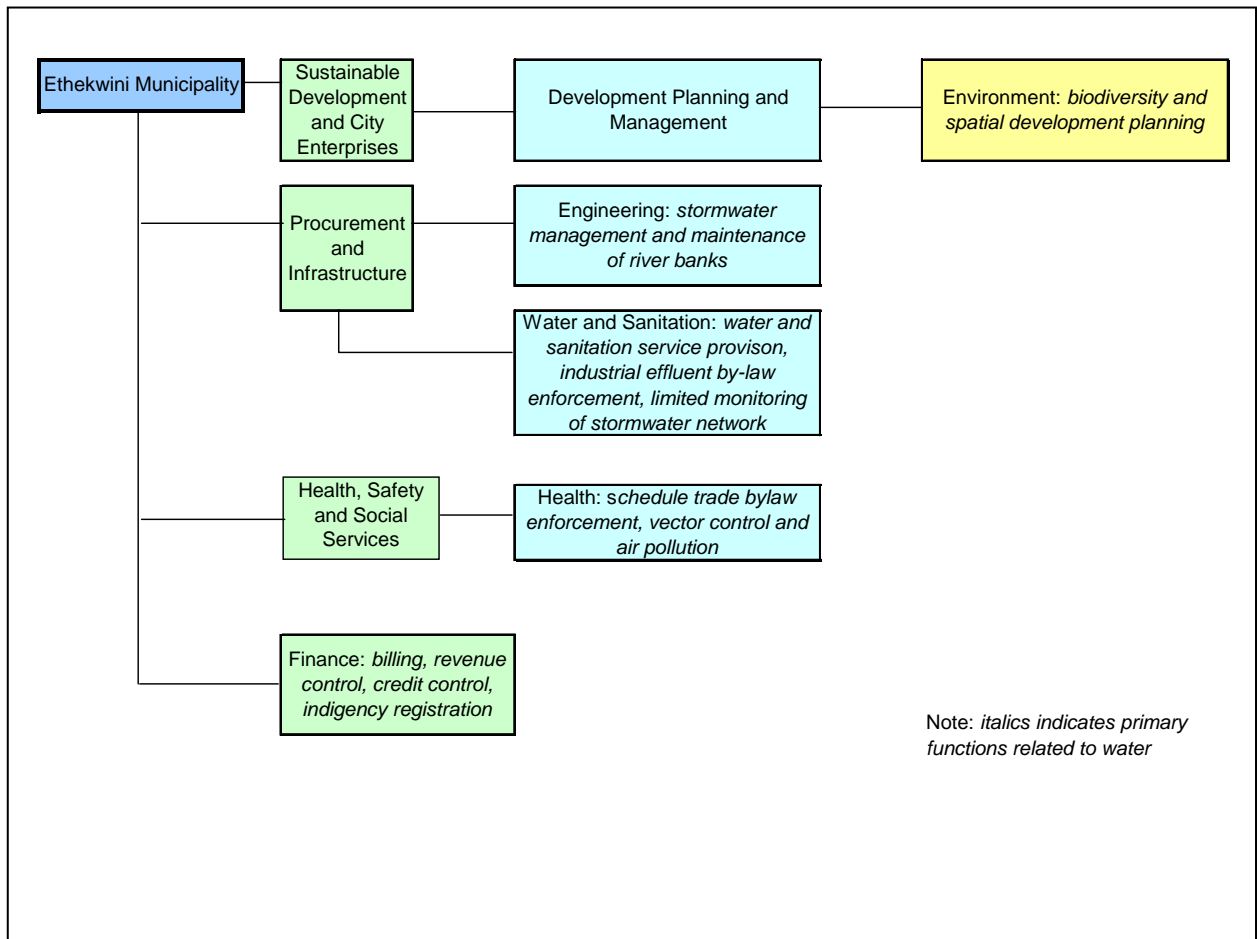


Figure 3: Institutional arrangements for IWRM in Durban Metro

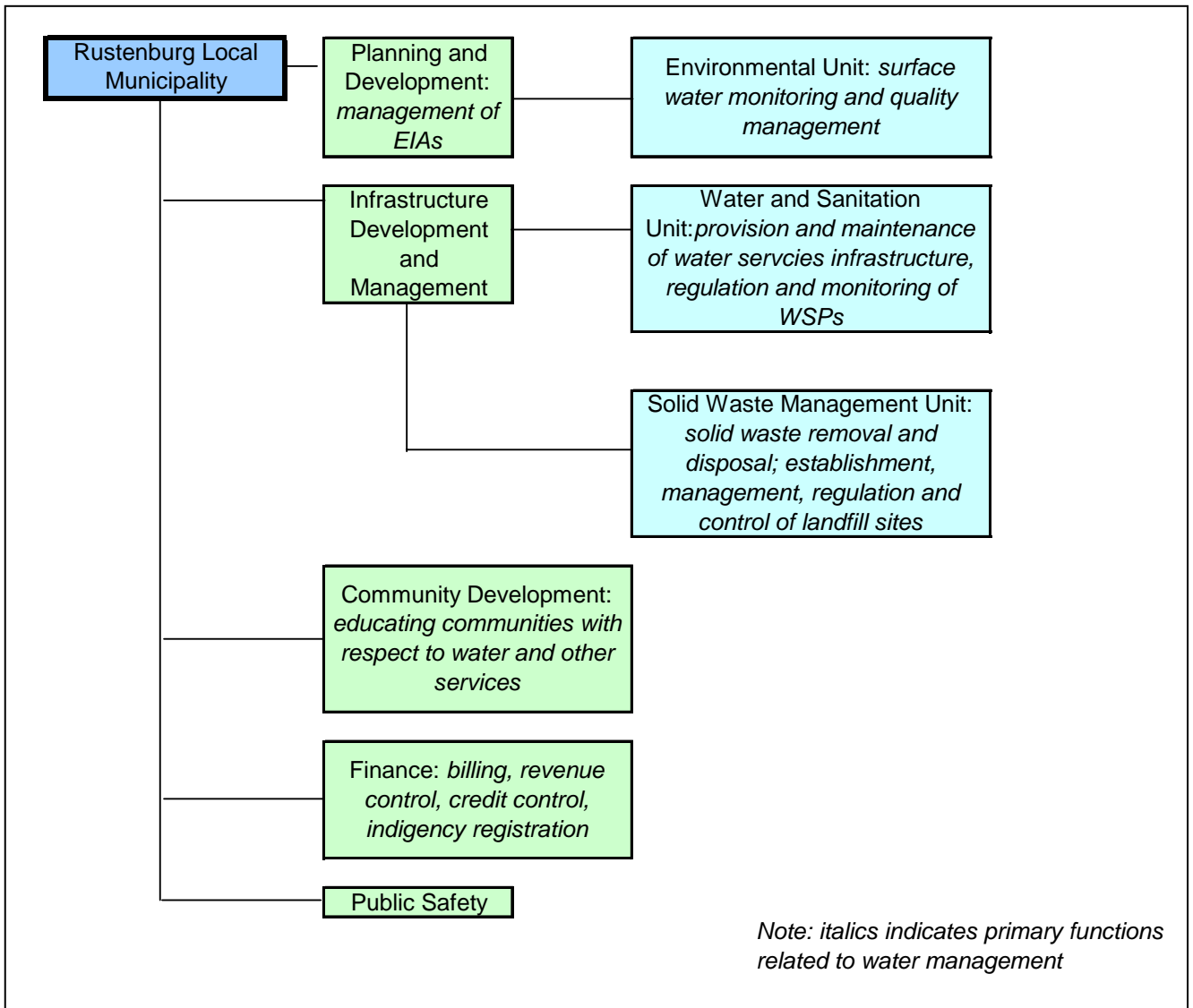


Figure 4: Institutional arrangements for IWRM in Rustenburg Local Municipality