FINAL RESOURCE MANAGEMENT PLAN

GROOTDRAAI DAM




water & sanitation

Department:
Water and Sanitation
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Compiled for:

Department of Water and Sanitation
Private Bag X 313
Pretoria 0001
Tel: 012 336 7500
Fax: 012 324 6592

Compiled by:

Nemai Consulting
147 Bram Fisher Drive
Ferndale, 2191
Tel: 011 781 1730
Fax: 011 781 1731

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- Standerton Police Station;
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- Standerton Boat and Angling Club; and
- Department of Water and Sanitation.

Title and Approval Page

Recommended:

Name	Title	Signature	Date
Mishelle Govender	Project Manager: National Water Resources Infrastructure Branch: Integrated Environmental Engineering (NWRI: IEE)		
Mmutle Thunye	Area Manager (Acting): Central Operations, NWRI		
Nelly Ndumo	Director: Central Operations, NWRI,		
Leonardo Manus	Chief Director: Operations, NWRI		

Approved:

Name	Title	Signature	Date
Zandile Mathe	Deputy Director General: NWRI		

Review:

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Annual Review of Business Plans	August	2015	2016	2017	2018	2019
Five (5) Yearly review of RMP	August	2019				

Amendments Page

Date	Nature of Amendment	Amendment No.
6 May 2014	First Draft for DWS Review	1
30 June 2014	Draft for PSC Review	2
8 September 2014	Draft RMP for Public Review	3
15 October 2014	Final RMP for PSC Review	4
31 October 2014	Final RMP for Public Review	5
15 March 2015	Final RMP	6

Executive Summary

According to the Guidelines for the Compilation of Resource Management Plans (2006), the main aim of and Resource Management Plan is to "attain the objectives underlying sustainability and to compile workable, functional sustainable access and utilisation plans for water resources and in particular State Dams". A Resource Management Plan is thus a planning tool aimed at working within the requirements of existing policies, while taking into account the needs and interests of stakeholders.

A Resource Management Plan can also be described as a systematic process for the sustainable development and management of a water resource in the context of social, economic and environmental objectives. One of the main functions of the Resource Management Plan process is to implement an **Institutional Plan**. The focus on institutional arrangements is accompanied by a **Zonal Plan** together with a detailed **Strategic Plan**. In addition, a **Financial Plan** provides guidance on funding opportunities and how these should be used for the improved management of the Dam. Together these components provide a comprehensive guide on the "what?"; "why?"; "how?" and "who?" of the management of prioritised Government Waterworks.

Grootdraai Dam was built in 1982 mainly to support the water needs of the SASOL I, II and III Coal to Petrol Plants at Secunda, ESKOM's, Tutuka Power Station as well as Matla, Duvha, Kendal and Kriel Power Stations located on the coal fields in the adjacent Olifants River Basin. Water from Grootdraai Dam is used mainly for industrial purposes, and to a lesser extent for domestic and recreational purposes. The Dam also provides some flood attenuation for Standerton. The Dam is a National Key Point due to its strategic importance in providing water to industry.

In addition, it is South Africa's 10th largest Dam and therefore is one of the most popular Dams in Mpumalanga for water sports. The following recreational activities commonly take place at the Dam:

- Birdwatching;
- Shoreline Fishing;
- Camping;
- Boardsailing/Windsurfing;
- Kite Surfing;
- Fishing from Boats;
- Paddleskiing/Rowing/Canoeing;
- Yachting;
- Swimming;
- Skiing and Powerboating;
- Competitive and Recreational Angling; and
- Picnicking and Sunbathing.

Unlike many other State Dams, Grootdraai Dam does not form part of a Nature Reserve. There is a public resort managed by Lekwa Local Municipality at the Dam which has camping and picnicking facilities as well as ablution facilities. However, due to a lack of funds, the resort is not currently managed and has been vandalized.

The main recreational club at the Dam is the Standerton Boat and Angling Club. The club has accommodation and picnicking facilities available for members only.

There is a number of angling clubs which make use of the Dam and an informal fishing area near the Dam wall.

In compiling the Resource Management Plan for Grootdraai Dam the following process was applied.

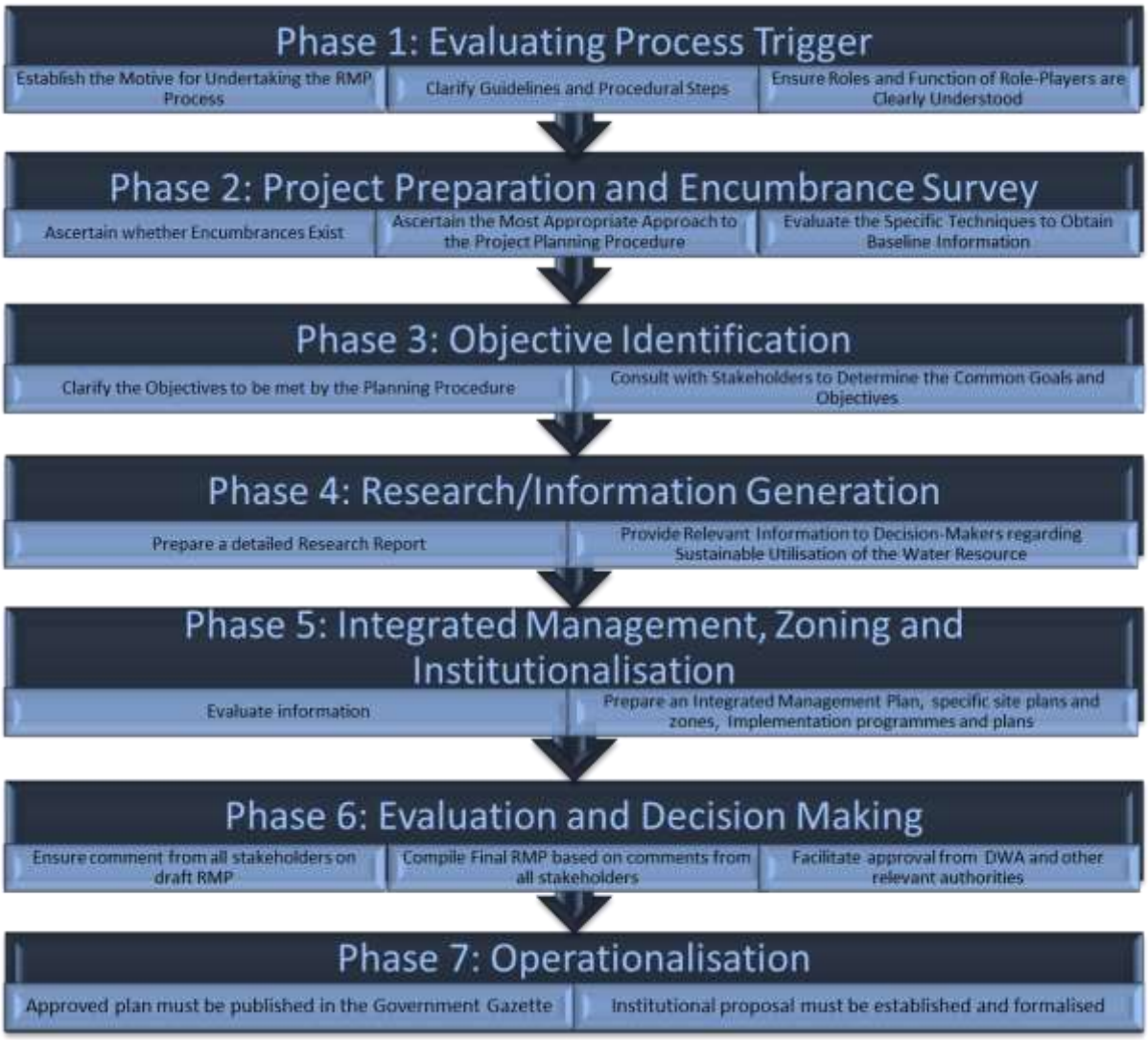

Figure 1: RMP Process (DWA, 2006)

It is important to note that the Resource Management Plan was compiled based on detailed stakeholder engagement and input. This formed the cornerstone of the Resource Management Plan through the establishment of a Vision for the Dam with a number of Key Objectives.

The key recommendations of the Grootdraai Dam Resource Management Plan are as follows:

- Implementation of the Institutional Plan including the formation of a Dam Management Committee, Operations Management Committee and Resource Management Plan Steering Committee. As part of this Institutional Plan, it is vital that all agreements are updated to take into account the findings of the RMP;
- Implementation of standardised and harmonised Aids to Navigation and Demarcation Markers;
- Implementation of Unique Positioning Number System and the Wash Bay System at the Dam;
- Information brochures to be developed to inform communities about the potential uses of the Dam and how to join recreational clubs and societies;

- Transport system to be created to provide transport for local community members. It is suggested that discussions with the Lekwa Local Municipality and the Taxi Union take place and if possible a weekly taxi route be put in place;
- The potential for additional accommodation should be determined. A mixture of different types of accommodation (i.e. high income, middle income and lower income accommodation) should be put in place if possible. In addition, the feasibility of a Public Private Partnership to manage the Public Resort and additional accommodation should be determined. The new management body should include security at Public Resort area to ensure a safe environment;
- All recreational and land use to be regulated through agreements. Old agreements to be updated to take into account the findings of the RMP. Agreements with Shoreline Fishing Clubs to be updated or put in place. Caretaker agreements with adjacent landowners to be put in place to manage resources;
- A survey of all illegal access points, abstraction points and structures to be undertaken and Zonal Plan should be updated with this information;
- New recreational activities such as triathlon events, swimming events and musical festivals to be implemented in partnership with Lekwa Local Municipality and a Marketing plan to be developed to increase tourism to the Dam. This should include the development of a website and improve road signs to the Dam;
- Water quality monitoring results should be discussed at the Dam Management Committee meetings. Further, the potential for water quality monitoring data to be linked to the Unique Positioning Number system should be determined so that if water quality issues are noted they will activate the UPN system. A Point Source Pollution Assessment should also be undertaken;
- A Shoreline Management Plan to be compiled and implemented;
- Education programmes regarding the impacts of alien invasive species should be developed;
- A Containment Plan for Invasive Fish Species such as Bass and Carp should be developed and implemented so that the economic benefits of recreational angling can be achieved without the further spread of these species to other valuable water resources;
- Potential for commercial fishing or small scale fisheries programme to be assessed;
- Siltation prevention measures to be assessed and put in place;
- Coordination between Standerton Boat and Angling Club, local schools and South African Sailing to introduce youth sailing and fishing programme at the Dam;
- Access agreement with Vaal Rivier School to be updated; and
- Skills training programmes including life guard and first aid training as part of tourism development and community skills development.

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Acronyms

AGIS	Agriculture Geographic Information System
AMD	Acid Mine Drainage
AtoN	Aids to Navigation
BP	Business Plan
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CCA	Carrying Capacity Assessment
CITES	Convention on International Trade of Endangered Species of Wild Fauna and Flora
CIWSP	Cooperative Inland Waterways Safety Programme
CMA	Catchment Management Agency
COGTA	Department of Cooperative Governance and Traditional Affairs
CPSI	Centre for Public Service Innovation
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DMC	Dam Management Committee
DoT	Department of Transport
DRDLA	Department of Rural Development and Land Reform
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry (previous name for DWA)
EC	Electrical Conductivity
ECC	Effective Carrying Capacity
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
FIRE	Finance, Insurance, Real Estate
FEPA	Freshwater Ecosystem Priority Area
GDP	Gross Domestic Product
GGP	Gross Geographic Product
GIS	Geographical Information System
GN	Government Notice
GVA	Gross Value Added
Ha	Hectares
IA	Implementing Agent
I&APs	Interested and Affected Parties

LAAP	Local Accountable AtoN Parties
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IDP	Integrated Development Plan
IWRM	Integrated Water Resource Management
LED	Local Economic Development
LLM	Lekwa Local Municipality
MAP	Mean Annual Precipitation
mASL	Metres above Sea Level
MPTA	Mpumalanga Parks and Tourism Agency
NEMA	The National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Amendment (Act 15 of 2009)
NGP	New Growth Plan
NSDP	National Spatial Development Perspective
NTU	Nephelometric Turbidity Units
NWRI	National Water Resource Infrastructure
NWRI: IEE	National Water Resources Infrastructure: Integrated Environmental Engineering
OMC	Operational Management Committee
ORASECOM	Orange-Senqu River Commission
PCC	Physical Carrying Capacity
PFMA	Public Finance Management Ac (Act 29 of 1999)
PGDS	Provincial Growth and Development Strategy
PPP	Public Private Partnership
PSDES	Provincial Spatial Economic Development Strategy
QDS	Quarter Degree Square
RCC	Real Carrying Capacity
RHIB	Rigid-Hulled Inflatable Boat
RMP	Resource Management Plan
RQO	Resource Quality Objectives
RSC	RMP Steering Committee
RWU	Recreational Water Use
SAMSA	South African Maritime Safety Authority
SANBI	South African National Biodiversity Institute
SAPIA	South African Plant Invaders Atlas
SAPS	South African Police Service
SAR	Sodium Absorption Ratio
SAS	South African Sailing
SASCOC	South African Sports Confederation and Olympic Committee

SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SFWS	Strategic Framework for Water Services
SPC	Strategic Plan for Commercialisation
THETA	Tourism, Hospitality and Sports Education Training Authority
TR	Treasury Regulations
UPN	Unique Positioning Number (used in the CIWSP)
WIP	Weeds and Invasive Plants
WMA	Water Management Area
WSDP	Water Services Development Plan

1 WHAT IS A RMP AND WHY IS IT NECESSARY?

A Resource Management Plan (RMP) is a management tool which provides guidance on how recreational use at Government Waterworks, such as Dams, should be managed. RMPs focus on the current and future uses of the Dam, as well as requirements that must be met, to ensure the optimal, equitable and sustainable management of the Dam.

According to the Guidelines for the Compilation of RMPs (DWA, 2006), the main aim of the RMP is to "attain the objectives underlying sustainability and to compile workable, functional sustainable access and utilisation plans for water resources and in particular State Dams". A RMP is thus, a planning tool aimed at working within the requirements of existing Government Policy, while taking into account the needs and interests of stakeholders.

A RMP can also be explained as a systematic process for the sustainable development and management of a water resource in the context of social, economic and environmental objectives. In many ways, it shares similarities with Integrated Water Resource Management (IWRM). Hence, one of the main functions of the RMP process is to implement an **Institutional Plan** for the effective management of State Dams. The focus on institutional arrangements is accompanied by a **Zonal Plan** together with a detailed **Strategic Plan**. In addition, a **Financial Plan** provides guidance on funding requirements and funding options. Together these components provide a comprehensive guide on the "what?"; "why?"; "how?" and "who?" of the management of prioritised Government Waterworks.

The RMP lays the foundation required to consolidate objectives for the resource, within the framework of existing policy priorities. The RMP also informs decision-making which may have a direct impact on the resource. Further, the RMP creates a platform to unlock economic potential at the Dam without compromising environmental principles and recreational use of the Dam. Recreational use includes activities which range from leisure, sport to culture and religion. Although recreational use is not consumptive, it is still a major water use and needs to be managed correctly to ensure increased personal, societal and economic benefits with minimal disturbances and environmental impacts.

RMPs are managed by the National Water Resources Infrastructure Branch (NWRI) of the Department of Water and Sanitation (DWS). This Branch is tasked with developing, operating and maintaining strategic water resource infrastructure in an efficient way to ensure that the needs of the Nation are met.

The RMP also provides a platform for coordination between different spheres of government that have official mandates regarding the management of the Dam. These Departments include:

Table 1: Government Departments and Agencies

DEPARTMENT	MANDATE
Department of Transport (DoT)	Responsible for legislation, policy and regulations for all transportation in South Africa, including shipping and other transport by water or sea, including inland waterways.
Department of Environmental Affairs (DEA)	Responsible for biodiversity management within the Dam including Invasive Alien Species.
Lekwa Local Municipality (LLM)	In the case of Grootdraai Dam, some of the State Land (specifically around the Resort area) is managed by LLM.
Department of Water and Sanitation (DWS)	DWS is responsible for the construction, operation and maintenance of Government Waterworks (as per the National Water Act, 1998 (Act 36 of 1998). This includes management of Dam Safety, and Recreational Use.
South African Maritime Safety Authority (SAMSA)	Administers and executes maritime related Legislation and Regulations.

Each Government Department has its own suite of Legislation to govern the use and management of the Dam. The RMP consolidates these roles and functions into a coherent management platform.

The RMP presents the twenty-year vision of the Dam which is distilled into 5 year goals and annual Business Plans (BPs). Hence, the RMP is a tool aimed at meeting the expectations of users without sacrificing the environment.

2 WHERE ARE WE NOW?

2.1 Overview of the WMA

Grootdraai Dam falls within the Upper Vaal River Water Management Area (WMA) which is centrally located in the country and covers a catchment area of 55 562 km^2. The Upper Vaal River WMA is part of Gauteng, Mpumalanga, Free State and North-West Provinces. It is the uppermost WMA in the Vaal River System and includes the Grootdraai Dam and the Vaal Dam, two major Dams in the country.

The general topography of the area is described as flat with occasional gentle slopes. The general surface drainage is to the west.

Temperature and rainfall differ extensively with the seasons although the same patterns are seen throughout the WMA. The winters are typically dry and cold (17 °C average) with occasional frost, while the summers are very hot and wet (28 °C average daily maximum). Rainfall occurs during the summer. The mean annual precipitation (MAP) decreases from 800 mm in the south east to 600 mm in the north west with the potential evaporation increasing from 1300 mm in the south east to 1700 mm in the north west (DWAF, 2004).

Vegetation is mostly savannah grassland with sparse bushveld. The geology is varied and is particularly complex in the west and north-west where mineral deposits are found. Extensive dolomitic formations also occur in these parts.

2.1.1 Surface Water and River Systems

The largest proportion (46%) of the surface flow in the WMA is contributed to by the Vaal River upstream of the Vaal Dam, together with its main tributary the Klip River. In addition, the Wilge River and the Liebenbergsvlei River contribute 36%, with the remaining 18% originating from the tributaries downstream of the Vaal Dam. Other rivers include the Boesmanspruit, the Leeuspruit and the Diepspruit River (DWAF, 2003).

There are no natural lakes in the WMA however a number of important wetlands occur along the Klip River, with several vlei areas occuring elsewhere in the WMA (DWAF, 2003).

The surface water naturally occurring in WMA has been well developed through the construction of several large dams. The main Dams include:

- Grootdraai Dam on the Vaal River upstream of the Vaal Dam;
- Sterkfontein and Fika Patso Dams in the Wilge River Catchment;
- Saulspoort on the Liebenbergvlei River, in the Wilge sub-area; and
- The Vaal Barrage as well as Klerkskraal, Boskop and Klipdrif Dams in the sub-area downstream of the Vaal Dam.

Heyshope Dam does not occur within the WMA, however it is part of the inter-catchment transfers which take place and therefore also impacts on the status of surface water in the WMA.

The Upper Vaal WMA does not directly share any rivers with neighbouring countries. Large quantities of water are, however, transferred into the WMA from Lesotho and through inter catchment transfers to and from neighbouring WMAs (DWAF, 2004).

The majority of the rivers in the WMA are classified as Class C: Moderately Modified however some exceptions do occur with a number of rivers classified as Class D: Largely Modified or Class E: Not an Acceptable Level.

2.1.2 Land Use

Land use in the Upper Vaal WMA is characterised by sprawling urban and industrial areas in the northern and western parts. Mining is also located in these areas although much of this is now inactive. Maize, wheat and other annual crops are grown on large areas under dry

land cultivation in the central and south western parts. There are several large towns in the WMA, mainly to serve the mining and agricultural developments (DWAF, 2004).

The main land use impacts are relatively large increases in runoff due to impermeable surfaces in urbanised areas, as well as reductions in runoff due to infestations by alien vegetation. No significant afforestation occurs in the WMA. Numerous farm dams have also been built in the catchment of the Vaal Dam (DWAF, 2003).

According to the Gert Sibande District Municipality Spatial Development Plan (SDF) (2011), the area located within the central extents of the District, between Secunda and Standerton does have suitable land for agriculture. However, it is also noted that agricultural activities within the Standerton, Bethal, Ermelo and Carolina areas are adversely affected by water and air pollution from petrochemical and manufacturing activities.

2.1.3 Water Quality

In general, the quality of surface water in the Upper Vaal WMA is good due to the outflow from the dolomitic aquifers in the Region. However, due to the large quantities of urban and industrial effluent, together with urban wash-off and mine pumpage, tributary rivers in the north western part of the WMA such as the Waterval, Blesbokspruit, Natalspruit and Klip etc. have been negatively affected.

Atmospheric pollution is also prevalent over parts of the WMA and contributes to the pollution of surface water resources.

According to the Department of Water Affairs and Forestry (DWAF) Water Quality Monitoring Status Report for the Upper Vaal WMA (Munnick, 2005), the two main concerns in the area are salinity and eutrophication (nutrient enrichment).

Salinity is evaluated by looking at variables such as Electrical Conductivity (EC), as an indication of dissolved salts, such as Sulphate (SO_4), which is usually related to coal and gold mining activities. Examples of point sources of salinity are industrial and mine water discharges, and the diffuse sources of salinity are seepages from mine dumps and other discard and disposal facilities.

Figure 2 below summarizes the water quality monitoring results for the WMA (Grootdraai Dam is circled in red). In general, the biggest impact on water quality in terms of salinity and eutrophication is from the Vaal Barrage catchment as measured at Point VS8. Specifically, there is a huge inflow of phosphate and nitrate from the tributaries of the Vaal Barrage, namely the Klip River, the Leeu Taaibos Spruit, the Blesbok Spruit and Suikerbosrand River, and the Riet Spruit.

Eutrophication is evaluated by looking at nutrients such as Phosphate (PO_4) and Nitrate (NO_3). Examples of point sources of nutrients are discharges from sewerage works and the diffuse sources are informal settlements. The worst impacts in terms of eutrophication is also at the Vaal Barrage (Figure 2).

Further, during consultation it was noted that the Standerton Wastewater Treatment Works (WWTWs) are operating above design capacity and are not compliant in terms of the discharge quality.

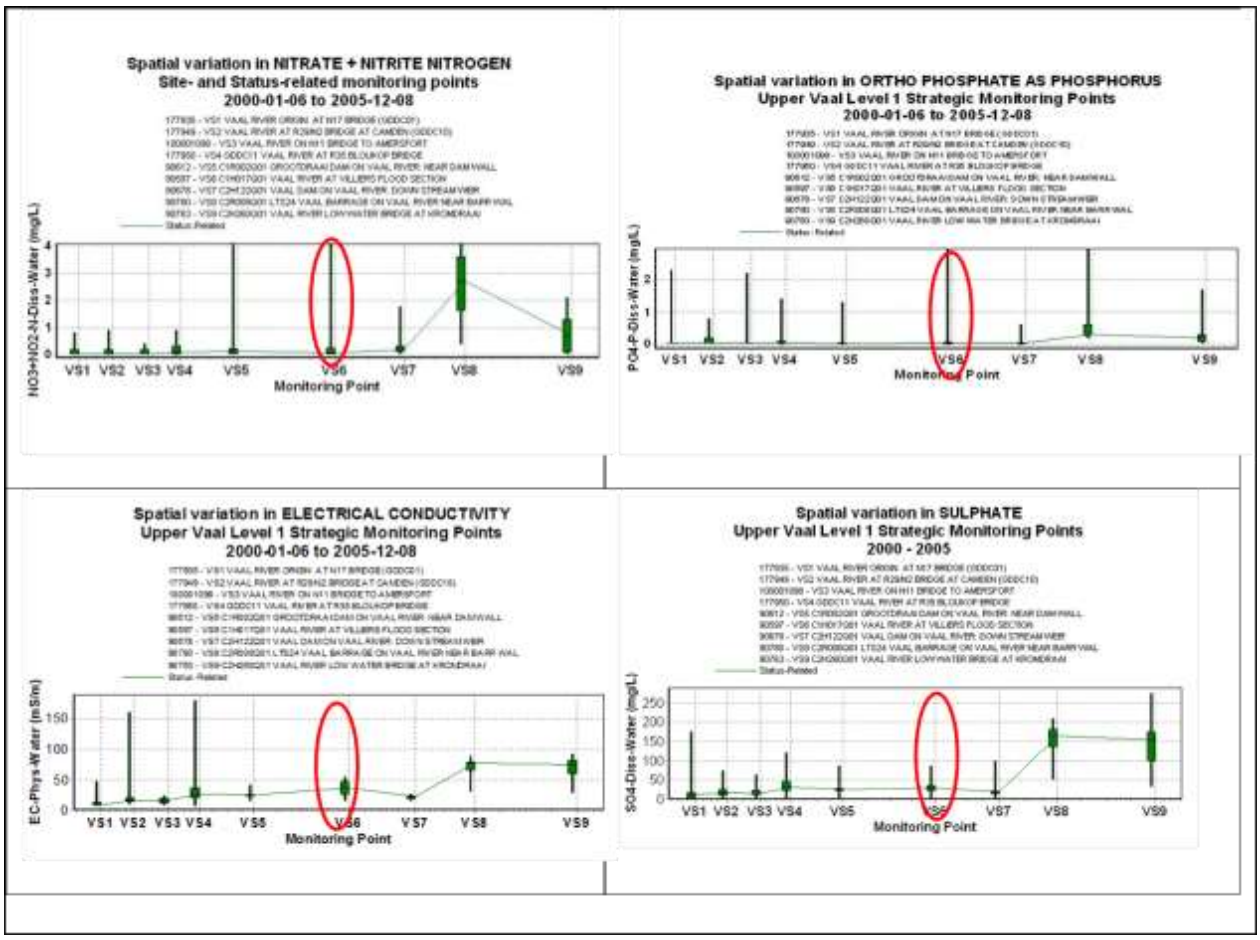

Figure 2: Water Quality Monitoring in Upper Vaal WMA: 2000 to 2005

2.1.4 The Social Environment

The Upper Vaal WMA is economically important, contributing nearly 20% of the Gross Domestic Product (GDP) of South Africa, which is the second largest contribution to the National wealth amongst all nineteen of the WMAs in the country (DWAF 2003). The manufacturing sector contributes over 30% to the Gross Geographic Product (GGP) generated in the WMA, followed by trade at just over 15% and both finance and mining slightly higher that 10%.

Although there are large areas under cultivation, agriculture only contributes about 2% of the GGP. It nevertheless has important linkages to other sectors and provides livelihood to a large proportion of the rural population.

2.1.5 Tourism Potential

LLM has a rich array of natural attractions. In particular, these include a unique combination of natural scenery, floral diversity and Dams. Some of the more significant attractions include:

- Water sports such as skiing, wind surfing, sailing, motor boating at Grootdraai Dam;
- San/bushman rock engravings near Standerton;
- Standerskop Nature Reserve;
- Graceland casino, golf course and resort;
- Horse riding;
- Bird watching; and
- Hiking trails

The proximity of the Region to Johannesburg and Pretoria is significant in terms of tourism potential.

Further, the Mpumalanga Tourism Growth Strategy (MPTA, 2007) has determined that Mpumalanga's tourism product can be diversified and expanded to cover a wide range of product market segments to include:

- Nature tourism;
- Residential;
- Activity tourism;
- Sports;
- Adventure;
- Shopping;
- Golf;
- Medical;
- Eco-resorts;
- Conference;
- Special interest;
- Festivals/events;
- Touring; and
- Leisure/entertainment.

The tourism potential of part of the Upper Vaal WMA was noted (specifically, the area which is south-east of Gauteng). The Tourism Growth Strategy called this area "Cosmos Country" and noted that it is valuable in offering easy weekend access for visitors. Grootdraai Dam was also noted as a popular water sports destination. Events in the area include the National Potato Festival; Kosmos Karnival; and the Sejacufe Jazz Festival (MPTA, 2007).

2.1.6 Catchment Management Agency

There is no Catchment Management Agency (CMA) in place for the catchment. However, there are a number of forums in the Upper Vaal WMA. These include:

- Barrage Reservoir Forum;
- Blesbokspruit Forum;
- Klip River Forum;
- Leeu-Taaiboschspruit Forum;
- Rietspruit Forum;
- Grootdraai Dam Forum;
- Vaal Dam Reservoir Forum;
- Waterval Forum; and
- Wilge River Forum.

The different forums report to the Vaal Dam Catchment Executive Committee, which in turn reports to the Upper Vaal Reference Group and Upper Vaal CMA (once in place) (Figure 3 below).

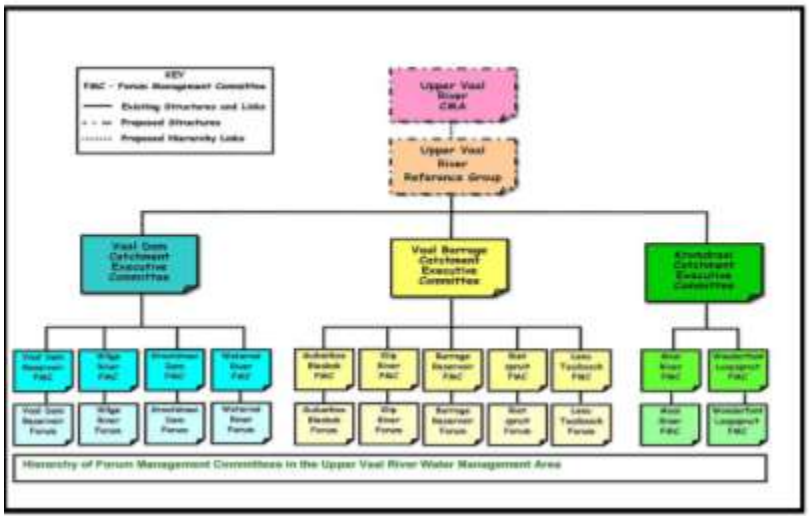

Figure 3: Forums which form part of the Vaal Dam Catchment Executive Committee

2.1.7 Safety of Navigation

In addition to its common law responsibility, DWS is, in terms of the requirements described in the National Water Act (Act 36 of 1998), amongst others, responsible for the safety of Government's waterways and watercourses, including its Dams. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed and/or floating[1] AtoN for general navigation.

Furthermore, Local Accountable AtoN Parties (LAAP) and other Bodies (clubs, commercial enterprises, private landowners etc.) which provide access to the Dam have a responsibility to ensure that the required fixed and/or floating AtoN are provided. These bodies are required to obtain the necessary support and permission from DWS and SAMSA.

In order to demarcate specific zones/areas, standardised demarcation markers are to be used in conjunction with the relevant AtoN.

There are currently no adequate, standardised and harmonised fixed and floating AtoN and Demarcation Markers in place.

[1] A marine Aid to Navigation (AtoN) is defined by the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) as "*A device or system external to vessels that is designed and operated to enhance the safe and efficient navigation of vessels and/or vessel traffic*".

2.2 Purpose of Grootdraai Dam

Grootdraai Dam was built in 1982 mainly to support the water needs of the SASOL I, II and III Coal to Petrol Plants at Secunda, ESKOM's, Tutuka Power Station as well as the Matla, Duvha, Kendal and Kriel Power Sations located on the coal fields in the adjacent Olifants River basin. Water from the Grootdraai Dam is used mainly for industrial purposes, and to a lesser extent for domestic and recreational purposes. The Dam also provides some flood attenuation for Standerton.

2.3 Overview of the Dam

Grootdraai Dam falls within LLM and the Gert Sibande District Municipality in the Mpumalanga Province. The Dam also falls within the Upper Vaal WMA. Table 2 below provides an overview of the Dam whilst Figure 4 shows the locality of the Dam.

Table 2: Overview of Grootdraai Dam (DWA, 1988)

Dam Characteristics	
Year of Completion	1981
Purpose of the Dam	Industrial water
River	Vaal River
Nearest Town and Province	Standerton, Mpumalanga
Type	Combined gravity and earth-fill type dam
Net Storage Capacity	350 000 000 m^3
Wall Height	42 m
Crest Length	2180 m
Material Content of Dam Wall	Concrete

Type of Spillway	Gated
Capacity of Spillway	11500 m^3/s
Surface Area of Dam at Full Supply	5500 ha (55 km^2)
Owner, Designer and Construction	DWS

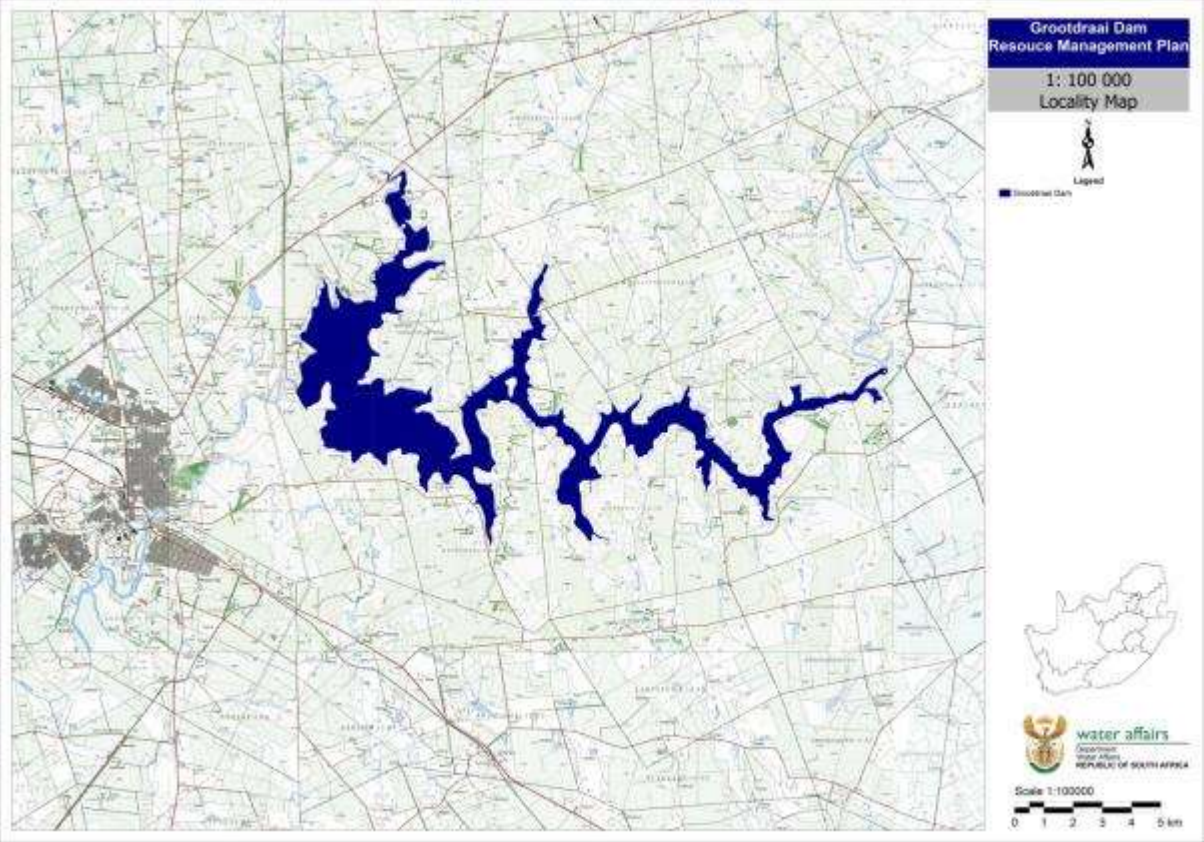

Figure 4: Location of Grootdraai Dam

2.4 Legislative Framework

The RMP forms the overarching framework for the management of Grootdraai Dam. It is informed by relevant policy, legislation and planning documents administered by other Government Departments. Similarly, these Government Departments are required to use the RMP to inform the development of future policy, legislation and planning documents.

The Grootdraai Dam RMP was informed by the following policies, legislation, frameworks and strategies:

- Constitution of the Republic of South Africa, (Act 108 of 1996);
- National Water Act (Act 36 of 1998);
- Municipal Systems Act, 2000 (Act 32 of 2000);
- The Development Facilitation Act, 1995 (Act 67 of 1995);

- Communal Land Right Act, 2004 (Act 11 of 2004);
- Restitution of Land Rights Act, 1994 (Act 22 of 1994);
- Intergovernmental Relations Framework Act, (Act 13 of 2005);
- Disaster Management Act, 2002 (Act 57 of 2002);
- Water Services Act, 1997 (Act 108 of 1997);
- State Land Disposal Act, 1961 (Act 48 of 1961);
- Land Administration Act, 1995 (Act 2 of 1995);
- Environment Conservation Act (Act 73 of 1989);
- National Environmental Management Act (NEMA) (Act 107 of 1998);
- National Environmental Management Air Quality Act (Act 39 of 2004);
- National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004);
- National Environmental Management: Protected Areas Act (Act 57 of 2003);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Veld and Forest Fire Act, (Act 101 of 1998);
- Minerals and Petroleum Resources Development Act (Act 28 of 2002);
- National Heritage Resources Act (Act 25 of 1999);
- Conservation of Agricultural Resources Act (Act 43 of 1983);
- Tourism Act (Act 72 of 1993);
- South African Maritime Safety Authority Act (Act 5 of 1998);
- National Sport and Recreation Act (Act 110 of 1998 as amended);
- Safety at Sports and Recreational Events Act (Act 2 of 2010);
- Merchant Shipping (National Small Vessel Safety) Regulations, 2007
- NEMA EIA Regulations (2010);
- South African National Biodiversity Institute (SANBI) Biodiversity GIS information;
- Provincial Growth and Development Strategy (PGDS);
- Spatial Development Framework (SDF) and Integrated Development Plan (IDPs);
- Local Economic Development Plans;
- Water Services Development Plans;
- Land Use Management Plans;
- Provincial Integrated Environmental Management Plan;
- Sport and Recreation SA Strategic Plan - 2011-2015;
- Provincial Conservation Plan; and
- Provincial State of the Environment Report.

The Section below provides an overview of how the RMP has considered some of the key policies, legislation and strategies.

2.4.1. National Water Act (Act 36 of 1998)

The Act aims to ensure that the Nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account (amongst other factors):

- 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 growing demand for water use; 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.

Further, Section 113 of the Act makes provision for the recreational use of Dams. It further allows that the Minister may control or prohibit access to Dams and make reasonable charges for the a.) use of; b.) entrance into; and c.) use of any water surface or land associated with any Government Waterworks for recreational purposes.

The definition of water use in the Act includes the use of water for recreational use (Section 21k). Based on this requirement, the Department has published guidelines for recreational use of water and requires the following:

- DWS structures or infrastructure in and around water resources need to be constantly protected and maintained;
- Enforcement through mechanisms such as a Zonal Map, which is developed as part of the RMP process, is essential to resolve conflict amongst users both within the recreational water use; e.g. skiing vs. angling, or with other uses; e.g. agriculture;
- An appropriate degree of policing of irresponsible use should be maintained;
- Establishing water management institutions for the water resource users allows the institutions to charge for their activities therefore improving management and policing which instils a sense of ownership and responsibility among users; and
- Involving Public Private Partnerships (PPPs) could address commercial use but also assist with safety management at the Dam.

Once the RMP has been gazetted, the RMP will regulate access and use of the Dam. It is important to note that users will need to comply with other relevant legislation including the Merchant Shipping (National Small Vessel Safety) Regulations, 2007, The National Water Act, 1998 (Act No 36 of 1998), SAMSA Marine Notices and its Directive on the Standardisation of fixed and floating AtoN and Demarcation Markers on all navigable Inland Waterways in the Republic of South Africa and the relevant provincial ordinances.

According to DWAF (2007) Internal Guideline: Generic Water Use Authorisation Application Process, the term Recreational Water Use (RWU) encompasses the uses of water, including the surface, for:

- The exclusive purpose of sport, tourism or leisure;
- Personal or commercial recreational water use; and
- Activities which contribute to the general health, well-being and skills development of individuals and society.

In addition, the only water use entitlement that currently applies to RWU is Schedule 1 of the Act. Currently the Act is silent on Commercial RWU and thus it is necessary for the RMP to provide guidance this regard.

2.4.2. GN 654 of May 1964

The only Departmental Regulations limiting RWU at Government Waterworks is Government Notice R654, dated 1 May 1964.

These Regulations are read together with section 113 of the National Water Act (Act 36 of 1998) and only apply to the water surface and surrounding State Land of a State Dam, and not to other water resources.

The Regulations provide guidance on access control, use of firearms and other weapons,

speed limits, parking areas, trading, reserved areas, fire management, hygiene, camping and accommodation, access to works, photography, safety rules, reckless and unseemly conduct, damage to property, prohibited areas, protection of fauna and flora, swimming, angling, boat Regulations, water skiing and hydroplaning; and general rules.

2.4.3. Water Services Act (Act 108 of 1997)

The Act outlines the roles and responsibilities for the supply of water and sanitation to citizens. It also recognises the rights of all humans to basic water supply and sanitation services. The management of the Dam cannot compromise the purpose of the Dam especially if it is for domestic water supply.

2.4.4. National Environmental Management Act (Act 107 of 1998) as Amended

The National Environmental Management Act (Act 107 of 1998), or NEMA, as it is simply known, is the foundation piece of legislation for environmental management in South Africa.

Section 2 of the Act has the largest impact on the RMP in that future development and management of the Dam must ensure the following:

- The disturbance of ecosystems and loss of biological diversity both in and around the Dam must be avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- Pollution and degradation of the Dam is avoided, or, where it cannot be altogether avoided, is minimised and remedied;
- The disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;
- 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 jeopardised;
- A risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Coupled with these considerations, the following is stipulated with regards to integrating social and economic aspects into the purely biophysical aspects of the environment:

> *"Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option."* ***(National Environmental Management Act, 1998 (Act 107 of 1998)***

2.4.5. National Environmental Management: Protected Areas Amendment Act (Act 15 of 2009)

The National Environmental Management: Protected Areas Amendment Act (NEMPA) (Act 15 of 2009) ensures the protection and conservation of ecologically viable areas in the country. It further seeks to achieve co-operative environmental governance and to promote sustainable and equitable utilisation and community participation.

2.4.6. The National Environmental Management: Biodiversity Act (Act 10 of 2004)

The National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004)

provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.

Chapter 4, Part 2 of the Biodiversity Act provides a listing of species as threatened or protected. If a species is listed as threatened, it must be further classified as critically endangered, endangered or vulnerable. The Act defines these classes as follows:

- **Critically endangered species:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- **Endangered species**: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- **Vulnerable species**: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain restricted activities are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the Act are keeping, moving, having in possession, importing and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007 along with the Regulations on Threatened or Protected Species.

Many Dams around South Africa are likely to have threatened or protected species. The management of these species in line with NEMBA must be taken into account in the RMP and by managers at the Dam.

2.4.7. National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive Species Lists, 2014 (GN 599 of 2014)

The Alien and Invasive Species Lists were promulgated on 1 August 2014. They provide certain prohibitions of use of Invasive alien species. This includes Catch and release of a specimen of a listed invasive fresh-water fish or listed invasive fresh-water invertebrate species. However certain exemptions apply depending on the area and species in question. The details are provided in Notice 3 of the Species List and include:

Species	Category/Area
Large-mouth bass	a. 2 in National Parks, Provincial Reserves, Mountain Catchment Areas and Forestry Reserves declared in terms of the Protected Areas Act. b. 3 in all rivers, wetlands, natural lakes and estuaries in which it occurs. c. 2 for conveying, moving or otherwise translocating a live specimen. d. Large-mouth bass is not listed for dams within discrete catchment systems in which it occurs (excluding (a) above).
Common carp	a. 1b in National Parks, Provincial Reserves, Mountain Catchment Areas and Forestry Reserves declared in terms of the Protected Areas Act. b. 2 for release into a dam within a discrete catchment system in which it occurs. c. 3 in all rivers, wetlands, natural lakes and estuaries in which it occurs. d. Subject to b, common carp is not listed for dams within discrete catchment systems in which it occurs.

The Dam does not occur in a protected area and thus both species are not listed however it should be noted that no moving or translocating of live specimens are allowed.

2.4.8. The National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive

Species Regulations (GN 33683 of 19 July 2013)

The Alien and Invasive Species Regulations require the development and coordination of Species Management Programmes for all Invasive Species listed in Category 1B.

These species management programmes must stipulate the following:

- The listed invasive species to which it relates;
- The measures to eradicate or control the listed invasive species;
- The areas in which the measures are to be applied; and
- The schemes to fund the measures, if applicable.

Species monitoring, control and eradication plans are also required and the Department will publish guidelines on the compilation of these documents within a year of the publication of the regulations.

The Regulations provide for a register of alien and listed invasive species to be compiled. In addition, all research on invasive species needs to be lodged. This has implications for the RMP as any small-scale fishery proposals or alien invasive management plans will need to be approved in line with these regulations.

2.4.9. The Municipal Systems Act (Act 32 of 2000)

The Municipal Systems Act (Act 32 of 2000) serves to provide the framework to enable municipalities to ensure access to essential services to their citizens. The Act gives priority to the basic needs of the community, but also gives local government the freedom to set tariffs, and charge for services independently of other municipalities, providing that decisions made are in the best interest of the community.

The Act is of particular relevance to the RMP process, as it requires integrated planning from all spheres of government to ensure equitable and accessible municipal services. This means that any planning or policy-making must be in line with local government policies, planning and initiatives.

2.4.10. Conservation of Agricultural Resources Act (Act 43 of 1983)

The Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983) seeks to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader plant species.

Given that much of the land surrounding the Dam is State Owned Land it needs to be managed in such a way that it reduces the threat and spreading of invasive alien species.

In addition, Invasive Alien Plants are known to use significant volumes of water in correlation to the plants biomass and thus affect the volume of water available for use.

2.4.11. Public Finance Management Act (PFMA) (Act 29 of 1999)

The object of the Act is to secure transparency, accountability and sound management of the revenue, expenditure, assets and liabilities of Government Departments.

The Act promotes the objective of good financial management in order to maximise service delivery. The Act allows DWS to enter into PPP agreements with the private sector for the commercial use of state assets.

2.4.12. Treasury Regulations of 15 March 2005

Section 76 of the Public Finance Management Act (PFMA) (Act 29 of 1999) provides for the making of Regulations for governing the efficient use and financial management of State Resources.

Section 16 of the Treasury Regulation provides guidance on PPP including the process that needs to be followed, procurement and management of PPPs.

2.4.13. *Safety at Sports and Recreational Events Act (Act 2 of 2010)*

The purpose of the Safety at Sports and Recreational Events Act (Act 2 of 2010) is to provide measures to safeguard the physical wellbeing and safety of people at at sports, recreational, religious, cultural or similar events held at stadiums, venues or along a route. It also provides for the accountability of event role-players. The Act also provides for Access Control Officers which can be appointed by the Event Organisers. These officers control access of both people and motor vehicles to an event and prevent a person from entering or requesting that a person leaves should the need arise. The act also allows for Peace Officers to be in charge of search and seizures at an event.

The Act also specifies that an Event Planning and Safety Committee must be set up for all events categorized as medium or high risk. This committee should include the following stakeholders:

- The National Commissioner or an authorised member;
- A local authority disaster management department or centre;
- A controlling body, in respect of high-risk events only;
- A stadium or venue owner;
- The event organiser; and
- An emergency service provider.

2.4.14. *Merchant Shipping (National Small Vessel Safety) Regulations (GN.R 705 of 8 August 2007)*

The National Small Vessel Safety Regulations, 2007 were promulgated under Section 356 of the Merchant Shipping Act (Act 57 of 1951) and provides a number of requirements including:

- Vessel Safety Requirements;
- Crewing; and
- Requirements for Water Skiing.

It also provides for the provision of an Enforcement Officer who can go aboard a vessel and search it and take possession of any intoxicating drugs or liquor. The Enforcement Officer may also request that the Identification Documents, Skipper's Licenses etc. be produced. The Officer may also direct the movement of the Small Vessel where necessary.

2.4.15. *South African Maritime Safety Authority Act (Act 5 of 1998)*

One of the South African Maritime Safety Authority's (SAMSA's) three legislative mandates is "to ensure safety of life and property at sea". The Act enables SAMSA to administer and execute the relevant maritime legislation.

2.4.16. *The National Key Points Act (Act 102 of 1980)*

The Act allows the Minister to declare any place or area a National Key Point should he feel that: "*that any place is so important that its loss, damage, disruption or immobilization may prejudice the Republic, or whenever he considers it necessary or expedient for the safety of the Republic or in the public interest.*"

The owner of the National Key Point is then required to take the necessary steps to ensure the security of the declared area.

Although there is no published list of National Key Points, it is known that Grootdraai Dam is a declared Key Point due to its strategic importance of supplying water to important industries.

2.4.17. *The Mpumalanga Nature Conservation Act (Act 10 of 1998)*

The Act sets out how wild species are to be managed in terms of human use, such as collecting, fishing, hunting, capture, transport and trade. It deals with rare and endangered

species and the powers needed to protect them, and the protection of sensitive natural sites from damage and exploitation.

2.4.18. The Mpumalanga Tourism and Parks Agency Act (Act 5 of 2005)

The Act was responsible for creating the MTPA in 2006, with a specific mandate:

- To promote and sustainably manage tourism and nature conservation; and
- To provide for the sustainable use of natural resources.

In pursuing its objectives, the MTPA is required to:

- Conserve and manage biodiversity and ecosystems;
- Develop and manage protected areas;
- Promote, develop and market tourism; and
- Create growth and transformation within the industry, and thereby economic and employment opportunities for disadvantaged people.

MPTA does not manage the State Land around Grootdraai Dam however there is an informal fishing area is in place which has MPTA sign posts in place. The management of this fishing area is unknown.

2.5. Existing Plans

An RMP cannot function in isolation therefore associated planning initiatives must be considered and must inform the development of the RMP.

The following planning initiatives were taken into account in developing the RMP:

- The IDP of LLM;
- The Water Services Development Plan of LLM;
- The Strategic Framework of Water Services, 2003;
- The Provincial Spatial Economic Development Strategy, 2003;
- National Spatial Development Perspective, 2006; and
- The New Growth Path, 2012.

Figure 5 below provides an overview of how the RMPs is informed by existing plans at different spheres of government.

Figure 5: Relationship between RMP and Planning Initiatives

2.5.1. The Cooperative Inland Waterways Safety Programme (CIWSP)

The Cooperative Inland Waterways Safety Programme (CIWSP) project is a partnership between multiple government entities and between the government and the community. The aim is to enhance the development of a best practice model to ensure a safe and structured inland maritime environment and culture, whilst protecting the country's precious water resources.

Although Grootdraai Dam is not one of the Pilot Dams for this project, this RMP integrates information from the CIWSP into the management objectives for this Dam.

2.6. Socio-Economic Environment

LLM is one of the largest local authorities in the Gert Sibande District Municipality, embracing the town of Standerton on its western boundary.

Unless otherwise indicated, all information in the section was obtained from the Census 2011 (Statistics South Africa, 2011) data.

2.6.1. Population

Lekwa Local Municipality has a population of 115 662 persons. The population of 15 – 34 age groups and the 35-64 age group account for 37 % and 27% of the population respectively. This means that 64% of the population are of working age.

Youth in total account for 29% of the population indicating that youth are expected to contribute

towards the households bearing more responsibility than what is normal. Only 5% of the population are over 65 years of age (Figure 6).

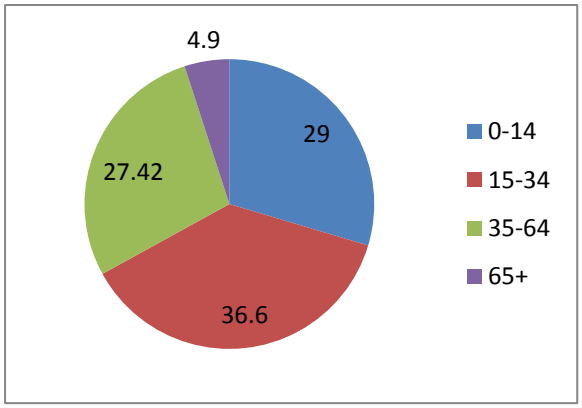

Figure 6: Population

2.6.2. Education

Forty-two percent of the population in LLM have only received some primary school education while only 12.7% of the population have completed High School (Figure 7).

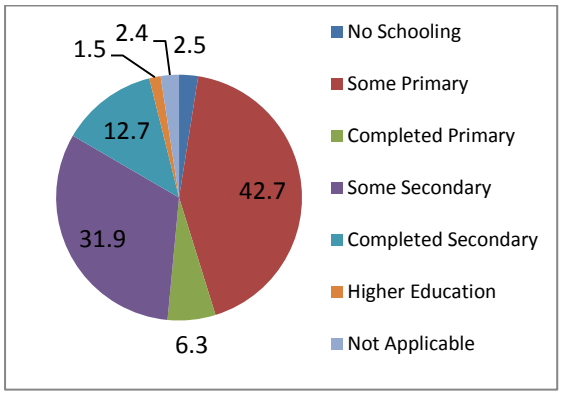

Figure 7: Education Level

2.6.3. Employment

Figure 8 shows that 15% of the people in the LLM are unemployed. 44% of persons are employed while 37% of the population is not economically active.

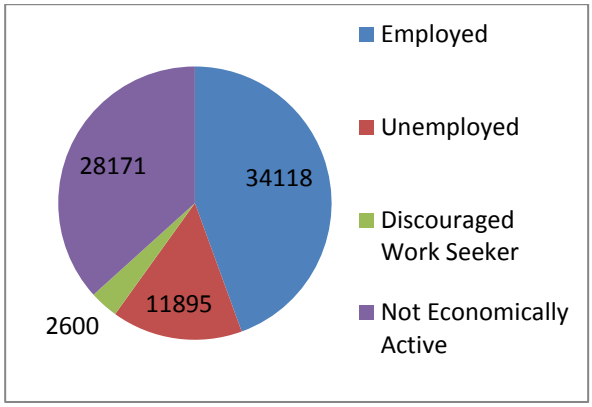

Figure 8: Employment Status

Many of the people living around the Dam are farm workers.

2.6.4. Monthly Personal Income

Figure 9 below shows monthly income per person for 2011. 10% of the population earn no income at all.

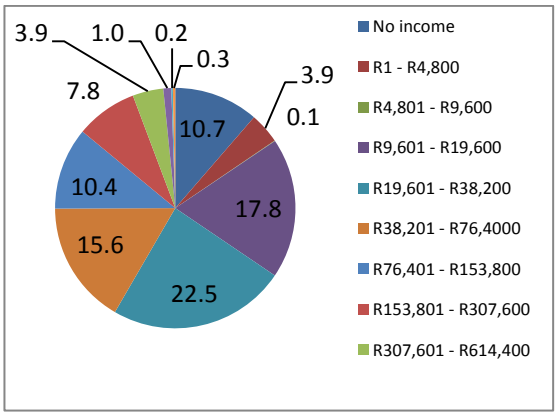

Figure 9: Income status

2.6.5. Gross Value Added

Gross Value Added (GVA) is defined as the total value of all the goods produced in a specific area during a specific period.

Quantec Research defines the major sectors into Primary Sector, which is extractive, Secondary Sector, made up of manufacturing and the Tertiary Sector, which comprises of services. Figure 10 below shows the GVA per sector for 2011. This data is taken from Quantec Research and the variables are explained below.

Primary Sector:

- Agriculture, forestry and fishing;
- Mining and Quarrying

Secondary Sector:

- Manufacturing. This includes food, beverages and tobacco; textiles, clothing and leather goods; wood, paper, publishing and printing; petroleum products, chemicals, rubber and plastic; other non-metal mineral products; metals, metal products, machinery and equipment; electrical machinery and apparatus; radio, TV, instruments, watches and clocks; transport equipment; and furniture and other manufacturing.
- Electricity, gas and water; and
- Construction

Tertiary Sector:

- Wholesale and retail trade, catering and accommodation. This sector represents the tourism sector through catering and accommodation and the sale of goods through trade.
- Transport, storage and communication;
- Finance, insurance, real estate and business services;
- Community, social and personal services; and
- General Government

Figure 10 shows that Finance, Insurance, Real Estate and Business Services contributes the most to the GVA (R865 million) followed closely by Mining and Quarrying (R838 million).

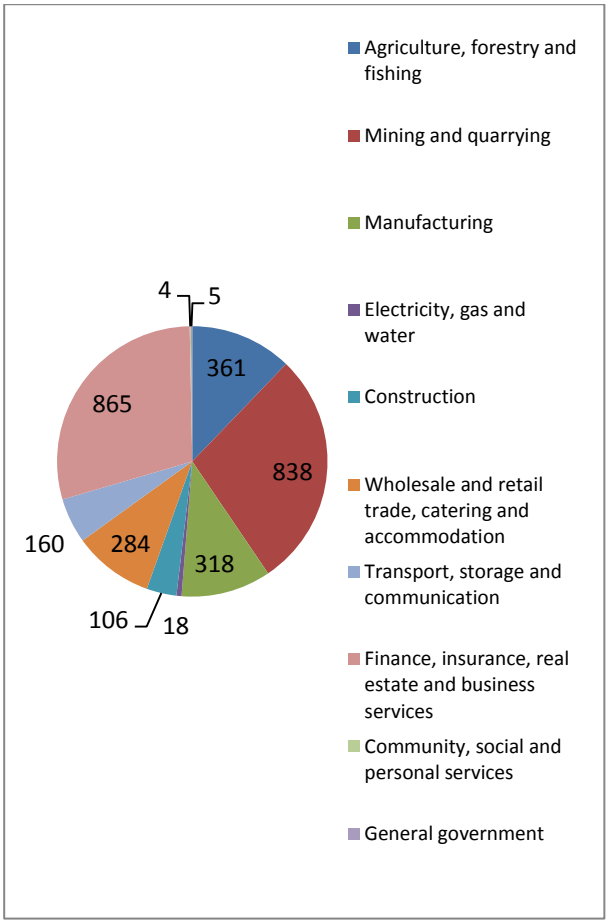

Figure 10: GVA for the Lekwa LM (In R Millions)

2.7. Development Potential

The development potential of Grootdraai Dam and the surrounding town is relatively high especially in terms of tourism and water sport activities.

The LLM IDP (2013) noted that growing sectors such as the Agriculture and Tourism need to be strengthened to ensure progressive economic development. Investment in these areas needs to be coordinated and integrated with the IDP and Local Economic Development (LED) Strategy. The IDP also noted that there are currently limited tourism facilities within the LLM and tourism does not make a meaningful contribution to employment or GVA in the area. However, given the proximity of the area to Gauteng and other tourism attractions and routes e.g. the N4 and Chrissiesmeer, as well as

some of its resources, tourism can be developed for the area. Potential resources include:

- The Grootdraai Dam;
- The Vaal River;
- The Reitvaal Conservancy;
- Bloukop Conservancy, and
- The railway lines.

The IDP and LED strategy also highlighted the need for encouraging water craft related industries as well as the need for the proper institutional arrangements required to do so.

Other development opportunities occur in light of the biodiversity in the area which has not been utilised to its full extent. According to SANBI Municipal biodiversity summaries, there are no formally protected areas in LLM. However, two conservation are present in the general region, Bloukop and Reitvaal Nature Reserves.

Further, due to the high income estates (e.g. Grootverlangen Country Estate) near the Dam, there is also potential for more high income accommodation around the Dam. However, there is also a concern that this would make the Dam inaccessible to the local community.

According to the Gert Sibande SDF (2009), Standerton is one of four first order service centres within the district, together with Secunda, Ermelo and Piet Retief. These towns have the largest populations of all towns in the District, and also offer the widest spectrum of activities and services, including business, retail, industrial uses, social services and residential uses.

Standerton is centrally located within the LLM and being the main urban settlement dominates industrial and manufacturing activities within the local municipal area. In terms of business activities, Standerton makes the largest contribution to both private sector services and retail activities, and public services and administration activities. It is also the focus of most of the main roads as well as the railway network, thus reinforcing its importance. The location of the Dam near Standerton thus also increases development potential.

2.8. Access and Infrastructure

Public Access is through the Grootdraai Dam Resort which was managed by LLM. The resort is no longer managed and has been vandalized. There is no security or control of access through the resort.

The main recreational club is SBAC. The club has a facility with picnic areas, camping and caravan accommodation, ablution facilities and slipways.

There is an informal fishing area. Access to this fishing area is through the DWS access point into the National Key Point Area and then through a separate access gate near the Dam Wall. The organisation responsible for management of this area is not known at this point however there is a MPTA signboard in place at the entrance.

2.9. Biophysical Environment

2.9.1. Water Quality

The water quality at Grootdraai Dam has been monitored by DWS since 1982. The average values during the period between 1975 and 2013 are provided below for Monitoring Point C11_90612. For the most part, the values are good and the time series analysis does not show any worrying trends at this point (Table 3).

Table 3: Water Quality at Grootdraai Dam (DWA)

Variable	Average (1976-2013)
Calcium (Ca)	15.13
Chloride (Cl)	10.62
Dimethyl sulphide (DMS)	166.22
Electrical Conductivity (EC)	23.45
Fluoride (F)	0.25
Potassium (K)	3.32
KJEL_N_Tot_Water	0.71
Magnesium (Mg)	10.12
Sodium (Na)	12.65
Amonia (NH4_N)	0.09
Nitrates (NO3_NO2)	0.25
Phosphorous (P)	0.07

pH	7.92
Phosphates (PO4_P)	0.03
Silicon (Si)	5.42
Sulphates (SO4)	24.31
Total Alkalinity (TAL)	74.00

The Maucha Diagram below shows that the Total Alkalinity (TAL) is high (Figure 11).

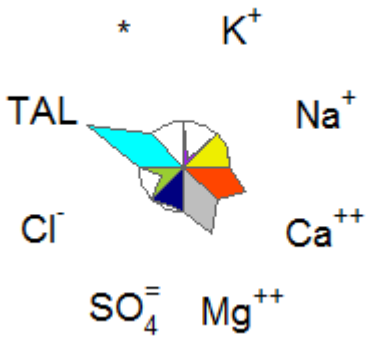

Figure 11: Maucha Diagram for Grootdraai Dam

The water quality of the Vaal headwater deteriorates significantly in the Bethal area, upstream of Grootdraai Dam possibly due to extensive coal mining activity and sewerage inflow from the numerous small towns in the area (ORASECOM, 2008). Further, high loads of phosphate and nitrogen enter the Vaal system via the Blesbokspruit and Leeuspruit upstream of Grootdraai Dam due to sewage and agricultural pollution. While there is some mixing and dilution occurring in the Dam and phosphate levels are quite low (39µg/l), the total phosphorus concentrations are high (>47 µg/l), which is causing algal problems in the Dam. This is despite the fact that the Grootdraai system is turbid and light limitation inhibits the development of extreme phytoplankton blooms (van Ginkel, 2001). Toxic cyanobacteria blooms in the Dam poses a domestic health hazard to the local community, as the water treatment facilities cannot remove cyanobacteria toxins, if present (van Ginkel 2001).

Van Ginkel et al. (2001) showed that cyanobacteria formed the dominant phytoplankton group in the Grootdraai Dam from 1989 to 1999. The chlorophyll a concentrations seldom exceeded the 30 µg/_ eutrophication limit, which typically indicates potential bloom conditions (van Ginkel 2001). The cyanobacteria in the Grootdraai Dam have previously been found to contain both toxic and non-toxic Microcystis (van Ginkel 2001).

According to the Integrated Water Quality Management Plan for the Vaal River System (DWAF, 2009), the most significant pollution sources in the incremental catchment between Vaal Dam and Grootdraai Dam are located in the Waterval River catchment. These include gold and coal mines as well as the Sasol Secunda oil-from-coal petrochemical plant. There are significant waste facilities in the form of ash dumps and tailings storage facilities associated with the mines and Sasol Secunda industrial complex. There are also point source discharges in the form of permitted cooling water blow down from Sasol Secunda plant and the major wastewater treatment works discharges from Embalenhle and Secunda.

Further, Acid Mine Drainage (AMD) is also a potential problem although at this point the risk of this is low (McCarthy and Humphries, 2012) due to the fact that the Dam has a large volume and there are no large wetland's in the catchment which can accumulate pollution in large enough volumes. Pollution of the Dam is more likely to proceed gradually.

Although the water quality of the Grootdraai Dam is currently acceptable there are a number of operational and defunct coal mines in the catchment which need to be managed pro-actively. Estimates of the of water volumes decanting from the mines post closure is 48 million m^3 per annum and thus post closure plans need to be finalized and implementation of the plans need to be managed.

The water quality in the Grootdraai Dam is also dependent on the water quality of the water transferred into the Vaal River System. The recent water quality history shows that the water quality in Heyshope Dam is deteriorating, and thus impacting the water quality of Grootdraai Dam.

In addition, during consultation, concerns regarding increased siltation were raised.

2.9.2. Aquatic Invasive Plant Species

Currently 14 alien aquatic and wetland plant species are declared weeds or invader plants in South Africa and their control is subject to the CARA (Act 43 of 1983), and amended in 2001. Another 13 species have been proposed for listing under CARA and the NEMBA (Act 10 of 2004). There are also a number of indigenous or cosmopolitan (world-wide) species that can flourish and become troublesome in disturbed aquatic habitats.

According to the Agricultural Geographic Information System (AGIS) Weed and Invasive Plant (WIP) website, only *Azolla filiculoides* (red water fern) occurs in the 2629CD Quarter Degree Square (QDS) surrounding the Dam.

*Figure 12: Azolla filiculoides (*www.invasives.org.za*)*

A. filiculoides is a small, green to reddish-brown or purplish, free floating plant. The adult plant is approximately 25-35 mm long, with the length of the individual leaves being approximately 1-1,5 mm. *A. filiculoides* is native to South America and was introduced to South Africa some 30 years ago. The plants are able to rapidly colonise open water surfaces through vegetative reproduction as well as produce spores that may be transported over vast distances. The National Botanical Institute has recorded the weed at 136 localities throughout the country, and it is reported to infest every river in the Free State (SANPARKS, ND). The major consequences of the dense mats that are formed by the plant are:

- Reduction in quality of drinking of water caused by bad odours, colour and turbidity;
- Promotion of water-borne, water-based and water related diseases;
- Increased siltation of rivers and dams; and
- Loss of water by water evaporation through the weeds surface.

Figure 13: Nymphaea Mexicana (SAPIA, 2010)

Nymphaea Mexicana (yellow water lily), and *Eichhornia crassipes* (water hyacinth) are also known to be problems on the Vaal River (ORASECOM, 2008; SAPIA, 2010).

Figure 14: Eichhornia crassipes (SAPIA, 2010)

Although these species are not confirmed at the Dam, it is important to ensure that it does not spread to the Dam from the Vaal River (if it has not already done so).

Invasive aquatic plants are known to disrupt navigation, fishing and other recreational activities, adversely affect waterflow, increase

the loss of water from storage dams and pose a threat to hydro-electric installations. High densities of the plants degrade aquatic ecosystems and are a threat to biodiversity. They can also result in the deaths of cattle and livestock (due to walking on 'beds' of aquatic weeds which can result in drowning).

Further, oopportunistic species can flourish in disturbed environments, often becoming the dominant species to the detriment of the other species. This group includes indigenous and cosmopolitan (world-wide) species. These species respond to various disturbances and are usually symptomatic of a problem and not the problem itself. The disturbances range from nutrient enrichment through agricultural run-off and sewerage contamination to manipulations of river flow and water levels, including destruction of wetland vegetation (Henderson and Cilliers, 2002).

2.9.3. Terrestrial Invasive Plant Species

A large number of alien species occur in the catchment which surrounds the Dam. These include the following.

- *Achyranthes aspera*;
- *Datura stramonium*;
- *Eucalypyus* spp.;
- *Gleditsia triacanthos*;
- *Oenothera jamesii*;
- *Salix babylonica*; and
- *Sesbania punicea*.

This has potential negative implications for the management of the Dam as terrestrial invasive plant species are known to result in:

- Loss of indigenous species as a result of competition for space and resources with alien species;
- Disruption of aquatic and riparian ecosystems;
- Erosion of river banks and riparian areas;
- Alterations in environmental flows as a result of water use by invasive alien plants; and
- An increased fire risk, which destroys indigenous habitats.

2.9.4. Fauna

2.9.4.1. Fresh Water Fish

Freshwater Ecosystem Priority Area (FEPA) maps provide an overview of the threatened fish species in an area. Although there are no specific threatened species at Grootdraai Dam, a Fish Sanctuary does occur approximately 8 km from the Dam and *Barbus pallidus* North (Barbus sp. 'pallidus cf. north') does occur in this area.

The following species are found at the Dam:

- Barbel (*Clarias gariepinus*);
- Carp (*Cyprinus carpio*);
- Large Mouth Bass (*Micropterus salmoides*);
- Mudfish (*Labeo capensis*); and
- Yellow Fish (*Labeobarbus marequensis*).

2.9.4.2. Amphibians

The Mpumalanga Province has 57 described frog species. At least one South African species alien to Mpumalanga have been recorded. There is only one invasive species (guttural toad) that is not indigenous at the provincial level.

11 species were found in the Quarter Degree Grid Square (QDS) which surrounds the Dam using the South African Frog Atlas Project (www.sarca.adu.org.za). These species are listed below.

- *Amietophrynus rangeri;*
- *Amietophrynus gutturalis;*
- *Kassina senegalensis;*
- *Semnodactylus wealii;*
- *Xenopus laevis;*
- *Amietia angolensis;*
- *Amietia fuscigula;*
- *Cascosternum boettgeri;*
- *Strongylopus fasciatus;*

- *Tomoptera cryptotis; and*
- *Tomopterna nataensis.*

2.9.4.3. Mammals

Mpumalanga has 81 described mammal taxa (species and subspecies).

The following species have been recorded in the 2629 degree grid square which surrounds Grootdraai Dam (www.vmus.adu.org.za) (ADU, 2012):

- Common Duiker (*Sylvicapra grimmia*);
- Yellow Mongoose (*Cynictis penicillata*);
- Suricate (*Suricata suricatta*); and
- Spotted-necked Otter (*Lutra maculicollis*).

2.9.4.4. Avifauna

Bird life at Grootdraai Dam is very species rich, with well over 250 bird species noted in the area (www.mybirdpatch.adu.org.za) including the following species:

- African Fish-Eagle;
- Amethyst Sunbird;
- Barn Owl;
- Black Stork;
- Giant Kingfisher;
- Greater Double-collared Sunbird;
- Greater Flamingo.
- Malachite Kingfisher;
- Marabou Stork;
- Marsh Owl;
- Pied Kingfisher;
- Secretarybird;
- White Storks; and
- Yellow-Billed Stork.

2.10. Heritage

Standerton (located near Grootdraai) was named after Adriaan Hendrik Stander, a Boer leader who owned the farm on which Standerton was established in 1876. Standerton played a role in South African history when, during the Second Boer War, a British garrison was besieged in the town for three months by Boer forces. Stander died in 1896 and was buried in the town bearing his name.

The Great Trek Memorial Monument was destroyed in 2007 however there are plans to restore the memorial.

According to TourismRSA, other heritage and historical resources include:

- **Fort Alice:** The old fort, 2km outside town, was officially known as Fort Alice and unofficially as the "flea laager". During the First Anglo-Boer War, while the British troops waited in vain for their relief, the Boers peppered them with long-range shots from their vantage point on Stander's Kop. Not much is left of the fort and the battle site;
- **Historic Buildings**: The Dutch Reformed Church, Magistrate's Court with its colonnades, arches and "Juliet" balconies and the building housing the Carnegie Public Library are some of the fine architectural examples in town; and
- **Kraal remnants:** The remnants of the kraal (village) of the famous chief, Chief Mzilikazi, the founder of the Ndebele (Matabele) Nation is located in the area.

2.11. Current Institutional Arrangement

2.11.1. Official Institutional Structure

DWS is the official custodian and owner of the Grootdraai Dam. However, DWS signed over management of approximately 145 ha (1.45 km^2) of State Land (known as the Embankment) to the then City Council of Standerton (now LLM) on 19 November 1985. This agreement had the following conditions:

- The Council has the right to set foot on, occupy with vehicles, equipment,

animals and buildings that you will need for the development of and the practice of control and supervision over public recreation (in the Embankment area but excluding the demarcated area);

- No permanent structure in the area between the water level and the high flood line of the Dam should be erected, unless principle approval is obtain from DWS beforehand;
- The Council is responsible for providing precautions against any danger on the Embankment, to keep the land clean and free from dangerous plants weeds and management and maintenance of any existing fencing. The Council is also responsible for paying for any further fencing needed at the Embankment; and
- The Council is responsible for providing suitable materials to prevent pollution on the Embankment. The use of poison toxin and the medicine that is used to destroy alien plants must be discussed beforehand with DWS.

Further, based on a letter dated 11 June 2007, the agreement requires that LLM provide an update of their plans for the development of the resort for approval by DWS before entering into any new agreements. Further, the land is not available to be sublet to any other parties.

This condition may have an impact on the future management of the Resort.

2.11.2. Informal Institutional Structure

Currently, the SBAC manages much of the access and recreational use at the Dam. According to LLM, SBAC has an agreement with the municipality to lease the land however no agreement is currently available. Further, SBAC does not have any agreements with DWS.

SBAC does have an internal safety system and has a SAMSA accredited safety officer. There is also a rescue boat available. Although the Boat Club will help with rescues informally, if someone is available, there is no specific system in place for public users accessing the water at the Resort. The SBAC may not always available to deal with an emergency.

During public consultation, it was noted that there may be caretaker agreements between the Department of Agriculture, Forestry and Fisheries (DAFF) or DWS and adjacent farmers which allows them to limit the access of some recreational clubs (such as Sakhile Angling Club) to the State Land. These agreements are not available and the status of such agreements is unknown.

2.11.3. Management of the Water Surface

The water surface of the Dam is managed by DWS. Initial payment for the AtoN and demarcation markers (for general navigation) will be undertaken by DWS. However, the provision and maintenance of the demarcation markers at SBAC and other Bodies will be for the cost of the latter.

In addition, SBAC has surveyed the Dam to determine the location of obstacles and/or dangerous area. These are marked however in some cases, the buoys have been stolen or lost and are no longer in place.

2.11.4. Access

Landownership within the purchase boundary could not be confirmed. However comparison between the purchase boundary provided as part of the 2002 Zonal Plan for the Dam and current GIS suggests that purchase boundary is intact. Further, according to DWS (2013), DWS owns the servitude around the Dam as well as the area around the Dam Wall.

The main public access point is at the Grootdraai Resort. However, the resort is currently not managed and there is no control or safety management in place. During consultation it was also noted that the community did not feel safe at the resort as there was no security in place.

Most access is through SBAC. The club has a facility with picnic areas, camping and caravan accommodation, ablution facilities and slipways.

In addition, to surface water rights, there are a number of shore based angling clubs which have to traverse private property in order to access the surface water. The 2002 Zonal Map for the Dam makes mention of the following Angling Clubs:

- New Denmark Angling Club;
- Standerton, District and Meyerville Angling Club;
- Morgenson Angling Club;
- Volksrust Angling Club;
- Amersfoort Angling Club;
- Meyerville Angling Club; and
- Sakhile Angling Club.

The status of these clubs is unknown at present. However, no specific agreements regarding access to the surface water with DWS are available.

Further, during public consultation, it was mentioned that there had been some issues with the Sakhile Angling Club as the owner of the adjacent land did not want to allow access to the club. It was further noted that there may be caretaker agreements between DAFF or DWS and adjacent farmers which allows them to restrict access to State Land.

There is an informal fishing area at the Dam. Access to this fishing area is through the DWS access point into the National Key Point Area and then through a separate access gate near the Dam Wall. Based on the MPTA signboard is at the entrance to the area, the following rules apply. However, despite the signboard, the management of the fishing area is unclear.

- A valid fishing license is required;
- A valid DWS permit is required;
- Access is under the care of a DWS employee only;
- The area is to be kept clean and tidy;
- No person is allowed in the area between the Dam wall and the bridge;
- Access to the fishing area is only allowed between 06h00 and 18h00; and
- During flood areas, no fishing will be allowed in the river sections.

There is a small community located near the Dam. However, during consultation with the Ward Councillor, it was noted that this community does not access the Dam as they do not believe they are allowed to.

There is also an agreement in place with Vaal Rivier School where an area around the Dam has been made available to the School for recreational and education purposes. During consultation with the School, it was noted that this area had not been used in some years but there was interest in reviving the school's use. The area is mainly used for camping, fishing and group activities. There is no slipway in place.

In addition, due to the gradient of the shoreline, it is possible for vessels to be launched throughout the Dam without any form of access control or agreements with DWS in place.

2.11.5. Permits

A Freshwater Angling License is required from MPTA for freshwater angling in Mpumalanga Province. The sign outside the access point to the fishing area makes mention of a DWS permit which is required. However no information is available on how this permit is acquired and who controls this access point.

2.11.6. Safety

There is no overall safety system in place at the Dam. SBAC does have an internal safety system and has a SAMSA accredited safety officer. The club does have a rescue boat however this is mainly for use during weekends and holidays when club members are available. There is therefore no guarantee that the club will be able to assist in rescues.

2.11.7. Overnight facilities

There are some overnight facilities around Grootdraai Dam. This includes basic self-catering chalets, camping sites and caravan parks.

Although Grootdraai Dam Resort is no longer functioning, it did in the past offer overnight camping facilities including ablution facilities, braai facilities and electricity (at some camp sites).

In addition, a number of bed and breakfast/guest houses are available in Standerton. Although these are not specifically at the Dam they do provide some accommodation for people who visit the area (including the Dam).

SBAC have caravan and tented sites which are for use by members only (although visitors of members are also permitted).

There is also a private resort adjacent to the Dam which offers accommodation.

2.11.8. Event Management

There is no specific official event management system in place. Most events are organized through SBAC who then notify Standerton SAPS of the event. In some cases, Standerton SAPS do spot checks at the event.

2.12. Users and Uses of Grootdraai Dam

2.12.1. Industrial Use and Electricity Supply

The primary purpose of Grootdraai Dam is to supply water for industrial use. The Dam was built in 1982 mainly to support the water needs of the SASOL I, II and III Coal to Petrol Plants at Secunda and a number of other Power Stations.

The Dam is a component of the Usutu–Vaal Water Transfer Scheme. Apart from natural inflow from the Vaal River, it can store an additional 100 million m^3 of water per annum which is pumped from Heyshope Dam in the Usutu River basin across the watershed to the Vaal River. Water is then transferred from Grootdraai Dam to the Olifants River basin and supplies Tutuka Power Station. Other Power Stations in the Olifants catchment can also be supplied from the Dam when the Usutu system cannot meet the full demand namely: Matla, Kriel and Kendall.

Water is pumped from the Grootdraai pump station at Grootdraai Dam to the Knoppiesfontein Diversion tank where the water is diverted to the Bossiesspruit Dam and to the Trichardsfontein Balancing Dam. Bossiesspruit Dam releases water to the Sasol–Secunda Complex. From the Trichardsfontein Balancing Dam, water is released to Rietfontein Weir and is then pumped to various Power Stations as and when required. Duvha Power Station can also be supported from water released from Rietfontein Weir to Witbank Dam.

The Dam is also an important component of the emergency water supply to Eskom's other power stations during periods of water scarcity (DWAF, 1988). Its function as part of the emergency water supply came about in 1983 due a serious drought in South Africa which resulted in a depletion of the Usutu and Komati Systems. Due to these depletions, approximately 80% of South Africa's electricity output was dependent on water supply from the Dam. There were however fears that the increased water use would result in the water in the Dam being depleted and thus an emergency augmentation scheme involving the construction of seven weirs and pump stations was put in place. This emergency augmentation scheme allows water to be pumped from the Vaal Dam to Grootdraai Dam so it can be distributed to the various Power Stations (DWAF, 1988).

2.12.2. Flood Attenuation

The Dam also serves as a flood control Dam and has reduced the risk of flooding Standerton which has happened in the past.

2.12.3. Recreational Use

Grootdraai Dam is South Africa's 10th largest Dam and therefore is one of the most popular Dams in Mpumalanga for water sports. The following recreational activities commonly take place at the Dam:

- Birdwatching;
- Fishing from Shore;
- Camping;

- Boardsailing/windsurfing;
- Kite surfing
- Fishing from Boats;
- Paddleskiing/rowing/canoeing;
- Yachting;
- Swimming;
- Skiing and powerboating; and
- Picnicking and sunbathing.

In the past, windsurfers used to enjoy the Dam because the winds are typically stronger here than on the Vaal Dam however due to lack of facilities, the number of people windsurfing on the Dam has decreased.

The Dam is also very popular with the angling community and a number of angling competitions take place at the Dam.

2.12.4. Domestic and Irrigation Use

According to the Orange–Senqu River Basin Infrastructure Catalogue (ORASECOM, 2013), the Dam is also used for domestic water supply and irrigation. The total irrigation demand of 19.31 million m^3/annum is representative of the Grootdraai catchment. Return flows amount to 2.88 million m^3/a, leaving a net demand of 16.43 million m^3/annum. The irrigation demand includes 0.336 million m^3/annum which is classified as a streamflow reduction activity.

Further, approximately 103 million m^3/annum of water is for domestic water supply (ORASECOM, 2013).

2.13. Catchment Interactions

Based on the status quo of Grootdraai Dam, it is clear that there are a number of factors that influence the ecological status, the use and management of the Dam.

- Land use in the catchment, especially industrial use, mining and agriculture has an impact on the water quality of the Dam;
- Due to the fact that the Dam forms part of inter-catchment transfers, catchments outside the WMA may also impact the Dam, this is especially true of Heyshope Dam which has decreasing water quality;
- The properties of the Dam (such as Winds and location) creates an opportunity for the Dam to be used for windsurfing once again;
- The fish stocks at the Dam allow for varied competitive and recreational angling;
- Lack of capacity and funding at the LLM threatens the management of the Resort and also decreases the opportunity for the municipality and local community to benefit from recreational use at the Dam;
- The lack of institutional management threatens future growth and development at the Dam; and
- The lack of access to the purchase boundary (as the purchase boundary is in many cases landlocked by private properties) decreases the number of available recreational areas. This also decreases equitable access.

It is important to understand how the Dam is influenced by these factors so that management of the Dam through the RMP are taken into account.

3. WHERE DO WE WANT TO BE?

3.1. Vision

A visioning exercise was carried out with a combination of stakeholder input from public meetings, authorities meetings, one on one stakeholder meetings and community focus group meetings.

The vision for Grootdraai Dam is a long-term, 20-year goal that is achieved through a series of objectives. While the vision is constant for a 20 year period, RMPs are updated every five years. This allows the objectives to be re-visited taking into account progress towards achieving the vision.

The vision for Grootdraai Dam is informed by the needs, interests, requirements and uses of the Dam.

Stakeholders showed a strong focus on using the Dam as an economic lever for the town and local community through increased tourism and recreational use. The need for improved management, access and security at the Public Resort and around the Dam was also noted as important.

Clear roles and responsibilities and institutional arrangements are also key as all other objectives require a management system in place. The potential for PPP for management was suggested.

Drug and alcohol abuse by youth in the area was a problem noted by the community and youth development programmes which make use of the Dam are also important.

The vision statement that encompasses this is:

"A well-managed, clean and safe Dam used by all to ensure social, economic and recreational growth in the area."

3.2. Objectives

The vision was distilled into a number of key objectives which are listed below. Key actions required to ensure that these objectives are met are also provided. More detail on these actions is provided in Section 4.5. (The Strategic Plan).

Improved and Equitable Access for the Surrounding Community

- Public Resort to be upgraded and repaired;
- Information brochures to be developed to inform communities about the potential uses of the Dam and how to join recreational clubs and societies; and
- Transport system to be created to provide transport for local community members. It is suggested that discussions with the LLM and the Taxi Union take place and if possible a weekly taxi route be put in place.

Improved Control, Management and Safety

- Formalised institutional structure to be implemented;
- Agreements to be updated in line with the findings of the RMP;
- Zonal plan to take into account different recreational activities;
- UPN System to be implemented;
- Standardised AtoN and demarcation marker system to be implemented;
- Lifeguard skills training and first aid training to ensure safe public use of the Dam;
- All recreational use to be regulated through agreements;
- Survey of all illegal access points, abstraction points and structures to be undertaken and Zonal Plan to be updated with this information. This should also include a survey of commercial activities; and
- Agreements with all Shoreline Fishing Clubs to be updated or put in place.

Increased Tourism and Recreational Use Development

- The potential for additional accommodation to be determined;
- Potential for a PPP to manage the Public Resort and accommodation to be determined. New management body to include security at Public Resort area to ensure a safe environment;
- New recreational activities such as triathlon events, swimming events and musical festivals to be implemented in partnership LLM; and
- Marketing plan to be developed to increase tourism to the Dam. This should include the development of a website and improve road signs to the Dam.

Improved Resource Management

- Water quality monitoring results should be shared with relevant parties;
- The Standerton WWTWs to be upgraded to ensure that downstream users are not negatively impacted by tourism development at the Dam;
- The potential for water quality monitoring data to be linked to the UPN System should be determined;
- A Pollution Point Assessment should be undertaken to determine the main pollution points to the Dam;
- Shoreline Management Plan to be compiled and implemented;
- Education programmes regarding the impacts of alien Invasive Species;
- A Species Management Plan for Invasive Fish Species such as Bass and Carp should be developed and implemented so that the economic benefits of commercial angling can be achieved without the further spread of these species to other valuable water resources;
- Potential for commercial fishing or small scale fisheries programme to be assessed;
- Siltation prevention measures to be assessed and put in place;
- Caretaker agreements with adjacent landowners to be put in place to manage resources; and
- Wash bay system to be implemented to prevent the spread of Alien Invasive Species infestations.

Education and skills development

- Coordination between the SBAC, local schools and South African Sailing (SAS) to introduce youth sailing and fishing programme at the Dam. This should be undertaken after the review of the current lease agreements is completed;
- Youth development programmes at the Dam should be investigated to give the youth an opportunity to engage in productive activities;
- Access agreement with Vaal River School to be updated; and
- Skills training programmes including life guard and first aid training as part of tourism development and community skills development.

4. HOW DO WE GET THERE?

4.1. How does the RMP Work?

The overarching framework for the Grootdraai Dam RMP is presented in Figure 15 below. It highlights the consultative nature of the RMP process where stakeholder meetings, public meetings and authority meetings were used to identify the Vision and Objectives for the Dam. The Vision and Objective forms the central tenet around which the RMP is based. The RMP is further broken down into 4 main Plans namely, the Institutional Plan, Financial Plan, Strategic Plan and Zonal Plan.

Each of the major areas of the RMP will be presented in detail further in this chapter. Briefly: The **Institutional Plan** provides a framework for the institutional arrangements at the Dam. In this case a three-tiered management system is proposed. This three-tiered approach includes a RMP Steering Committee (RSC), Operations Management Committee (OMC) and Dam Management Committee (DMC). However it should be noted that DWS reserves the right to appoint an Implementing Agent (IA) to manage the Surface Water and the Dam Basin. Should this take place, the IA would form part of the institutional structure.

The RSC includes representatives of National Government Departments and fulfils a monitoring and high level guidance function to ensure that all functions of the DMC and OMC are being undertaken.

The OMC will be formed at an Operations or Cluster Level and is a current reporting line within DWS. The DMC will include authorised access point representatives and those who have an official mandate at the Dam. All three committees are chaired by a DWS official.

The Institutional Plan discusses requirements for agreements, development targets (in relation to community development of water sports) and information on the affiliations required. The detailed Institutional Plan is provided in the **Chapter 4.2.**

The **Financial Plan** provides information on how money generated through recreational use should be used, by whom and for what. It also provides guidelines on the financial reporting required. Further, the information from the Financial Plan is used to inform the Business Plan. The detailed Financial Plan is provided in **Chapter 4.3.**

The **Zonal Plan** has three main components:

- Shoreline Management Zones;
- Water Surface Management Zones; and
- Activities allowed in each zone.

The activities are presented in Table 5 and provide information on activities that are not allowed within a zone together with preferred or potential activities. The detailed Zonal Plan is provided in **Chapter 4.4.**

In terms of the **Strategic Plan**, the vision for the Dam was distilled into a number of objectives. These objectives are further distilled into actions required in order to achieve the Vision. This information was used to inform the BP for each objective. The detailed Strategic Plan is provided in **Chapter 4.5.**

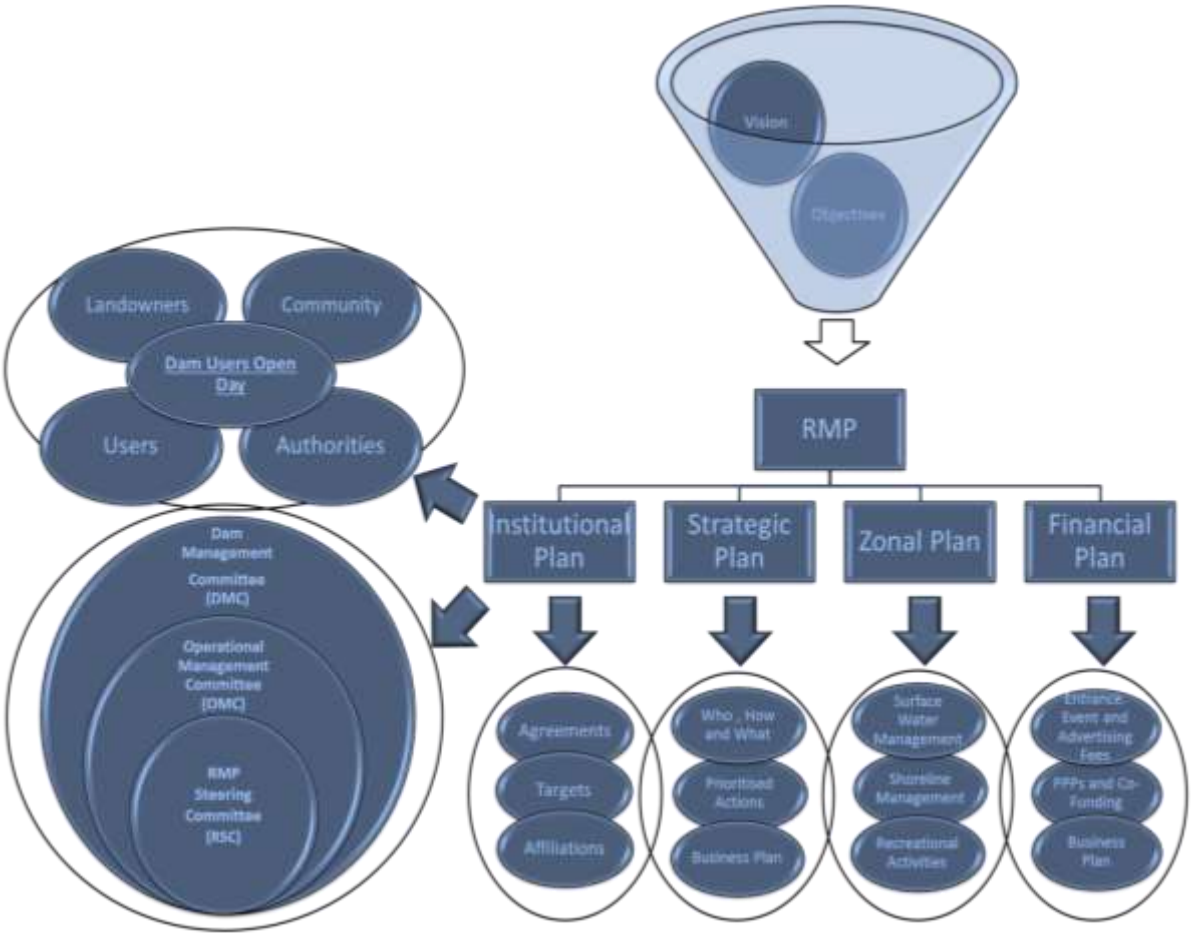

Figure 15: RMP Framework

4.2. Institutional Plan

The Institutional Plan is the backbone of the RMP as it identifies the management system which is required to ensure the objectives of the RMP are met. The Institutional Plan consists of three sets of tools which will be used to manage the Dam so that the Vision can be met.

The first toolset involves three separate but interlined committees all Chaired by the DWS because DWS is the custodian of all surface water in South Africa. The membership of each committee and their roles and responsibilities is provided in Section 4.2.1., 4.2.2. and 4.2.3. below.

The second toolset involves an open communication forum which allows all stakeholders to be involved in the management of the Dam. The purpose of this forum is to share information and allow stakeholders to raise concerns and ideas regarding the management of the Dam. It also provides a platform for dealing with issues and challenges faced by users.

The third toolset includes a number of management tools including agreements, affiliations and targets.

Figure 16 below provides a visual representation of how these toolsets function together

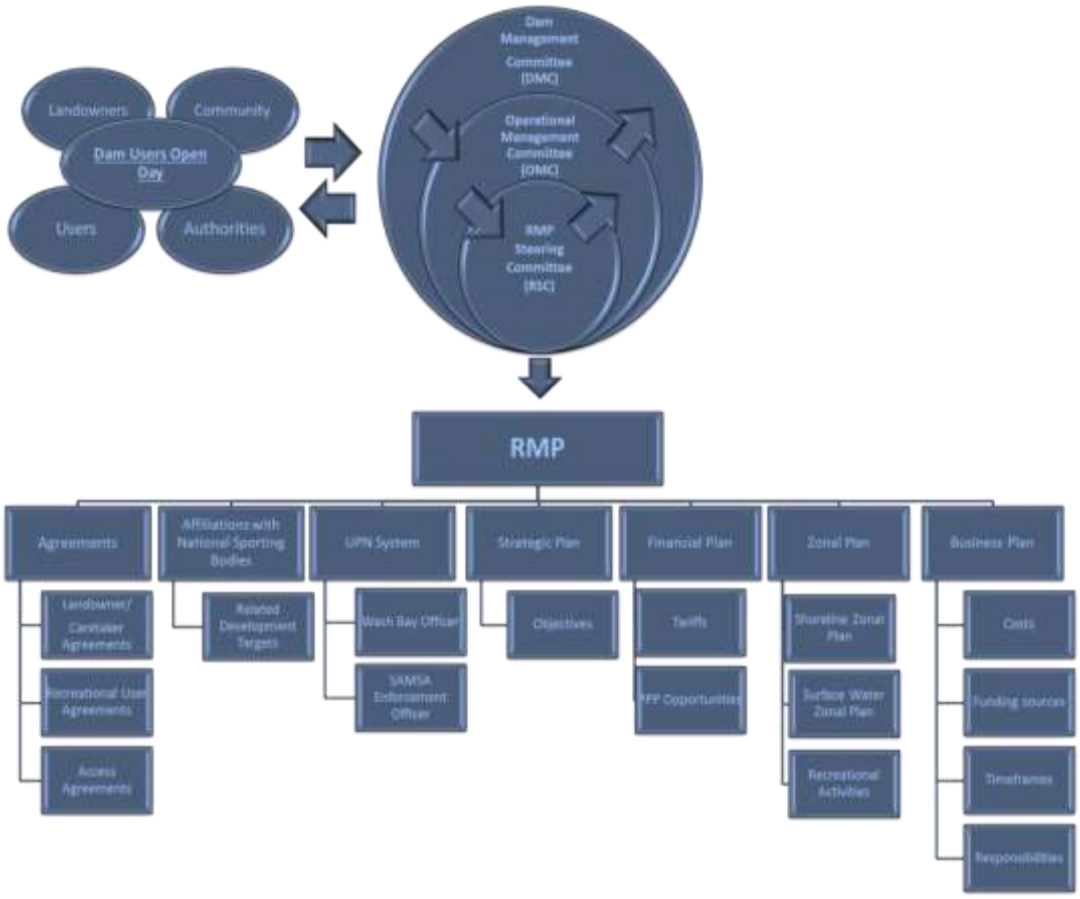

Figure 16: Institutional Framework

4.2.1. RMP Steering Committee (RSC)

The RSC is made up of representatives from National Government and National Agencies. The main focus of this meeting is to ensure that both the DMC and OMC are performing all necessary functions. The committee will also provide high level guidance. The RSC allows for a formal reporting structure between the Chief Director: Operations and Integrated Environmental Engineering (IEE). Relevant departments from DWS including Operations, Water Quality Management and Catchment Management will be included in the RSC. The committee will meet every six months. The figure below provides details of the membership of the RSC.

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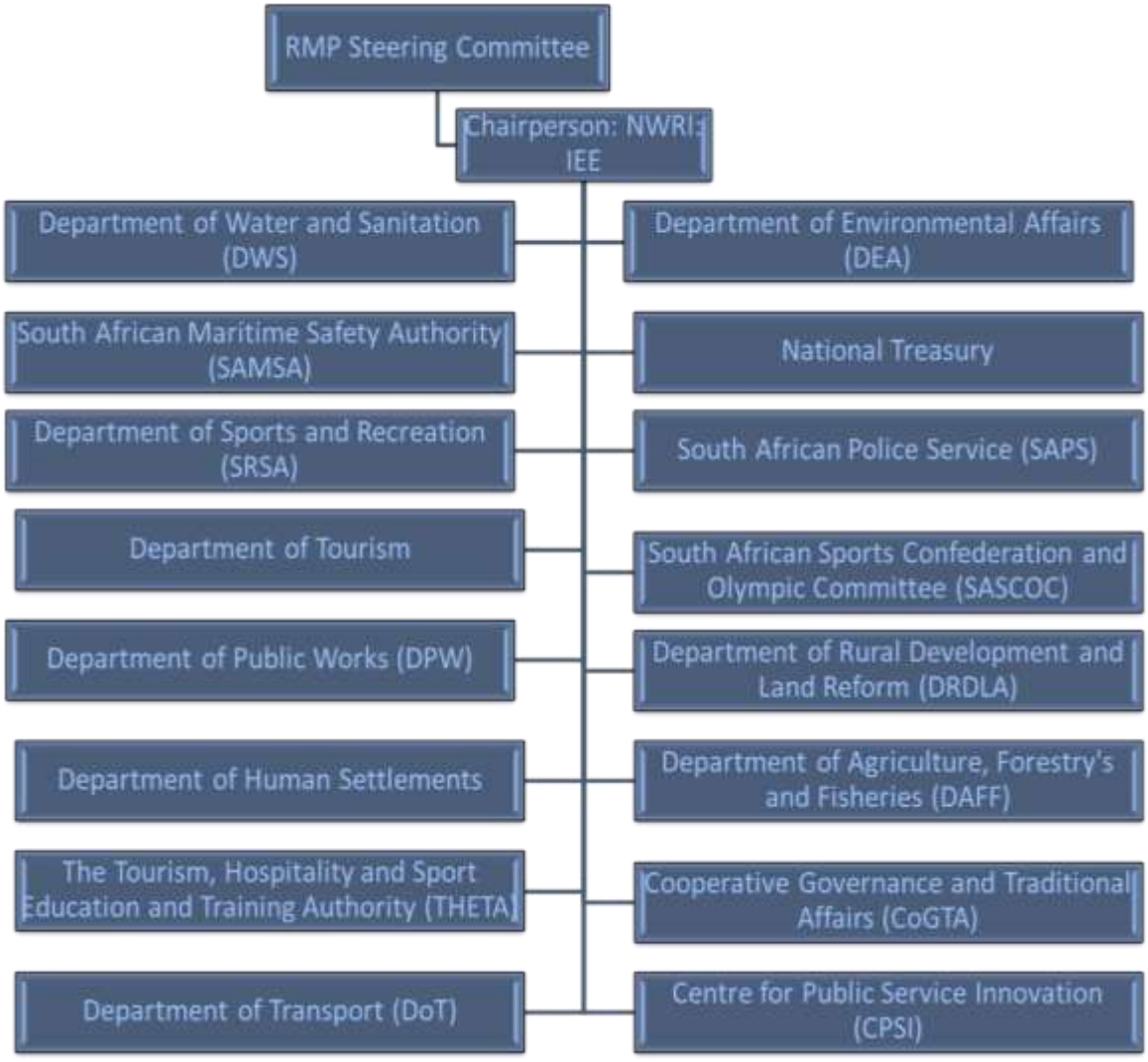

Figure 17: RSC Membership

4.2.2. Operations Management Committee (OMC)

The OMC will function at a catchment level and will provide high level guidance for all Dams occurring within one catchment. This is an existing reporting line between Area Managers for various schemes, the Regional Manager and the Director: Operations. The implementation of the RMP will be added as an agenda item, hence providing an opportunity to discuss the RMP. The Regional Manager will be fully aware of all commercial and/or recreational activities/opportunities at all Dams within the cluster.

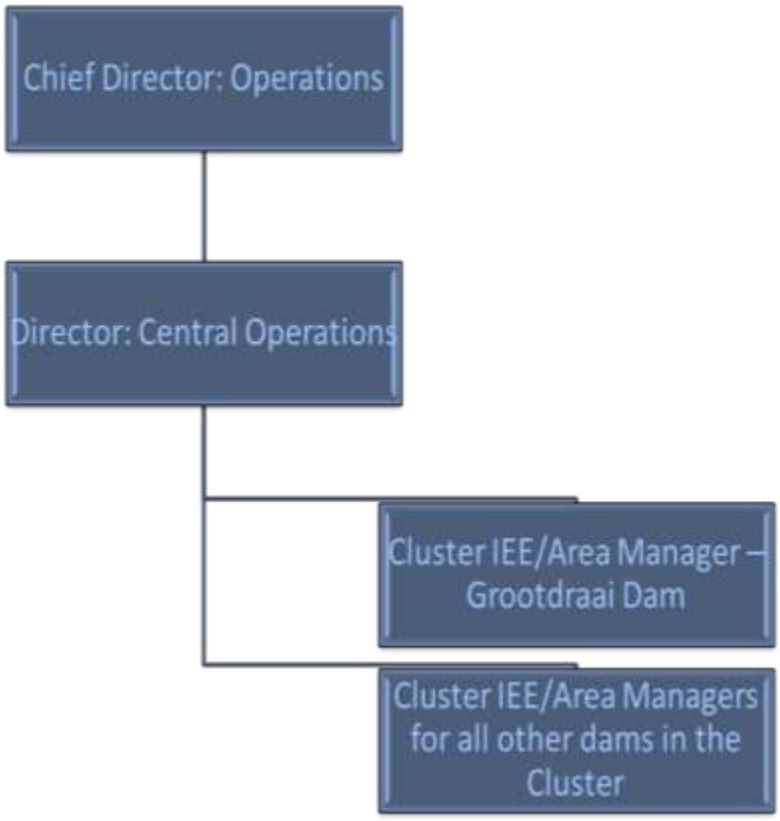

Figure 18: OMC Membership

4.2.3. Dam Management Committee (DMC)

The DMC is responsible for operationalisation of the RMP and includes a larger pool of representatives. This committee is chaired by the delegated DWS Official/IA. The DMC is involved in the management of the UPN System as part of the Cooperative Inland Waterways Safety Programme (CIWSP) and includes the following representatives:

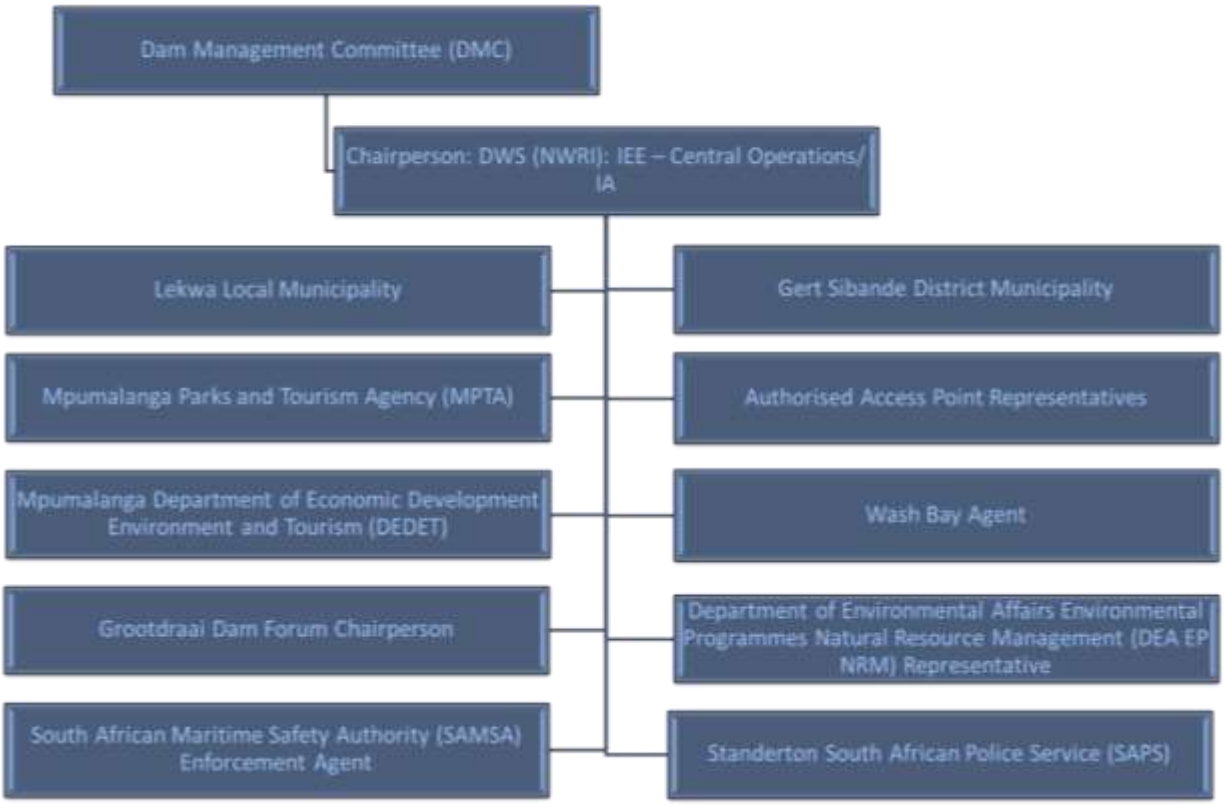

Figure 19: DMC Membership

One of the main functions of the DMC is to assess commercial opportunities at the Dam. As such, an agenda item related to the Strategic Plan for Commercialisation (SPC) is required. In addition, changes in water quality, developments in the area, status of Aquatic Invasive Species and education and information programmes should be discussed. The DMC should meet every three months (i.e. quarterly).

One of the most important functions of the DMC is to organise and facilitate the quarterly Dam User Open Day. All stakeholders should be invited to this meeting so that issues regarding use of the Dam can be discussed. If necessary, serious issues can be escalated from the Public Open Day to the OMC and then RSC so to ensure swift conflict resolution. The Open Day also provides an opportunity for the DMC to inform users of the Dam of all rules and regulations governing the access and use of the Dam.

Operational management of recreational activities such as ensuring the AtoN and demarcation markers system is in place and setting times for use of the Dam (within the current framework of GN 654 of 1964) will also be managed by the DMC.

The final structure of the DMC may change once agreements with Authorised Access Points Representatives are concluded. The updated

DMC membership list will be added as an addendum of the Gazetted RMP.

Lastly, the DMC is also responsible for ensuring the BP is implemented.

4.2.4. Management tools

The RSC, OMC and DMC will have a number of management tools which will enable proper management of the Dam in line with Legislative requirements.

4.2.4.1. Terms of Reference

The RSC, and DMC will be guided by Terms of Reference regarding roles and responsibilities. The Terms of Reference will provide guidance on the following management aspects:

- Meeting frequency;
- Roles and Responsibility of Chairperson;
- Roles and Responsibilities of Members;
- Minutes and attendance requirements;
- Reporting requirements;
- Management of agreements;
- Management of access objectives;
- Management of development targets;
- Strategic Plan for Commercialisation (SPC);
- Management of Water quality monitoring;
- Management of the Control of Aquatic Invasive Species;
- Management of Development Pressure; and
- Management of UPN system and wash bays.

Terms of Reference are not required for the OMC as this is an existing reporting structure.

4.2.4.2. Agreements

1.) Agreements between DWS and LLM/Implementing Agent (IA)

One of the main management tools available is the use of agreements to ensure proper use of the Dam in line with the RMP vision and objectives. DWS signed over management of approximately 145 ha (1.45 km^2) of State Land (known as the Embankment) to the then City Council of Standerton (now LLM) on 19 November 1985.

LLM has provided verbal confirmation that due to financial constraints, they do not have the capacity to manage the Resort.

Should LLM have the means to continue their management of the Resort, then the agreement with LLM must be updated in line with the findings of the RMP. It is further suggested that if this agreement be updated, that it include management of the surface water and management of any potential commercial opportunities. In this way, LLM would be responsible for all recreational use at the Dam.

However, should the LLM not be in a position to manage the Resort at the Dam, a PPP should be investigated. The PPP should include management of the wash bay, UPN System, Accommodation, Picnic Sites, Bird Hides, Hiking Trails and Angling Area.

An interim agreement is required while the PPP process is underway. The agreement should be updated in line with the RMP requirements which as a minimum must achieve the following:

- Conditions on the Interim Management Body's mandate to enter into agreements with other parties on the use of the surface water for recreational use;
- Terms and conditions regarding equitable access must be included in ALL agreements;
- Safety management to be in line with SAMSA requirements;
- Roles and responsibilities regarding the following:
    - Maintenance of AtoN and Demarcation Markers;
    - Maintenance of Wash Bays;
    - Maintenance of Recreational Infrastructure;

- Maintenance of Fencing; and
- Maintenance of the UPN System including signage.

- Management of agreements with other recreational users;
- Conditions on the use of the Dam for small scale fisheries or for commercial fisheries projects; and
- Conditions for the negotiations of agreements with recreational clubs. As a minimum, it is suggested that all agreements between the Interim Management Body with any new boat clubs, fishing clubs etc. should be reviewed and accepted in writing by the DWS Regional Manager for Central Operations. They should also be presented to the DMC prior to signature to ensure the vision and objectives of the RMP are met.

Irrespective of the nature of the agreement the following must be incorporated:

- Clear start and end dates and terms of renewal/extension;
- Rights and obligations of both parties;
- Access points to be used must be stipulated. The RMP makes provision for two currently authorized access point (The Grootdraai Dam Resort and DWS Access Point) and one potential authorized access point at the SBAC. Access agreements with DWS will be necessary within the next year. Failure to do so will result in unauthorized access points being closed (see section on Access agreements for more details);
- LLM/IA's (and therefore DWS's) exclusion of liability;
- Terms and conditions of improvements made to the property should be stipulated. All improvements require consent from DWS and the DMC. Furthermore, the financial consequences should this requirement not be met should also be stipulated in the agreement. No permanent structures shall be built within the 1:100 year floodline without additional approval as required by Section 21 (c) and (i) of the National Water Act (Act no 36 of 1998);
- The extent of the rights to use the resource should be stipulated;
- Clear instructions on the financial requirements of both parties, and where and when money must be paid should also be stipulated. All recreational clubs and societies on State Land must be managed in line with National Treasury requirements. Lease agreements for use of State Land should include fair remuneration at the current market value;
- All agreements should include a cancellation clause if requirements cannot be met;
- All clubs or associations must be affiliated to a National Sporting Body recognised by the South African Sports Confederation and Olympic Committee (SASCOC). All agreements must include a cancellation clause if clubs or associations fail to obtain affiliation within one year from date of signature of the agreement;
- Limitations of the number of people allowed to access the water surface of the Dam based on carrying capacity of Dam as well as the carrying capacity of the CIWSP wash-bays must be adhered to;
- A list of current and potential recreational activities allowed at the Dam;
- Requirements for safety, disaster management and emergency response plans;
- Duties and responsibilities of either party regarding maintenance, management and infrastructure;
- A list of prohibited activities;
- Prohibition of subletting portions of the leased area;
- A mandate for programmes to assist in equitable access and redressing past

imbalances at the Dam, such as sponsored gate-fees for members of previously disadvantaged communities. This should be in line with the RMP. The DMC will then be required to report against all targets at the OMC.

- All recreational activities must be in line with the RMP, which once gazetted, becomes the mechanism to control and manage recreational use. Although no Section 21k Water Use License Application (WULA) is required, all activities must comply with all other relevant legislation requirements including the following:
    - The Merchant Shipping (National Small Vessel Safety) Regulations, 2007, - Control of Boating;
    - Section 21 (a) of the National Water Act, 1998 – abstraction;
    - Section 21 (c) and (i) of the National Water Act, 1998 – construction of slipways/infrastructure;
    - Safety at Sports and Recreational Events Act, 2010 – Events; and
    - Provincial Ordinances – Fishing.

These agreements should be updated within one year of the RMP being gazetted.

2.) Recreational Use Agreements

All recreational use at the Dam must be through an appropriate legal framework between the recreational user and LLM/IA as they would be responsible for the surface water management of Grootdraai Dam (should the agreement discussed above be put in place). However, all agreements must be approved by DWS and the DMC.

Recreational Use Agreements must be developed in line with the conditions stipulated in the agreement between DWS and LLM/IA.

All recreational clubs should be affiliated to a SASCOC affiliated organisation. The development targets set by the National Organisations must be met. All recreational clubs will also need to comply with the requirements of the RMP.

Further, recreational clubs which obtain access to the shoreline through private properties should have agreements in place with the specific landowner. The landowner will also be required to have an agreement with LLM/IA (see 4. Access Agreements).

All agreements must be finalised within one year of the RMP being gazetted.

3.) Land Management Agreements

The DMC should actively consider land management strategies that improve the efficiency of current practices. This could include co-management agreements with surrounding or adjacent landowners which may result in environmentally sustainable and more efficient land management.

Agreements must be developed with appropriate legal advice and consultation.

All agreements must be finalised within one year of the RMP being gazetted.

4.) Access Agreements

All surface water access must be formalised. The conditions for such access must be written into the agreement. All illegal practices must be addressed. Appropriate action must be taken to ensure that all Parties comply with the requirements of the RMP.

In the case of Grootdraai Dam, the majority of the purchase boundary is landlocked by private property and thus the Angling Clubs gain access to the Dam through this private land.

Access agreements between private landowners and LLM/IA would thus be required to regulate management of access by recreational clubs. This agreement should be in line with the conditions stipulated in the agreement between DWS and LLM/IA. Further, all recreational clubs

which access the Dam should be affiliated to a SASCOC affiliated organisation.

Due to the gradient of the banks, boats can be launched directly into the Dam. All adjacent landowners and clubs must be made aware that this is an illegal activity unless they enter into a formal agreement with DWS.

Further, a formal agreement with DWS will be required by all adjacent landowners and recreational clubs that have direct access to the water surface of the Dam through 1.) constructed slipways; 2.) natural slipways; or 3.) jetties for angling and/or launching of boats. Additional agreements with LLM/IA may also be necessary.

The wash bay must be built on State Property as part of the CIWSP. A formal agreement is necessary between LLM/IA and DEA on the management and maintenance of the facility. The agreement will be overseen by the DMC.

All agreements must be finalised within one year of the RMP being gazetted.

5.) Safety of Navigation Agreements

Agreements between SAMSA and DWS/other relevant Parties/Bodies are to be concluded to allow them to:

- Exhibit the relevant AtoN; and
- Establish or deploy the relevant fixed and/or floating AtoN.

6.) Event Applications

Grootdraai Dam is used for a number of competitive angling events.

All events must be managed through an event application process. While the application may be made to LLM/IA, DWS and the DMC must approve the application. These applications must follow a specific template and will include but not limited to the following:

- Number of participants;
- Emergency Response Plan;
- Advertising and branding (will need to be in line with DWS communication requirements);
- Access points to be used;
- Costs; and
- Films/photographs that will be generated to be in line with DWS communication requirements.

Further, all Events must meet the requirements of the Safety at Sports and Recreation Act (Act No 2 of 2010).

4.2.4.3. National Affiliations and Development Targets

All recreational clubs should be affiliated to a SASCOC affiliated organisation. The development targets set by the National Organisations must be met.

SBAC is already nationally affiliated, but the status of the various angling clubs is not known. Should angling clubs wish to continue to operate at Grootdraai Dam they must become affiliated within two years of the RMP coming into effect.

4.2.4.4. Community Participation and Beneficiation

The RMP has suggested a number of different objectives, actions, interventions, agreements and institutional arrangements to ensure that community participation and beneficiation of the resource takes place. These are captured throughout the different plans and in the vision and objectives. However, in order to ensure a strong focus on this aspect by the DMC, OMC and RSC going forward, the different elements of community participation and beneficiation are consolidated below.

1.) Socio-Economic Development

Socio-economic development is a key aspect of the RMP. The vision makes specific mention of the need of economic growth and as such socio-economic development is one of the central tenets of the RMP. One objective (and related

actions) is specifically related to socio- economic development.

Increased Tourism and Recreational Use Development

- The potential for additional accommodation to be determined;
- Potential for a PPP to manage the Public Resort and accommodation to be determined. New management body to include security at Public Resort area to ensure a safe environment;
- New recreational activities such as triathlon events, swimming events and musical festivals to be implemented in partnership LLM; and
- Marketing plan to be developed to increase tourism to the Dam. This should include the development of a website and improve road signs to the Dam.

Further, as discussed in the Financial Plan below, Grootdraai Dam can become a key economic lever for the region, thereby creating job opportunities for the local community.

One of the key mechanisms for this is the use PPPs. However in regards to potential PPPs, the following should be noted:

- A balance between high and small cap opportunities is required to ensure that revenue generation occurs together with the promotion of equitable access and job creation at the Dam; and

- While the tariff structure can be used for revenue generation, it should not be used to deny people access to the dam.

The BP has a specific intervention regarding determining the feasibility of a PPP for additional accommodation and recreational activities. There is also a specific BP for compiling and implementing a marketing plan.

Further, due to the fact that Grootdraai Dam is known as a good fishing area a specific BP is included to determine the feasibility of potential small scale fisheries or commercial fisheries programmes. This is especially important due to the fact that there are a number of poor and marginalised communities around the Dam. Fisheries have the opportunity to provide a source of protein for poor households as well as a source of income.

2.) Equitable Access

One of the main triggers for the RMP was the issue of inequitable access. In order to rectify this, one of the objectives (and related actions) has aspects which are specifically related to equitable access:

Improved and Equitable Access for the Surrounding Community

- Public Resort to be upgraded and repaired;
- Information brochures to be developed to inform communities about the potential uses of the Dam and how to join recreational clubs and societies; and
- Transport system to be created to provide transport for local community members. It is suggested that discussions with the LLM and the Taxi Union take place and if possible a weekly taxi route be put in place.

There is currently a public resort in place for which LLM is responsible for however due to a lack of financial capacity they are unable to adequately manage the facilities. This has resulted in the resort being run down and vandalised. There is also no security in place which prevents community use of the Dam as there are fears regarding safety and security. In addition, there are no agreements in place to manage the surface water of the Dam.

It is therefore suggested that a PPP for new accommodation, upgrade of the current resort and management of recreation and safety be undertaken together. This PPP would also include management of the public access area.

One of the main factors limiting equitable access is the location of the Dam and the difficulty for

the local community to travel to the Dam. It is therefore suggested that a taxi route be put in place.

Section 4.2.4.1. provides guidance on the aspects which should be included in the ToR for the DMC and RSC. Specific mention is made of Management of access objectives and Management of development targets. While, Section 4.2.4.2. provides the guidance on the aspects which should be included in all agreements. This includes the following:

- A mandate for programmes to assist in equitable access and redressing past imbalances at the Dam, such as sponsored gate-fees for members of previously disadvantaged communities. This should be in line with the RMP. The DMC will then be required to report against all targets at the OMC.; and
- All agreements must include a cancellation clause should community access targets not be met.

3.) Skills Development and Training

Youth Training programmes were specifically emphasized as an important component of the management and use of the Dam due to the high level of alcohol abuse by youth in the area. There is one objective (and related actions) related to skills development and training.

Education and skills development

- Coordination between the SBAC, local schools and South African Sailing (SAS) to introduce youth sailing and fishing programme at the Dam. This should be undertaken after the review of the current lease agreements is completed;
- Youth development programmes at the Dam should be investigated to give the youth an opportunity to engage in productive activities;
- Access agreement with Vaal River School to be updated; and
- Skills training programmes including life guard and first aid training as part of tourism development and community skills development should be developed.

The BP has a specific intervention relating to development and implementation of a skills training programme as there is an opportunity for local community members to obtain skills (such as first aid) to be employed at the public access area as 'lifeguards'. This would have the added benefit of improving community safety at the Dam. In addition, youth outreach programmes, sailing programmes and coordination between various groups is suggested.

4.3. Financial Plan

Grootdraai Dam is an economic lever and can become central to development in the Region. The RMP provides guidance on cost recovery mechanisms to ensure the sustained and improved management of the Dam.

There are opportunities for PPPs which could further unlock the economic potential of the Dam.

With PPPs, the private party assumes the financial, technical and operational risks but receives a benefit for this. PPPs allow for DWS to make State Assets such as Dams available to private parties who wish to engage in tourism related commercial operations (DWAF, 2009). This risk sharing mechanism aims to unlock socio-economic potential of State Dams. In addition, development of PPPs in remote areas often require related infrastructure upgrades and thus there is the opportunity for new infrastructure investment and development and related services which would benefit local communities.

Although high cap PPPs result mostly in revenue generation, small cap opportunities (less than R10 million (2007 figures) are more likely to fulfil socio-economic objectives such as job creation, promotion of Broad-Based Black Economic Empowerment, LED and Small, Medium and Micro Enterprises. A balance between high and small cap opportunities is required to ensure that revenue generation occurs together with

the promotion of equitable access and job creation at the Dam.

Further, Grootdraai Dam is a State Resource and as such all profits made from the recreational use of the Dam should be used for further development of the Dam.

Currently, SBAC generates an income from entrance fees and membership fees at the SBAC club. As the Grootdraai Dam Resort is no longer managed, LLM does not generate any income from the resort.

There is an opportunity for LLM/IA to generate an income from special events, filming and/or advertising, access to the Dam and fishing competitions. There is also an opportunity for DWS to generate an income from leasing of State Land.

While the fees for use of the Dam can be used for revenue generation, it should not be used to deny people access to the Dam. Thus it should take into account the socio-economic status of recreational users. For example, a sliding scale, cross subsidy fee structure and/or contractual obligations which ensure equitable access must be considered when setting a fee.

The BP provides a financial framework to undertake certain interventions.

4.4. Zonal Plan

The Zonal Plan for Grootdraai Dam has three main sections. The first involves the current recreational activities together with an identification of potential recreational and/or commercial opportunities. This section also includes the determination of carrying capacity. The second involves the shoreline management zones (together with preferred activities and prohibited activities within each zone) and the third involves surface management zones (together with preferred activities and prohibited activities within each zone).

4.4.1. Current Recreational Uses

The main recreational activities are related to SBAC, however recreational activities also occur at the Grootdraai Dam Resort as well as a number of Angling Clubs.

In the past, windsurfers used to enjoy the Dam because the winds are typically stronger here than on the Vaal Dam however due to lack of facilities, the number of people windsurfing on the Dam has decreased.

The Dam is also very popular with the angling community and a number of angling competitions take place at the Dam.

4.4.2. Potential Recreational and/or Commercial Opportunities and Uses

A matrix model was used to determine the feasibility of possible recreational and eco-tourism activities in line with the operational requirements of the Dam, the biophysical environmental conditions and safety requirements.

The following activities were found to be potentially feasible:

- High end accommodation;
- Housing Estates;
- Smallscale/Commercial Fisheries;
- Kayaking touring;
- House Boats;
- Upgrade of the Grootdraai Resort;
- Potential Triathlon;
- Music Festivals;
- Swimming events;
- Junior competitive angling school; and
- Junior competitive sailing school.

The scores utilised to determine viability are as follows:

Table 4: Scores for Recreational Use

Score	Meaning	Comment
0	Not feasible	High Negative Impact to Dam Environment + High Negative Impact to Recreational Users Text provided in red highlights the specific factors which make the activity not feasible at the Dam.
1	Likely to be feasible however feasibility study is required.	**Feasibility Study is required**
2	Likely to be feasible	Benefits appear to outweigh impacts. Allowed should there be an interest. Adequate agreements and safety measures would be required as per RMP. **No feasibility study is required.**
3	Current use	Benefits outweigh impacts. **No feasibility study is required.**

Table 5: Potential and Current Recreational Activities

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
No Contact	Day Hiking/ Walking Trail	Only the purchase boundary is available and thus changing water levels may impact any trails.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	None	N/A	Not required for Day hikes	At Grootdraai Resort	Not required	No available land for this activity due to the fact that the purchase boundary is landlocked by private land. The only access would be Grootdraai Dam and there is not enough space for a full hiking trail in this area.	Not at this time.	N/A	0
	Camping at Grootdraai Dam Resort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May be disturbed by noise from recreational users	N/A	Facilities available	At Grootdraai Dam Resort	Not required however access to water may be the main drawcard and thus an agreement with DWS would be required	Access through Grootdraai Dam Resort	The resort used to be popular however has fallen into disuse due to poor management. Current activity	PPP for resort would require feasibility study	3
	Upgrade of Grootdraai Resort	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May be disturbed by noise from recreational users	N/A	Facilities available	At Grootdraai Dam Resort	Not required however access to water may be the main drawcard and thus an agreement with DWS would be required	Access through Grootdraai Dam Resort	The resort used to be popular however has fallen into disuse due to poor management	PPP for resort would require feasibility study	1
	Music Festivals	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May be disturbed by noise from recreational users	N/A	Facilities available	At Grootdraai Dam Resort	Not required.	Access through Grootdraai Dam Resort	Noted during stakeholder consultation	Managed as part of PPP	1
	High end accommodation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May be disturbed by noise from recreational users	N/A	Limited land available for development although there is some land available near the resort	All facilities for the high end accomodation would be required	Not required however access to water may be the main drawcard and thus an agreement with DWS would be required	Purchase boundary land near Grootdraai Dam Resort	Stakeholders at meetings mentioned that there may be interest and that it would boost the local economy	PPPs	1
	Housing Estate next to the Dam	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Proper stormwater and sewerage management would be required	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May result in equitable access	N/A	Limited land available for development.	All facilities would be required	Not required however access to water may be the main drawcard and thus an agreement with DWS would be required	Limited land available for development	Stakeholders at meetings mentioned that Country Estates would be a potential economic lever however due to the lack of land this would be very	PPPs	1

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
																					difficult.		
	Birding	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May be disturbed by noise from recreational users	N/A	No accommodation specifically required however a bird hide would be necessary	At Grootdraai Dam Resort	Not required	Access through Grootdraai Dam Resort	Already occurs at Grootdraai Dam and the Dam has a large number of bird species	Through creation of Bird Watching Club and related membership fees or through potential agreements with MPTA	3
	Picnicking	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May be disturbed by noise from recreational users	N/A	Picnicking facilities available at the Resort	At Grootdraai Dam Resort	Not required however access to water may be the main drawcard and thus an agreement with DWS would be required	Access through Grootdraai Dam Resort	The resort used to be used for picnicking	Entry fees to the Resort	3
Primary Contact	Open Water Swimming - Recreational	N/A	N/A	Water quality is acceptable for primary contact	No specific health risks associated	No known infestation at this time	N/A	N/A	N/A	Would be required	Acceptable for swimming	Water is very turbid	Cell-phone reception available	None. Would require UPN System	Zoning would need to be adjusted to accommodate swimmers	N/A	N/A	Ablution facilities and change rooms are available at the Resort. These would need to be upgraded	Through the Resort	Through the Resort	Some interest	SwimSA, Telkom Splash or similar foundations or through entrance fees to Resort	3
	Swimming Events	N/A	N/A	Water quality is acceptable for primary contact	No specific health risks associated	No known infestation at this time	N/A	N/A	N/A	Would be required	Acceptable for swimming	Water is very turbid	Cell-phone reception available	None. Would require UPN System	Zoning would need to be adjusted to accommodate swimmers	N/A	N/A	Ablution facilities and change rooms are available at the Resort. These would need to be upgraded	Through the Resort	Through the Resort	Some interest	Events could be managed as part of PPP	1
	Triathlon	N/A	N/A	Water quality is acceptable for primary contact	No specific health risks associated	No known infestation at this time	N/A	N/A	N/A	Would be required	Acceptable for swimming	Water is very turbid	Cell-phone reception available	None. Would require UPN System	Zoning would need to be adjusted to accommodate swimmers	N/A	N/A	Ablution facilities and change rooms are available at the Resort. These would need to be upgraded	Through the Resort	Through the Resort	Some interest	Events could be managed as part of PPP	1
	Open Water Swimming – Development School	N/A	N/A	Water quality is acceptable for primary contact	No specific health risks associated	No known infestation at this time	N/A	N/A	N/A	Would be required	Acceptable for swimming	Water is very turbid	Cell-phone reception available	None. Would require UPN System	Zoning would need to be adjusted to accommodate swimmers	N/A	N/A	Facilities for a development school would be required or agreement with resort for a swimming school to be run in the resort area	Through the Resort	Through the Resort	Some interest	SwimSA, Telkom Splash or similar foundations or through entrance fees to Resort	2

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
	Snorkelling	N/A	N/A	Water quality is acceptable for primary contact	No specific health risks associated	No known infestation at this time	N/A	N/A	N/A	Would be required	Acceptable for swimming	Water is very turbid	Cell-phone reception available	None. Would require UPN System	Zoning would need to be adjusted to accommodate snorkelers	N/A	N/A	At Grootdraai Dam Resort	Through the Resort	Through the Resort	None at present	N/A	0
	Diving	N/A	N/A	Water quality is acceptable for primary contact	No specific health risks associated	No known infestation at this time	N/A	N/A	N/A	Would be required	Acceptable for swimming	Water is very turbid	Cell-phone reception available	None. Would require UPN System	Zoning would need to be adjusted to accommodate divers	N/A	Facilities and infrastructure required.	At Grootdraai Dam Resort	Through the Resort	Through the Resort	None at present	N/A	0
Secondary Contact	Small-scale/Commercial Fisheries	N/A	N/A	Water quality is acceptable at this stage although AMD is a potential risk	Water quality is acceptable at this stage although AMD is a potential risk	N/A	Fishing of invasive species may assist indigenous populations	May disturb bird nesting	Maintenance of boats and equipment required to prevent contamination	Required for aquaculture	N/A	N/A	Cell-phone reception available	None. Would require UPN System	May reduce fish stocks and interfere with competitive fishing	N/A	None currently	Required	Required	There is some areas available in the purchase boundary however this may impact private landowners	None at present	PPPs	1
	Shore Fishing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	None	None	None	N/A	N/A	N/A	Cell-phone reception available	None. Would require UPN System	No	No required	Not required	Available at Grootdraai Resort and SBAC. There are also ablution facilities at the Informal fishing area near the Dam Wall. It is unclear whether the other fishing clubs have ablution facilities available	Shoreline access required	There are a number of areas which were previously used or are currently used by angling clubs however these sites are surrounded by private land and thus access to these site may be potentially limited	The 2002 Zonal Map mentions a number of clubs	Would be funded by clubs themselves	3
	Tube Fishing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	None	None	None	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Potential interest due to large fish stock	N/A	2
	Pontoon Fishing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	None	None	None	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Potential interest due to large fish stock	N/A	2
	Bass Fishing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Current activity	Would be funded by clubs themselves	3

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
	Motorised Boats	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Currently occurs and is the main activity at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Jet Powered Boats	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Currently occurs and is the main activity at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	RHIB	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Currently occurs and is the main activity at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Jet Ski	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Currently occurs and is the main activity at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Dragon Boats	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Grootdraai Resort	Grootdraai Resort	No interest noted at this point	Not required	2
	Slalom Canoe	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Grootdraai Resort	Grootdraai Resort	Not known	Not required	2
	Fishing Canoe	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Canoeing occurs at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Jet Ski Fishing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Grootdraai Resort	Grootdraai Resort	Not known	Not required	2

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
	Wind Surfing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Kite Surfing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Ski Jumping	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known however skiing already occurs at the Dam	Not required	2
	Slalom Skiing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known however skiing already occurs at the Dam	Not required	2
	Ski and Wakeboard Boat	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Wash bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known however skiing already occurs at the Dam	Not required	2
	Kayaking Sprints	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Canoeing occurs at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known however canoeing already occurs at the Dam	N/A	2
	Kayaking Marathons	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Canoeing occurs at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known however canoeing already occurs at the Dam	N/A	2
	Kayaking Water Polo	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Canoeing occurs at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known however the Dam is not surrounded by nature reserves and there may be no interest in touring.	N/A	2
	Kayaking Touring	N/A	N/A	Water quality is	No specific	There are no known	No impact	No impact	No impact	Zoning AtoN and	Depth is suitable	N/A	Cell-phone	None. Would	Canoeing occurs at the	No	N/A	Available at Grootdraai	Available at Grootdraai	Available at Grootdraai	Not known however	PPP	2

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
				acceptable	health risks associated	infestations at this time				Demarcation Markers required			reception available	require UPN System	Dam			Resort and SBAC	Resort and SBAC	Resort and SBAC	there may be possible linkages to the Vaal Dam though PPPs for touring		
	Kayaking Fishing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	Canoeing occurs at the Dam	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Paddle Ski	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	None	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Already occurs at Grootdraai Dam	N/A	3
	Surf Ski	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	None	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Not known but similar to current activities	N/A	2
	Pedal Boat	N/A	N/A	N/A	N/A	There are no known infestations at this time	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers require	Depth is suitable	Safety concern as not visible to bigger craft,flags and other safety measures required	Cell-phone reception available	None. Would require UPN System	None foreseen at present	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	May be interest as part of Grootdraai Resort	N/A	2
	Hovercraft	N/A	N/A	N/A	N/A	There are no known infestations at this time	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	Not required	Cell-phone reception available	None. Would require UPN System	May conflict with current users	N/A	Not required	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	None at present	N/A	0
	Stand Up Paddling	N/A	N/A	N/A	N/A	There are no known infestations at this time	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers require	Depth is suitable	Safety concern as not visible to bigger craft,flags and other safety measures required	Cell-phone reception available	None. Would require UPN System	None foreseen at present	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Similar to current activties	N/A	2
	Parasailing	N/A	N/A	Water quality is acceptable	No specific health risks associated	There are no known infestations at this time	No impact	No impact	No impact	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	May conflict with other users, zoning to prevent major conflict	The Dam is known for strong winds	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Similar to current activities	N/A	2
	Sailing	N/A	N/A	Water quality is acceptab	No specific health	There are no known infestations at	No impact	No impact	No impact	Zoning	Depth is suitable	N/A	Cell-phone reception	None. Would require UPN	May conflict with other users, zoning	The Dam is known for strong	N/A	Available at Grootdraai Resort and	Available at Grootdraai Resort and	Available at Grootdraai Resort and	Current activities	N/A	3

Contact Type	Activity	Operational Management Issues		Environmental Impacts on Recreational Use			Recreational Use Impacts on the Environment			Safety Requirements					Recreational Requirements				Legal Requirements		Economic Viability		Score
		Change in Water Level	Impacts on Dam Wall	Water Quality	Health Impacts	Aquatic Invasive Species	Fish Spawning	Bird Nesting	Water Quality	AtoN and Demarcation Markers	Water Depth	Visibility	Radio Signal	Emergency Response	Conflicts with current activities	Winds required	Accommodation	Ablution facilities	Access to water	Access to Land	Interest in the activity	Funding Opportunities	
				le	risks associated	this time				AtoN and Demarcation Markers required			available	System	to prevent major conflict	winds		SBAC	SBAC	SBAC			
	Water Toys	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers required	N/A	Safety concern as not visible to bigger craft,flags and other safety measures required	Cell-phone reception available	None. Would require UPN System	None foreseen at present	No	N/A	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Available at Grootdraai Resort and SBAC	Occasional use at Grootdraai Dam	N/A	3
	Flying Boats/Water Planes	N/A	Possible Damage to infrastructure	N/A	N/A	N/A	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	Specific aviation requirement would need to be met	Some sections of the Dam are very deep	N/A	Cell-phone reception available	None. Would require UPN System	Conflict with current use	N/A	Not required	N/A	Would be required	Grootdraai Dam does not have land area available for aviation requirements	None at present	N/A	0
	House Boats	N/A	Possible Damage to infrastructure	N/A	N/A	N/A	N/A	N/A	Possible pollution from litter	Zoning AtoN and Demarcation Markers required	Required depth to be determined in feasibility study	Zoning would be required to prevent danger to smaller crafts such as tube-fishermen	Cell-phone reception available	None. Would require UPN System	Conflicts with current recreational operating hours	N/A	N/A	N/A	Required	Required	None at this time	PPP	1
	Junior Competitive Angling School	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	No	Not required	Facilities for a Training area would be required	Facilities for a Training area would be required	There is access to water near the Resort area which could be used	There is access to water near the Resort area which could be used	The Dam is currently used by competitive anglers (with South African Colours) and thus lends itself to this		1
	Junior Sailing School	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	None. Would require UPN System	No	The Dam is known for strong winds	Facilities for a Training area would be required	Facilities for a Training area would be required	There is access to water near the Resort area which could be used	There is access to water near the Resort area which could be used	Interest and need would need to be determined		1

4.4.3. Carrying Capacity

In order to determine the degree of recreational use possible on the water surface, the Methodology for Carrying Capacity Assessment: Recreational Water Use (DWS) was used as a guideline to determine the level of activity that would be sustainable at Grootdraai Dam.

Calculating carrying capacity for recreation is a vital step to ensure that recreation at the Dam is safe and that users do not feel crowded and enjoy their use of the Dam as a venue for recreation. There are three kinds of carrying capacity:

1. Physical Carrying Capacity (PCC). This is the maximum number of users that can physically fit onto the water surface at any given time.

2. Real Carrying Capacity (RCC). This is the maximum number of users that can use the resource once corrective factors (such as wildlife or weather conditions) that are unique to the Dam are taken into account.

3. Effective (permissible) Carrying capacity (ECC). This is the number of visitors that can use the resource, given the management capacity available at the Dam.

4.4.3.1. Physical Carrying Capacity (PCC)

PCC is calculated as PCC = A ÷ U/a x Rf

- Where A = area available for public use;
- U/a = area required for each user; and
- Rf = Rotation Factor (the number of visits per day)

A is calculated as the area of the water surface: 37.83 km ^{2}, or 3 782 hectares (ha)

U/A = There is a range of literature regarding the area required for different recreational users. The U/A used for that assessment are as follows:

Craft	Water Depth (m)	U/A (ha/ craft)
Canoes	>0.6	0.5
Windsurfers	>0.6	0.5
Rowing	>1.0	0.5
Dinghies	>1.0	1.0
Yachts	>1.8	2.0
Powerboats	>1.4	4.0
Fishing	>1.0	4.0
Water-skiing	>1.4	16.0
Average		3.0

Based on the fact that most activities do not require much space, and that the average hectares per user is 3 ha (30 000 m^2), the value of 4 ha (40 000 m^2) is an acceptable area per user.

As Grootdraai is quite remote it is unlikely that people would use the Dam more than once per visit. It is far more likely that visitors to the Dam would spend the majority of the day on the water surface. In this case RF = 1.

The PCC for Grootdraai Dam can therefore be calculated as:

PCC = 3 782÷ 4 x 1

PCC = 945 boats on the Dam.

However, this is based on the full length of the Dam at 100% capacity. It also doesn't take into account the zoning of the Dam.

4.4.3.2. Real Carrying Capacity (RCC)

Real capacity is the PCC, taking into account factors that limit recreation. In this case limiting factors include:

- Conservation areas,
- Safety No Go Zones; and
- Swimming Areas.

The above factors result in an 11% decrease in water area available for recreation at the Dam (Area available for use decreases from 3783 ha (37.83 km^2) to 3 353 ha (33.53 km^2). Therefore, 88% of the surface area of the Dam is still available for recreation.

The RCC for Grootdraai Dam is therefore:

- RCC = PCC x (100 – Cf1) % x (100 – Cf2) % x … (100 – Cfn)%
- Where Cf = a corrective factor expressed as a percentage.
- RCC = 3783 x (100 – 88)%

RCC = 429 boats on the Dam at any given time ***Based on water surface.***

4.4.3.3. Effective (permissible) Carrying Capacity (ECC)

Effective Carrying Capacity is the maximum number of visitors that a site can sustain, given the management capacity available. Given that Grootdraai Dam has a formal, nationally affiliated boat club with safety provisions in check, the ECC is 1.

- ECC = [Infrastructure Capacity x MC]/ RCC
- Where: ECC = Effective Carrying Capacity;
- MC = Management capacity based on staff and budget;
- RCC = Real Carrying Capacity

At this point, LLM does not have any management capacity for managing the Resort and there is no IA managing recreation at the Dam. Once the IA is in place, the ECC will need to be calculated.

4.4.4. Water Surface Zonal Plan

The Zonal plan for the water surface at Grootdraai Dam is divided into thirteen distinct areas or zones. These zones are based on a number of factors including:

- Operational requirements of the Dam;
- Safety requirements of each activity;
- Types of activities (in terms of contact); and
- Environmental requirements.

The overall zonal map is provided in the figure below.

The zones are as follows:

- Zone A: Secondary Contact: Combination Zone. All crafts and all activities are allowed in this zone, however motor boats are required to maintain an idling speed as this Zone is a No Wake Zone. This zone extends from the shoreline for between 100m to 200m;
- Zone B: Primary Contact – Swimming and Water Toys. This blue zone is a zone available for recreational swimming and the use of water toys. No Boats are allowed in this area for safety reasons;
- Zone C: No Go Zone – Safety. This is the 100m buffer around the Dam Wall and is denoted in orange. No access to the public is allowed;
- Zone D: No Go Zone – Conservation. This dark blue zone is a No Go area for recreational use as inlets provide good fish breeding and bird nesting habitat;
- Zone E: Secondary Contact – Motor Boats. This zone is designated for the use of Motor Boats at high speed;
- Zone F: Secondary Contact – Jet Ski. This grey zone is allocated for the use of Jet Skis. No other vessels are allowed in this area; and
- Zone G: Secondary Contact – Water Skiing. This maroon zone is allocated for water skiing.

Detailed information of the current and potential activities is provided in Table 6 below. Information on requirements for each zone is also provided.

Table 6: Surface Water Management Zones

Zone Name	Contact Type	Permissible Activities - Current	Permissible Activities - Potential	Access Point	Safety Requirements for Users	Safety Requirements for DMC
Zone A	Secondary Contact	Motorised Boats – No Wake zone Canoeing Fishing canoe Kayak fishing Shore fishing Kayaking Rowing Tubing Paddle Ski Bass Fishing Fishing from Boats Wind Surfing Kite Surfing Sailing	Commercial/Small-scale fisheries Dragon Boats Slalom Canoe Kayaking Sprints Kayaking Marathons Kayaking Touring Kayaking water polo Junior competitive angling school Pedal Boat House Boats Stand Up Paddling Tube Fishing Pontoon Fishing	SBAC (if agreements are put in place) Grootdraai Dam Resort Authorised access point representatives (including private landowners should access agreements be put in place)	Registered Safe for Water Vessel Valid Skipper's License First Aid Kit UPN date stamp UPN tag	AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforcement Officer SBAC will require system of checking UPN tag and date stamp
Zone B	Full Contact	Swimming – recreational Water toys	Swimming events Open water swimming development school	Grootdraai Dam Resort Vaal Rivier School		AtoN and Demarcation Markers UPN system OPS point Rescue Boat available at all times
Zone C	N/A	DWS maintenance and management activities	None	N/A	N/A	AtoN and Demarcation Markers
Zone D	No Go Zone - Conservation	Research related activities	None	Grootdraai Resort	Registered Safe for Water Vessel Valid Skipper's License First Aid Kit UPN date stamp UPN tag Approval for Research by DWS	AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforcement Officer

Zone Name	Contact Type	Permissible Activities - Current	Permissible Activities - Potential	Access Point	Safety Requirements for Users	Safety Requirements for DMC
Zone E	Secondary Contact – Motorised Boats and Sailing	Bass Fishing Motorised Boats Jet Powered Boats RHIB Wind Surfing Kite Surfing Paragliding Sailing Ski and Wakeboard Boat Canoeing Rowing Kayaking Sprints	Jet Powered Boats Dragon Boats Fishing Canoe Jet Ski Fishing Ski jumping Surf ski Junior sailing school Parasailing	SBAC (if agreements are put in place with DWS) Grootdraai Dam Resort Authorised access point representatives (including private landowners should access agreements be put in place)	Registered Safe for Water Vessel Valid Skipper's License First Aid Kit UPN date stamp UPN tag	AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforcement Officer SBAC will require system of checking UPN tag and date stamp
Zone F	Secondary Contact – Jet Ski	Jet Ski		SBAC (if agreements are put in place with DWS) Grootdraai Dam Resort Authorised access point representatives (including private landowners should access agreements be put in place)	Registered Safe for Water Vessel Valid Skipper's License First Aid Kit UPN date stamp UPN tag	AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforce-ment Officer
Zone G	Secondary Contact – Water Skiing	Water Skiing Slalom skiing	None	SBAC (if agreements are put in place with DWS) Grootdraai Dam Resort Authorised access point representatives (including private landowners should access agreements be put in place)	Registered Safe for Water Vessel Valid Skipper's License First Aid Kit UPN date stamp UPN tag	AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforcement Officer SBAC will require system of checking UPN tag and date stamp

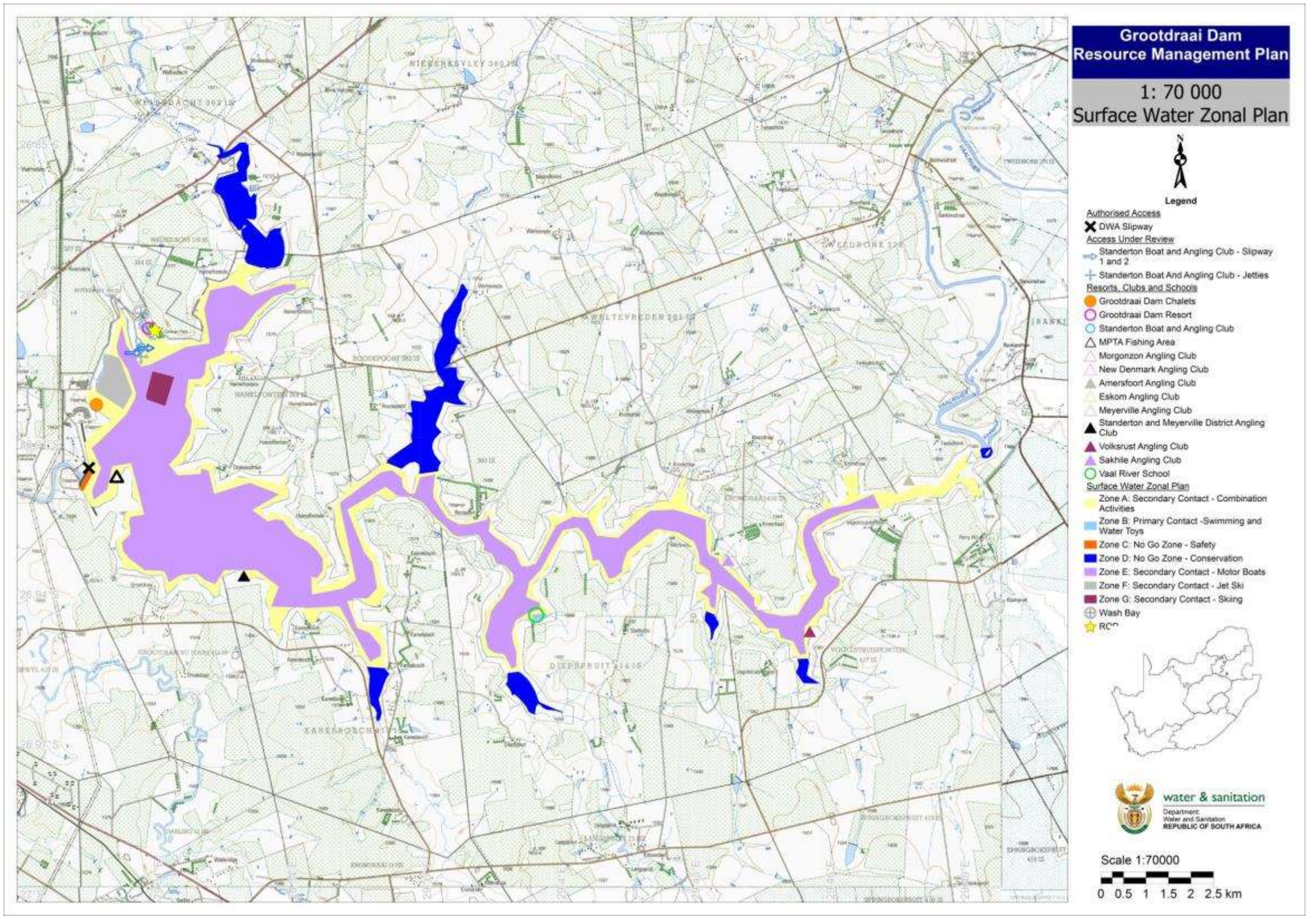

Figure 20: Map of the Water Surface Zonal Plan

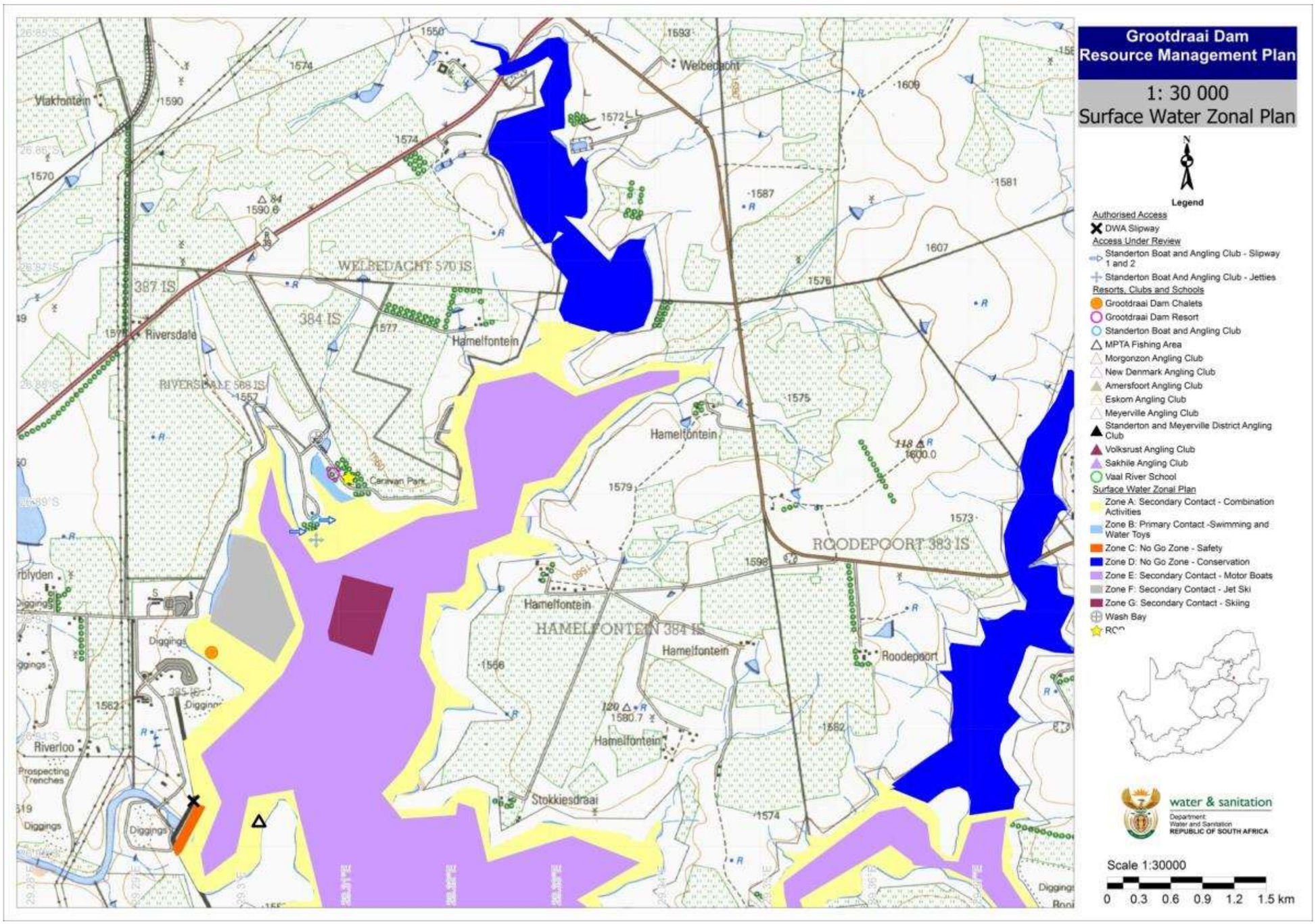

Figure 21: Map of the Water Surface Zonal Plan – Section 1

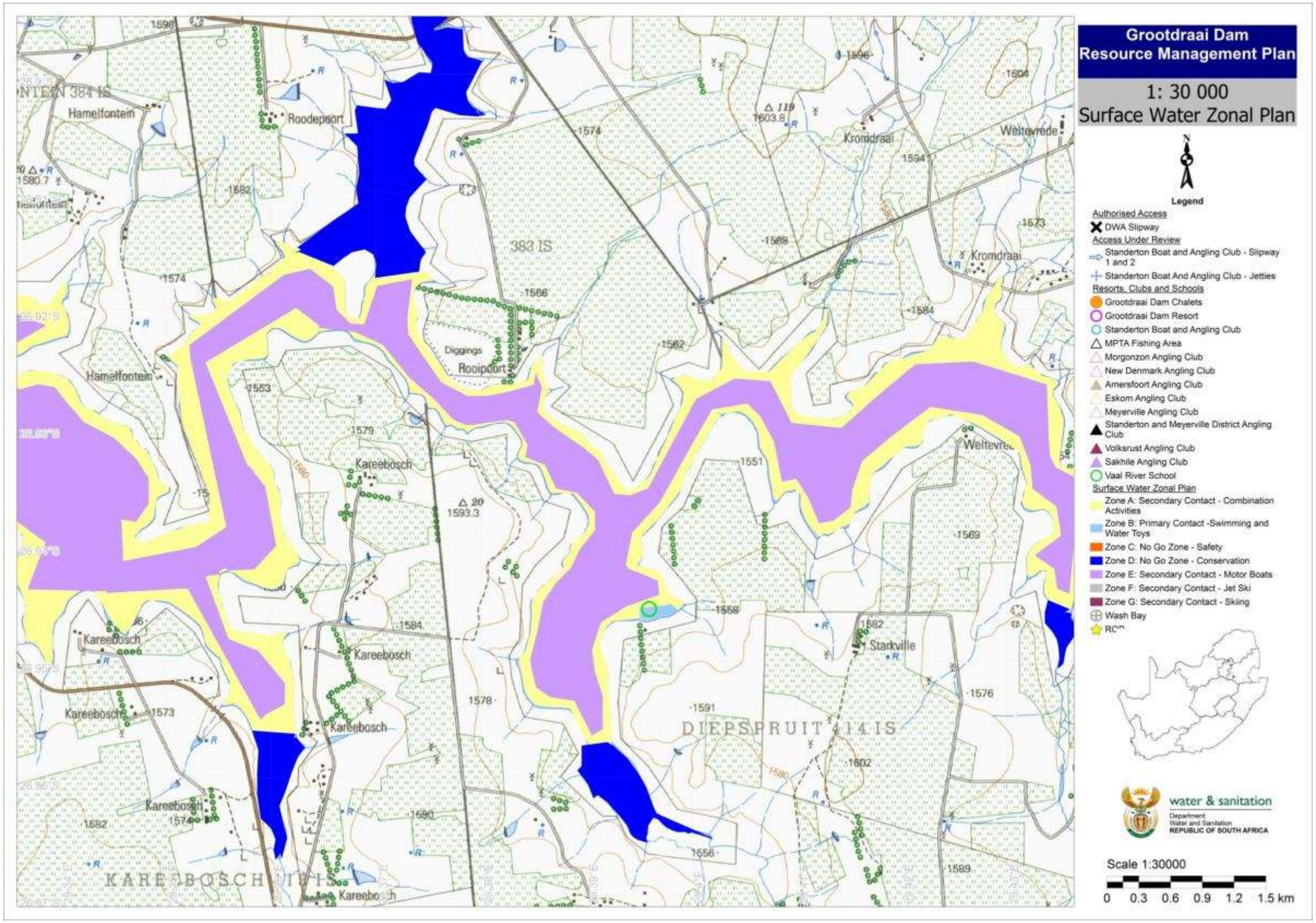

Figure 22: Map of the Water Surface Zonal Plan – Section 2

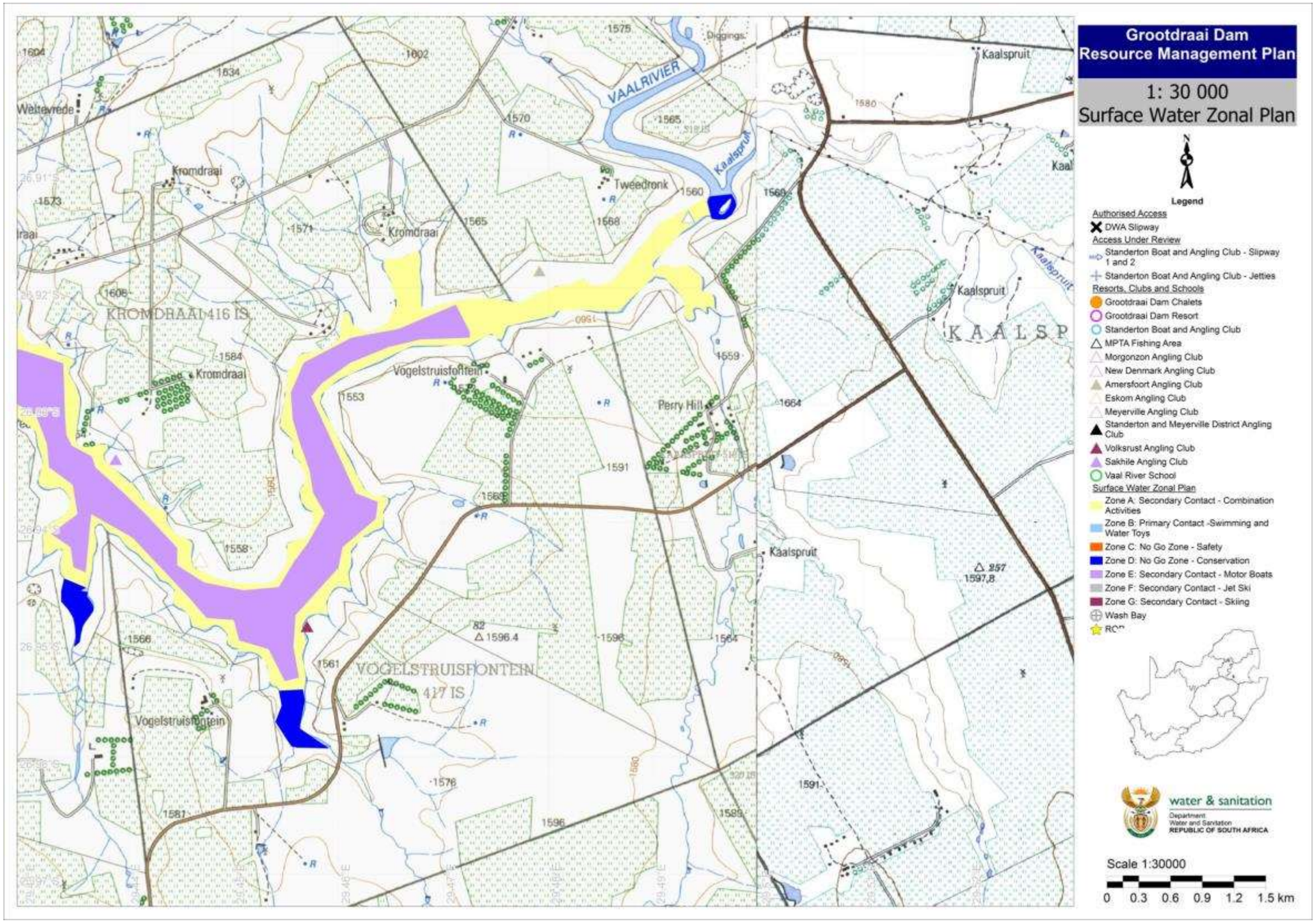

Figure 23: Map of the Water Surface Zonal Plan – Section 3

4.4.5. Shoreline Zonal Plan

In addition to the Surface Water Zonal Plan above, an integral part of the RMP is shoreline zoning. This provides guidance on what activities (if any) are allowed in the land adjacent to the Dam.

However, landownership within the purchase boundary could not be confirmed. Comparison between the purchase boundary provided as part of the 2002 Zonal Plan for the Dam and current GIS suggests that purchase boundary is intact. However this needs to confirmed. There are also a number of shore based angling clubs which have to traverse private property in order to access the surface water. The 2002 Zonal Map for the Dam makes mention of the following Angling Clubs:

- New Denmark Angling Club;
- Standerton, District and Meyerville Angling Club;
- Morgenson Angling Club;
- Volksrust Angling Club;
- Amersfoort Angling Club;
- Meyerville Angling Club; and
- Sakhile Angling Club.

The status of these clubs is unknown at present and no specific agreements regarding access to the surface water with DWS are available.

Due to these issues, the Strategic plan has a specific action whereby a survey of all illegal access points, abstraction points and structures is to be undertaken and the zonal Plan updated with this information. This should also include a survey of commercial activities as well as recreational clubs.

The Shoreline Zonal Plan provided below will therefore be updated as part of this Strategic Action.

Further, it should be noted that the Shoreline Zonal Plan can only manage state owned land around the Dam. Much of the purchase boundary around the Dam is landlocked by private land. It is thus suggested that this land be managed through caretaker agreements with adjacent landowners. It should be noted that due to the gradient of the land around the Dam, it is possible for boats to be launched without a slipway. Adjacent landowners may not access the Dam via informal launches without agreements with DWS being in place.

In addition, it should be noted that no improvements (including private or public slipways) to property within the DWS purchase boundary is permitted without a specific agreement regarding such improvements being in place. Further, all improvements require consent from DWS and the DMC. No permanent structures shall be built within the 1:100 year floodline without additional approval as required by Section 21 (c) and (i) of the National Water Act (Act no 36 of 1998). If necessary, environmental authorization in terms of NEMA should also be obtained.

The management zones include:

- Zone A: Management Area –Agreements – Grazing Allowed;
- Zone B: Management Area – Agreements – Conservation;
- Zone C: Development and Recreation;
- Zone D- No Public Access – Management Only;
- Zone E: Education and Recreation;
- Zone F: Recreation – Shoreline Fishing Area.

Permissible activities are detailed in the table below. It is important to note that the shoreline zoning provides guidance to the DMC and all developments require approval from the DMC as well as the relevant agreements to be in place with DWS/IA prior to commencement regardless of the shoreline zoning (see section on agreements for more details).

Table 7: Shoreline Management Zones

Zone Name	Zone Type	Permissible Activities	Requirements for Users	Requirements for DMC
Zone A	Management Area – Caretaker Agreements – Grazing Allowed	Grazing (only if caretaker agreements are in place) Management of firebreaks Management of litter Management of Invasive Plant Species	Caretaker agreements with adjacent landowners	Caretaker agreements with adjacent landowners
Zone B	Zone B: Management Area – Caretaker Agreements – Conservation	Management of firebreaks Management of litter Management of Invasive Plant Species	Caretaker agreements with adjacent landowners	Caretaker agreements with adjacent landowners
Zone C	Recreation and Development	Expansion of facilities/infrastructure for recreation Development of facilities/infrastructure for development/training Development of facilities/infrastructure for tourism Fishing Camping/Accommodation Birding Picnicking Access to surface water for recreational purposes	Camping, birding, hiking, picnicking, shoreline fishing and access to the water must be done in accordance to access agreements Camping allowed only in designated areas Noise levels to be kept at a minimum. No littering at Picnic spots All users bringing boats to go through Wash Bay All activities to be formalised and agreements drafted before the expansion of existing facilities No private slipways to be built without approval from DWS. In addition Section 21 (c). and (i) Water Use License Application (WULAs) would be required	Enforcement Officer to check all designated picnic spots Feasibility of employing local community members as part of "Working For Dams" programme to be assessed. Potential jobs include management of picnic sites/picking up of any litter DMC must ensure that all developments have been approved by DWS and DMC. Requirements of National Water Act and National Environmental Management Act must be taken into account All developments should have an approved Environmental Management Plan (EMP) to ensure construction does not impact on Dam
Zone D	Management – No Public Access	Fire management Invasive alien species clearing Management of Dam Infrastructure Shoreline fishing by DWS and MPTA officials	Agreement with DWS regarding shoreline fishing area to be formalised	Agreement with DWS regarding shoreline fishing area to be formalised
Zone E	Education and Recreation	Use for education and recreational purposes by Vaal Rivier School as per agreement	Access agreements with DWS.	Access agreements with DWS.

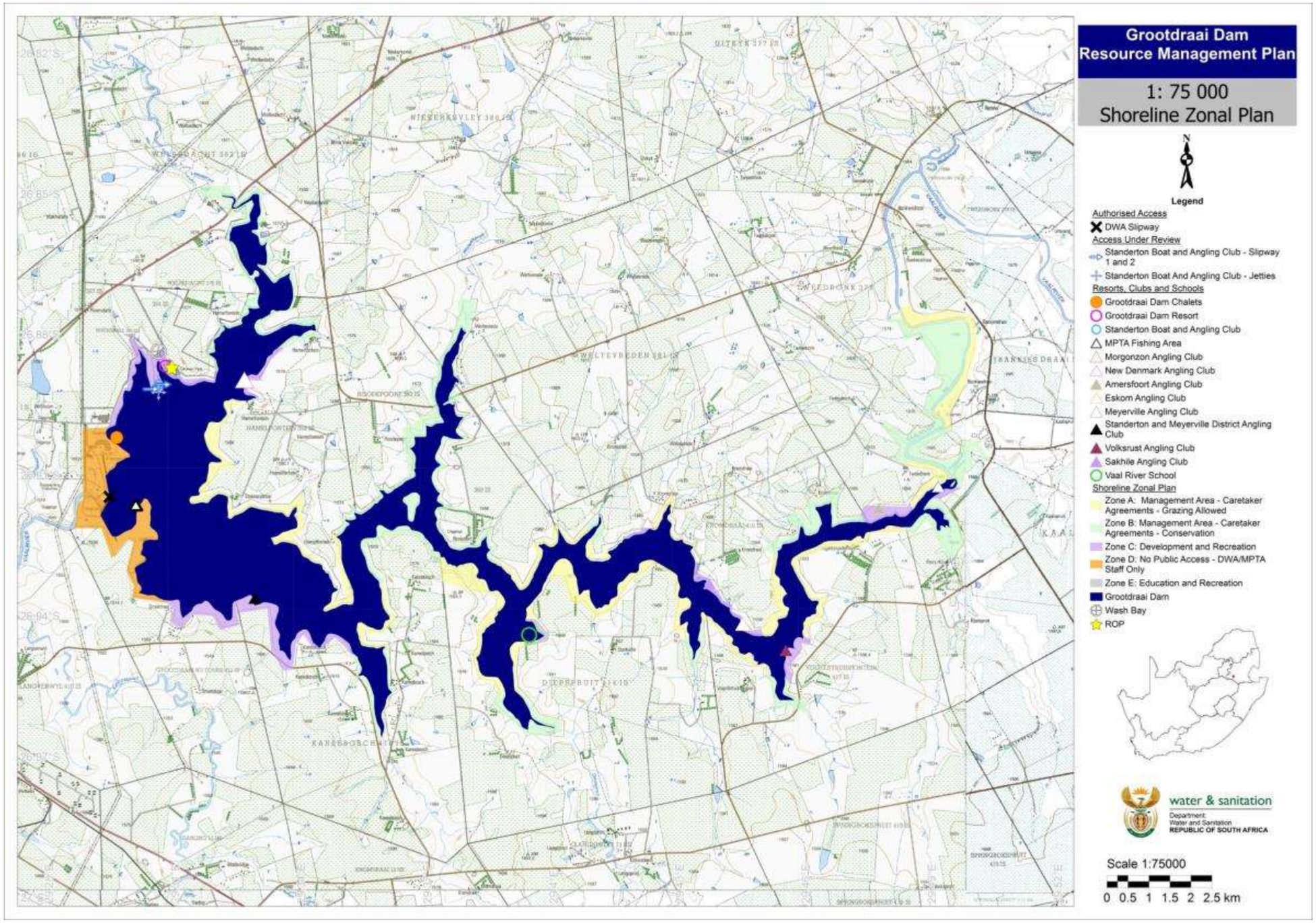

Figure 24: Map of the Shoreline Zonal Plan

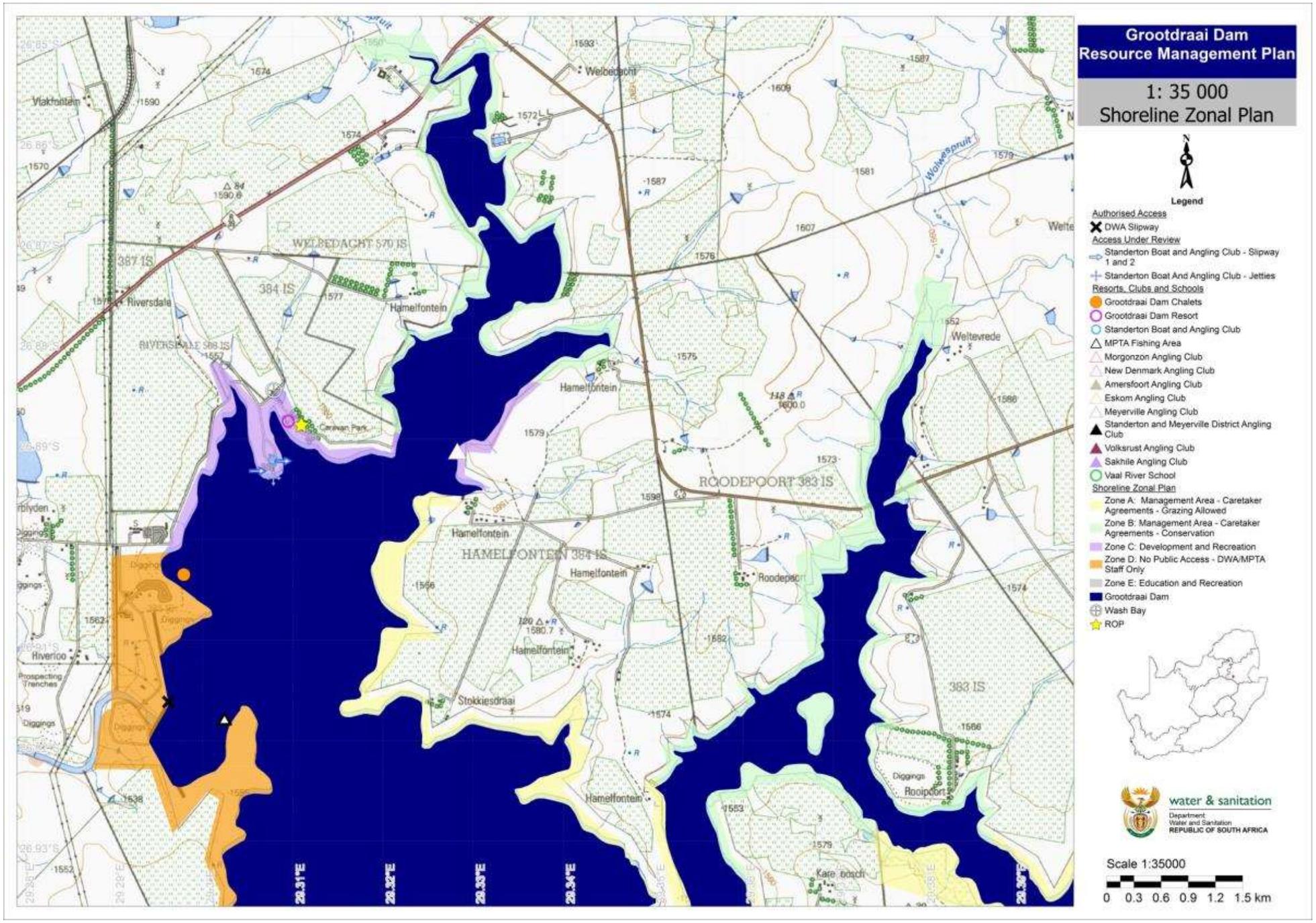

Figure 25: Map of the Shoreline Zonal Plan – Section 1

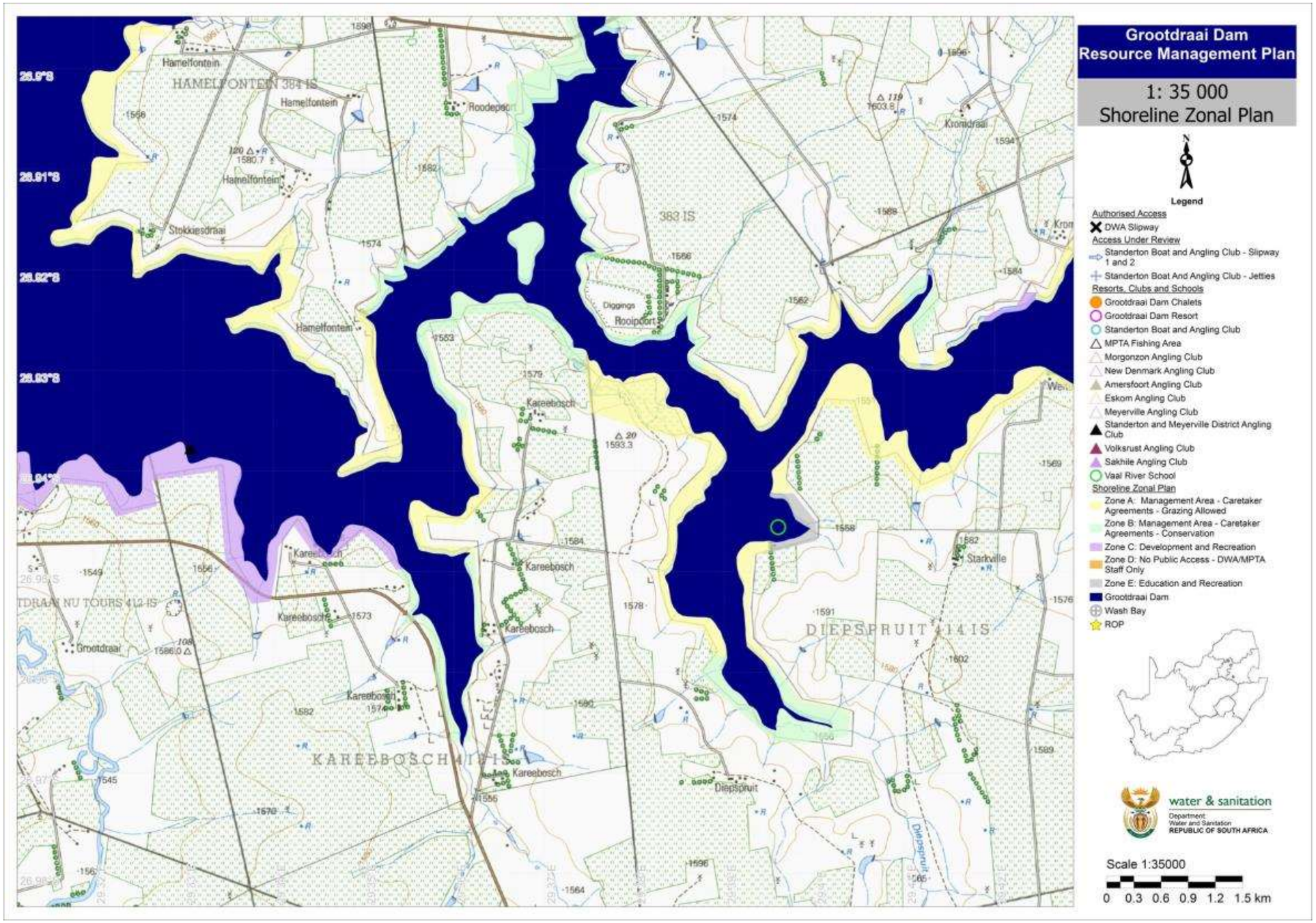

Figure 26: Map of the Shoreline Zonal Plan – Section 2

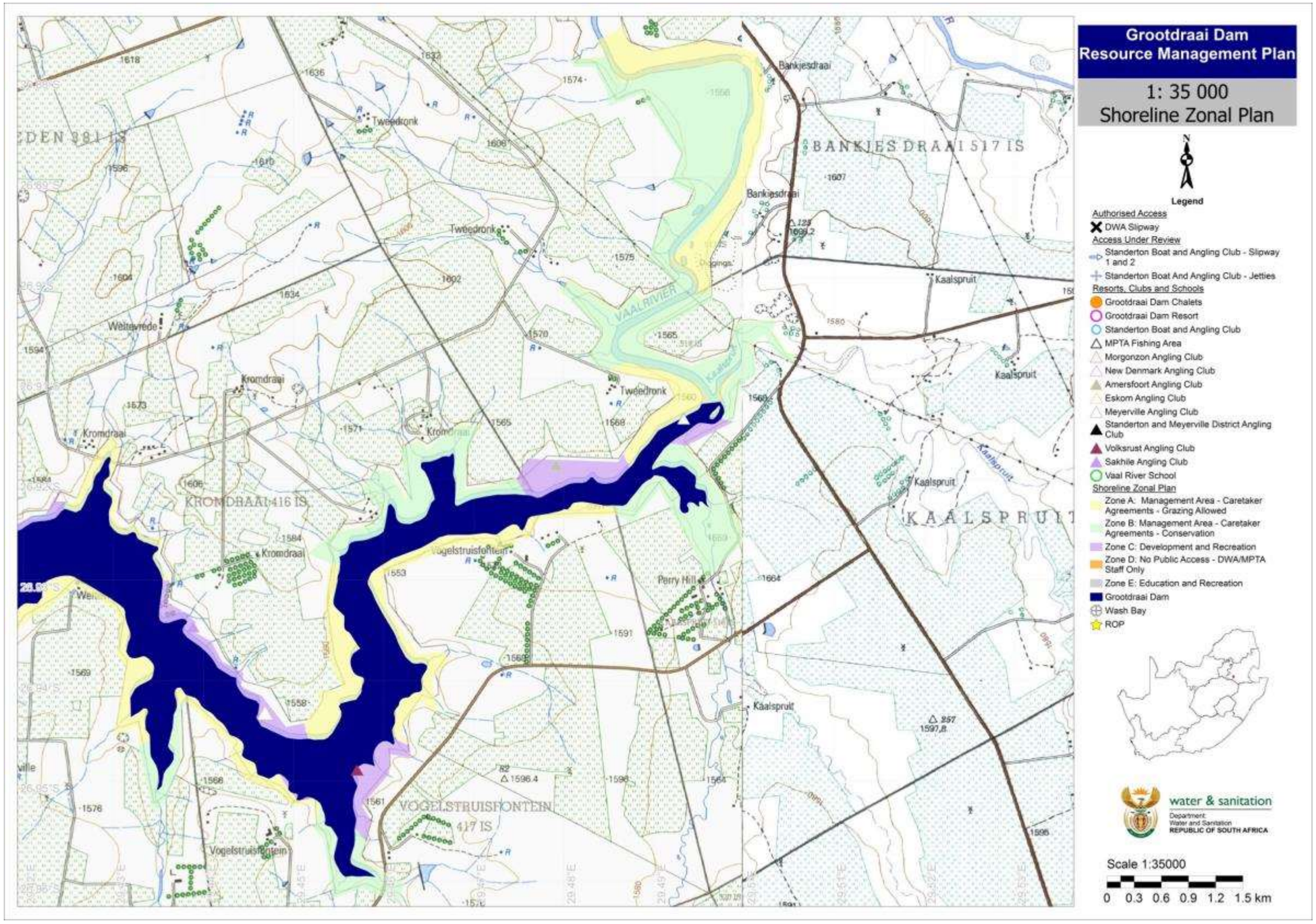

Figure 27: Map of the Shoreline Zonal Plan – Section 3

4.5. Strategic Plan

The Strategic Plan is informed by the objectives determined during the Visioning exercise and through research on feasible opportunities for the Dam.

Objective category/major objective	What	Why	How	Who
Improved And Equitable Access for the Surrounding Community	Public Resort to be upgraded and repaired	The public resort is currently unmanaged, the facilities are run down and have been vandalised. This prevents community use as there are fears regarding safety and security	Discussions with LLM to take place to discuss the potential for an updated management agreement in place. This agreement would allow LLM to undertake a PPP process for the management of the Dam. It is suggested that after an agreement with LLM is put in place that a PPP be put in place for the management of the Resort.	DWS LLM PPP
	Information brochures to be developed to inform communities about the potential uses of the Dam and how to join recreational clubs and societies	During consultation with Ward Councillors, it was determined that most local community members are not informed about the Dam and the potential recreational activities.	The DMC should develop informative brochures to ensure that the local community members are aware of opportunities at the Dam. It is also suggested that the DMC develops a presentation which can be made to the Ward Councillors, Local Schools, Churches etc. about the potential for recreational use at the Dam	DMC
	Transport system to be created to provide transport for local community members. It is suggested that discussions with the LLM and the Taxi Union take place and if possible a weekly taxi route be put in place	One of the main reasons that the community do not make use of the Dam, it the lack of transport from the Town to the Dam. It is thus suggested that the current transport system be increased to include a taxi route to the Dam over the weekends and during the holidays.	LLM to meet with the Taxi Unions in Standerton and Sakhile to discuss the potential for an additional taxi route to the Dam	DWS LLM DMC
	Equitable Access to be ensured	During public consultation, it was mentioned that the Sakhile Angling Club were denied access to the Dam by certain landowners. It was	Caretaker agreements should be updated in line with the principles of the RMP. No	DWS LLM

Objective category/major objective	What	Why	How	Who
		further noted that there may be caretaker agreements between DAFF or DWS and adjacent farmers which allows them to restrict access to State Land.	organisation or group should be denied access to the Dam via the authorised public access points There should be a centralised public access point to the surface water which is available to everyone.	Adjacent Land Owners
Improved Control, Management and Safety	Formalised institutional structure	Although there is an agreement with LLM regarding the management of the Resort, there is currently no formal institutional structure in place to manage the water surface and purchase boundary. This has a number of implications for safety, resource management and recreational use	Institutional structure suggested as part of the RMP DWS to put in place the DMC, OMC and RSC	DWS
	All recreational use to be regulated through agreements. Old agreements to be updated to take into account the findings of the RMP	There are currently only two known agreements in place (one with LLM and one with Vaal Rivier School). These agreements should be updated to take into account the findings of the RMP All recreational clubs should have an agreement in place within 1 year of the RMP being gazetted	Agreements to be updated New agreements to be put in place	DWS Recreational Clubs
	UPN System to be implemented;	There is no overall safety management system or emergency response system in place at the Dam	UPN System to be implemented	DWS LLM SAMSA CIWSP
	Standardised AtoN and Demarcation Marker system to be implemented	Improve safety of navigation.	Implement AtoN and Demarcation markers as required. Agreements between SAMSA, DWS, LAAPs and other relevant parties to be concluded	SAMSA DWS Recreational Clubs Relevant Parties LLM
	Survey of all illegal access points, abstraction points and structures to be	Based on a Desktop Google Earth Survey, a number of potential launch sites for vessels, potential abstraction points and structures were noted. A survey should be undertaken to assess these points. All illegal access points to be managed through agreements or closed	DWS to undertake survey of the Dam All illegal access points to be closed Agreements regarding access to be put in place with adjacent landowners	DWS Adjacent Landowners

Objective category/major objective	What	Why	How	Who
	undertaken and Zonal Plan to be updated with this information. This should also include a survey of commercial activities and recreational clubs.			
	Agreements with Shoreline Fishing Clubs to be updated or put in place	The status of the following clubs is currently unknown: • New Denmark Angling Club; ▪ Standerton, Distrik and Meyerville Angling Club; ▪ Morgenson Angling Club; ▪ Volksrust Angling Club; ▪ Amersfoort Angling Club; ▪ Meyerville Angling Club; and ▪ Sakhile Angling Club. It is necessary for all recreational clubs to be documented and agreements regarding shoreline fishing to be put in place	DWS to document all recreational clubs at the Dam Agreements to be put in place for all clubs	DWS Recreational Clubs

Objective category/major objective	What	Why	How	Who
Increased Tourism and Recreational Use Development	Potential for PPP to manage Public Resort and additional accommodation if required. New management body to include security at Public Resort area to ensure a safe environment	Grootdraai Dam is located in close proximity to Gauteng and near Standerton. The Dam is known for its good fishing and sailing and due to the undeveloped nature of the area, there is potential for increased and improved recreational use and tourism. There is currently a public resort in place for which Lekwa Local Municipality (LLM) is responsible for however due to a lack of financial capacity they are unable to adequately manage the facilities. This has resulted in the resort being run down and vandalised. There is also no security in place which prevents community use of the Dam as there are fears regarding safety and security. In addition, there are no agreements in place to manage the surface water of the Dam. It is therefore suggested that a LLM undertake a PPP for new accommodation, public access, upgrade of the current resort and management of recreation and safety be undertaken together. This PPP would also include management of the surface water and the components that would require management include: · Safety and Security; · Access Control; · Washbay Facility; · Management of current Agreements in place; · Management of Marketing Plan; · Management of Shoreline Management Plan; · Management of Invasive Fish Species Containment Plan; · Management of Siltation Prevention Measures; · Additional Accommodation (if required); · Public Resort including camping, accommodation, picnic facilities and ablution facilities; · Bird watching; · Hiking trails; · Swimming school; and · Fishing.	Discussions with LLM to take place to discuss the potential for an updated management agreement in place. This agreement would allow LLM to undertake a PPP process for the management of the Dam. It is suggested that after an agreement with LLM is put in place that a PPP be put in place for the management of the Resort A feasibility study for a PPP should be undertaken.	DWS LLM

Objective category/major objective	What	Why	How	Who
	The potential for additional accommodation to cater for different levels of affordability to be determined.	The Dam is located in close proximity to Gauteng and near Standerton. The Dam is known for its good fishing and sailing and due to the undeveloped nature of the area, there is potential for varying levels of accommodation at the Dam. This would develop tourism in the area.	Discussions with LLM to take place to discuss the potential for an updated management agreement in place. This agreement would allow LLM to undertake a PPP process for the management of the Dam. It is suggested that after an agreement with LLM is put in place that a PPP be put in place for the management of the Resort A feasibility study for a PPP should be undertaken.	DWS LLM
	New recreational activities such as triathlon events, swimming events and musical festivals to be implemented in partnership with LLM.	In the past the Dam was used for Musical Events. There is also opportunities for the Dam to be used for more events.	Discussions with LLM should be undertaken to identify potential events and festivals which can be held at the Dam	DWS LLM
	Marketing plan to be developed to increase tourism to the Dam. This should include the development of a website and improve road signs to the Dam	The Dam is not well known despite the fact that it is one of the largest Dams in the country and occurs in relatively close proximity to the urban areas in Gauteng. A marketing plan should be developed. It is suggested that this include the development of road signs and a website for the Dam	Discussions with MPTA and LLM should be undertaken MPTA should compile the marketing plan for the Dam with LLM	MPTA LLM DWS DMC
Improved Resource Management	Water quality monitoring results should be discussed at the DMC meetings	Water quality monitoring is undertaken by DWS. Due to the industrial land use of the area it is suggested that all results are reported at the DMC so that any issues can be picked up quickly	Water Quality Status must be a standard agenda item at the DMC.	DWS DMC

Objective category/major objective	What	Why	How	Who
	The Standerton WWTWs to be upgraded to ensure that downstream users are not negatively impacted by tourism development at the Dam	The Standerton WWTWs is operating above its design capacity and the discharge quality is not compliant. This has the potential to restrict development at the Dam as if the WWTWs is not upgraded it will not be able to deal with additional effluent from proposed developments.	LLM to upgrade the Standerton WWTWs.	LLM
	The potential for water quality monitoring data to be linked to the UPN system should be determined so that if water quality issues are noted they will activate the UPN system	The UPN system in its current form has a function whereby ecological issues at a Dam can be noted. It is suggested that this be developed so that water quality monitoring bodies such as DWS and members of industry such as Eskom and Sasol can activate the UPN System should any results indicate issues with the water quality	Discussions with CIWSP should be undertaken to determine feasibility If feasible, discussions with Sasol and Eskom etc to be undertaken to discuss the potential for this system	DWS CIWSP Eskom Sasol Grootdraai Forum
	A Point Source Pollution Assessment should be undertaken.	There is concern that water quality at the Dam is decreasing due to land use in the catchment. An assessment of pollution points should be undertaken to identify issues.	An assessment of point sources of pollution should be undertaken to identify issues.	DWS DMC
	Shoreline Management Plan to be compiled and implemented	There is currently no shoreline management in place. This results in the potential for increased terrestrial invasive species, erosion and siltation of Dam etc.	A Shoreline Management Plan should be compiled	DWS MPTA
	Education programmes regarding the impacts of alien invasive species	Alien invasive species can negatively impact biodiversity, water quality etc. However their impacts on the environment are seldom known	An Alien Invasive Species Education programme including notice boards, information brochures etc. should be developed	LLM/IA DEA MPTA DMC
	A Species Management Plan for Invasive Fish Species such as Bass and Carp should be developed and implemented so that the economic benefits of recreational angling can be achieved without the further spread of these species to other valuable	Both Carp and Bass are Category I(b) invasive species. Both of these species can provide economic benefits through recreational angling. Based on new draft legislation, a containment plan for these species should be compiled	A Species Management Plan for Bass and Carp should be compiled and should include the following. These species management programmes must stipulate the following: ▪ The listed invasive species to which it relates; ▪ The measures to eradicate or control the listed invasive species; ▪ The areas in which the measures	DMC DEA DWS LLM/IA

Objective category/major objective	What	Why	How	Who
	water resources		▪ are to be applied; and ▪ The schemes to fund the measures, if applicable.	
	Potential for commercial fishing or small scale fisheries programme to be assessed	Grootdraai Dam is known as a good fishing area. This could be used for potential small scale fisheries programmes	A feasibility study for the small scale fisheries programme should be compiled	DWS DAFF MPTA DMC
	Siltation prevention measures to be assessed and put in place	The Dam has a high level of turbidity and siltation measures should be put in place if possible	Potential siltation prevention measures should be assessed and put in place if feasible	DWS DMC
	Caretaker agreements with adjacent landowners to be put in place to manage resources	Due to the fact that most of the land around the Dam is landlocked by private land, it is very difficult for proper resource management to be put in place. It is thus suggested that land management agreements or caretaker agreements be put in place in line with the Shoreline Zonal Plan	Caretaker agreements to be compiled and put in place	DWS
	Wash bay system to be implemented to prevent alien invasive species infestations	There are a number of aquatic invasive species in the catchment. These species could have a negative impact on water quality, biodiversity, safety and recreational use. The use of a Wash Bay will prevent the spread of aquatic invasive species and contain any invasive species currently in the Dam (although at this point none have been identified)	Wash Bay to be built Agreements with DEA regarding Wash Bay Agent, herbicides etc to be put in place Wash Bay agent to be appointed Wash Bay Offices to be appointed	DWS DEA CIWSP DMC
Education and Skills Development	Coordination between SBAC, local schools and SAS to introduce youth sailing and fishing programme at the Dam	There are currently no youth development programmes at the Dam despite the fact that the Dam offer could sailing and fishing environment. During public consultation it was noted that the youth in the area have a number of issues regarding alcohol and drug abuse. Using the Dam for life skills training and youth development training may assist in this regard	Discussions between stakeholders regarding potential for youth development programme. Discussions between church groups, schools, recreational clubs and DMC to be initiated	DWS SAS SBAC DMC Recreational Clubs Churches Schools
	Access agreement with Vaal Rivier School to be	The Vaal Rivier School has an agreement with DWS to use the Dam for education and recreation purposes. This agreement should be updated	Agreement to be updated	DWS Vaal Rivier

Objective category/major objective	What	Why	How	Who
	updated	in line with the RMP		School
	Skills training programmes including life guard and first aid training as part of tourism development and community skills development	This programme would provide, skills, jobs and ensure safe use of the Dam.	Feasibility study to be undertaken.	DWS SAMSA Dept of Education

5. WAY FORWARD

5.1. Compilation of Business Plans

Based on the strategic objectives identified for Grootdraai Dam, a suite of BPs were developed. The BP describes the financial management and operational requirements to implement the Objectives of the RMP. The Financial Plan will facilitate the implementation of listed and recommended activities in the RMP.

The Business Plans are approached in the following manner:

- Identify Strategic Objective – informed by RMP
- Determine Interventions – Each objective was divided into practical interventions
- List Detailed Activities – Interventions were further divided into activities, in order to establish timeframes and provide guidance to the entity who implements the business plan
- Establish Key Performance Indicators per intervention – Key Performance Indicators allow for monitoring and evaluation
- Establish timeframes per activity
- Establish a budget per activity
- Determine Funding sources – Innovative mechanisms to obtain funding were identified

5.2. Review of RMPs and Business Plans

The RMP presents a twenty-year vision for the Dam. This vision will be implemented through the RMP which will be revised and updated every five years, according to changing priorities, constraints and achievements. Within a five-year cycle of the RMP, the BPs will identify key objectives in line with a changing status quo and potential change in circumstances. After five years the RMP will be reviewed and updated so to identify new objectives in line with the vision for the Dam.

The BPs are updated annually.

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