Groundwater Licensing Guide

APPLICATION PROCEDURE FOR THE DEVELOPMENT AND USE OF GROUNDWATER

Report to the

Water Research Commission

by

Roger Parsons - Parsons and Associates Specialist Groundwater Consultants CC
Larry Eichstadt - Resource Management Services CC
Jonathan Crowther - CCA Environmental (Pty) Ltd
Jeremy Blood - CCA Environmental (Pty) Ltd

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EXECUTIVE SUMMARY

Parsons and Associates Specialist Groundwater Consultants cc, in collaboration with CCA Environmental (Pty) Ltd and Resource Management Services cc, was commissioned by the Water Research Commission to develop a Groundwater Licensing Guide to guide groundwater development and use applications.

Aim

- The overall purpose of the Groundwater Licensing Guide is aimed at allowing officials and practitioners to effectively and efficiently determine the appropriate authorisation process for the development and use of groundwater in a fair, reasonable and just manner that results in a consistent outcome.

Principles

- It is recognised the authorisation process is aimed at gathering sufficient information in an efficient and effective manner in order for an informed decision to be taken.
- The authorisation process aims to avoid any administrative burden without compromising the responsibilities of the authorities or proponent.
- The authorisation of groundwater development and use is founded on the principle that development must be environmentally sustainable and address the social and economic needs of the country.
- Co-operative governance is the foundation on which authorisation is based.
- To promote management of water resources without an unreasonable administrative burden, a hierarchical process is adopted that allows for authorisation of activities that could have minimal or no risk; while appropriate resources are required when an activity could result in significant impacts to the environment or geohydrological regime.
- Qualified geohydrological input is mandatory when formal authorisation is required, both from the proponent or potential groundwater user and from the authorities' perspective.

Guide

- The Groundwater Licensing Guide is simple, based on a logical set of questions that address specific legislative requirements and aims to produce consistent results.
- The guide is supported by information, guidelines and tools needed to determine the appropriate authorisation process.

Limitations

- Lack of clear guidance on what constitutes Schedule 1 water is a limitation in the authorisation of water entitlements.
- Limits at which the national groundwater use general authorisations are set are extremely conservative and are at levels below those of Schedule 1 use. Revision of the general authorisations is required.
- The EIA Regulations require a basic assessment be undertaken if the planned groundwater abstraction exceeds that generally authorised i.e. when DWAF stipulate the planned groundwater use is subject to being issued with a licence. This duplication of authorisation processes is contrary to the Constitution and legislative requirements of co-operative governance.

Way Forward

- A set of key issues have been identified that require further consideration if the overall objectives of licensing are to be met.
  - A single authority to manage the licensing process;
  - Clear procedures that need to be followed and information required for decision making;
  - Time frames within which the authorities will respond to Licence applications; and
  - The limits of abstraction at which Licences are required.
- Promotion of the generic EMP to ensure potential environmental damage is minimised during exploration and training of officials in the use of the Groundwater Licensing Guide are also important follow-up actions.

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GLOSSARY

NOTE: A dictionary of groundwater-related terms is included in the Groundwater Licensing Guide software.

Activity	an activity listed in NEMA Regulation No. R.386 or No. R.387 of 2006, or in any other notice published by the Minister or MEC in terms of Section 24 of the National Environmental Management Act.
Aquifer	a geological formation, which has structures or textures that hold water or permit appreciable water movement through them.
Basic assessment	an environmental assessment, as set out in Section 22 of NEMA Regulation No. R.385 of 2006, a simpler, less comprehensive impact assessment than a Scoping & EIA assessment.
Basic Assessment Report	the report resulting from the Basic Assessment process and containing a description of the proposed activity, a description of the environment that may be affected, and the possible geographical, physical, biological, social, economic, and cultural impacts.
Basic human needs	currently defined by the Water Services Act as 25 litres of potable water per person per day.
Bulk water supply	water supplied in a significant volume to a local authority, who in turn reticulates it to individual consumers; it is also supplied in bulk to mines, industries, and agricultural schemes in some cases (*no longer used in EIA Regulations*).
Competent authority	the authority which is responsible for judging and then approving or rejecting the proposed activity.
Competent person	a person suitably qualified and experienced to undertake a particular task.
Co-operative governance	a process where different spheres of government co-operate with one another in mutual trust and good faith by fostering relations, assisting and supporting one another, consulting one another on matters of common interest, co-ordinate their actions and adhering to agreed procedures.
Delegated organ of state	An organ of state to which a competent authority has delegated its powers in terms of Section 42 of NEMA.
Environmental Assessment Practitioner	a qualified and experienced person or company - independent of the developer - that manages the environmental assessment process of a proposed project on behalf of the proponent.
Environmental Authorisation	a process that may entail a basic assessment, scoping or an environmental impact assessment; or a combination thereof.
Environment Impact Assessment	a public process used to identify, predict and assess potential impacts of a proposed development; and proposes appropriate mitigation and monitoring programmes.

Environmental Management Plan	an environmental management tool used to ensure undue or reasonably avoidable adverse impacts from construction, operation and decommissioning of a project are prevented.
Existing Lawful Use	water use that took place up to 2 years prior to promulgation of the National Water Act [Note – because different parts of the Act came into effect on different dates the period considered for existing lawful use is from October 1996 to October 1999.]
Exploration	a process of gathering geohydrological information about an area or particular aquifer; and may include geological mapping, a hydrocensus, geophysical surveys, drilling, pumping tests and sampling.
General Authorisation	authorisation to use water without having to apply for a Licence.
Geohydrology	used interchangeably with *hydrogeology*; the study of the properties, circulation and distribution of groundwater.
Groundwater	water found in the subsurface in the saturated zone below the water table or piezometric surface i.e. the water table marks the upper surface of groundwater systems.
Groundwater dependent ecosystem	an ecosystem or component of an ecosystem that would be significantly altered by a change in the volume and / or temporal distribution of its groundwater supply.
High-tide mark	the highest line reached by the water of the sea during ordinary storms occurring during the most stormy period of the year, excluding exceptional or abnormal floods.
Hydrogeology	see *geohydrology*
Identified geographical area	an area identified in terms of Section 24(2) of NEMA in which specified activities may not commence without any environmental authorisation; and includes the core area of biosphere reserves and areas designated for protecting and conserving resources.
Interested & Affected Party	an individual or organisation with a personal or professional interest in the proposed development (e.g. a wildlife-protection organisation.) Certain individuals and groups, specified by the regulations, are automatically registered as Interested & Affected Parties. However, any individual or entity can register with the Environmental Assessment Practitioner and / or proponent to be registered as an Interested & Affected Party.
Lead authority	the authority that will manage and oversee an authorisation application to develop or use groundwater.
Licence	A permit from a responsible authority to use something or carry out a particular activity.
Listed activity	an activity that is registered in either NEMA Regulation No. 386 or No. 387 as a listed activity requiring environmental authorisation.
Public participation process	a process in which potential Interested & Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Other authority	authorities who have a direct responsibility in granting approval for groundwater development and use, but who exercise their responsibility through the lead authority.
Reasonable domestic use	*not defined by the National Water Act*
Reserve	the quantity and quality of water required to supply the basic needs of people to be supplied with water from that resource, and to protect aquatic ecosystems in order to secure ecologically sustainable development and use of water resources.
Responsible authority	An authority mandated by legislation to manage or administer that legislation; can be the *lead authority, competent authority* or *other authority*.
Schedule 1 water use	water used *inter alia* for reasonable domestic use, small gardening and stock watering; it is restricted to domestic uses and subsistence activities.
Scoping & EIA	a full-scale assessment of the impacts of a development, primarily applied to those activities registered in NEMA Regulation No 387 as a listed activity requiring Scoping & EI assessment.
Scoping report	a report, prepared as part of the Scoping Process, setting forth a description of a proposed project, the environmental and other impacts, and a Plan of Study for the Environmental Impact Assessment.
Sea	the water and the bed of the sea and the subsoil thereof, below the high-water mark and including the water and the bed of any tidal river and tidal lagoon.
Significant impact	an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.
Small gardening	*not defined by the National Water Act*
Sustainable development	defined by NEMA as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.
Water resource	all water bodies in the hydrological cycle, including underground water, are regarded as water resources.

ABBREVIATIONS USED

DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
ECA	Environmental Conservation Act (Act 73 of 1989)
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
LAAC	Licence Assessment Advisory Committee
MEC	Member of Executive Council
NEMA	National Environmental Management Act (Act 107 of 1998)
NGDB	National Groundwater Data Base (now referred to as the National Groundwater Archive)
NWA	National Water Act (Act 36 of 1998)
NWRS	National Water Resource Strategy
PAJA	Promotion of Administrative Justice Act (Act 3 of 2000)
RoD	Record of Decision

ACKNOWLEDGEMENTS

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The groundwater community was requested to provide information pertaining to their experiences with licensing groundwater use in South Africa and to comment on the generic EMP for groundwater exploration. Responses from the following were received and considered in developing the Groundwater Licensing Guide:

- Mr Carel Haupt
- Mr Gordon Maclear
- Mr Irené Saayman
- Mr Mike Smart
- Mr Des Visser
- Mr Theo van Niekerk

Participants in the February 2005 and May 2005 workshops are also thanked for their attendance. Interaction during the workshops greatly helped to shape the research product.

Useful discussions were also held with Mr Mike Luger, Ms Karen Shippey and Dr Andrew Spinks regarding the generic environmental management plan proposed for groundwater exploration.

Finally, the Department of Water Affairs and Forestry is thanked for allowing the inclusion of the Groundwater Dictionary in the Groundwater Licensing Guide software.

PART 1:

INTRODUCTION

1. INTRODUCTION AND BACKGROUND TO PROJECT

Parsons and Associates Specialist Groundwater Consultants cc, in collaboration with CCA Environmental (Pty) Ltd and Resource Management Services cc, was commissioned by the Water Research Commission to develop a Groundwater Licensing Guide to guide applications to develop and use groundwater.

This chapter presents the motivation for the project, research objectives, the methodology used in the development of this Groundwater Licensing Guide, and structure of the report.

1.1 Motivation

The granting of approval for groundwater development and use falls within the responsibility of the Department of Water Affairs and Forestry (DWAF), the Department of Environmental Affairs and Tourism (DEAT) and their delegated regional and local authorities. Authorisation is legislated under the National Water Act (NWA) (Act 36 of 1998), the Environment Conservation Act (ECA) (Act 73 of 1989, and amendments) and the National Environmental Management Act (NEMA) (Act 107 of 1998). These acts promote sustainable use of resources in an environmentally responsible manner. The NWA specifically seeks a balance between the protection and use of water resources, and the need to promote social and economic development.

Note:

Responsibility for environmental authorisation is delegated by DEAT to provincial authorities. Reference to DEAT in this document refers to the appropriate level of environmental authority. Because the nine provincial environmental authorities function differently, the research team considered approaches adopted by the Department of Environmental Affairs and Development Planning (DEA&DP) of the Western Cape Provincial Government.

A very useful website has been developed (http//www.eiatoolkit.ewt.org.za) that currently provides useful information about linkages between the national and regional environmental authorities. Hopefully this website will be regularly updated and remain current.

Unfortunately, clear procedures for granting approval for groundwater use are lacking and hence groundwater's development and use. This is because:

- Both DWAF and DEAT require potential groundwater users obtain a licence or approval when certain levels of use or conditions are exceeded;
- The two departments follow different procedures with respect to assessing groundwater use applications; and
- No effective co-operative governance procedures have been established; with different procedures, guidelines and definitions preventing the departments and their officials functioning in a standardized and integrated manner.

In many instances, the officials who make decisions regarding procedures to follow or information required have no basic understanding of geohydrology. While the NWA requires

an integrated approach to managing the country's water resources, some basic geohydrological knowledge and experience is usually required.

The lack of clear guidance regarding procedures, information requirements and co-operative governance result in officials adopting conservative, uninformed positions regarding information they require before considering approval for groundwater development and use. This has a number of consequences:

- The officials become overloaded with applications, many of which could be approved without requiring formal study;
- A significant (and unnecessary) backlog of applications develops, proving frustrating to officials and applicants alike; and
- Proponents are required to undertake expensive specialist and public consultation studies, some of which are unnecessary.

This problem was initially brought to the attention of relevant authorities at a workshop arranged under the auspices of the Western Cape Branch of the Ground Water Division (of the Geological Society of Southern Africa) on 10 October 2000 in Stellenbosch. The workshop was arranged in response to Cape Nature's (formerly the Western Cape Nature Conservation Board) documented policy of not supporting any groundwater schemes for bulk water supply purposes.

Environmental Impact Assessment (EIA) regulations promulgated in terms of the Environmental Conservation Act (Act 73 of 1989), regarded groundwater used for bulk water supplies as a listed activity, thereby requiring an EIA to be undertaken (DEAT, 1998). In some instances, this proved to be unjust as small-scale town supply required an EIA while large-scale abstraction for agriculture, for instance, fell outside this requirement. Since initiating this project, new EIA Regulations promulgated under NEMA have moved away from bulk water supply as a criterion for undertaking an EIA, while the NWA allows for approving certain groundwater development and use without having to go through a formal licensing process.

The lack of clear guidance from the responsible authorities provided an opportunity to undertake a multi-disciplinary research project to promote efficient and effective co-operative governance, provide guidelines for licensing the exploration, development and use of groundwater supplies in South Africa, and develop a Groundwater Licensing Guide. It is intended that the Groundwater Licensing Guide will help to avoid an unnecessary administrative burden while promoting sustainable and beneficial use of groundwater.

1.2 Research Objectives

The overall objective of the project was to identify legal requirements for authorising groundwater development and use in South Africa, and develop a Groundwater Licensing Guide or decision-support system that will allow officials, applicants and the general public to ascertain information that the officials require to assess applications to develop and use groundwater. Specific goals included:

- Development of workable definition for the term "bulk water supply", an activity for

which an EIA was required;
- Review the general authorisations, as applied by DWAF to groundwater;
- Review DWAF licence information requirements and licensing procedures;
- Review EIA Regulations applicable to groundwater;
- Develop a decision-support system that will allow users to ascertain information officials require to assess applications to develop and use groundwater;
- Develop a standardised code of practice / standard operating procedure in order that as little environmental damage as is practically possible results from exploration drilling and pumping tests; and
- Document the results of the research and prepare a users manual.

1.3 Methodology

Procedures and information requirements for licensing of groundwater development and use were ascertained through literature studies (Perkins, 1999; DWAF, 2000; Haupt, 2003; Basson *et al*., 2005) and interviews with senior national and regional water resource and environmental managers and practitioners. The project team also liased with other researchers undertaking related projects (Münster, 2005; Quibell, 2005; Saayman, 2005; Thompson, 2006; DWAF, 2007a).

A basic Groundwater Licensing Guide was developed and presented to senior national and regional authorities responsible for authorisation and licensing at a workshop in Stellenbosch on 15 February 2005. Information from the workshop was used by the project team to further develop and refine the proposed procedure and guide. A second workshop was held with regional authorities and practitioners on 24 May 2005 to test the usefulness of the guide. Feedback from the workshop was then used to finalise the research product that was submitted to the Water Research Commission in March 2006.

A month after submitting the research product, new EIA Regulations were promulgated. This required the research product be revised and take into account the new legislation. The Groundwater Licensing Guide is based on regulations promulgated on 21 April 2006.

It is expected these guidelines will have to be periodically revised to take into account changes to legislation and regulations. Since the term “bulk water supply” is no longer used as a criterion for initiating an EIA in terms of the EIA Regulations, the need for this project to develop a workable definition of the term fell away.

1.4 Structure of report

To facilitate ease of use, this guide has four parts (Table 1.1). The motivation for the guide and research objectives are presented in Part 1 while background information relevant to the guide is provided in Part 2. The overall process to be followed when applying for authorisation to develop and use groundwater and the Groundwater Licensing Guide is presented in Part 3. A series of case studies are presented in Part 4 to demonstrate how the guide can be used. Weakness and shortcomings in the water use authorisation process identified during the research are highlighted in Part 5, as are a series of actions required to

promote widespread use of the Groundwater Licensing Guide.

Table 1.1: Structure of Groundwater Licensing Guide report.

SECTIONS	CONTENTS
Part 1	**Introduction**
Chapter 1: Introduction and background to project	This chapter presents the motivation for this project, the research objectives, the methodology used in the development of this Groundwater Licensing Guide, and structure of the remainder of the report.
Part 2	**Background Information**
Chapter 2: Legislative drivers	This chapter provides a description of the two key pieces of legislation that are of direct relevance to groundwater development and use.
Chapter 3: Objectives of the Groundwater Licensing Guide	This chapter outlines the objectives of the Groundwater Licensing Guide.
Chapter 4: Scope of the Groundwater Licensing Guide	This chapter sets the scope of work and outlines what the intention of the Groundwater Licensing Guide is.
Chapter 5: Principles	This chapter presents some of the key principles of the National Environmental Management Act, National Water Act and the Promotion of Administrative Justice Act relevant to this project.
Chapter 6: Administrative issues	This chapter provides guidance on certain administrative issues relating to the groundwater development and use application process.
Chapter 7: Limitations of the Groundwater Licensing Guide	This chapter presents the limitations that exist with this Groundwater Licensing Guide.
Part 3	**Groundwater Licensing Guide**
Chapter 8: Licence application procedure	This chapter presents the generic overall licence or authorisation application procedure and outlines the pre-application and application phases.
Chapter 9:Groundwater licensing guide	This chapter presents the guide and the processes to be followed when specific conditions apply.
Part 4	**Case Studies**
Chapter 10: Case studies	A series of case studies are presented to demonstrate how the Groundwater Licensing Guide can be applied.
Part 5	**The Way Forward**
Chapter 11: The Way Forward	Issues that require further research or consideration are listed, as well as a series of actions required to ensure acceptance of this guide by the relevant authorities and its widespread use.
Appendices	
Appendix A	Generic groundwater exploration environmental management plan

PART 2:

BACKGROUND INFORMATION

2. LEGISLATIVE DRIVERS

The Constitution of the Republic of South Africa (Act 108 of 1996), which is the highest law of the land, gives all South Africans the right to an environment "not harmful to their health or well-being" as well as the right to have the environment protected for the benefit of present and future generations. These rights have to be balanced against the need to promote and sustain "justifiable economic and social development".

The Constitution also requires co-operative governance between different spheres of government. It is recognised an issue may have to be addressed by a range of legislation, thereby requiring different spheres and levels of government input. The relevant authorities are thus required to come together and advise an applicant on the appropriate process to be followed that will satisfy legal requirements in an efficient and effective manner. The process needs to be efficient, effective and credible from all points of view.

Outside of the Constitution, the NWA and NEMA are the two key pieces of legislation with direct relevance to groundwater development and use in South Africa. Authorisation and licensing of groundwater use is managed under the NWA, while NEMA provides the framework for the sustainable management and protection of the environment. As illustrated below, the two Acts are based on similar principles, including:

- Sustainable use of resources
- Recognition of the need to protect the environment
- Recognition of the need for economic and social development
- Co-operative governance

In addition to NWA and NEMA, a number of other Acts may have to be considered when developing groundwater resources. These include:

- Water Services Act (Act 108 of 1997)
- Environment Conservation Act (Act 73 of 1989)
- Mineral and Petroleum Resources Development Act (Act 28 of 2002)
- Conservation of Agricultural Resources Act (Act 43 of 1983)
- National Forests Act (Act 84 of 1998)
- Promotion of Administrative Justice Act (Act 3 of 2000)
- Access to Information Act (Act 2 of 2000)

The plethora of legislation that has to be complied with makes it impossible to develop a simple, logical process that has to be followed. This guide only considers requirements resulting from the NWA and NEMA as they are considered the key drivers in the water use authorisation process. However, this places an onus on the Lead Authority to ensure the applicant is guided in terms of compliance with other legislation.

2.1 National Water Act (Act 36 of 1998)

In developing new water legislation, Principle 1 of the White Paper on a National Water Policy for South Africa (DWAF, 1997) recorded that water law shall be subject to and consistent with the Constitution in all matters; including the determination of the public

interest and the rights and obligations of all parties, public and private, with regards to water. While taking cognisance of legitimate existing uses, the water law actively promotes the values enshrined in the Bill of Rights. The resulting National Water Act (Act 36 of 1998) provides a legal framework for the effective and sustainable management of South Africa's water resources. The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial and gender discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for a growing demand for water;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and droughts.

In order to protect the country's water resources the NWA focuses on providing legal decision-making tools for attaining a balance between protecting and using water resources. Protection is addressed in Chapter 3 (Sections 12 – 20) while water use is considered in Chapter 4 (Sections 21 – 53). The NWA requires all water use be authorised in a manner that promotes efficient use of water. However, before any water use can be authorised, water has to be set aside for the Reserve (that required to satisfy basic human needs and to protect aquatic ecosystems), international obligations, inter-basin transfers, strategic use and future use. At present the basic human need is set at 25 L/p/d.

The NWA recognises water use that took place 2 years prior to promulgation of the Act as lawful existing use. However, because different parts of the Act came into effect on different dates the period used for confirming existing lawful use is from 1 October 1996 to 30 September 1999. An existing lawful water use may continue only to the extent that it is not limited, prohibited or terminated by the NWA (i.e. until permission to use the water is revoked). No licence is required to continue with an existing lawful water use until a responsible authority requires a person claiming such an entitlement to apply for a licence. If a licence is issued it becomes the source of authority for the water use. If a licence is not granted, then that use is no longer permissible. Under Section 26(1)(c) existing lawful users are required to register their water use with DWAF or the delegated authority within 60 days of being notified to do so.

DWAF does not have sufficient resources to investigate, assess and licence all water use. To overcome this problem, a hierarchical approach to authorising water use was developed, whereby a more rigorous authorisation and licensing procedure is required as the risk of the impact increases (Figure 2.1). It is recognised that the biggest users of water pose the greatest potential threat to water resources, and as a result need to be licensed. Water use with a low risk of impact can be authorised using less resource intensive approaches. It is noted that compulsory licensing is not addressed by the guide [NWA S43]. In areas of water stress, a responsible authority may require all water users to apply or re-apply for a licence so fair allocations can be made, beneficial use promoted, efficient management facilitated or water resource quality protected. However, this process is initiated by the responsible authority and hence falls outside the scope of this guide.

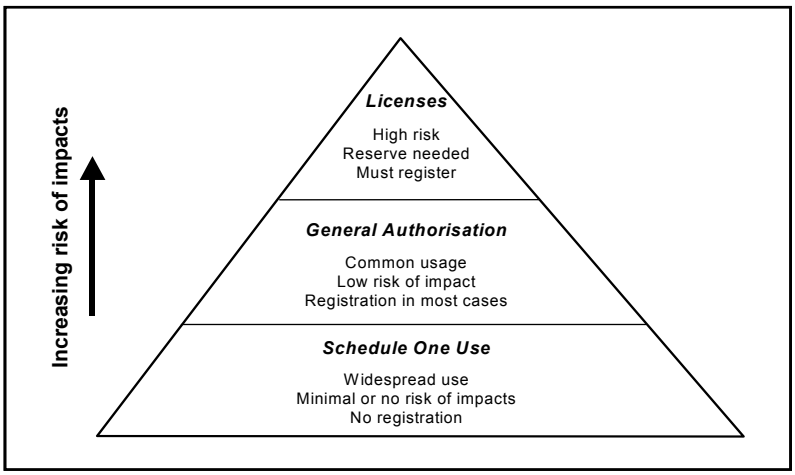

Figure 2.1: Schematic representation of mechanisms used to regulate the use of water.

All water users who fall outside entitlements relating to basic human needs, existing lawful use, Schedule 1 use and General Authorisations require a licence. The EIA Regulations stipulate environmental authorisation is required when the abstraction of groundwater is at a volume exceeded that allowed under General Authorisation. In such cases a Basic Assessment is required. When issuing General Authorisations and Licences, DWAF must take into account all relevant factors outlined in Section 27 of the NWA. These are:

- existing lawful water uses;
- the need to redress the results of past racial and gender discrimination;
- efficient and beneficial use of water in the public interest;
- the socio-economic impact of the water use or uses if authorised; or of the failure to authorise the water use or uses;
- any catchment management strategy applicable to the relevant water resource;
- the likely effect of the water use to be authorised on the water resource and on other water users;
- the class and the resource quality objectives of the water resource;
- investments already made and to be made by the water user in respect of the water use in question;
- the strategic importance of the water use to be authorised;
- the quality of water in the water resource which may be required for the Reserve and for meeting international obligations; and
- The probable duration of any undertaking for which a water use is to be authorised.

DWAF are in the process of developing a framework for Water Allocation which focuses on promoting the beneficial use of water in the public interest, as required by Section 27 (Quibell, 2005). The level of licensing required would be related to both potential impact and the public good that would result from that use (Figure 2.2).

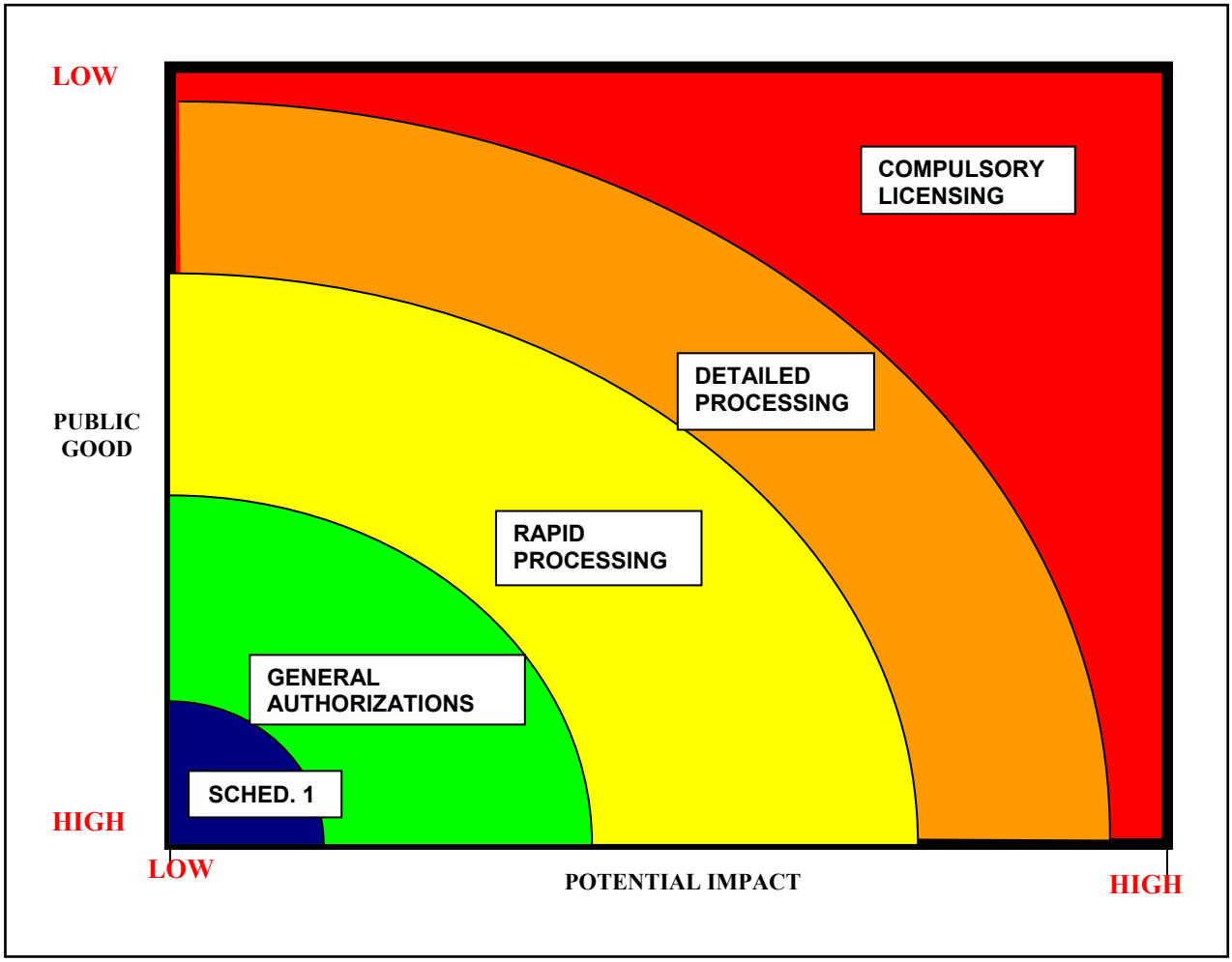

Figure 2.2: Water use applications considered in terms of potential impact and public good.

2.2 National Environmental Management Act (Act 107 of 1998)

The National Environmental Management Act (NEMA) (Act 107 of 1998) (as amended) provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state.

Section 2 of NEMA sets out a range of environmental principles that are to be applied by all organs of state when taking decisions that significantly affect the environment. Included amongst the key principles are:

- All development must be socially, economically and environmentally sustainable; and
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.

In addition, EIA Regulations established under Section 24(5) of NEMA (as amended) provide for control of certain listed activities that require authorisation or permission by law and

which may have a significant environmental impact. These activities are listed in Regulation No 386 (Basic assessment) and Regulation No 387 (Scoping and EIA). Only Activity 13 of Regulation No 386 refers specifically to groundwater [The abstraction of groundwater at a volume where general authorisation issued in terms of the National Water Act, 1998 (Act 36 of 1998) will be exceeded]. However, other provisions in the EIA Regulations relate indirectly to activities associated with groundwater exploration and groundwater used. For example, the drilling of a borehole within the 1 : 10 yr flood line of a river or stream (or if unknown, within 32 m thereof) is subject to environmental authorisation. Similarly, the bulk transportation of groundwater in a pipeline with an internal diameter of 0.36 m or more is also subject to environmental authorisation.

The EIA Regulations prohibits such activities until written authorisation is obtained from the Minister or MEC. The regulations make provision for a basic assessment and scoping & EIA assessment. The basic assessment is a simpler, less comprehensive impact assessment than a Scoping & EIA assessment. Most assessments triggered by groundwater exploration or use will be at a basic level. It is only in those instances where groundwater is transferred between catchments at a rate of 20 000 m^3/d or more (approximately 250 L/s) that the more comprehensive assessment will be required.

Environmental authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations, which sets out procedures and documentation that need to be complied with. A number of useful guides have been prepared to facilitate implementation of the EIA Regulations. These are supported by earlier documents relating to various aspects of the EIA process (DEAT, 1998; Münster, 2005; Saayman, 2005; Keatimilwe and Ashton, 2005).

3. OBJECTIVES OF GROUNDWATER LICENSING GUIDE

The objectives of the Groundwater Licensing Guide are to:

- Consider the intentions of both NEMA and the NWA;
- Promote effective and efficient co-operative governance;
- Provide a tool that will result in consistent interpretation by officials and practitioners of procedures to be followed and information to be supplied by an applicant applying to use groundwater;
- Provide a simple, logical and pragmatic process that can be used by authorities, applicants and practitioners;
- Provide clear guidance regarding application procedures to be followed for the development and use of groundwater that is fair, reasonable and just; and
- Produce consistent results.

The Groundwater Licensing Guide is not intended as a decision-making tool for issuing licences and / or environmental authorisations, as this remains the prerogative of the responsible authorities. The guide is intended to assist decision-making with regard to the application and licensing process to be followed when developing and using groundwater.

4. SCOPE OF GROUNDWATER LICENSING GUIDE

This Groundwater Licensing Guide relates specifically to the development and abstraction of groundwater as set out in Section 21(a) of the NWA (i.e. taking water from a (ground) water resource). It is based on provisions in the NWA and General Authorisations promulgated on 26 March 2004.

Section 21(j) relates to 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. While this water cannot be consumed and has to be discharged to a waste collection network or a water resource, this water use is also addressed by the guide.

Groundwater exploration *per se* is not a listed activity. However, when undertaken in specific locations or when specific conditions are exceeded, exploration may be subject to environmental authorisation. This has to be obtained before exploration commences.

The Groundwater Licensing Guide does not specifically address Sections 21(b) and 21(e) of the NWA that could relate to artificial recharge as they have been included in the national artificial recharge strategy (DWAF, 2007a):

(b) Storing water [where this relates to artificially recharging an aquifer for later use];
(e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1) [Section 37(1)(d) relates specifically to the intentional recharging of an aquifer with any waste or water containing waste].

This guide does not specifically address issuing licences for use of water found underground on the property of another person (Section 24 of the NWA). The NWA and General Authorisations appear contradictory on this issue. For the purpose of the guide, it was interpreted a person may abstract groundwater from a borehole located on land he or she does not own under the provisions of Schedule 1 and General Authorisation if they have permission to do so from the owner of the land and the General Authorisations associated to that land are not exceeded.

The guide does not consider issues relating to abstracting water from surface water bodies, storing water, transporting water across boundaries, impeding or diverting flow, and disposal of waste or water containing waste or recreational use. Having said that, it is a requirement that, where applicable, the applicant applying for a licence to abstract groundwater must consider any potential impact to adjacent and dependent surface water bodies.

While this guide is aimed at both groundwater specialists and non-specialists, it cannot provide non-specialists with all the geohydrological expertise and information that may be required for decision-making. It is an underlying principle of this guide that a groundwater specialist be consulted at some stage when formal approval (either water use licensing or environmental approval) is required.

5. PRINCIPLES

In developing the Groundwater Licensing Guide the importance of ensuring that the guide is both functional and provides a clear understanding of the appropriate legal principles has been acknowledged. The key principles and objectives of NEMA, NWA and the Promotion of Administrative Justice Act (Act 3 of 2000) (PAJA) relevant to this project are summarized below.

5.1 National Environment Management Act

Section 2(1) of NEMA sets out a range of environmental principles that are to be applied by all organs of state when taking decisions that significantly affect the environment. These include, but are not limited to, the following:

- Development must be socially, economically and environmentally sustainable.
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations.
- Sustainable development also requires consideration of:
    - the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardized.
    - negative impacts on the environment and on peoples rights be anticipated and prevented, and where they cannot be altogether prevented, are minimized and remediated.
- Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.
- Community well-being and empowerment must be promoted.
- There must be intergovernmental co-ordination – with the understanding that the management of the environment is a responsibility of all tiers of government and therefore a spirit of co-operation, consultation and support should prevail.

5.2 National Water Act

DWAF is responsible for ensuring sufficient water of an acceptable quality is available to meet basic human needs and to support economic and social development. South Africa is not a water-rich country and, as a result, water has to be managed and used wisely. Water management as set out in the NWA is to be based on three key principles:

- Sustainability – water use must promote social and economic development, but not at the expense of sustaining the environment (technical component).
- Equity – every citizen of the country must have access to water and the benefit of using

water (social component).
- Efficiency – water must not be wasted and must be used to the best possible social and economic advantage (economic component).

The NWA recognizes the need to authorise water use in a manner that gives effect to the principles of sustainable utilization of water resources, and in doing so to focus attention on the more potentially sensitive water resources in a just and fair manner. For something to be sustainable, it must help create economic growth, it must be fair about who benefits (social equity) and it must not damage the environment (ecological integrity). Guiding principles in the NWA recognize:

- Basic human needs (25 litres of potable water per person per day);
- A need to protect water resources;
- A need to promote social and economic development; and
- A need to protect aquatic and associated ecosystems and their biological diversity.

The NWA also promotes a spirit of co-operative governance between the different tiers of government. This is reflected as follows:

- The NWA states "a responsible authority may dispense with the requirement for a licence for water use if it is satisfied that the purpose of this Act will be met by the grant of a licence, permit or other authorisation under any other law". (NWA S22(3)).
- The NWA states that "in the interests of co-operative governance, a responsible authority may promote arrangements with other organs of state to combine their respective licence requirements into a single licence. " (NWA S22(4)).

The Groundwater Licensing Guide promotes co-operative governance by promoting joint decisions regarding the authorisation process to be followed (see Section 8.1) and joint review of applications submitted for the development and use of groundwater (Section 8.2). It is recognised that DWAF and DEAT are in most cases the primary authorities responsible for authorisation, but it is recognised that other authorities have a role to play in particular instances.

5.3 Promotion of Administrative Justice Act

While NWA and NEMA deal with the sustainable development and use of resources and the environment, the Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) (PAJA) gives effect to the constitutional right to administrative action that is lawful, reasonable and procedurally fair. PAJA aims to promote an efficient administration and good governance; and create a culture of accountability, openness and transparency in the public administration.

Under the provisions of this Act, it is expected officials execute their duties efficiently, fairly and without unreasonable delay. While the Act does not stipulate timeframes for specific actions, the following guidance is interpreted:

- Members of the public must be given at least 30 days from the date of publication of a notice to submit comments in connection with a proposed administrative action; and
- An administrator to whom a request is made must, within 90 days after receiving

the request, give that person adequate reason in writing for an administrative action.

- The maximum duration for an administrative action is not longer than 180 days.

Similarly, Principle 19 of the White Paper on a National Water Policy for South Africa (DWAF, 1997) accepted any authorisation to use water shall be given in a timeous fashion and in a manner which is clear, secure and predictable in respect of the assurance of availability, extent and duration of use. The purpose for which the water may be used shall not arbitrarily be restricted.

6. ADMINISTRATIVE ISSUES

This chapter provides guidance on certain administrative issues relating to the groundwater development and use application process. These issues apply mainly to the applicant, but in certain instances also to the relevant authorities.

6.1 Appointment of a competent person

A proponent may - in certain instances - be required to appoint a competent person to provide input into the application process.

In order to obtain a Water Use Licence for abstracting groundwater, a proponent may need to appoint a competent person with a certain level of expertise to provide the relevant authority with sufficient information needed to make a decision. Section 41(2ii) of the NWA states the responsible authority may require the applicant to obtain an assessment by a competent person of the likely effect of the proposed licence on the resource quality.

If the applicant is required to obtain environmental authorisation in terms of the EIA Regulations, then he or she must appoint an Environmental Assessment Practitioner to conduct a Basic assessment or Scoping and EIA process. The Environmental Assessment Practitioner must provide an independent assessment in an objective manner and must have no financial interest or vested interest in the proposed groundwater development and abstraction application. If needed, the Environmental Assessment Practitioner can appoint a specialist geohydrologist to provide specific information and address groundwater issues.

Similarly, officials with the relevant authorities need to ensure that they consult with a qualified and experienced geohydrologist when considering an applicant and deciding on the appropriate course of action. Ideally, DWAF Regional Office geohydrologists should be consulted, as they are most familiar with conditions in their area. Failing this, a qualified and experienced geohydrologist from elsewhere can be used to provide the required input.

In the absence of any professional register or registration, Saayman (2005) proposed a geohydrologist with at least a M.Sc. degree and 3 years relevant work experience be included in an EIA specialist study team. The EIA Regulations do not specify qualification or experience requirements of an Environmental Assessment Practitioner, but this issue is receiving attention from the Interim Certification Board established for this purpose.

6.2 Timing

This section presents the time required for the relevant authorities to make a decision at various stages through the application process depending on what process needs to be followed.

The NWA does not stipulate any timeframes for the relevant authority to consider a Water Use Licence application and issue a decision. However, the NWA specifies a time of between 30 and 60 days for parties to respond to notices issued under the NWA or take a particular action. DWAF (2000) indicate that existing lawful users will have 60 days to register after

being given notification to do so while DWAF (2000b) estimated time requirements for a water use authorisation process from application initiation to formal decision-making is approximately 100 days. It should be noted that this time relates to time required for authorisation and not time required to prepare the application and obtain the relevant information. Some of the important steps in the authorisation process and associated authority response times are presented in the table below (DWAF 2000b).

Table 6.1: Steps in water use authorisation.

	STEPS IN WATER USE AUTHORISATION PROCESS	TIME REQUIREMENT
1	Formal application: • Acknowledge receipt of application form	5 days
2	Legal assessment: • Establish water users involved and other parties to be consulted. • Evaluate application and / or legal assessment to verify need for licence.	12 days
3	Pre-assessment: • Determine if assessment is required. • If required, evaluate pre-assessment.	10 days
4	Determine extent of investigations: • Establish parties involved in evaluation of licence application. • Provide applicant with information requirements. • Establish whether the Reserve needs to be determined and the responsibility for determining the Reserve. • Evaluate extent of investigation(s) report to determine if detailed investigations are necessary.	10 days
5	Detailed investigations: • Evaluate content of investigation report. • Decide on application status and record decision. • Approve Reserve.	6 days
6	Detailed licence application and recommendation • Provide applicant with Reserve determination results. • Evaluate application against technical and socio-economic criteria. • Decide on acceptability and record recommendations and conditions	18 days
7	Decision-making: • Issue / refuse licence.	20 days

The EIA Regulations are more specific in this regard and present various timeframes for the relevant authority to strive toward when considering an application. These timeframes relate to consideration of various documents produced at specific stages of the environmental authorisation process. Table 6.2 provides a summary of these timeframes.

If authorities fail to take a decision within a reasonable time, then the applicant can petition the courts to issue a writ for mandamus. The courts can order a responsible authority or governmental body to perform an act required by law, when it has neglected or refused to do so. However, the order cannot force the authorities to take a particular decision. Where applicants disagree with a decision made by the authorities, they can appeal against that decision (Section 6.5).

Table 6.2: Time allowed for processing

DOCUMENT	TIME	COMMENT
Application form	14 days	The authority must acknowledge receipt of the application; or notify the applicant if the application does not comply with the requirements of the EIA Regulations.
Basic assessment	30 days	A competent authority must within 30 days of acknowledging receipt of an application consider the application and the Basic Assessment Report.
Scoping Report	30 days	The authority must either accept the report and advise the applicant to proceed with the activities contemplated in the Plan of Study for EIA; request the applicant to make any amendments to the Scoping Report or Plan of Study for EIA; reject the Scoping Report and Plan of Study for EIA because it does not contain material information.
EIA Report	60 days	The competent authority must within 60 days of receipt of an environmental impact assessment report accept the report, notify the applicant that the report has been referred for specialist review, request the applicant to make amendments to the report or reject the report.
Acceptance of EIA Report	45 days	Within 45 days of receiving an EIA report, the authority must either grant authorisation in respect of all or part of the application with any conditions; or refuse authorisation.

6.3 Review

Once the Basic Assessment Report and / or Geohydrological Report have been compiled and submitted to the relevant authorities, the departments review the information provided to them, using guidelines for reviewing specialist reports presented by Keatimilwe and Ashton (2005) and Saayman (2005). This review should include input from a qualified, experienced geohydrologist familiar with the area under assessment.

On completion of the authorities review, and should both a licence and environmental authorisation be required, it is proposed officials from DEAT and DWAF (and any other relevant authority) meet to discuss and consider the application. Such a meeting could be called to discuss a specific application, or regular meetings be held between the Departments to discuss a number of applications.

These meetings could take the form of Licence Assessment Advisory Committees (LAACs) (DWAF, 2004a), which are licensing assessment advisory committees that can be established under Section 99 of the NWA for this purpose. Advisory Committees aim to provide authorities with the necessary advisory support for decision-making and could be used as a very effective tool to promote co-operative governance. LAACs could be established in each catchment management area to review water licence applications and would comprise officials from all authorities who have jurisdiction over water matters. The LAAC could meet to review Water Use Licence applications and / or decide on an appropriate course of action required by the applicant. If the LAAC approach is to be adopted, it is imperative that:

- A single lead authority be charged with managing the process;
- A single simple and efficient licensing process should be developed to meet the objectives of licensing; and ensure administrative requirements of the participating departments are satisfied; and

- Geohydrological expertise be included on the committee.

6.4 Authorisation

When considering an application the relevant authorities shall issue an authorisation, either granting authorisation in respect of all or part of the application with any conditions or, refuse authorisation in terms of the NWA and EIA Regulations.

6.5 Appeals

Both the NWA and the EIA Regulations include appeal processes.

In terms of the NWA (S147), a Water Tribunal has been established to hear appeals against certain decisions made by a responsible authority, catchment management agency or water management institution under this Act. The Tribunal is an independent body, whose members are appointed through an independent selection process, and which may conduct hearings throughout South Africa. A person may appeal to a High Court against a decision of the Tribunal on a question of law. The appeal must be noted in writing within 21 days of the date of the decision of the Water Tribunal.

In terms of Chapter 7 of the EIA Regulation No 385 any affected person may appeal against a decision made in terms of the regulations. The appellant must lodge a notice of intention to appeal with the Minister, MEC, or delegated organ of state within 10 days after that person has been notified of the authorisation decision. An appeal must be submitted in the form stipulated within 30 days of submitting the notice of intention to appeal. After receipt of an appeal, the Minister or MEC must within 10 days acknowledge receipt of the appeal and advise the appellant of the environmental authorisation or exemption, or any provisions or conditions attached thereto. The Minister or MEC must reach a decision within 60 days of being in possession of all the relevant information, including any recommendations of an appeal panel. The Minister or MEC must in writing indicate the reasons for the decision and the extent to which the decision being appealed against is upheld or overturned.

7. LIMITATIONS OF GROUNDWATER LICENSING GUIDE

A number of limitations exist with this Groundwater Licensing Guide. While the overall concepts and procedures for licensing are quite clear, little detail exists on which to base decisions. The lack of clarity generally relates to the interpretation of the existing legislation, and the fact that regulations and guidelines are continually updated. Key limitations are outlined below.

7.1 Legislation

- Much of the environmental authorisation is currently undertaken at provincial level. As each provincial environmental authority has their own EIA procedure, it was not possible to develop a single guide to suit the 9 provincial authorities. To accommodate this problem, the research team considered procedures set at national level (DEAT) and provincial level in the Western Cape Province (DEA&DP). It is expected that the guide could be modified to match the needs of each province. Given that the NWA promotes the water management at a provincial and catchment scale, similar problems with water use authorisation will emerge as the Catchment Management Agencies come into being.

- The General Authorisations have been modified three times since promulgation of the NWA, while the EIA Regulations where promulgated on 21 April 2006. The legislation under which licences and environmental authorisation are issued is new and untested. This suggests that the guide will have to be regularly updated in order to remain useful.

- While it is understood there is a need to improve legislation and associated regulations based on experiences from implementing them, it is important the current documents are readily available to both officials and applicants. Continual modifications create confusion amongst those applying for Water Use Licences and those administrating the process.

7.2 Schedule 1 Use

- Schedule 1 of the NWA describes water use in vague and ambiguous terms. Clear definitions and policy are required regarding the meaning of “reasonable domestic use”, “small gardening”, “not excessive”, etc. No numeric guidelines are given regarding how much groundwater use falls within Schedule 1. It is recommended clear guidance be given regarding the volume of use that constitutes Schedule 1 use. A tool is presented in Table 7.1 that allows for Schedule 1 Use to be quantified on the basis of reasonable use.

- Confusion exists regarding the term “commercial” and its application to Schedule 1 use. The term is only used in relation to gardening (small gardening not for commercial purposes) and not to domestic use or stock watering. The National Water Resource Strategy interprets Schedule 1 Use as that used for domestic purposes and subsistence activities (DWAF, 2004b).

- It has been argued that development and use of groundwater to supply domestic water

to a group of houses falls outside Schedule 1 Use, and if the demand exceeds that generally authorised, then that use would require a licence. While Schedule 1 refers to *taking water for reasonable domestic use in that person's household, directly from any water resource to which that person has lawful access,* strict interpretation would allow each household to abstract groundwater from its own borehole. It is contrary to the spirit of the NWA and NEMA and the National Water Resource Strategy to require this sort of expenditure to be incurred when the collective use of a borehole makes more sense without increasing the potential impacts that could result from such abstraction. Precedent already exists with the major rural water supply drive of DWAF where many households depend on one borehole for a source of water.

- The water use registration guide (DWAF, 2000) requires groundwater use in excess of 10 m^3/day per property be registered while surface water use in excess of 50 m^3/day per property be registered. As one of the distinctions between Schedule 1 use and generally authorised use relates to the need to register water use, the 10 m^3/d limit could also be used to define the upper limits of Schedule 1 use. However, the units used to specify when one has to register water use (m^3/d) are different from those used in setting the limits for general authorisation (m^3/ha/a).

Table 7.1: Guide to quantify Schedule 1 use applicable to groundwater abstraction.

What consitututes Schedule 1 use?	Annual Requirement (m3/a)	Pumping Rate (L/s)
- if use is not excessive in relation to the capacity of the resource		
- reasonable domestic use per household	219	0.003
- small gardening (not for commercial purposes) per property	1820	0.101
- watering of animals (excluding feedlots) per farm	91	0.001
- store and use run-off water from a roof		
in emergency situations (for human consumption and fire-fighting)		
recreational purposes		
discharge water and waste water		

INPUT PARAMETERS	
Reasonable domestic use per person	
Number of people per household	4
Reasonable domestic use per person	150
Daily pumping regime (hr/d)	2
Small gardening	
Irrigation (mm/week)	70
Area irrigated (ha)	0.1
Duration of irrigation season (months)	6
Irrigating days per year	52
Daily pumping regime (hr/d)	4
Stock watering	
Water consumed per stock unit (L/d/su)	10
Carrying capacity of land (stock units per ha)	5
Extent of property (ha)	5
Daily pumping regime (hr/d)	4

7.3 General Authorisations

- The General Authorisations can be set generally, for specific areas and / or for specific water resources [NWA S39]. While these guidelines have been based on national General Authorisations, officials and applicants need to take cognisance of the fact that more local scale authorisations may exist for their area of interest.

- It is also noted DWAF can withdraw General Authorisations, if deemed appropriate. In these instances only Schedule 1 water use is permissible without a licence. In fact, this situation already exists where 17% of the 1 946 quaternary catchments in South Africa have been listed as Zone A catchments i.e. where only Schedule 1 use and that for small industrials users is permitted. It is perplexing that some of the most productive aquifers in the country (Cape Flats Aquifer, Atlantis Aquifer, Langebaan Road Aquifer,

Uitenhage Artesian Basin, some of the Dolomitic Aquifers in Gauteng) have been included in Zone A.

- Exemption of small industrial users who use less than 20 m^3/d in the General Authorisation can potentially be problematic where a number of small industrial users are located in the same area. Further, it is of interest that this exemption only applies to food processing; prospecting, mining and quarry; manufacturing and construction while other work creating enterprises in the tourism and agricultural sectors are excluded.

- While General Authorisations are used to guide the need for licensing, they do not relate to the availability of groundwater in an area. Appropriate exploration and development may be required to assess the volume of groundwater authorised or licenced.

- The thresholds for General Authorisations set out in the various guideline documents are often contradictory to those specified elsewhere (Table 7.2). While it is a requirement that users of water entitled under the General Authorisations must register their use, the limits set for registration suggest that a person in Zone B would only have to register their use if their property covered an area of over 81 ha. Similarly a person owning a property in Zone B would have to own a property covering almost 5 ha to satisfy a household's reasonable domestic use.

Table 7.2: Limits for groundwater use specified under the NWA.

REGISTRATION	SCHEDULE 1 USE *		GENERAL AUTHORISATION	
(irrespective of property size) (m^3/a)	(irrespective of property size) m^3/a		m^3/ha/a	
3 650	Domestic	219	Zone A	0
	Gardening	1 820	Zone B	45
	Stock	91	Zone C	75
			Zone D	150
			Zone E	400
			Small industry	7 300 **

Notes: * - see Table 7.1 for assumptions used to calculate annual volumes
** - irrespective of property size

- Similarly, in converting the General Authorisations to a yield[1] and comparing the thresholds to the yield of boreholes stored in the National Groundwater Data Base, it is apparent that almost 95% of boreholes drilled in the country will require licensing (Figure 7.1). This is clearly contrary to the hierarchical authorisation process provided for in the NWA and the NWRS (Figure 2.1). It is expected that the General Authorisations will require revision to come into line with the intention of the NWA and NWRS.

- Given the implications of too conservative General Authorisation limits to both groundwater users and the relevant departments (requires the Reserve to be determined, Water Use Licence applied for and basic assessment undertaken for environmental

[1] This was done by assuming the abstraction would take place 200 days a year and for 10 hours a day.

authorisation), it is crucial that the limits are revised. At present, almost all planned groundwater use requires a licence, and hence also environmental approval. This was clearly not the intention of either the NWA or NEMA. While it is important that all use that could have a significant impact on the environment be properly authorised, it is just as crucial that use with insignificant or low impacts be approved using procedures that are not resource-intensive.

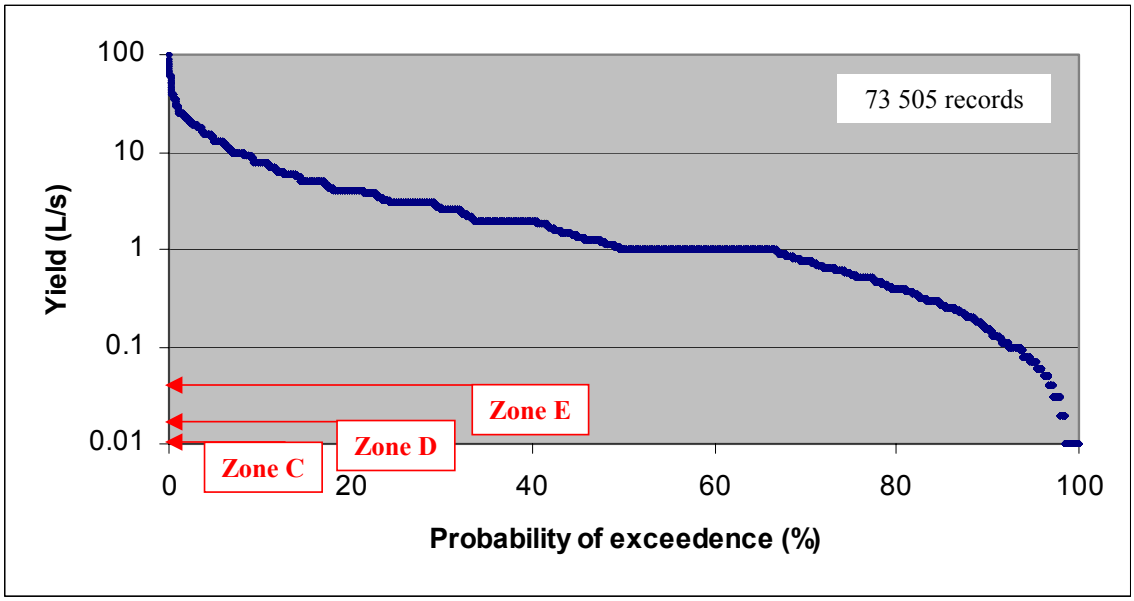

Figure 7.1: Comparison of the distribution of the yield of boreholes stored on the NGDB (73 500) and the thresholds for generally authorising groundwater use in different zones. Note that Zone B is too low to plot on the yield scale used.

7.4 Access to Water on Property Not Owned by Applicant

The abstraction of groundwater from a borehole located on a property not owned by that person is likely to be the exception rather than the norm. The NWA allows for this, but it is not clear whether a Water Use Licence is required in all instances where this circumstance prevails, or just when the General Authorisations associated with that property are exceeded. Clarity on this matter is required.

PART 3:

Groundwater Licensing Guide

8. LICENCE APPLICATION PROCEDURE

The basic stages in the development and use of groundwater are illustrated in Figure 8.1 while a more detailed procedure is presented in Figure 8.2. The procedure has been modelled on the EIA application procedure as well as that applied in the DWAF Regional Office (Van Coller, *pers.comm*., 2005). In keeping with Section 22(4) of the NWA, the respective licence requirements of the two authorities have been combined into a single procedure to promote efficient and effective co-operative governance. The licence application procedure is described in Section 8.1 and 8.2.

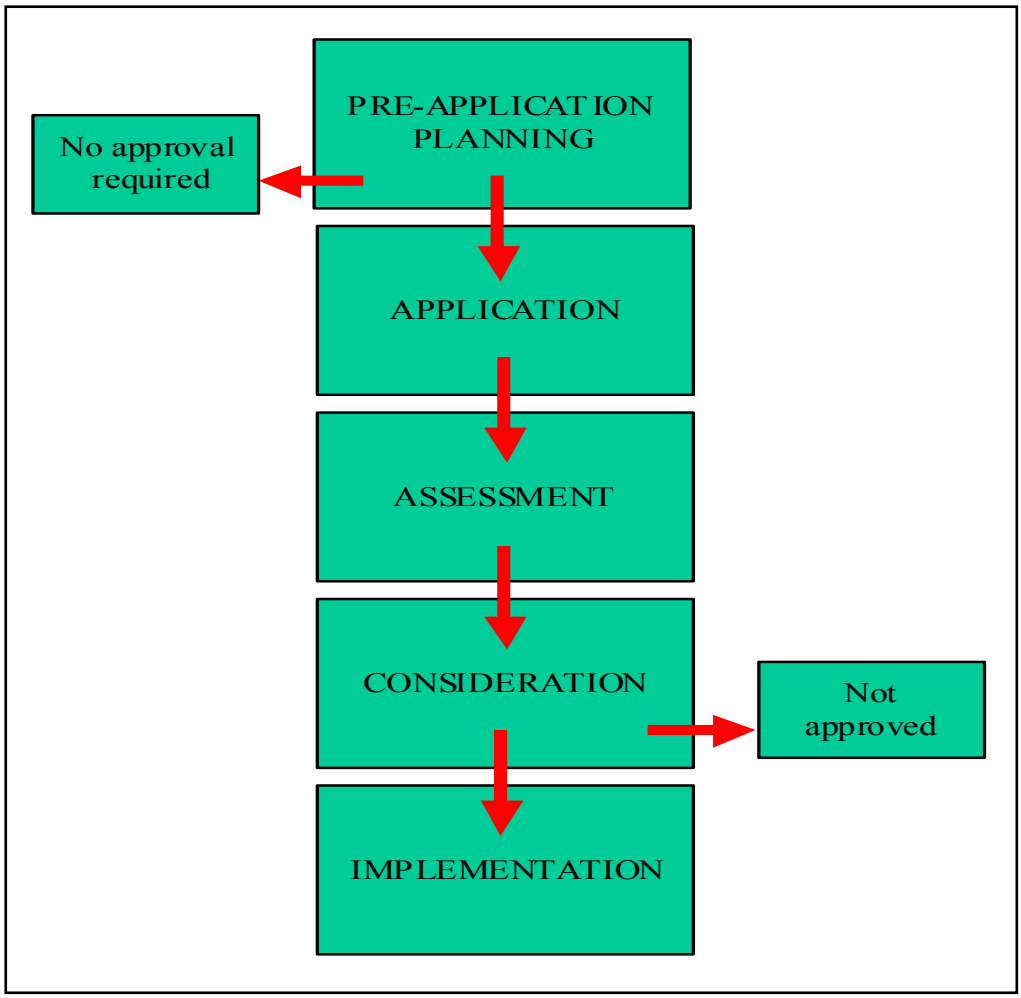

Figure 8.1: Generic application approval process used when considering applications to use groundwater.

The key purpose of the Groundwater Licensing Guide is to help officials make decisions in an efficient and consistent manner on the process that has to be followed when applying to develop and use groundwater. The guide will mainly be used at the pre-application stage (Figure 8.1). To promote efficient and effective licensing, the guide includes information pertaining to the relevant legislation, definitions and limits used in the decision-making process, tools that can be used to determine the level of use and forms to be completed when applying for authorisation. The guide is discussed in more detail in Section 8.3.

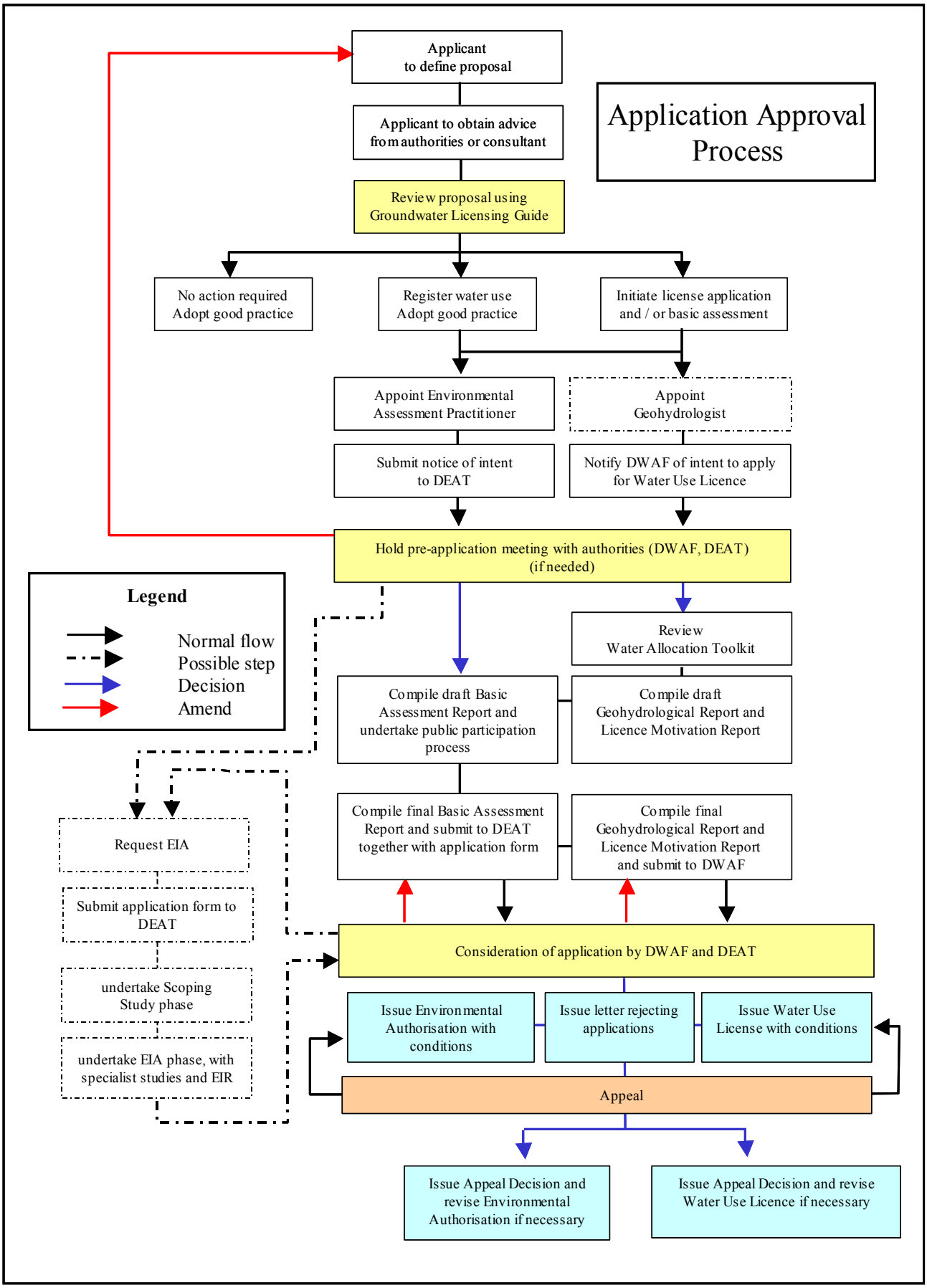

Figure 8.2: Detailed groundwater use application procedure

8.1 Pre-application

The pre-application phase may take the form of a telephone call from a proponent to either an official in either DWAF or DEAT, or to any other party knowledgeable in licensing requirements for groundwater use. Once the proponent has described what he or she plans to do, the contacted person will use the Groundwater Licensing Guide to determine the correct process to follow and advise the proponent in this regard.

In those instances where impacts are likely to be absent or small, the contacted person will be able to advise the proponent on requirements of both NWA and NEMA. Essentially, this will require Processes A or B be followed. In the case of Process B, the proponent is required to complete the water use registration forms (usually one of DW756/769, DW757/770, DW758/771 and 759/772; as well as DW760).

When formal application for authorisation is required, Processes C, D, E, F or G will have to be followed. It is expected DWAF will be the Lead Authority when either Process C or Process F has to be followed, while DEAT will be the Lead Authority when the remaining processes apply. This should be clarified at the pre-application meeting.

Whenever environmental authorisation is required, the proponent is required by law to appoint an Environmental Assessment Practitioner to assist in the application and contact the provincial environmental authority. The Environmental Assessment Practitioner has to submit a notice of intent to submit an application for environmental authorisation. The relevant official would then advise and confirm the procedures to be followed.

The NWA does not stipulate a geohydrologist be appointed when applying for a Water Use Licence. However, it is recommended that this be the case as they have the knowledge and experience to prepare the application efficiently.

Where larger volumes of groundwater are to be abstracted or the activity is likely to have significant impact on the surrounding environment, the contacted person is to advise the proponent to contact either DWAF or DEAT, depending on which authority is likely to be the Lead Authority (see above). In the absence of an agreed single authorisation procedure, it is recommended a joint pre-application meeting be held with the proponent and officials from all relevant authorities when Process F has to be followed in order to ensure all information needs and requirements can be met through a single process. It is expected that prior to this meeting, the proponent would have defined the proposed activity, appointed a party to assist them with the authorisation process, registered their water use (if applicable) and have completed application forms for both DWAF and DEAT.

It is not possible for officials to give a ruling about a proposed activity at a pre-application meeting. However, they can advise proponents on the likelihood of approval being granted for the planned activity and possible constraints that the authorities may impose. They may also advise the proponent how to modify the planned activity so that it would in all likelihood be approved. The toolkit being developed by Quibell (2005) may be useful in this regard. While ensuring that they offer advice to the best of their ability, the officials need to make it clear to the proponent that they are entitled to proceed with an application (even if advised not to) and that there is no guarantee that the application will be successful.

If the planned activity requires licensing and / or environmental approval, the proponent

should be provided with a written record of the agreed course of action to be followed, activities which have to be undertaken and information required by the Departments for decision-making purposes.

In general, the exploration phase of a groundwater project is not subject to approval from DWAF as the NWA relates to the use of water. However, in some instances, the EIA Regulations require environmental approval be obtained before exploration can proceed.

8.2 Application

Based on the outcome of the pre-application meeting, the proponent would initiate investigations to comply with legislation (e.g. apply for licence, public consultation, etc.) and collect information required by the relevant authorities on which they would base a decision regarding the authorisation of the planned groundwater use.

Depending on the outcome of the pre-application meeting, the proponent may be required to undertake some or all of the following:

- Reconsider the application
- Register the water use
- Compile a Basic Assessment Report
- Compile a Geohydrological Report
- Compile a Water Use Licence Motivation Report
- Undertake Scoping and an EIA

Both NEMA and NWA require the public be informed of an application and afforded the opportunity to comment thereon. The public participation requirements are well documented in the EIA Regulations, but the same does not apply with respect to NWA. A single Public Participation Process should be followed in all instances where formal authorisation is required. Because the requirements for environmental authorisation are more onerous than those required by DWAF, it is recommended the requirements specified in the EIA Regulations for public participation be met and the Public Participation Process be managed by the Environmental Assessment Practitioner. When Process C has to be a followed (i.e. Water Use Licence application only), the public participation requirements must be clarified with the DWAF official at the pre-application meeting.

Once the documentation has been prepared in the form required and the Public Participation Process completed, the documents are handed to the relevant authorities for review (see Section 6.3). A number of iterations may be required before the authorities issue a decision. This could include collection of additional information not provided, verification of information and consideration of appeals. On completion of the process, a Water Use Licence and / or Environmental Authorisation will be issued by the relevant authority. It is likely that the licence or authorisation will be subject to a set of conditions.

If the Lead Authority informs the applicant that the application for a licence has not been approved, the project can either be abandoned or modified to ensure the planned activity is acceptable to the relevant authorities. If rejected on the basis of water reform criteria, the toolkit being developed by Quibell (2005) will be of value in this regard.

9. GROUNDWATER LICENSING GUIDE

9.1 Preamble

The guide has been developed around a series of questions that relate to environmental issues addressed by the EIA Regulations and NWA. While the principles of the guide are well established, some of the detail may be amended periodically. For example, outside of a few specific instances, the EIA Regulations specify environmental authorisation is only required when water use exceeds that generally authorised. However, the levels at which general authorisation is exceeded may change. In this instance, the procedure to follow would remain the same, but the levels at which different procedures apply would have to be modified.

9.2 Basic Structure

Authorisation requirements set by the NWA and NEMA were considered. It was decided that by posing a series of simple questions in a logical sequence, a consistent outcome could be attained. Each question relates directly to a requirement of the legislation, with those addressed in Step 1 and Step 3 relating to NEMA and those in Step 2 that relate to NWA (Figure 9.1). On the basis of the identified authorisation requirements, seven different realistic combinations of actions were identified (Table 9.1). Considering the overall flow process presented in Figure 8.2, specific process flow diagrams were created for each combination (Figure 9.2 – 9.8).

Table 9.1: Possible combination of requirements when applying for Authorisation to develop and use groundwater.

LEGISLATION		PROCESS	
NWA	**NEMA**		
No action	No action	A	Figure 9.2
Registration only	No action	B	Figure 9.3
Licence	No action	C	Figure 9.4
No action	Basic assessment	D	Figure 9.5
Registration	Basic assessment	E	Figure 9.6
Licence	Basic assessment	F	Figure 9.7
Licensing	Scoping and EIA	G	Figure 9.8

It was decided at the outset to develop the Groundwater Licensing Guide on an Excel Spreadsheet as most officials and practitioners have ready access to this software. Also, the spreadsheet can easily be updated or modified. As the legislation and associated regulations are reviewed and modified, the Groundwater Licensing Guideline will have to be updated. The current General Authorisations are valid for a period of 5 years from the date of publication (March 2004).

9.3 Additional Information

To facilitate ease of use and promote an efficient and effective authorisation process the

Groundwater Licensing Guide includes documents and tools from which information required in the authorisation process can be obtained, as well the different forms that have to be completed. The following are included in the guide and are accessed via hyperlinks:

- Relevant legislation (NWA, NEMA, EIA Regulations);
- Documents containing the legislation applicable to a particular water use;
- Definitions and limits of the different types of water use;
- Tools that can be used to determine the level of use (Schedule 1, general authorisation applicable to a particular area);
- Current procedure guidelines;
- Application forms;
- Information to be included in supporting reports.

Note:

When environmental authorisation is required for both exploration and abstraction (Process F), clarity must be obtained from the environmental authority in terms of whether one or two environmental authorisation processes are needed.

STEP	Home	QUESTION	APPLICABLE LEGISLATION	ANSWER yes	ANSWER no
1		**GROUNDWATER EXPLORATION - ASSESS ACTIONS REQUIRED BY NEMA (Act 107 of 1998)**			
1.1		Is the area to be explored or the planned borehole located within an area managed by an authority for which an environmental management framework is in place?	NEMA R385-S69	abide by EMF; go to 2.1	no action required yet, go to 1.2
1.2		Will the drilling of boreholes or abstraction of groundwater take place in the 1 : 10 flood line of a river or stream; or within 32 m from the bank of a river or stream where the flood line is unknown?	NEMA R386-1(m)	basic assessment required, go to 2.1	no action required yet, go to 1.3
1.3		Will the drilling of a borehole in a river, tidal river, tidal lagoon, lake, in-stream dam, wetland or floodplain result in the moving of soil, sand and rock in excess of 5 m3?	NEMA R386-4	basic assessment required, go to 2.1	no action required yet, go to 1.4
1.4		Will the drilling of a borehole within 100 m of the high-water mark of the sea result in the removal or damaging of indigenous vegetation of more than 10 m2?	NEMA R386-5	basic assessment required, go to 2.1	no action required yet, go to 1.5
1.5		Will the drilling of a borehole within 100 m of the high-water mark of the sea result in the moving of soil, sand and rock in excess of 10 m2?	NEMA R386-6	basic assessment required, go to 2.1	no action required yet, go to 1.6
1.6		Will more than 30 m3 but less than 1 000 m3 of dangerous goods (including petrol, diesel, liquid petroleum gas or paraffin) be stored above ground at the site?	NEMA R386-7	basic assessment required, go to 2.1	no action required under NEMA, go to 2.1
2		**GROUNDWATER USE - ASSESS ACTIONS REQUIRED BY NWA (Act 36 of 1998)**			
2.1		Is the planned groundwater abstraction aimed at satisfying basic human needs only?	NWA S2	no action required, go to 4	no action required yet, go to 2.2
		NWA - Basic Human Needs; Quantification			
2.2		Does the planned groundwater abstraction qualify as a continuation of an existing lawful use?	NWA S32	no action required yet, go to 2.2a	no action required yet, go to 2.3
		NWA - Existing Lawful Use; Definition			
2.2a		Does the existing lawful groundwater use exceed 10 m3/d?	NWA GA R399	register water use, go to 3.2	no action required, go to 4
2.3		Does the planned groundwater abstraction fall within Schedule 1 use, as stipulated by the NWA?	NWA Sch.1	no action required yet, go to 2.3a	no action required yet, go to 2.4
		NWA - Schedule 1 Use; Definition; Test			
2.3a		Does the planned groundwater use exceed 10 m3/d?	NWA GA R399	register water use, go to 4	no action required, go to 4
2.4		Is the planned groundwater abstraction for the sole purpose of removing, discharging or disposing of water found underground (as it is necessary for the efficient continuation of an activity or for the safety of people)	GA R398	no action required yet, go to 2.4a	no action required yet, go to 2.5
		GA S21(j) - Disposing of water found underground			
2.4a		Will the volume abstracted exceed 100 m3 on any day?	GA R398	water use license required, go to 3.1	no action required yet, go to 2.4b
2.4b		Will the planned groundwater abstraction exceed 50 m3/d?	NWA GA R399	register water use, go to 4	no action required by NWA, go to 4
2.5		Does the planned groundwater abstraction fall within the general authorised use of groundwater?	NWA S39 GA R399	no action required yet, go to 2.6a	no action required yet, go to 2.5a
		NWA - General Authorization; General Authorization Notices; Map of Quaternary Catchments; General Authorization per Quaternary Catchment			
2.5a		Is the planned groundwater abstraction to be used by a small industrial user (as defined) and at a rate of 20 m3/d or less?	NWA GA R399	no action required yet, go to 2.6a	water use license required, go to 3.1
2.6a		Is the planned groundwater abstraction in a government water control area?	NWA GA R399	water use license required, go to 4	no action required yet, go to 2.6b
		Map of Control Areas			
2.6b		Does the person intending to abstract groundwater have lawful access to that groundwater resource?	NWA GA R399	no action required yet, go to 2.6c	water use license required, go to 4
2.6c		Is the proposed borehole within 750 m of the high tide mark	NWA GA R399	water use license required, go to 4	no action required yet, go to 2.6d
2.6d		Does the planned groundwater use exceed 10 m3/d?	NWA GA R399	register water use, go to 4	no action required by NWA, go to 4
3		**GROUNDWATER USE - ASSESS ACTIONS REQUIRED BY NEMA (Act 107 of 1998)**			
3.1		Will groundwater be abstracted at a volume that any general authorisation issued in terms of the NWA (Act 36 of 1998) will be exceeded? (See question 2.4 above)	NEMA R386-13	basic assessment required, go to 3.5	no additional action required yet, go to 3.2
		General Authorization Notices; Map of Quaternary Catchments; General Authorization per Quaternary Catchment			
3.2		Will pipes used to transport the abstracted groundwater have an internal diameter of 0.36 m or more; or a peak throughput of 120 L/s or more?	NEMA R386-1(k)	basic assessment required, go to 3.5	no additional action required yet, go to 3.3
3.3		Will the abstracted groundwater be stored in a dam or reservoir with a capacity of 50 000 m3 or more?	NEMA R386-1(n)	basic assessment required, go to 3.5	no additional action required yet, go to 3.4
3.4		Will the abstraction of groundwater result in the transformation or removal of indigenous vegetation in excess of 3 ha, or of any size where the transformation or removal would occur within the critically endangered or endangered ecosystem listed in terms of Section 52 of NEMA?	NEMA R386-12	basic assessment required, go to 3.5	no additional action required yet, go to 3.5
3.5		Will the abstracted groundwater be transferred between water catchments or impoundments at a rate of 20 000 m3/d or more?	NEMA R387-1(n)	scoping and EIA required, go to 4	no additional action required, go to 4
4		**DETERMINE PROCESS TO BE FOLLOWED**			
A		If no action is required by either NEMA or NWA, then follow Process A	Click here for Process A		
B		If no action is required under NEMA, but registration of water use is required, then follow Process B	Click here for Process B		
C		If no action is required under NEMA, but but a water use licence is required, then follow Process C	Click here for Process C		
D		If a basic assessment is required under NEMA, but no action necessary under the NWA, then follow Process D	Click here for Process D		
E		If a basic assessment and registration of water use are required, then follow Process E	Click here for Process E		
F		If a basic assessment and water use licence are required, then follow Process F	Click here for Process F		
G		If scoping & EIA and water use licence are required, then follow Process G	Click here for Process G		
5		**FOLLOW SPECIFIED PROCESS**			

Figure 9.1: Questions used to determine the appropriate procedure to follow when applying for authorisation to develop and use groundwater.

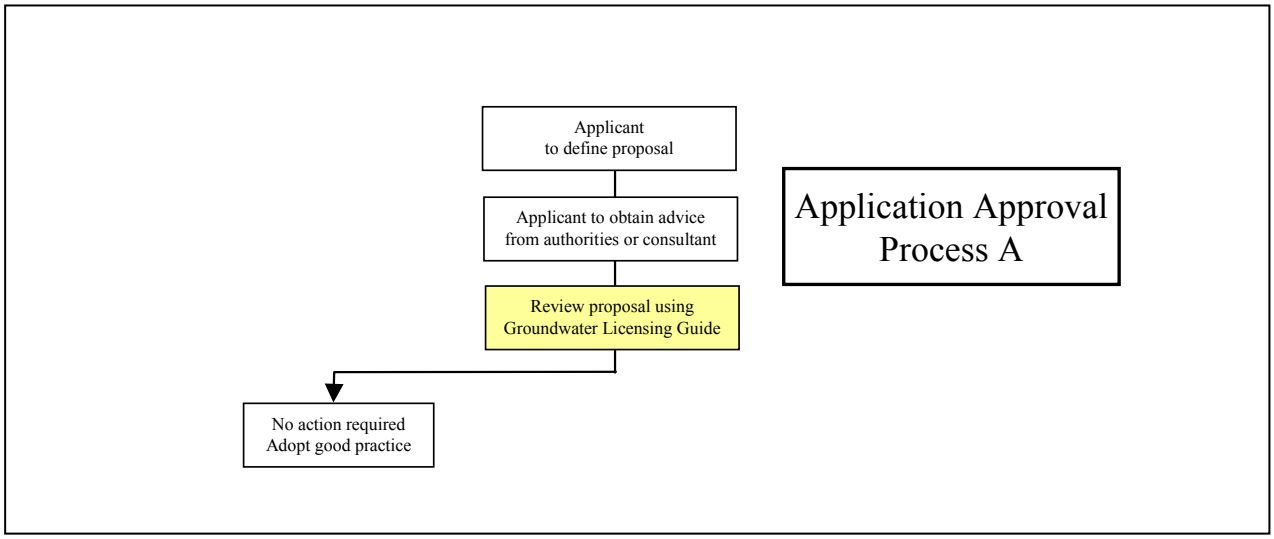

Figure 9.2: Groundwater development and use application Process A.

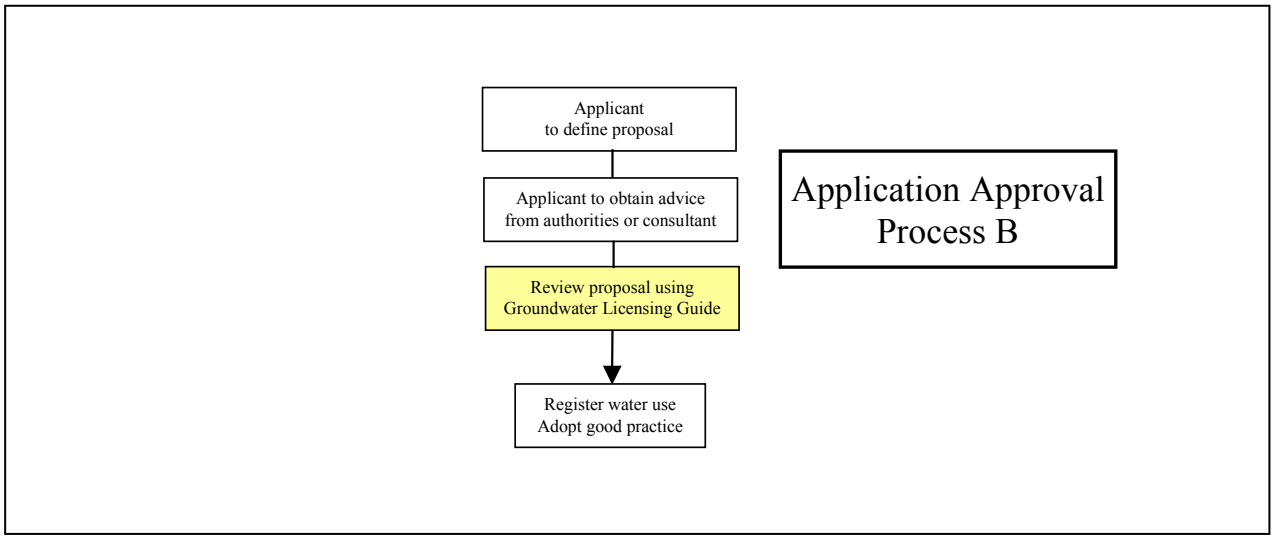

Figure 9.3: Groundwater development and use application Process B.

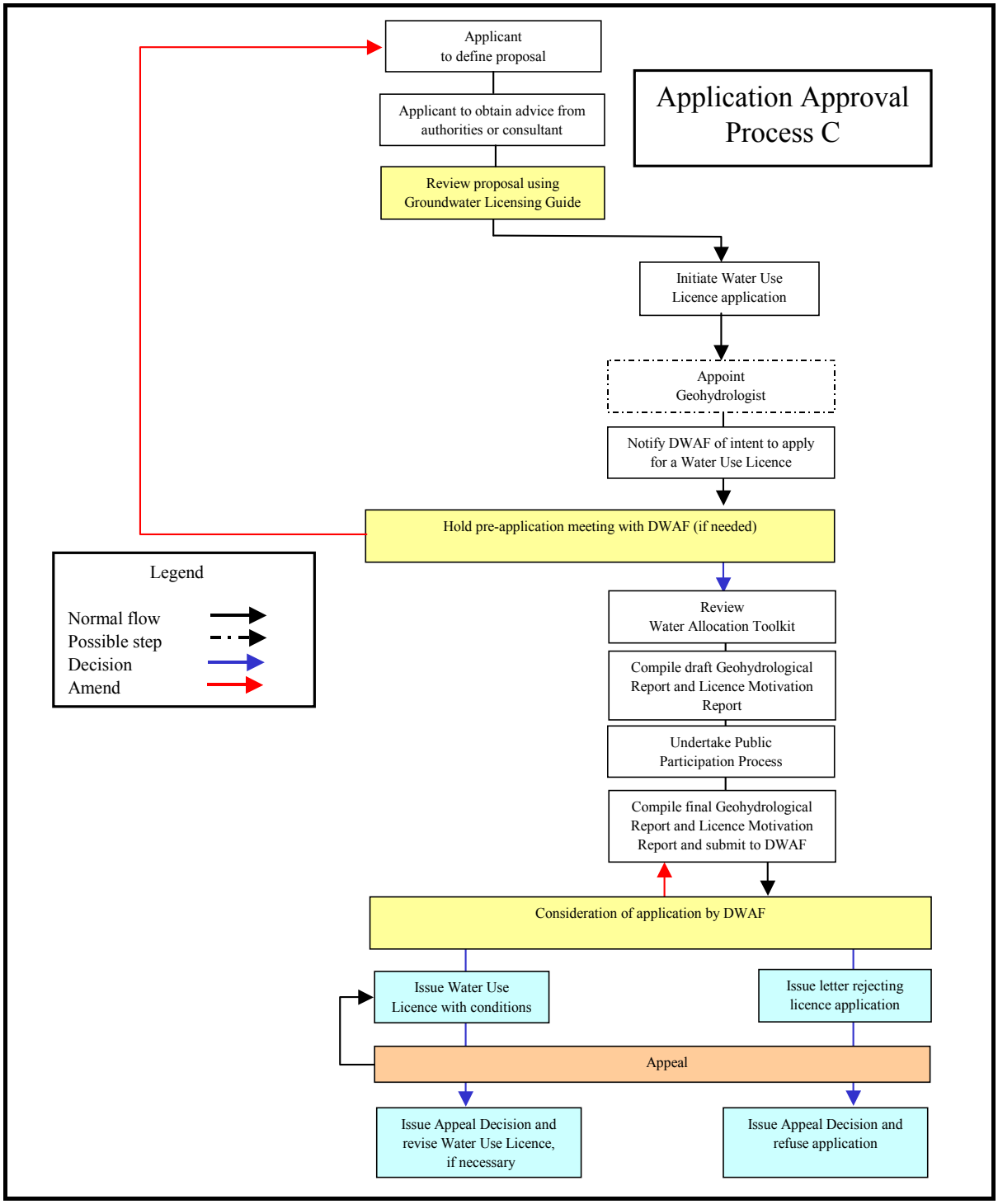

Figure 9.4: Groundwater development and use application Process C.

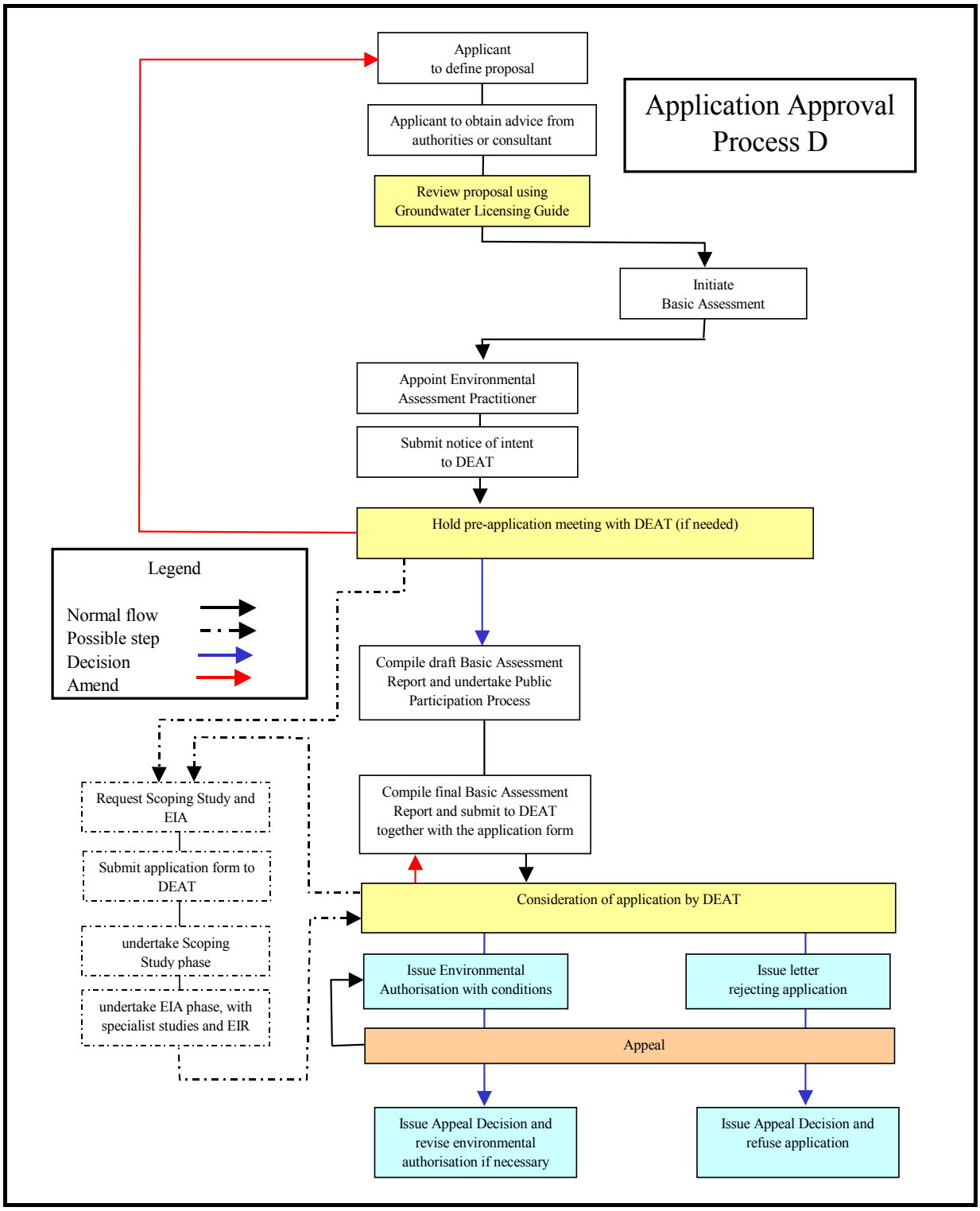

Figure 9.5: Groundwater development and use application Process D.

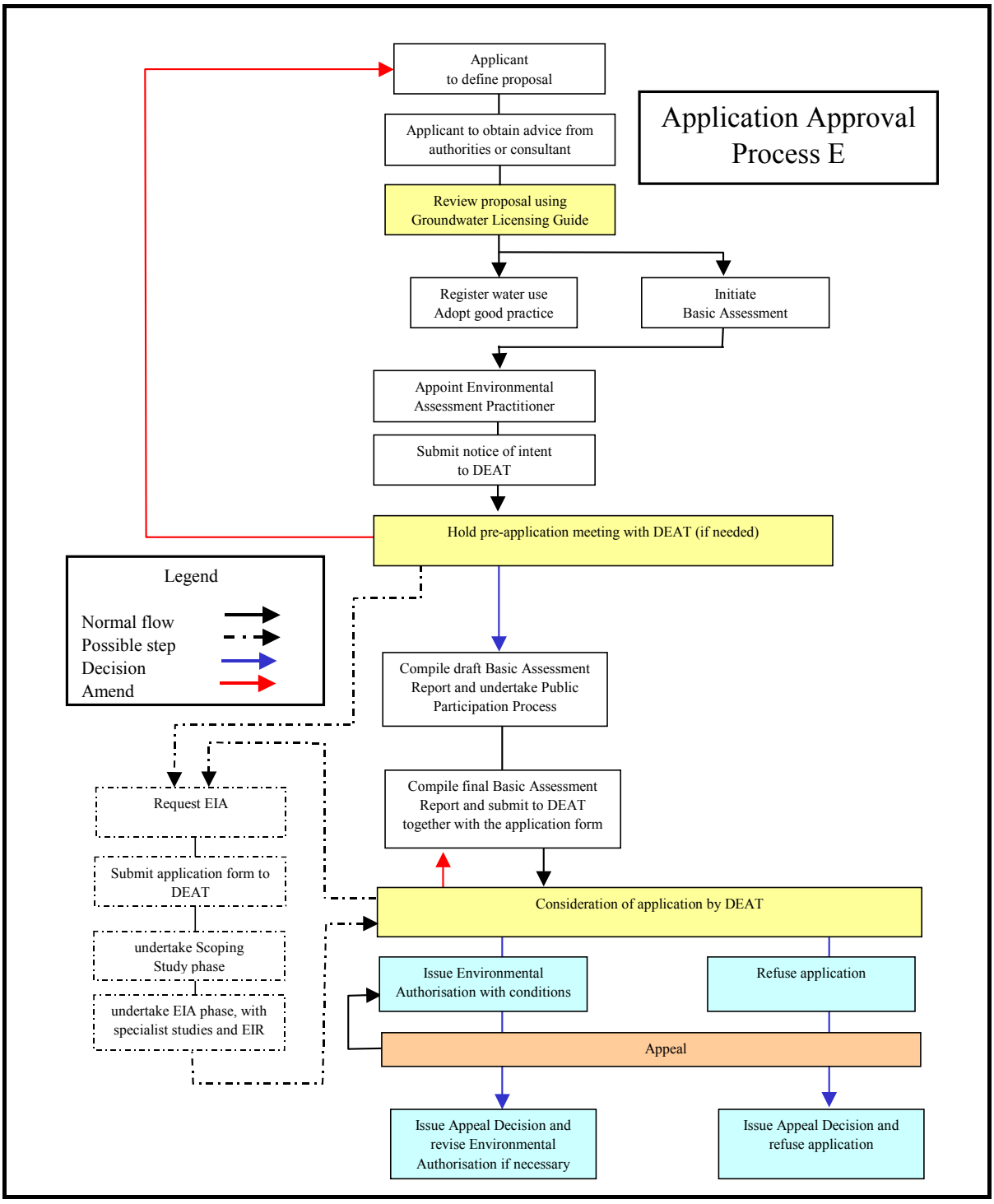

Figure 9.6: Groundwater development and use application Process E.

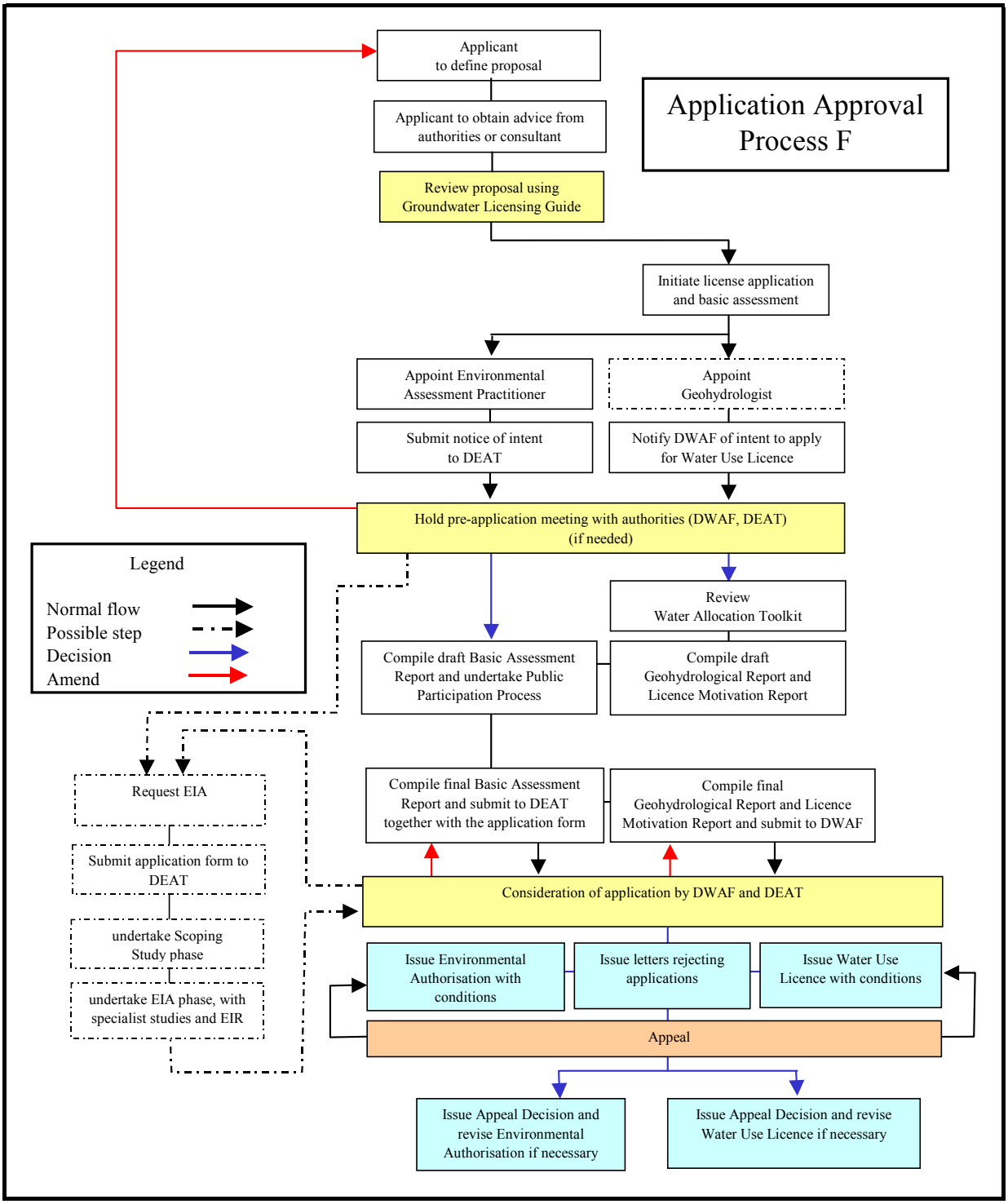

Figure 9.7: Groundwater development and use application Process F.

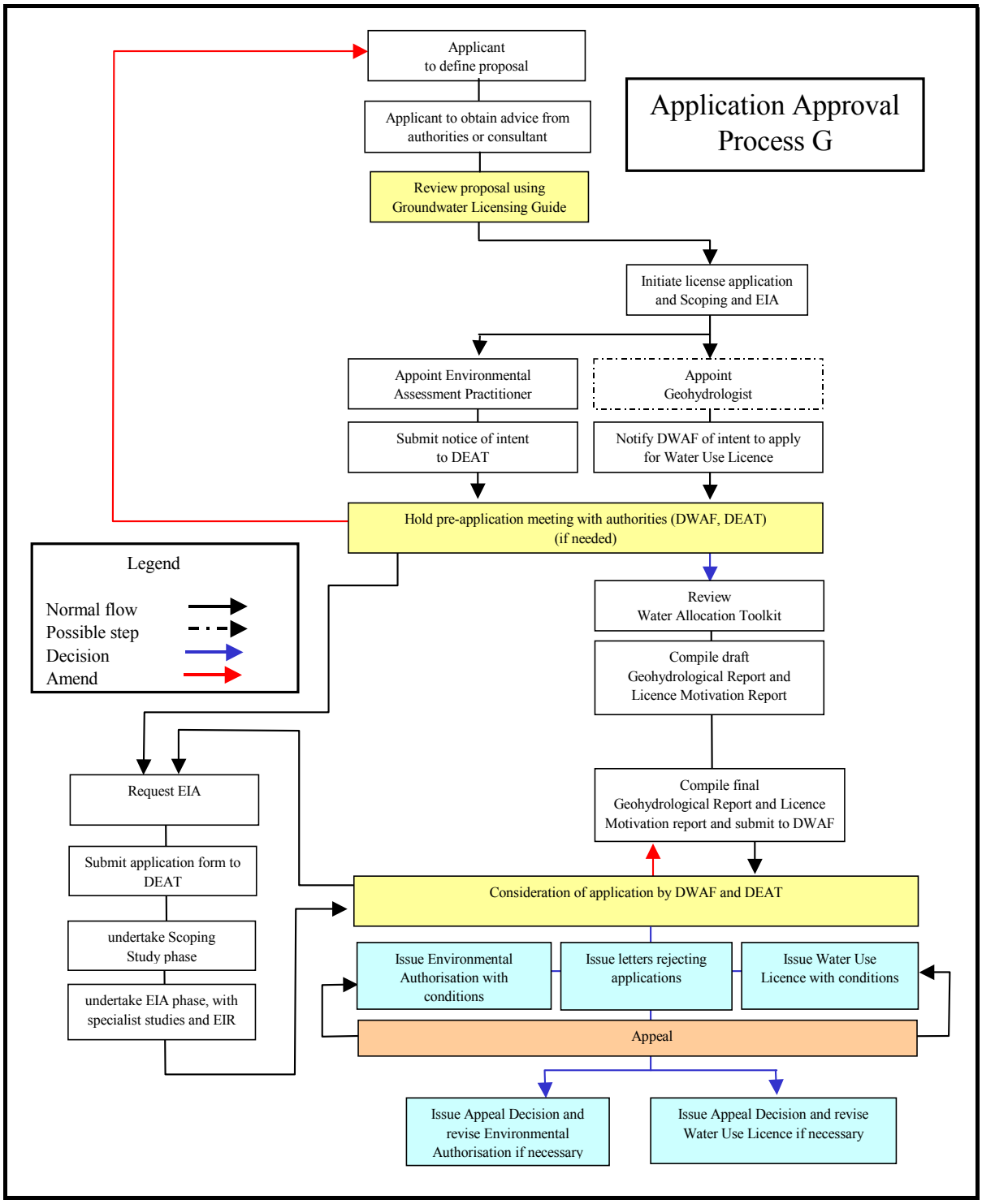

Figure 9.8: Groundwater development and use application Process G.

PART 4:

Case Studies

10 CASE STUDIES

10.1 Southern Cape

Situation:

A property developer plans to develop some 100 upmarket housing units just outside Sedgefield. It is estimated 20 000 m^3/a is required for the development, which could be abstracted from the underlying primary aquifer system at a peak rate of 1.1 L/s.

The underlying aquifer is a major aquifer system that has been reasonably well studied. Some groundwater users in the general area experience saline intrusion problems because their boreholes are too close to a brackish vlei and the rate of groundwater abstraction is too high.

Decision:

The property is not located in an identified geographic area, but is located adjacent to a large brackish vlei. The planned borehole positions are at least 250 m from the vlei. None of the criteria relevant to exploration are pertinent and, as a result, no environmental authorisation is required for exploration.

The proposed groundwater use is neither a basic human needs nor an existing lawful use. However, it could be regarded as Schedule 1 water use, as the water will only be used for domestic supply purposes. However, the DWAF Regional Office rejected the motivation for recognition as a Schedule 1 water use.

As the property covers some 30 ha and the limit for General Authorisation in quaternary catchment K40D is set at 150 m^3/ha/a, the total volume of groundwater abstraction allowed under General Authorisation (4 500 m^3/a) is too small to meet the expected demand of the proposed development (20 000 m^3/a). The planned groundwater use is subject to a Water Use Licence. As a direct result thereof, the planned groundwater use is also subject to environmental authorisation and a basic assessment has to be undertaken.

Assessment of Decision:

The planned volume of groundwater abstraction is small in relation to the total groundwater resource. As the abstraction will not impact adjacent users nor the environment, the need to go through a water licensing and basic assessment process is difficult to justify. However, because of problems of saline intrusion, the developer requires some specialist input to ensure that the planned abstraction is sustainable. Nonetheless, the General Authorisation for the area is considered very conservative, and will result in an administrative burden.

The proposed housing development is subject to environmental authorisation, with water supply being an issue to be addressed. Current legislation requires two water use authorisation processes. This dual requirement is unnecessarily burdensome to both the developer and the state, and is not in keeping with a policy of co-operative governance.

10.2 Central Karoo

Situation:

Mr Piet Smit recently purchased a 120 ha farm just outside Prince Albert. The farm is located in quaternary catchment J23F for which no groundwater can be abstracted under General Authorisation except for a maximum of 20 m^3/a per property for small industrial use. He plans to introduce sheep onto the farm, but requires a source of water for stock watering. He plans to drill a borehole, as no other sources of water are available. He does not know the volume of groundwater that he requires, except that he would be using a windpump to abstract the groundwater.

There are a number of tracks across the farm thus making access to most of the farm quite easy. The veld on the farm is largely well-grazed Karoo bush. No neighbouring farms have any water supply in close proximity to Droogtevlakte.

Decision:

The farm is not in an area with an Environmental Management Framework and is not in an identified geographic region. The borehole will be drilled in a position that will not invoke environmental criteria relevant to exploration and, as a result, no environmental authorisation is required for exploration.

As long as the farmer remains within the carrying capacity of the farm, the planned groundwater use is classified as a Schedule 1 water use, and is thus not subject to a Water Use Licence. As the expected water use will be less than 10 m^3/d, the planned water use need not be registered.

Because no groundwater can be abstracted from quaternary catchment J23F under General Authorisation unless within limits specified for small industrial use, the planned use of groundwater for stock watering *could* be subject to environmental authorisation. Based on the interpretation of the listed activities presented by DEA&DP (2006), Schedule 1 water use is not included in the listed activities that require basic assessment. Consequently, no authorisation need be obtained for the planned use of groundwater for stock-watering purposes.

Assessment of Decision:

This small-scale use is clearly a Schedule 1 water use, and a formal environmental authorisation process cannot be justified. The outcome of the assessment is considered reasonable, and promotes a balance between use and protection without being administratively burdensome.

10.3 West Coast Mine

Situation:

An existing heavy mineral mining company located along the west coast of South Africa proposes to use groundwater in its mineral separation process. The company requires approximately 1 070 m^3/d (or 391 000 m^3/a) for the separation process. Boreholes are to be located within the mining lease area, but will be more than 1 km from the coast.

Decision:

The mine is not in an area with an Environmental Management Framework and is not in an identified geographic region. Boreholes can be drilled in positions that will not invoke environmental criteria relevant to exploration and, as a result, no environmental authorisation is required for groundwater exploration.

The planned use of groundwater for mining is not a continuation of an existing lawful use and falls outside the scope of Schedule 1 use. As no groundwater can be abstracted from quaternary catchment F30G under General Authorisation unless within limits specified for small industrial use, the planned use of groundwater for mining is subject to a water use permit being issued and environmental authorisation.

Assessment of Decision:

As the mine is some 1 000 ha in extent, the volume of groundwater to be abstracted is not excessive in relation to the resources. If the mine were located in a Zone E with a General Authorisation of 400 m^3/ha/a, then the water demand could be met under General Authorisation. However, as water will be required at a rate of between 15 L/s and 20 L/s, the need to apply for a Water Use Licence is not unreasonable.

As the mine is an existing mine, and an environmental assessment is only required because of the planned use of groundwater in excess of that Generally Authorised, the need for environmental authorisation is not warranted. The delegation of authority from DEA&DP to DWAF (or vice versa) is considered appropriate in this instance.

10.4 Cape Town (Philippi) Irrigation

Situation:

A farmer in Philippi, Cape Town wants to incorporate an additional 20 ha of his farm into his existing vegetable producing operation. The area was previously mined for sand. It is estimated 700 m^3/ha/week is required for irrigation during summer. His annual water demand is thus in the order of 420 000 m^3/a. Assuming a 12 hr/d abstraction cycle, a water supply of 65 L/s is required. The farmer intends to abstract groundwater from the Cape Flats Primary Aquifer System to meet his additional irrigation demand.

The farm is located within the Berg Water Management area and situated adjacent to other farms that use groundwater for domestic supply and irrigation purposes. In spite of large volumes of groundwater being abstracted in the area, the area does not display any signs of over-use. The farm is located 5 km inland from the False Bay coastline.

Decision:

The farm is not in an area with an Environmental Management Framework. Boreholes can be drilled in positions that will not invoke environmental criteria relevant to exploration and, as a result, no environmental authorisation is required for groundwater exploration.

The planned use of groundwater for irrigation is not a continuation of an existing lawful use and falls outside the scope of Schedule 1 use. As no groundwater can be abstracted from quaternary catchment G22D under General Authorisation unless within limits specified for small industrial use, the planned use of groundwater is subject to a water use permit being issued and environmental authorisation.

Assessment of Decision:

In spite of being proven to be a productive aquifer, no groundwater can be abstracted from the Cape Flats Primary Aquifer System under General Authorisation unless for small industrial use. The same is also true for other well-studied major primary aquifer systems in the area, such as those at Atlantis and Langebaan. This limitation of use is difficult to understand.

However, the volume of water required for irrigation is significant. Given the volume of groundwater already pumped in the Philippi area for irrigation purposes and the potential to impact adjacent groundwater users, a requirement to apply for a Water Use Licence is clearly justified. However, the need for an additional authorisation from DEA&DP is questionable.

10.5 Western Cape Village Water Supply

Situation:

A small village comprising approximately 30 houses obtains water from a nearby spring. However, springflow reduces significantly during the dry summer months, causing periodic water shortages. To improve the reliability of the water supplied to the village, a borehole is to be drilled on a 5 ha piece of land expropriated for the purpose of containing a small reservoir (50 m^3) and water treatment works. The village is inhabited by people classified as being historically disadvantaged and located in quaternary catchment G40K.

Decisions:

The water supply from the new borehole is a continuation of an existing lawful use. The volume to be used from the borehole will be the same as previously obtained from the spring. Consequently the water use will remain the same. As the proposed exploration and

development of a new borehole does not trigger any environmental requirements, the municipality must ensure that the water use is properly registered.

Assessment of Decision:

This is a reasonable decision as the volume to be abstracted is small, no other groundwater users will be impacted and the proposed exploration and groundwater abstraction will not negatively impact the environment.

PART 5:

The Way Forward

11. THE WAY FORWARD

Obtaining a balance between using groundwater resources and protecting them is not easy. Further, in a country where economic growth and poverty alleviation is seen as a national imperative, it is crucial groundwater resources are used as a source of water; and used sustainably. To achieve this, effective and efficient authorisation processes for developing and using groundwater are required. These processes should be fair, reasonable and just, result in a consistent outcome and not create an administrative burden.

It is argued that present application procedures fail the above criteria and restrict groundwater use unnecessarily. In part, this is due to new and untested legislation driving the authorisation processes, the duplication of authorisation required by the NWA and NEMA and a lack of clear and consistent policy pertaining to specific aspects of the legislation (e.g. reasonable domestic use, using a single borehole to supply water to multiple properties). The lack of effective co-operative governance and a single lead authority to manage authorisation of the development and use of groundwater compound this. From the research undertaken, it is proposed the following issues be addressed so that the groundwater licensing process can be improved:

- A single lead authority should be charged with managing a single groundwater development and use authorisation process.

- Clear and simple licence application and administrative procedures to be followed needs to be developed; and information required for decision-making clearly documented.

- Realistic timeframes within which authorities will respond to licence applications need to be specified.

- Clear policy and guidance is required on what constitutes Schedule 1 use, with numeric values used as an indication of intent.

- Revision of general authorisations and limits at which licences and environmental authorisation are required.

This Groundwater Licensing Guide provides a useful tool for guiding officials and practitioners regarding authorisation needed to use groundwater. To promote its widespread use, the following specific actions are recommended:

- Official endorsement of the Groundwater Licensing Guide should be sought from both DWAF and DEAT. This should include endorsement and promotion of the generic EMP included in the guide aimed at minimising environmental damage during exploration.

- The electronic version of the Groundwater Licensing Guide must be distributed as widely as possible. It should be promoted through organisations such as the Ground Water Division (GWD) and the International Association of Impact Assessors (IAIA). Short presentations on the guide should be presented at conferences and seminars organised by these and similar organisations. Articles

about the guide should appear in popular literature such as the Water Wheel, Water Sewage & Effluent, Urban Green File, Resource, Borehole Water Journal and the like.

- Training of officials from the lead and other authorities in the use of the Groundwater Licensing Guide. It is proposed that joint training seminars for DWAF and DEAT officials be held in Cape Town and Pretoria. Officials from the Departments of Agriculture and Mineral and Energy Affairs could also be invited to attend. If the delegates consider these two training seminars worthwhile, similar seminars could be held elsewhere.

It is further recommended a project be initiated to consider tools needed to enable efficient decision-making regarding Water Use Licence applications. Mechanisms that allow for the Reserve to be considered at a level appropriate to the application are required, as well as approaches and tools for overcoming the lack of geohydrological capacity within the relevant authorities.

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APPENDIX A

GENERIC GROUNDWATER EXPLORATION ENVIRONMENTAL MANAGEMENT PLAN

The generic groundwater exploration EMP is included in this research report in a format that allows it to be copied or printed as a stand-alone document.

GENERIC GROUNDWATER EXPLORATION ENVIRONMENTAL MANAGEMENT PLAN

A rehabilitated exploration drilling site east of Sedgefield

Water Research Commission Project
WRC Project K5/1510

Roger Parsons - Parsons and Associates Specialist Groundwater Consultants cc
Larry Eichstadt - Resource Management Services cc
Jonathan Crowther - CCA Environmental (Pty) Ltd
Jeremy Blood - CCA Environmental (Pty) Ltd

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1. INTRODUCTION

An Environmental Management Plan (EMP) is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced (Lochner, 2005). This generic EMP for groundwater exploration has been developed to facilitate environmental input during exploration; and relates specifically to the drilling and testing of boreholes as these are the only exploration activities that have a potential to impact the environment.

The EMP serves as a standard guide of good practice for preventing unnecessary environmental impacts during groundwater exploration. Because environmental impacts resulting from groundwater exploration can remain insignificant when adopting good practice, implementation of this generic EMP aims to avoid an unnecessary administration burden.

The EMP is not exhaustive; and practitioners and contractors should take all reasonable measures to prevent environmental impact during the execution of their work. The EMP is based on a philosophy of leaving an area at least in the condition in which it was found. It is recognised this EMP will only be applicable to most small to medium sized groundwater exploration projects. Large scale projects and those in environmentally sensitive areas could require more formal approaches.

2. GENERIC ENVIRONMENTAL MANAGEMENT PLAN

In this generic EMP, distinction is made between an **exploration site** and an **exploration camp**. Typically, an exploration site would be a single borehole while an exploration camp is an area where a contractor would temporarily accommodate staff and / or store equipment. Where temporary buildings are to be constructed, a site-specific EMP should be prepared and implemented.

This generic EMP is intended for short duration occupation only (in the order of one to ten days). When contractors will be on site for periods longer than this, a site-specific EMP may be required.

Before commencement of any exploration work, including the establishment of access roads, exploration sites and exploration camps, the contractor shall brief his or her staff on the EMP and supply them with a copy of the environmental “Dos and Don’ts” (attached).

The contractor has the responsibility for implementing the EMP and ensuring their staff comply with the guidelines. Daily audits must be carried out; and corrective action implemented when needed. When under instruction of a geohydrologist, the geohydrologist should promote the implementation of this EMP.

2.1 Protection of natural features, flora and fauna

The contractor is responsible for ensuring the impact on the environment around the exploration site and exploration camp is minimised. The contractor shall not deface, paint, damage or mark any natural features (e.g. rock formations) situated in or around the site or camp.

No flora shall be removed, damaged or disturbed outside of designated working areas i.e. access routes and areas demarcated as exploration sites or exploration camps (see Section 2.4). Removal, damaged or disturbance to flora in the designated working areas is to be minimised.

The trapping, poisoning and shooting of animals is strictly forbidden.

Gates used to access the site shall be left as found (i.e. open or closed); or as instructed by the landowner.

The contractor shall not permit his staff to make use of any natural water sources (e.g. springs, streams, rivers, dams, etc.) for the purposes of swimming, personal washing or washing of vehicles, machinery and clothes without permission from the landowner. Washing of vehicles, machinery or clothes within 50 m of any surface water body is strictly prohibited.

2.2 Protection of archaeology and heritage sites

If any archaeological remains or artefacts (such as buried walls, old bottles, porcelain fragments, earthenware fragments, accumulations of bones or shells and ash dumps) are uncovered during access road construction or establishment of exploration sites or camps, the contractor shall stop work immediately and contact the South African Heritage Resources Agency (SAHRA). If human remains or burial sites are uncovered, the matter has to be reported to the South African Police Services

No work may continue at the site until the relevant authority has issued permission to do so.

2.3 Access routes

The exploration team (including the project manager, professional staff and contractors) shall use existing roads and tracks wherever possible.

Where new tracks have to be made, they shall be constructed with minimum disturbance to the surrounding vegetation; and measures taken to prevent erosion. New tracks shall be no wider than 4 m. No new tracks shall be established in areas considered to be environmentally sensitive (e.g. areas of sensitive natural undisturbed vegetation, water resources, etc).

The contractor shall control the movement of all vehicles and machinery in areas without roads or tracks in order to reduce impact on the natural environment. In these areas, a single track should be identified and used.

2.4 Site demarcation and "no go" areas

The contractor shall restrict all activities (including clearing, stockpiling of materials and equipment) and personnel at an exploration site to an area within 25 m of the borehole.

Areas outside this designated working zone shall be considered “no go” areas and no exploration activities may take place in these areas.

The exploration site shall be physically demarcated with temporary hazard marker tape (or similar), which must be maintained for the duration of the exploration activity.

The extent of an exploration camp shall not exceed 600 m^2. Exploration camps may not be established in environmentally sensitive areas (e.g. areas of natural vegetation, water resources, etc) and may only be established after permission has been obtained from the landowner.

The exploration camp must be physically demarcated with temporary hazard marker tape, which must be maintained for the duration of the exploration activity.

2.5 Vegetation and topsoil clearing

Clearing and pruning of vegetation shall only be undertaken where necessary. The extent of clearing shall be minimised and limited to the access roads, the exploration site and exploration camp.

Where possible, vegetation shall be brush-cut rather than cleared. Cleared vegetation shall be used as brush-cut packing during rehabilitation. No alien plant material shall be used for this purpose.

No herbicides or other poisonous substances may be used for clearing purposes.

In areas where the soil will be heavily compacted, topsoil to a depth of approximately 150 mm shall be removed from areas to be disturbed and stockpiled separately. This material shall be used for rehabilitation and is spread over the disturbed area after the activity ceases.

2.6 Exploration site and exploration camp

Fire control

The contractor shall take all reasonable measures and active steps to avoid increasing the risk of fire through activities on site and prevent the accidental occurrence or spread of fire; and shall ensure there is basic fire-fighting equipment on site at all times. This equipment shall include fire extinguishers and / or rubber beaters.

Suitable fire extinguishers or welding blankets are to be on hand when welding or operating grinders. This equipment is to be serviced regularly.

It is preferable that cooking be done on gas cookers. However, open fires shall only be permitted for cooking purposes at an exploration camp. Open fires shall be made in a portable "braai" or drum; and shall be monitored and extinguished properly after each use.

Fuel and oil handling, storage and refuelling

The contractor shall take all reasonable measures to prevent the contamination of surface or groundwater from the release - accidental or otherwise - of oils and fuels.

If it is not reasonably practical to refuel at a depot or workshop, fuel and oil containers shall be appropriately secured to ensure safe passage between destinations.

Fuel (diesel and petrol) and oil containers shall be in good condition and placed in a bunded area or on plastic sheeting covered with sand at the exploration site, the exploration camp or on a vehicle.

During on-site refuelling, the surface under the refuelling area shall be protected against spillages (e.g. use of drip trays or plastic sheeting covered with sand).

If any spillage occurs, contaminated soil shall be collected in a holding tank or drum for later disposal at a licenced hazardous waste site. Incidental spillages shall be raked and the ground scarified.

Wastewater control

The contractor shall take all reasonable measures to limit erosion and sedimentation due to the discharge of wastewater during drilling, testing or from artesian boreholes. Where erosion or sedimentation occurs, the contractor shall inform the landowner and rectify the situation.

Clean excess water can be discharged into drainage channels or surface water bodies; after reasonable measures taken in consultation with the landowner have been put in place to prevent erosion.

Water with a high level of suspended solids shall be allowed to settle out in a sump before being recycled or released into the environment.

No contaminated water, including that from diamond drilling or mud rotary drilling, shall be discharged into the environment. Any contaminated water shall be disposed at an appropriate disposal facility.

Equipment maintenance

Leaking equipment shall be repaired immediately or removed from the site.

Where practical, all maintenance of equipment and vehicles shall be performed off-site or at the exploration camp. If it is necessary to do maintenance on site the contractor must ensure that there is no contamination of the soil or vegetation. When servicing equipment, drip trays or plastic sheeting covered with sand shall be used to collect the waste oil and other lubricants.

Washing of equipment shall be restricted to urgent or preventative maintenance requirements only. All washing shall be undertaken at least 50 m from any surface water body.

Lights

The contractor shall ensure any lighting installed at the sites does not interfere with road traffic, lead to unacceptable light pollution or disturb surrounding communities.

Staff

The exploration camp shall only be established after permission has been obtained from the landowner.

The contractor shall be responsible for ensuring his or her staff have access to sufficient drinking water and food while on site.

It is preferable that cooking is done using a gas cooker. Open fires shall only be permitted for cooking purposes at the exploration camp. Open fires shall be made in a portable "braai" or drum; and shall be monitored and extinguished properly after use.

The contractor's staff shall be restricted to the area within the exploration site and exploration camp. Access outside the exploration site and exploration camp shall only be allowed during the execution of work/s or when supervised.

No domestic pets or livestock shall be brought to the exploration site and exploration camp.

No sound amplification equipment shall be used on site; and any audio equipment may not be played at levels considered intrusive by others.

No unauthorised firearms or weapons shall be brought onto site.

Ablution facilities

It is good practice to provide one toilet for every 15 workers. If possible, toilets shall be sited away from water resources and shall be secured in order to prevent them from blowing over.

The contractor shall ensure that there is no spillage when the chemical toilets are cleaned or during normal operation and that the contents are properly removed from site.

Toilets are to be provided in all instances where an exploration camp is established for more than five days and where the contractors do not have access to toilets elsewhere.

In instances where no toilets are provided, the contractor and their staff are required to dig a hole that is to be covered on completion of use.

Waste management

No on-site burning, burying or dumping of any waste materials, vegetation, litter or refuse

shall occur at either the exploration site or exploration camp.

The contractor shall remove all waste off-site. The contractor must provide sufficient bins or containers on-site to store any solid waste produced. The bins and containers should be weatherproof and scavenger-proof.

2.7 Site closure and rehabilitation

The contractor is responsible for repairing any damage to the site before leaving. The following shall be undertaken on site closure:

- All temporary facilities shall be removed;
- All waste, litter and contaminated water and soil shall be removed;
- All sumps and excavated areas shall be refilled and adequately compacted;
- All stockpiled topsoil shall be spread over the disturbed area after the activity ceases;
- Heavily compacted soil shall be scarified;
- Cleared vegetation shall be used as brush-cut packing on disturbed areas after the activity ceases. No alien plant material may be used for this purpose; and
- Boreholes shall be properly capped and locked for later use; or filled in if not to be of further use.

Environmental Do's and Don'ts

- Workers & equipment must stay inside the site boundaries at all times

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not damage the banks or vegetation of the stream

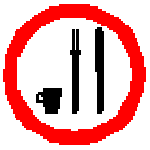
- Protect animals on the site
- Ask your supervisor to remove animals found on site

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish / vegetation without permission

- Report any petrol, oil & diesel leaks or spills
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away were instructed

- Use the toilets provided
- Report full or leaking toilets



- Only eat in designated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins

- Do not litter – put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!

Impacts on the environment resulting from exploration drilling remain insignificant if remediation measures are implemented.

Uncontrolled discharge from artesian boreholes could result in erosion. Measures must be put in place to avoid such impacts.

Demarcation of the drilling site ensures the footprint of the site remains small. Consideration of the possible impacts on the environment will ensure that they remain temporary and insignificant.

Boreholes must be properly completed to avoid collapse and prevent posing a threat to man and the environment.

Impacts resulting from pumping tests remain insignificant if the footprint of the camp is kept small and discharge is controlled.