FINAL RESOURCE MANAGEMENT PLAN

BOSKOP DAM




water & sanitation

Department:
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- Boskop Yacht Club;
- North West University;
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- Westvaal Bassmasters Club; and
- Tlokwe City Council

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Review Period	Month	Year				
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.
17 September 2013	First Draft for PSC Review	1
13 December 2013	Reviewed RMP for PSC review	2
10 March 2014	Amended RMP for PSC review	3
20 March 2014	Amended RMP for Public Review	4
27 May 2014	RMP for PSC Review	5
21 January 2015	Final RMP for PSC Review	6
10 February 2015	Final RMP for Public Review	7
22 March 2015	Final RMP	8

Executive Summary

According to the Guidelines for the Compilation of Resource Management Plans (2006), the main aim of and 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 Resource Management Plan is thus a planning tool aimed at working within the requirements of existing policies levels, 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**. This focus on institutional arrangements is accompanied by a **Zonal Plan** together with a detailed **Strategic Plan**. In addition, a **Financial Plan** provides guidance on what funds can be collected and how these should be used. Together these components provide a comprehensive guide on the "what?"; "why?"; "how?" and "who?" of the management of prioritised Government Waterworks.

The construction of Boskop Dam was completed in 1959. It was built when the Potchefstroom Dam was unable to meet the demands of domestic, industrial and agricultural water use in the area. While it was originally built for irrigation purposes, it is currently the primary source of potable water supply to Potchefstroom. Set in a vast grassland area, Boskop Dam is used as a venue for recreation and conservation by the surrounding communities.

The Dam forms part of the Boskop Dam Nature Reserve, a 2756 ha (27.5 km^2) protected area of the Kalahari Highveld. There are several education and training initiatives held at the Dam. Firstly, the Department of Water and Sanitation has a training centre situated at the Dam. Secondly, due to the proximity of Boskop Dam to the North West University, it has been used for research by a number of Departments and provides practical exposure for Zoology students. Studies have also been undertaken by the African Centre for Disaster Studies.

Boskop Nature Reserve allows canoeing and paddleboats on the water. Shoreline fishing is also popular. Some power boat access does occur at the Dam through Naturama. This activity is mainly related to Westvaal Bassmasters Angling Club. Westvaal Bassmasters has approximately 100 members and the Club holds some angling competitions during the spring and summer months.

In addition, Boskop Yacht Club has an established membership of approximately 130 members. They hold Regattas approximately twice a month with general sailing in the weeks when events are not scheduled. Due to speed restrictions, jet skis and similar recreational activities, such as waterskiing are prohibited on the Dam. Shoreline angling is common, but due to thick reeds growing along the banks of the Dam, spots for angling are limited which restricts the number of bank anglers at any given time. Other shoreline activities include camping in the Nature Reserve as well as hiking, picnics and game drives.

The process followed to compile the Resource Management Plan is detailed in the figure below.

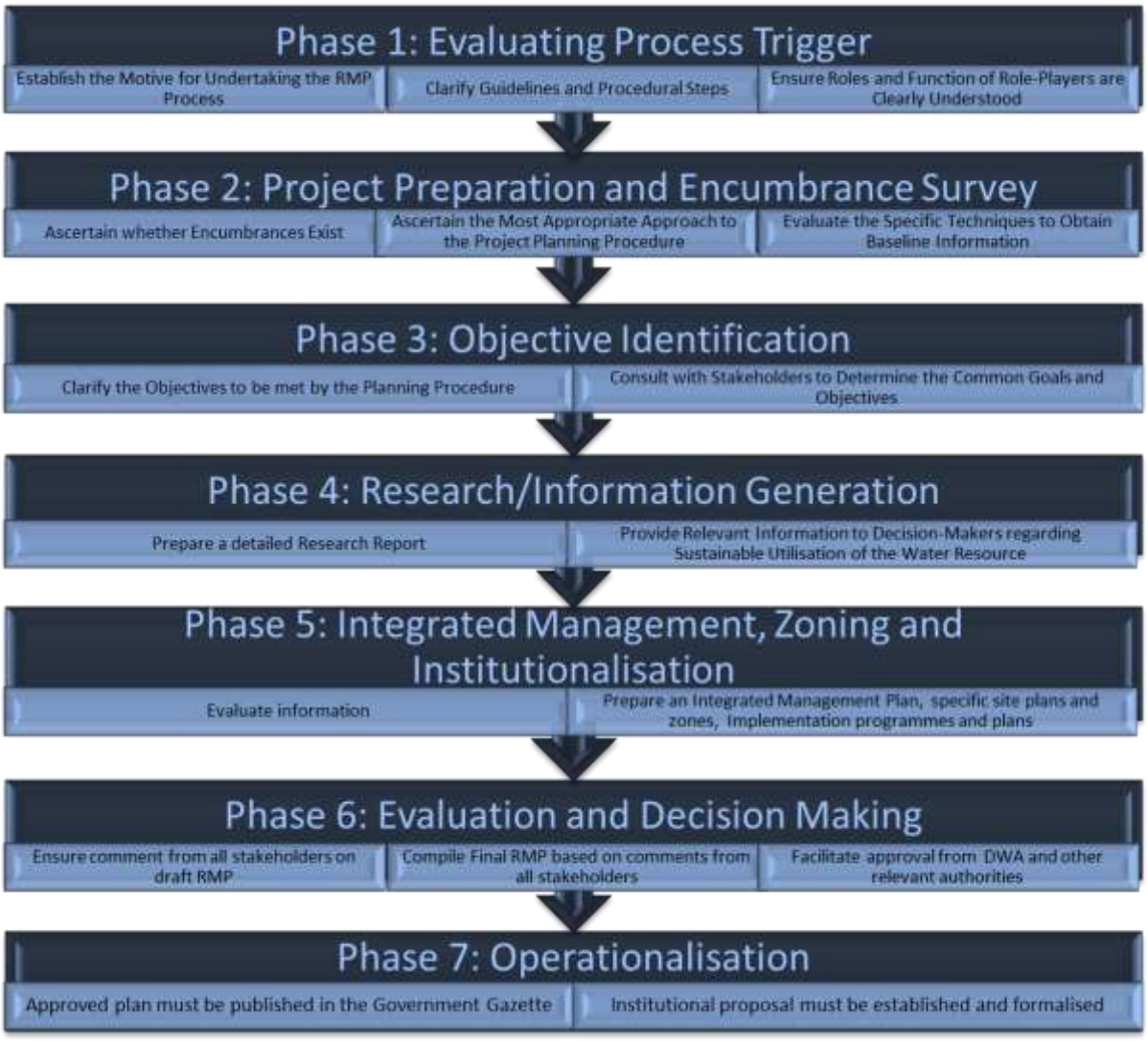


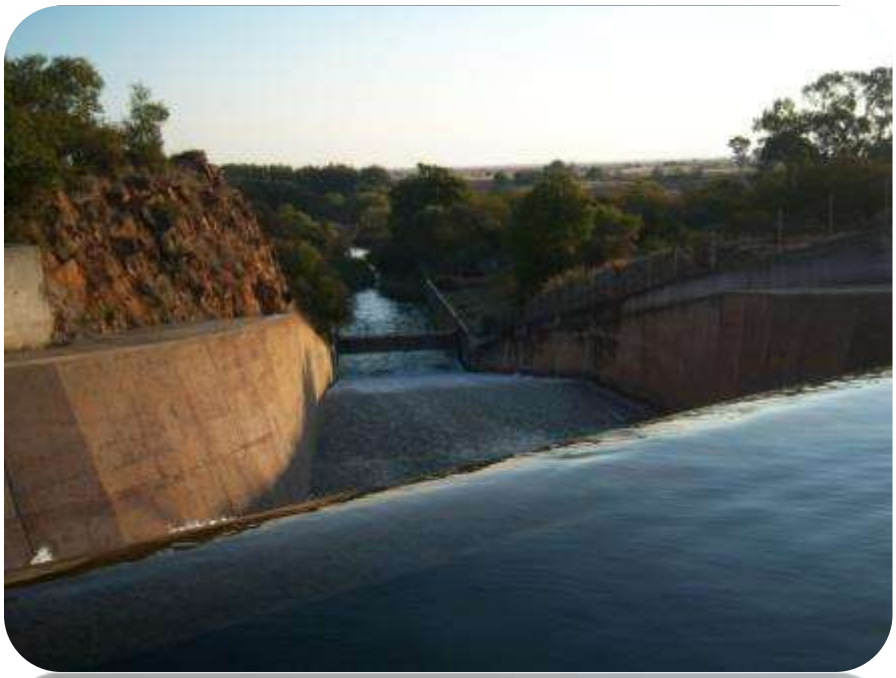
Figure 1: RMP Process (DWS, 2006)

It is important to note that the Resource Management Plan was compiled based on detailed stakeholder input and engagement. 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 Boskop 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 Resource Management Plan.
- Implementation of standardised and harmonised Aids to Navigation and Demarcation Markers.
- Implementation of Unique Positioning Number System and the Boat Wash Bay System at the Dam.

- All agreements must be updated and/or formalised according to the legal requirements of Public Private Partnerships or lease agreements. All access points to the Dam must be managed through appropriate legal mechanisms.
- Education programmes should be instituted by the DMC to encourage community members to utilise Boskop Dam. Additional coordination with South African Sailing should take place and the possibility of a school for sailing should be investigated.
- Law enforcement at the Dam is necessary to ensure that Department of Water and Sanitation conditions for recreational use are met.
- Water quality is an issue at the Dam. Due to landuse practices in the Catchment, water quality at the Dam has steadily deteriorated over the past few years. A Water Quality Management Plan is necessary for Boskop Dam.



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Acronyms and Abbreviations

AtoN	Aids to Navigation
BAR	Basic Assessment Report
BBBEE	Broad-Based Black Economic Empowerment
BP	Business Plan
BTC	Boskop Turffontein Compartment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
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
DRDLA	Department of Rural Development and Land Reform
DMC	Dam Management Committee
DSBC	Dorado Ski Boat Club
DoT	Department of Transport
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECC	Effective Carrying Capacity
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
FIRE	Finance, Insurance, Real Estate
GDP	Gross Domestic Product
GIS	Geographical Information System
GN	Government Notice
GVA	Gross Value Added
GWWs	Government Waterworks
Ha	Hectares
I&APs	Interested and Affected Parties
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities

IBA	Important Bird Area
IDP	Integrated Development Plan
IWRM	Integrated Water Resource Management
LAAP	Local Accountable AtoN Parties
LED	Local Economic Development
LM	Local Municipality
mASL	Metres above Sea Level
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
NW READ	North West Department of Rural, Environment and Agricultural Development
NWPTB	North West Parks and Tourism Board
NWRIB	National Water Resource Infrastructure Branch
NWRIB: IEE	National Water Infrastructure Branch: Integrated Environmental Engineering
OMC	Operational Management Committee
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
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
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
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment

SMME	Small, Medium and Micro Enterprises
SPC	Strategic Plan for Commercialisation
SRP	Soluble Reactive Phosphorus
SRSA	Department of Sports and Recreation
THETA	Tourism, Hospitality and Sports Education Training Authority
ToR	Terms of Reference
TR	Treasury Regulations
UPN	Unique Positioning Number (used in the CIWSP)
WMA	Water Management Area
WMA	Water Management Area
WSDP	Water Services Development Plan
WULA	Water Use License Application
WWTWs	Waste water Treatment Works

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 (GWWs), 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 GWWs.

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 of the Dam without compromising 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 Resource Infrastructure Branch (NWRIB) of the Department of Water and Sanitation (DWS). This branch is tasked with developing and operating strategic water resource infrastructure in an efficient way so to ensure the needs of the nation are met. This includes minimising business risks to DWS, financing investment and cost recovery.

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.
Nature Conservation	Often responsible for the management of State owned land around the dam. In the case of Boskop dam, the state land is managed by North West Parks and Tourism Board (NWPTB).
Department of Water and Sanitation (DWS)	DWS is responsible for the establishment and operation of GWWs (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)	SAMSA is responsible for *inter alia* safety of life and property at sea, including inland waterways. They also administer and execute maritime related Legislation and Regulations

Each Government Department has its own suite of legislation to govern its use of the Dam and its mandate regarding the 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. Therefore the RMP is a planning tool aimed at meeting the expectations of users without sacrificing the environment.

2 WHERE ARE WE NOW?

2.1 Overview of the Catchment

Boskop Dam falls within the Mooi River sub-catchment in the Mooi River Catchment within the Upper Vaal Water Management Area (WMA).

The catchment is situated on the Far West Rand with the upper section in the Gauteng Province and the lower part of the catchment in the North West Province. The surface water (the Mooi River and its tributaries) pass through Potchefstroom, Westonaria, Oberholzer, Fochville and Carletonville. A number of growing communities are also located in the catchment, including Kagiso, Mohlakeng, Toekomsrus, Rietvallei and Bekkersdal. Boskop Dam is within the Tlokwe Local Municipality which is part of the Dr Kenneth Kaunde District Municipality.

The area is characterised by dolomite, with three major dolomite compartments dewatered by gold mining companies. Two of the dewatered compartments are bypassed by a one metre diameter pipeline which transports the water from the Wonderfonteinspruit across the dewatered area.

The various Dams situated in the catchment include the Donaldson, Klipdrift, Boskop and Potchefstroom (Lakeside) Dams.

The Ecological Importance and Sensitivity of the quarternary catchment is classified as Moderate. This means that while it possesses unique biodiversity on a provincial scale, the rivers are not particularly sensitive to changes in flow regimes and therefore have capacity for substantial use.

2.1.1 Surface Water and River Systems

The Mooi River has been the main water source for Potchefstroom since the 19th century. The source of the river is a series of dolomitic Eyes, as well as the Wonderfonteinspruit, a major tributary that joins the Mooi River just upstream of the Dam. The quality of water in these Eyes is threatened by large-scale gold mining in the region, particularly since the closing of mines has led to re-watering of dolomite compartments which results in acid mine drainage. Additionally the mine residue deposits such as tailings dams and mine dumps of old and abandoned mines act as diffuse pollution sources. Concerns regarding potential mining pollution in the catchment have resulted in the Mooi Catchment being the first priority area for intensive radioactivity monitoring. A radioactivity monitoring report was conducted in 1997 by the Institute for Water Quality Studies of the Department of Water Affairs and Forestry in collaboration with a group of stakeholders. The concerns that led to the study included:

- Major gold mining activity in the Region which lead to the pollution of surface and groundwater. Several large active gold mines discharge waste water into the aquatic environment;
- Old and abandoned mines as well as mine dumps in the north of the catchment provide further sources of pollution;
- Informal settlements in the region use untreated groundwater and surface water for domestic uses;
- Questions have been raised regarding health and safety issues potentially caused by elevated radioactivity in water resources in the catchment, particularly in Carletonville which uses groundwater, and Potchefstroom which uses water from Boskop Dam for domestic purposes. Potchefstroom is located at the lower end of the catchment and so any pollution in the region will adversely affect the quality of raw water available to the town.

Industrial use of water from the Mooi River is concentrated in and around Potchefstroom. Some water is abstracted by farmers along the lower reaches of the river for livestock watering and domestic use. The Mooi River is further used for angling and general recreational purposes.

The Mooi River and its tributaries run through the Magisterial Districts of Potchefstroom, Westonaria, Oberholzer, Fochville and Carletonville. The river systems in the catchment are largely classified as Class D-Largely Modified and Class C – Moderately modified (North West State of the Environment Report, 2002).

Rand Water supplies nearly all the water required for domestic use in the area, excluding Potchefstroom and the lower Mooi River area which is supplied by Potchefstroom Local Municipality from the Boskop Dam. Carletonville Local Municipality occasionally extracts water for Welverdiend from a borehole in the Turffontein compartment (DWA, 1997).

Annual precipitation in the catchment is 683 mm with potential evaporation of 1 650 mm. Very little precipitation ends up as runoff due to the extensive dolomite outcrops in the area, and this contributes to groundwater and aquifer recharge.

2.1.2 Land Use

The predominant land uses are large- and small-scale mining, agriculture, and development. Agriculture includes crop-farming and grazing, with the most extensive farming occurring in the northern sub-catchment, while it remains common in the eastern and southern regions. Large-scale mining is most intensive in the lower Wonderfonteinspruit region, while small-scale diamond mines are located in the northern areas and smaller gold mines are located in the eastern part of the catchment.

The Tlokwe Spatial Development Framework (SDF) (2008) shows that while there is some prime agricultural land around Boskop Dam, most of the high-potential agricultural regions are to the central and eastern areas of the Municipality.

2.1.3 Water Quality

Water quality in the catchment is of moderate quality, although there is an alarming trend towards deteriorating quality as a result of land-use practices. Mining has resulted in higher concentrations of radioactive elements in the water.

Concentrations of uranium in the water of the Wonderfonteinspruit, an upstream tributary of the Mooi River are increasing, although current information reveals that the uranium levels in water reaching Potchefstroom are still within acceptable limits. This could be due to the non-perennial nature of the Wonderfonteinspruit Boskop Dam, which could be playing a part in sequestering heavy metals in sediment on the floor of the dam basin, in which case as long as this sediment is not agitated the dam could mitigate the rising uranium levels at the moment.

While the dolomitic areas in the catchment have very low concentrations of radioactive elements, the quartzites, granites and shales in the area are high in potassium, uranium and thorium.

The 1997 Radioactivity Monitoring Report found that despite the natural levels being elevated, the majority of water sampling sites showed water quality to be acceptable for continuous use according to water quality guidelines. Sites close to the discharge of mine water did show further elevated levels of radiation, which required further planning and management. In terms of Boskop Dam, the study found that both treated and untreated water was well within acceptable limits for radiation contamination.

In general, sulphate concentration in the water in the Catchment is high. Below is an overview of water quality in the various Dams in the Catchment (North West State of the Environment Report, 2002):

Table 2: Water quality data for the catchment

Description	TDS	SO4	F	Cl	TAL	Na	K	Mg	Ca
Hartbeespoort Dam	366	66	0.47	47.7	113.9	42.7	9.4	16.7	32.8
Olifantsnek Dam	172.06	23.7	0.2	5	76.9	7.3	3.1	11.8	16.2
Buffelspoort Dam	42.5	5.9	0.12	4.9	18.2	1.7	1.4	3.1	3.4
Bospoort Dam	496	79.4	0.27	99.6	126.4	81.5	13.4	22.5	32.8
Lindleyspoort Dam	128	12.6	0.22	5.2	65.70	5.7	3.5	8.1	11.8
Kosterrivier Dam	149	11.3	0.26	5.5	79	6	3.7	9.8	14.8
Klipvoor Dam	488	65.8	0.57	70.8	166.8	73.2	13.5	18.1	35.8
Swartruggens Dam	95.1	8.4	0.18	5	49.21	5.9	1.7	5.5	7.7
Vaalkop Dam	346	46.7	0.95	38.3	131.4	36.4	7.3	18.4	29.4
Roodekopjes Dam	622	128.9	0.69	94.2	174.7	86.5	9.1	32.6	44.8
Leeukraal Dam	555	77.5	0.39	70.6	182.8	78.15	12.9	19.7	42.8
Marico-Bosveld Dam	223	9.5	0.21	5	130.8	5.8	1.7	16.8	22.9
Klein Maricopoort Dam	317.5	26.8	0.54	13.9	165.7	10.8	6.2	23.1	34.1
Kromellen-boog Dam	126	11.8	0.29	5	65.7	5.4	2.3	6.9	14.3
Molatedi Dam	191	8.3	0.31	4.7	109.3	5.616	5.7	14.6	17.1
Boskop Dam	**489**	**112.7**	**0.2**	**21.4**	**195**	**22.2**	**2.2**	**43.1**	**51.3**
Johan Neser Dam	392	54.2	0.32	11.1	187.5	16.3	6.4	30.5	36
Klerkskraal Dam	392.5	5.9	0.15	4.35	244.4	4.35	1.44	31.8	44.9
Potchefstroom Dam	512	101.5	0.16	21.3	220.4	20.5	2.3	45.1	53
Klipdrift Dam	456	98.9	0.35	55.3	134.5	54	7.9	24.5	36.3
Elandskuil Dam	346	4.25	0.183	6.85	205.9	4.6	1.4	31.2	31

The Impact of Mining Activity on Water Quality

Due to the land use practices in the catchment, including a century of gold mining activity as well as the establishment of slimes Dams and un-mined uraniferous ore in the mine void, there are a multitude of sources for the migration of uranium into the environment (Winde, 2010).

Uranium pollution in the Wonderfonteinspruit Catchment was researched, and over the reference period, an average of some 3.5 tonnes of dissolved uranium was released into the fluvial system from monitored discharge points alone. The Wonderfonteinspruit River dries up before it reaches the Mooi River, however it does recharge the underlying karst aquifer of the Boskop Turffontein Compartment (BTC), the single most important water resource for Potchefstroom. Compared to 1997, groundwater in the BTC showed the highest relative increase in Uranium levels of the whole catchment, resulting in some 800 kg of uranium flowing into Boskop Dam per year.

This may have serious health implications for communities in the area as studies suggest abnormal hematological values related to increased incidences of leukemia observed in residents of the area (Winde, 2010).

Other Key Drivers of Water Quality

A number of growing communities are located in the catchment, including Kagiso, Mohlakeng, Toekomsrus, Rietvallei and Bekkersdal. These developments, as well as informal developments, also contribute to the diffuse sources of pollution.

Some of the key drivers of water quality are outlined below.

- Historical indiscriminate mining practices resulting in contamination of groundwater;
- Inadequate rehabilitation practices following mine closure leading to acid mine drainage;
- The construction of slimes dams about the dolomitic aquifer resulting in seepage and pollution;
- The characteristic association of uranium deposits alongside gold deposits leading to radioactive contamination of water from tailings and tailings dams;
- The rapid development of formal and informal settlements without appropriate and adequate waste, storm water and sewage infrastructure leading to contamination of the river system;
- Agriculture which leads to nutrient-rich runoff, increased salt load and sedimentation of water courses;
- Management issues at landfill sites;
- Increased salinity from mining activities, including dewatering discharges;
- Heavy metal contamination from tailings dams and slag dumps;
- Unmaintained open canal systems transporting water from Boskop Dam to Potchefstroom and from Klerkskraal Dam to Boskop Dam lead to contamination of water, particularly when animals are slaughtered in the canals. There is some debate to the degree of maintenance of the canals in the area.

2.1.4 The Social Environment

The Mooi River Catchment area includes the mining areas of Westonaria, Carletonville and Potchefstroom. The main contributor to Gross Domestic Product (GDP), employment opportunities and household income in the area is the mining industry with GDP at R7 814.7 million, employment opportunities of 32 946 and a contribution to household incomes of R3 573.1 million. The area also has a strong manufacturing sector. In total 23 700 direct employment opportunities is supported by water complemented by another 32 200 indirect and induced opportunities (DWA, 2012).

Potchefstroom is the main urban centre in the Tlokwe Local Municipality. It is located along the Mooi River.

2.1.5 Tourism Potential

The town of Potchefstroom was founded in 1838 and was the first capital of Transvaal (Pretoria later replaced Potchefstroom in 1855). The City has major historic importance and is located only 20 km away from Boskop Dam.

According to the Potchefstroom Tourism Development Policy, there are opportunities to market the area in regards to:

- Eco Tourism;
- Cultural Tourism;
- Adventure Tourism;
- Game Parks;
- Paleo-Tourism;
- Conference Tourism;
- Sports and Recreational Tourism;
- Event Attractions;
- Educational Attractions; and
- Community Based Tourism.

Tourism opportunities in the Dr Kenneth Kaunda District Municipality of the Province include:

- Bloemhof Dam Reserve;
- Boskop Dam Reserve;
- Vredefort Dome;
- Klerksdorp Mine Tours;
- Sunwa Water Experiences;
- The Vaal River; and
- Wolwespruit Nature Reserve.

Of particular significance is the Vredefort Dome, a world Heritage Site 90 km from Boskop Dam. The area attracts large numbers of tourism and marketing campaigns could possibly be used to attract people already visiting the area to Boskop Dam.

2.1.6 Catchment Management Agency

There is no Catchment Management Agency (CMA) in place for the catchment. However, there are three active Catchment Management Forums in the area: Kromdraai Catchment Forum, Wonderfontein Water Forum and Mooi Rivier Water Management Forum.

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 No 36 of 1998, amongst others, responsible for the safety of GWWs 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 Aids to Navigation[1] (AtoN) for general navigation.

In addition to the DWS, Local Accountable AtoN Parties (LAAP) and other Bodies providing access to Government waterways and watercourses have a responsibility to ensure that the required fixed and/or floating AtoN are provided after obtaining the necessary support from DWS and thereafter the permission by SAMSA.

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

As part of the Cooperative Inland Waterways Safety Programme (CIWSP), some standardised fixed and floating AtoN and Demarcation Markers have been put in place by DWS. However, standardized AtoN and Demarcation markers are still required by other LAAP to ensure there is a coordinated and standardised approach.

2.2 Purpose of Boskop Dam

The construction of Boskop Dam was completed in 1959. It was built when Potchefstroom Dam was unable to meet the demands of domestic, industrial and agricultural water use in the area. While it was originally built for irrigation purposes, it is currently the main source of potable water supply to Potchefstroom.

Set in a vast grassland area, Boskop Dam is used for recreation and conservation by the surrounding community. The Dam falls within the Boskop Nature Reserve which is managed by the North West Parks and Tourism Board (NWPTB).

2.3 Overview of the Dam

Boskop Dam falls within the Mooi River sub-catchment in the Mooi River Catchment within the Upper Vaal Water Management Area. The Dam occurs within the Tlokwe Local Municipality in Dr Kenneth Kaunda District of the North West Province.

The Dam is located approximately 20 km north of Potchefstroom, near to the R501 to Carletonville and also near to the N14 to Ventersdorp. The Dam forms part of the Boskop Dam Nature Reserve, a 2 756 ha (27.5 km^2) protected area of the Kalahari Highveld.

[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*".

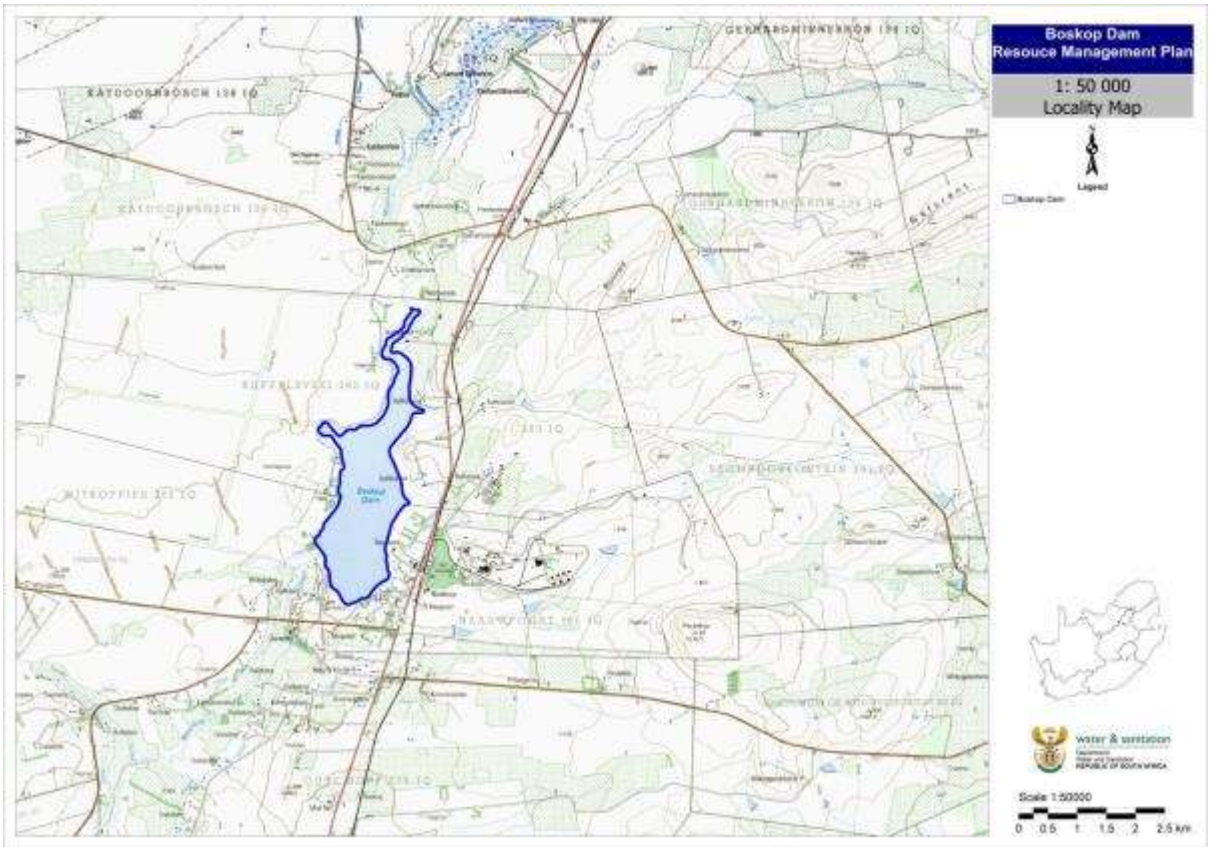

Figure 2: Location of Boskop Dam

Below is an overview of the catchment and the Dam.

Table 3: Overview of Boskop Dam (DWA, 1989)

Catchment Details	
Total Catchment Area	3297 km^2
Mean Annual Precipitation	683 mm
Annual Evaporation	1650 mm
Dam Characteristics	
Gauge Plate Zero	12.16 mASL
Net Full Supply Capacity	21.03 million m^3
Dead Storage	0.23 million m^3
Total Capacity	21.26 million m^3
Surface Area of Dam at Full Supply	373 ha (3.72 km^2)
Dam Type	earthfill
Crest Length	1320 m
Type of Spillway	Side channel
Gauge Plate Zero	12.16 mASL
Net Full Supply Capacity	21.03 million m^3
Purpose	Storage of water for irrigation and urban use
River	Mooi River
Length of Dam	4 km

2.4 Legislative Framework

The RMP forms the overarching framework for the management of Boskop 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 Boskop 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 (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);
- Game Theft Act, (Act 105 of 1991);
- Merchant Shipping (National Small Vessel Safety) Regulations, 2007
- National Environmental Management Act EIA Regulations (2010);
- Nature and Environmental Conservation Ordinance, 1974 (No 19 of 1974);
- South African National Biodiversity Institute (SANBI) Biodiversity GIS information;
- The Mountain Catchment Areas Act.
- North West Parks and Tourism Act (Act 3 of 1997);
- Transvaal Nature Conservation Ordinance (Act 12 of 1983); and
- Sport and Recreation SA Strategic Plan - 2011-2015.

The Section below provides an overview of how the RMP has considered some of 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 GWWs 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 GWWs 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): Draft Alien and Invasive Species Lists, 2014 (GN 78 of 2014)

The draft Alien and Invasive Species List proposes certain prohibitions of use of Invasive alien species. This includes catch and release of Bass within Fish Sanctuary Areas, National Parks, Provincial Reserves and Mountain Catchment Areas. This has implications for Bass fishing at all Dams in South Africa.

Should these Lists be promulgated, permits would be required for Bass Fishing. In addition, a Containment Plan for the species would be required.

2.4.8 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
Small-mouth bass	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 dams within discrete catchment systems in which it occurs c. 3 in all rivers, wetlands, natural

	lakes and estuaries in which it occurs. d. Subject to (b), each listed bass species is not listed for dams within discrete catchment systems in which it (the specific listed bass species) occurs.
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. d. Large-mouth bass is not listed for dams within discrete catchment systems in which it occurs (excluding (a) above).
Common carp	e. 1b in National Parks, Provincial Reserves, Mountain Catchment Areas and Forestry Reserves declared in terms of the Protected Areas Act. f. 2 for release into a Dam within a discrete catchment system in which it occurs. g. 3 in all rivers, wetlands, natural lakes and estuaries in which it occurs. h. Subject to b, common carp is not listed for dams within discrete catchment systems in which it occurs.

Largemouth and Smallmouth Bass and Common Carp occur at the Dam. However certain exemptions apply for these species.

2.4.9 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.

2.4.10 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.

2.4.11 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.

2.4.12 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.

2.4.13 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.

2.4.14 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.

2.4.15 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; and
- Crewing.

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.

2.4.16 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.

2.4.17 Explosives Regulations (GN 109 of 17 January 2003)

The Explosives regulations made provision for the regulation of occupational health and safety and manufacturing in explosives workplaces.

It provides provision for Danger Zones (defined as the region inside the area encompassed by the larger safety distance applicable to a danger building in terms of the safety distances stipulated in Annexure 1.). This legislation is important for Boskop Dam due to the proximity of the Dam to the Rheinmetall Denel Munitions Factory which manufactures explosives and thus need to comply to Explosives Regulations.

2.4.18 North West Parks and Tourism Act (Act 3 of 1997)

The purpose of the North West Nature Conservation Act (Act 3 of 1997) is to control and manage activities related to the management of formally Protected Areas and the promotion and development of tourism in the Province. The Act is administered by the North West Parks and Tourism Board and is key to the management of land around Boskop Dam.

2.4.19 Transvaal Nature Conservation Ordinance (12 of 1983)

The purpose of this ordinance is to consolidate and amend laws relating to nature conservation including the declaration of nature reserves and the management of protected games, hunting and fisheries.

2.5 Existing Plans

An RMP cannot function in isolation and so all associated planning initiatives must be considered and used to inform the development of the RMP.

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

- The IDP of Tlokwe Local Municipality;
- The Water Services Development Plan (WSDPs) of the affected LMs;
- The Strategic Framework of Water Services, 2003;
- The Provincial Spatial Economic Development Strategy (PSEDS), 2003;
- National Spatial Development Perspective (NSDP), 2006
- The New Growth Path, 2012 (NGP); and
- The Cooperative Inland Waterways Safety Programme (CIWSP)

2.5.1 The Cooperative Inland Waterways Safety Programme (CIWSP)

The 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.

Boskop Dam is one of the pilot projects for the CIWSP and thus the RMP integrates information from the CIWSP into the management objectives for the Dam.

Figure 3: Relationship between RMP and Planning Initiatives

2.6 Socio-Economic Environment

A summary of the socio-economic environment of Tlokwe Local Municipality is provided below. The information is obtained from Census 2011 unless otherwise stated.

2.6.1 Population

Tlokwe Local Municipality has a population of 162 762 persons. . The population of 15-34 age groups and the 35-64 age group account for 38% and 31% of the population respectively. This means that 63% of the Tlokwe Local Municipality population are of working age.

Youth in total account for 63% of the population indicating that youth are expected to contribute towards the households bearing more responsibility than what is normal. Only 6% of the population are over 65 years of age.

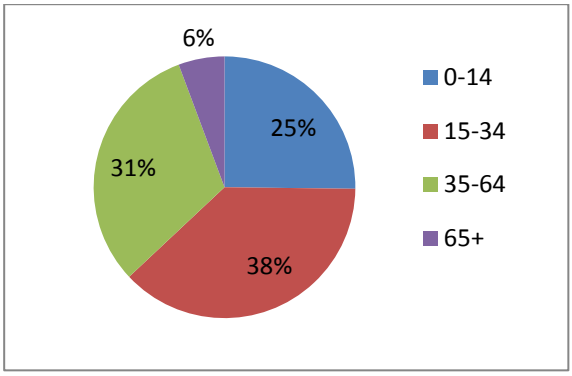

Figure 4: Population

2.6.2 Education

Over 80% of the population in the Municipality have received some level of education. 47% of the population has received some form of higher education. This indicates that with a trend of a large section of the population being of working age, that there should be sufficient capacity

within the local community to accommodate an increase in the tourism sector.

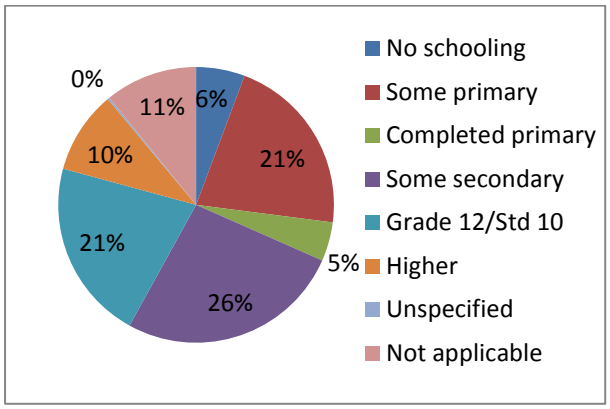

Figure 5: Education Level

2.6.3 Employment

The unemployment rate in the Municipality is 13.7%. 56% of persons in the Municipality are employed while 9% are unemployed. 35% of the population is not economically active.

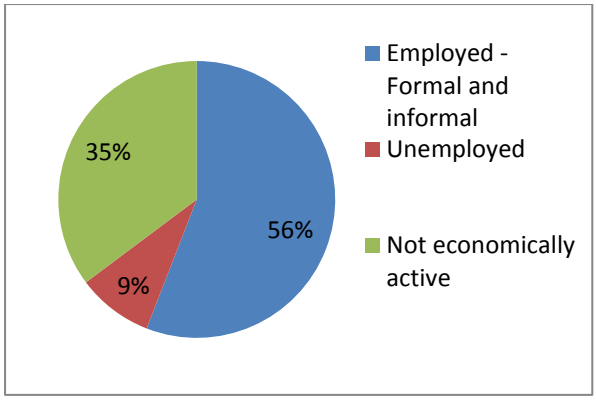

Figure 6: Employment Status

2.6.4 Monthly Personal Income

Personal income is grouped into the following brackets:

- No income R0
- Low Income R1 - R3 200
- Middle Income R3 201 - R 25 600
- High Income R25 601+

The figure below shows monthly income per person for 2011. 39% of the population earn no income at all. 34% of the population are low income earners while. Only 1% of the population earn in the high income bracket.

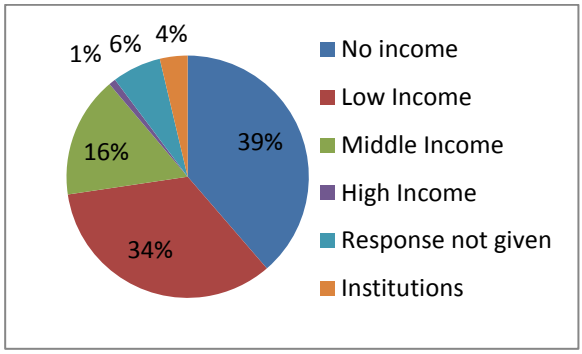

Figure 7: Income

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 which is made up of manufacturing and the Tertiary Sector, which comprises of services. The Figure 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; and
- 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.

In total, Tlokwe Local Municipality contributed R6 078.24 million to the GVA. General government contributed 20% to GVA implying that the Municipality is dependent on Government for job creation. The finance sector contributes 21% to GVA.

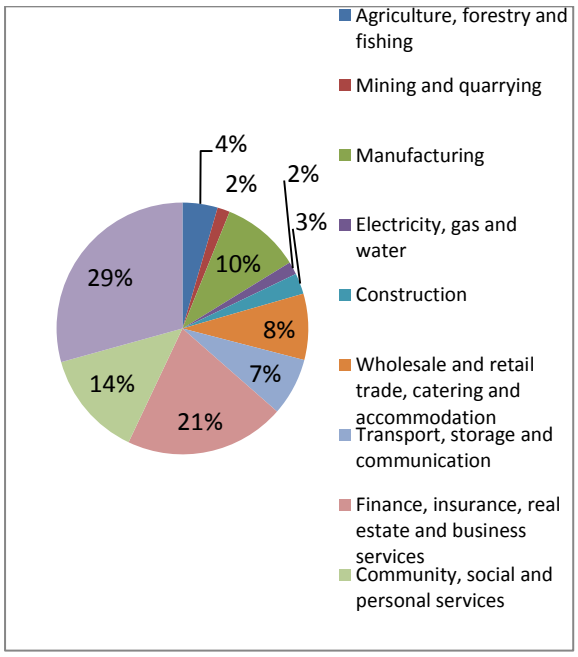

Figure 8: GVA

2.7 Development Potential

Tlokwe Local Municipality IDP (2012) identified the Region as a potential key agricultural producer. Current agricultural companies could provide small-scale agricultural producers with a secure market while the skills and capacity required to enter larger markets are developed. The Agricultural College in Potchefstroom could assist in providing training and capacity building initiatives to prospective farmers. In particular Sorghum and Bean production have been highlighted as potential ventures for the local community. Both of which are high water consuming crops.

Retail and Trade has showed a marked increase in recent years, partly attributed to the construction of the Mooi River Mall on the outskirts of Potchefstroom. An increase in the number of car dealerships as well as an increase in tourism-related retail outlets and restaurants has also contributed to growth in this sector. Other key contributors to the economy include manufacturing, construction, transport and finance.

Game Farming is also considered a key potential economic development avenue. Game farming and the creation of Game Parks in the area has increased recently due to an increase in the market demand for similar facilities. Associated products and services such as tour guides, venison products and accommodation facilities provide economic growth and job creation for the area.

Another potential avenue for economic growth identified in the IDP is tourism. The new Highveld National Park on the west of Potchefstroom is likely to increase tourism to the area which will result in increased investment opportunities in associated sectors such as accommodation, arts and crafts for souvenirs and field guiding. Associated development potential exists in the Tourism Marketing and Hospitality sectors. Due to the close proximity of Boskop Dam to Potchefstroom, it is possible for the Dam to capitalise of the marketing efforts for Potchefstroom.

2.8 Access and Infrastructure

The DWS training centre has an access point to the water surface with a slipway. The Boskop Yacht Club has access to an additional slipway (located on land adjacent to the club). However, the official public access to the Dam is through the Nature Reserve.

Naturama, a private resort, provides access to surface water to the public from its property. While the entrance is on Naturama's property, the slipway is on State Owned Land. Bass fishermen are known to access the Dam through Naturama. One local property adjacent to the Dam has a slipway while another private landowner launches his boat directly off his property.

The largest structure at the Dam is the Dam Wall. Open canals transport raw water from the Dam to the Water Treatment Works in Potchefstroom. The structural integrity of the canals are questionable.

2.9 Biophysical Environment

2.9.1 Water Quality

Over the last half-century the quality of water in the Dam has deteriorated due an increase in concentration levels of salts (particularly sulphates), heavy metals and radio-nuclides. This means that the cost of treating water for domestic purposes has increased significantly.

Table 3 presents a summary of the water quality for Boskop Dam between 1990 to 2000.

Table 4: Water Quality at Boskop Dam (DWA)

TDS	SO4	F	Cl	TAL	Na	K	Mg	Ca
489	112.7	0.156	21.4	195	22.2	2.165	43.1	51.25

TDS concentrations exceed the upper limits of the Target Water Quality Ranges of 200 mg/l for domestic use as stipulated in South African Water Quality Guidelines (DWA, 1997).

Boskop Dam is categorised as mesotrophic. DWAF (2003) defines mesotrophic as showing "*intermediate levels of nutrients, fairly productive in terms of aquatic animal and plant life and showing emerging signs of water quality problems*". The dominant algae in Boskop Dam are Chrysophyta and Chlorophyta, both bioindicators of high nutrient levels in water.

Table 5: Trophic Status

Name	Trophic Status	Toxic incidents	Dominant Algae
Boskop Dam	Mesotrophic	No	Chrysophyta Chlorophyta

In addition, Winde (2010) published that some 800 kg/a of uranium flows into Boskop Dam from groundwater pollution from mining operations.

Atrazine, a common herbicide, is an endocrine disruptor – known to alter the natural hormonal system in animals was also found in Boskop Dam (with a concentration of <0.25 g/l (WFA, 2010).

The Maucha Diagram for Boskop Dam shown below also shows elevated Total Alkalinity (TAL), Magnesium and Calcium.

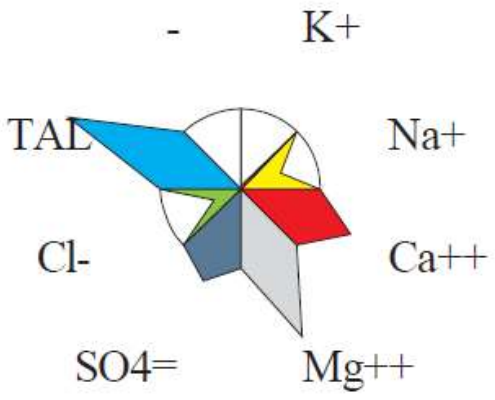

Figure 9: Maucha Diagram for Boskop Dam

2.9.2 Aquatic Invasive Plant Species

According to Sharp (2013), the surface area of the Dam is 373 ha (3.73 km^2) and the area currently being covered by invasive reeds such as

Arundo donax is approximately 54 ha (0.54 km^2). This equates to approximately 14% of the Dam being infested with reeds at present.

Figure 10: Arundo donax (www.invasives.org.za)

Opportunistic 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).

A good example of this is *Potamogeton schweinfurthii*, pondweed that has become problematic in Boskop Dam invading the shallow areas around the Dam and hampering the launching of boats. It is currently estimated that it covers about 50 ha (0.5 km^2) with the highest biomass in the areas near the DWS training centre. The inlet of the Mooi River into the Dam is choked by reeds and submerged species. This has numerous negative impacts (Sharp, 2013).

Figure 11: Potamogeton schweinfurthii, (www.iucnredlist.org)

2.9.3 Terrestrial Invasive Plant Species

According to Kotze et al (2010), the chief invasive plant species at Boskop Dam is *Melia azedarach* although site visits and conversations with stakeholders confirmed the existence of other invasive plant species, particularly black wattle (*Acacia mearnsii*) around the Dam.

2.9.4 Fauna

2.9.4.1 Fresh Water Fish

There are several indigenous species of fish recorded at Boskop Dam. These include: the Spot Tailed Rover (*Brycinus imberi*), Sharptoothed Tetra (*Micralestes acutidens*), Silver Butter Catfish (*Schilbe intermedius*), Vaal-Orange Smallmouth Yellowfish (*Labeobarbus aeneus*) and the Orange River Mudfish (*Labeo capensis.* It is well known that Carp and Bass occur in the Dam and are prized by angling clubs. It is recommended that a full fish census be taken in the future with the help of the angling clubs to determine the extent of dominance of invasive species.

2.9.4.2 Amphibians

Amphibian species include the African Bullfrog (*Pyxicephalus adspersus*), Common Platanna (*Xenopus laevis*), Striped Stream Frog (*Strongylopus fasciatus*), Banded Rubber Frog (*Phrynomantis bifasciatus*) and the Cryptic Sand Frog (*Tomoptena cryptotis*).

2.9.4.3 Mammals

The main mammal species in the area are cows and goats farmed in the vicinity of the Dam. There are also several Red Data indigenous species found in the Nature Reserve and in the area around the Dam: these include 18 mammal species.

A mammal species of particular note is the Black-footed cat (*Felis nigripes*) which is classified as Vulnerable. The Common Reedbuck (*Redunca arundinum*) and Blesbok (*Damaliscus pygargus*) are classified as Conservation Dependent, and the Brown Hyaena (*Hyaena brunnea*), Temminck's Ground Pangolin (*Manis temminckii*) and the Hamadryas Baboon (*Papio hamadryas*) are classified as Near Threatened.

2.9.4.4 Avifauna

Bird life at Boskop Dam is very species rich, with well over 250 bird species, including Fish Eagles seen regularly at the Dam.

2.10 Heritage

Heritage sites and artefacts in the immediate vicinity of Boskop Dam are currently unknown. Some graves are located in the Boskop Dam Nature Reserve, and further investigation into the history of the region is required to determine the heritage value of the area.

The Tlokwe Local Municipality Environmental Management Framework did not recognize any sites within Boskop Dam Nature Reserve as having heritage or cultural importance, but it indicate that several areas of heritage significance are located nearby and may act as a draw card for people visiting the area.

Potchefstroom, which is only 20 km away, provides a variety of cultural attractions including the Potchefstroom Museum, the Goetz Fleishack Museum, the President Pretorius Museum, Totius House Museum, the oldest Reformed Church in the Tranvaal, the remains of an old Fort from 1880, the Gunners memorial from the second World War, the Centenary Monument and an old Anglican church known for its stained glass windows.

In a broader sense Boskop Dam is situated 65 km from the Vredefort Dome, the centre of impact site from a meteor strike that occurred over 200 million years ago. The Dam is also situated on the N12 Treasure Route, which stretches from Potchefstroom to the Northern Cape. These locations, combined with the attraction of Boskop Dam as a venue for recreation, increases the potential for tourism development around the Dam.

2.11 Current Institutional Arrangement

2.11.1 Official Institutional Structure

The construction of the Dam was completed in 1959. In 1963 the DWS transferred the management of the surface water and surrounding State Owned Land, to the then Department of Agriculture Credit and Land Tenure for, recreation use. In 1974 the Department of Agriculture Credit and Land Tenure transferred control of the surface water and State Land to the Transvaal Provincial Administration: Nature Conservation. By then the Department of Agriculture Credit and Land Tenure had entered into 4 lease agreements granting access to the Dam, one of which was the Boskop Yacht Club. Since then the State Land around Boskop Dam was declared a Nature Reserve. The surface water and surrounding land still remains under the administration of Nature Conservation, only now it is called the North West Parks and Tourism Board (NWPTB).

2.11.2 Informal Institutional Structure

While a formal management agreement is in place between DWS and NWPTB, there remain many informal management practices at the Dam.

The Boskop Yacht Club manages safety on the Dam and some State Owned Land along the banks of the Dam.

Bass anglers run competitions at the Dam without clear rules or guidelines on management of the Dam.

Naturama accepts an entrance fee for public access to the Dam without any formal consent from DWS or NWPTB. Also, no commercial license is in place to provide these services.

It is unclear who manages the open canals transporting raw water from the Dam to the Potchefstroom Water Treatment Works.

2.11.3 Management of the Water Surface

The water surface of the Dam is managed by NWPTB.

AtoN and Demarcation Markers are managed by DWS, through the Regional Office and NWRI Training Centre. 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 the Boat Club and other Bodies will be for the cost of the latter.

The rules and responsibilities of either party are somewhat unclear especially in light of the new standardized AtoN and demarcation markers requirements (for general navigation). Initial payment will be undertaken by DWS. However, the provision and maintenance of the AtoN and Demarcation Markers for other areas needs to be agreed upon.

NWPTB is responsible for safety on the Dam however the Nature Reserve does not have a boat. Therefore, the Boskop Yacht Club assists in this function.

Currently the water surface is managed informally. During the public meetings it was mentioned that recreational users at the Dam have no regard for Rules and Regulations. This has potential safety implications on use of the Dam. For example fishermen occasionally fish near the yacht club shore, which puts members of the Yacht Club at risk of standing on fishing hooks, and put the anglers at risk as many boats are in the area at any given time. Anglers also admit to often crossing the buoys at the NWRI Training Centre which has been marked as a no access area. Further, even though the inlet to the Dam is designated a no access area, it is a favourite spot for bass fishing. Further, this area is an important conservation area. The Nature Reserve Manager pointed out that boats are launched at night and high-speed boating occurs on the Dam despite Boskop Dam being declared a no-wake Dam.

2.11.4 Access

Official Access to the Dam is through the Nature Reserve. There is a single gate manned by a Nature Conservation Employee. An entrance fee is charged to enter the Reserve. Camp sites are provided within the Nature Reserve. No boats with propellers are allowed to enter the Nature Reserve.

The DWS training centre has an access point to the water surface with a slipway. This point is intended for use for official purposes (DWS, DEA, SAPS Water-Wing, NWU Research Groups, etc.

The Boskop Yacht Club also has an access point. In additional the Yacht Club has access to another, unused slipway that is on a piece of land adjacent to the Club. The Club manages the land as part of a caretaker agreement with DWS. The slipway has not been used in recent years.

Given that DWS did not expropriate all land surrounding the Dam instead the Department registered a Servitude of Storage on some properties with rights for the landowner to access the surface water. However, even with these rights, the construction of a slipway is a Listed Activity in terms of the National Environmental Management Act (Act 107 of 1998) and requires Environmental Authorisation. In this regard, there are several informal and illegal access points to the surface water from private properties bordering the Dam.

There is also a piece of land within Boskop Nature Reserve which has historically been used by North West University.

2.11.5 Permits

Fresh Water Angling Licenses are required to fish at Boskop Dam; these are usually obtained at the local Post Office or Police Station.

Although the NWPTB charges a fee per fishing rod they do not issue any fishing permits.

Operators at Naturama do not check fishing permits, but will allow access to Park Officials should they require entrance onto the premises to check for permits.

2.11.6 Safety

Boskop Dam is one of the pilot locations for the implementation of the CIWSP which combines Boat Wash Bays to control the spread of Invasive alien species with safety measures including AtoN and Demarcation markers, zonal plans and a UPN System for reporting safety issues and problems on the water directly to a suite of response teams. This initiative is led by the Department of Transport, with a view to cooperative governance between institutional authorities, government departments and gatekeepers.

In many instances around the Dam, Water Storage Servitudes were registered with the land-owner hence, no purchase boundary exists. Therefore, shoreline safety is the responsibility of the land-owner.

2.11.7 Overnight facilities

Camping facilities are available at Boskop Nature Reserve. No access to the water is allowed at night.

The NWRI Training Centre provides overnight accommodation for trainees only. Naturama provides overnight campsite facilities and a caravan park which is currently not in operation.

2.11.8 Event Management

The main events at Boskop Dam are sailing regattas and bass angling competitions. No Event management system is in place at the Dam. However, if an Event is planned the Manager of the Boskop Nature Reserve is notified.

2.12 Users and Uses of Boskop Dam

2.12.1 Storage and Provision of High-Quality Potable Water

The primary purpose of Boskop Dam is to provide water for domestic use to Potchefstroom and surrounding communities. Raw water from the Dam is transported via open canals to the Potchefstroom Water Treatment Works.

2.12.2 Storage and Provision of Irrigation Water

The secondary purpose of Boskop Dam is to supply irrigation water to surrounding farmlands. It is currently unknown what extent of land is irrigated from Boskop Dam.

2.12.3 Recreational Use

The Dam is a no wake/dead slow zone Dam hence speed limits on the Dam are restricted to 8km/hour. Due to speed restrictions jet skis and similar recreational activities such as waterskiing are prohibited at the Dam. There is some conflict regarding this zonation.

No boats are allowed on the Dam before sunrise or after sunset.

Boskop Nature Reserve allows canoeing and paddleboats on the water. Power boats access the water from Naturama.

Fishing, especially Bass and Carp Fishing is a key attraction.

Boskop Yacht Club has an established membership of approximately 130 members. Sailing is a key attraction at the Dam. Many sailing events are held at the Dam through the Yacht Club.

Shoreline angling is common, but due to thick reeds growing along the banks of the Dam, spots for angling are limited which restricts the number of bank anglers at any given time. Other shoreline activities include camping in the

Nature Reserve as well as hiking, picnics and game drives. There was a historical agreement to allow horse riding in the reserve but the status of this concession is currently unknown and horse riding does not take place currently.

The Dorado Ski-Boat Club (DSBC) has also expressed interest in partnering with NWPTB. They would be interested in development of the park as well as training of fisherman in deep sea fishing.

2.12.4 Events at Boskop Dam

A number of sailing events are held at the Dam on a monthly basis. The Westvaal Bassmasters Club holds angling competitions eight times a year in the spring and summer months.

In the past the Bank Angling National Championships were held at the Dam however due to a lack of available shoreline, this competition no longer takes place. The South African Sport Anglers and Casting Federation (SASACC) has suggested that they would be interested in using the Dam for events in the future if there was improved management of the shoreline.

The Dam hosts many regattas and sailing competitions.

2.12.5 Educational Programmes

There are several education and training initiatives being carried out at the Dam. DWS: NWRI has a Training Centre situated at the Dam.

Secondly, due to the proximity of Boskop Dam to the North West University, it has been used for research by a number of Departments and provides practical exposure for Zoology students. Studies have also been undertaken by the African Centre for Disaster Studies.

Due to the increasing concentration of radioactive material in the Dam, various research studies are conducted at the Dam.

Boskop Dam is well known for the sailing competitions held at the Dam therefore it creates an ideal opportunity for Olympic Sailing training programmes.

There is also a piece of land within Boskop Nature Reserve which is in the process of being transferred to North West University. This land has historically been used by the University for education, research and recreation.

2.13 Catchment Interactions

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

- Aquatic invasive plant species, alien invasive fish species and unregulated fishing at the Dam has a direct impact on the ecological status of the Dam.
- Land use in the catchment, especially mining and agriculture has an enormous impact on the water quality of the Dam. This in turn has an impact on recreational use at the Dam.
- The physiological properties of the Dam and its location creates an opportunity for the Dam to become the prime sailing Dam in the country.
- The lack of institutional management, unaddressed land matters and general control over the use of the surface water threatens future growth and development at the Dam.
- The inter-relationship between Boskop Dam and other Dams in the catchment such as Karkloof Dam must be considered. This may create an opportunity for joint marketing and to provide a unique tourism experience.

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 Boskop 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 Boskop dam is informed by the needs, interests, requirements and uses of the dam. Boskop Dam has a unique challenge in that mining activities in the catchment has created severe water-quality issues at the Dam. Stakeholders agree that sustainable and cooperative use of the resource is a high priority to ensure that all can enjoy clean water for a multitude of uses. Improving the current water quality and the open canals are a key concern. Formal institutional arrangements with clear roles and responsibilities are required. The Dam is seen as an important resource for education and skills development, particularly to benefit the community. The vision statement that encompasses this is:

"A clean, peaceful Dam, used safely by all for conservation, education and recreation."

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 Resource Management

- Management of Invasive alien species including removal and control of Reed Infestation at Boskop Nature Reserve;
- Water Quality Management Plan to address the impact of agricultural and mining pollution;
- Determine the efficiency of the existing open canals;
- Educational Boards and booklets to be developed to inform users of invasive fish species and their impacts; and
- Boat Wash bay system to be implemented at all surface water access points.

Improved Fishing Management

- Discussions between NWPTB and SASACC to be undertaken to discuss potential for SASACC to be responsible for management of the shoreline fishing area (this should include removal of Reeds);
- Sustainable Fishing Management Plan to be compiled and implemented. This plan should take into account NEMBA legislation as well as the economic benefits of recreational and event angling at the Dam. As part of this study, a Fish Survey should be undertaken to determine the state of the resource;
- Regular Checks to ensure fishing licenses and fish removed from Dam comply with relevant Regulations and Permit requirements; and
- Subsistence/Small scale fisherman access card to be implemented.

Improved Management, Safety and Policing

- Formal Institutional Management System to be implemented;
- All land matters to be addressed and illegal access points to be closed;

- Trained Safety officer with authority is required;
- The implementation of standardised and harmonised AtoN and Demarcation Markers as directed by SAMSA should be undertaken;
- Active Enforcement of Rules and Regulations including prevention of vandalism at the GWWs; and
- Formalised agreements with adjacent landowners, recreational clubs etc. should be put place. These agreements should include RMP requirements as well as requirements for policing and safety.

Education and Skills Development

- Feasibility of a National Sailing School should be determined;
- Discussions between DWS and SASACC should take place to discuss the potential angling development initiatives at the Dam. These should be included in any agreements put in place;
- Dam Education programme to be initiated to teach youth about the benefits of the Dam. This should also include information on the importance of AtoN and demarcation markers so to prevent vandalism;
- Skills training programmes including life guard training, first aid training, and biodiversity training for local community members; and
- The extent of the land owned by North West University should be determined and agreements to allow access for educational and research should be put in place.

Management of Development Pressure

- DMC to comment on all Environmental Impact Assessments that may have an impact on the Dam;
- DMC should involve representatives from the Tlokwe Local Municipality and North West Department of Economic Development, Environment, Conservation and Tourism so that non compliances can be reported to the relevant Compliance units. The UPN System must take into account environmental non-compliances.

Improved Recreational Use

- Sporting clubs to be affiliated to National bodies;
- Maintenance of infrastructure at the Boskop Nature Reserve including public access area;
- Law Enforcement Control Officer/Safety Officer to be employed to ensure all boats and recreational users have relevant permits;
- Discussions between DSBC and NWPTB to take place regarding the potential for a partnership where development of deep sea fishing would take place at the Dam; and
- Events Management Plan to be developed and implemented.

4 HOW DO WE GET THERE?

4.1 How does the RMP Work?

The overarching framework for the Boskop Dam RMP is presented in Figure 12. 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 for the management of the Dam including the water surface and dam basin. The Implementing Agent would then also form part of the Institutional Structure at the Dam.

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 a Cluster level and will include authorities with a specific mandate at the Dam while the DMC will include landowners, users and community members who have an interest in the management of 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 8 and 9 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 Business Plan for each objective. The detailed Strategic Plan is provided in **Chapter 4.5.**

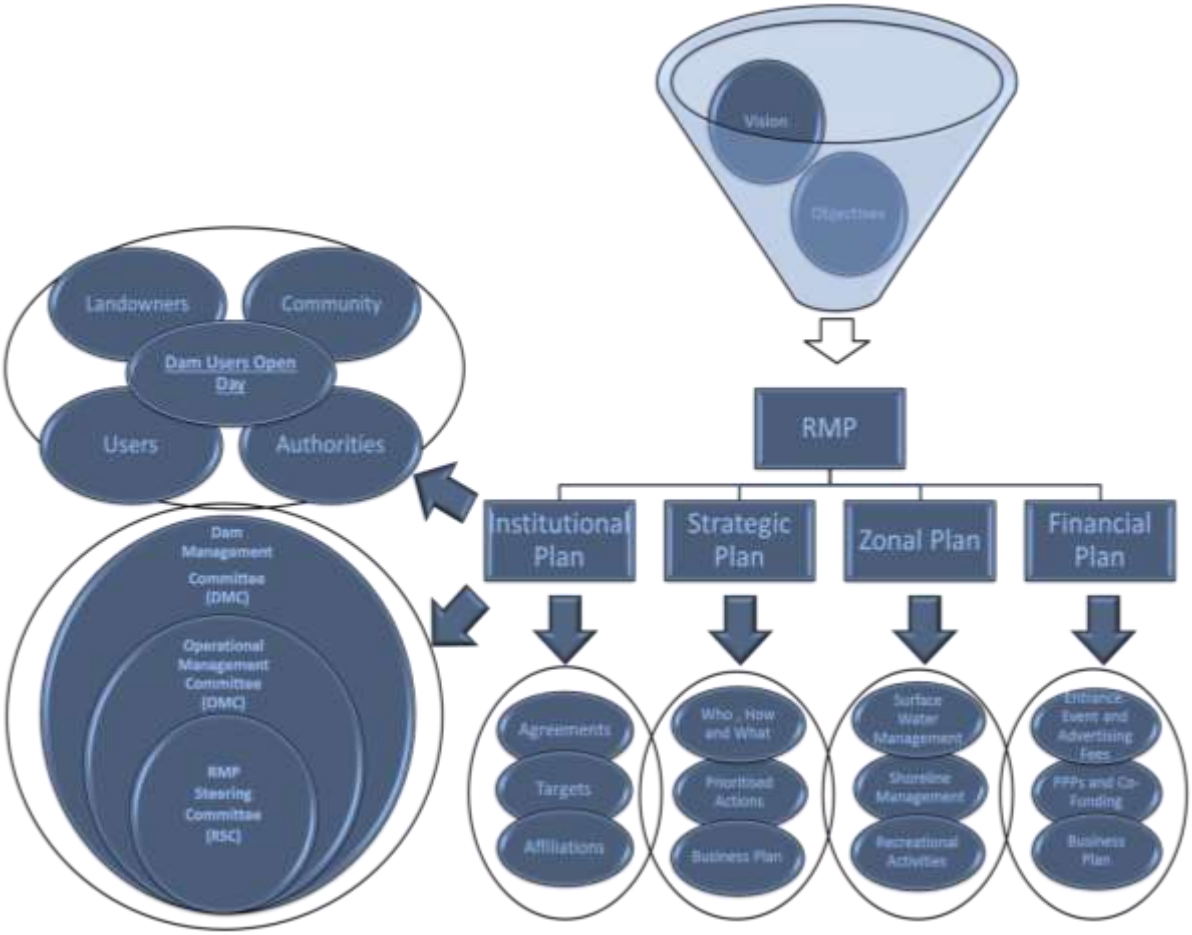

Figure 12: RMP Framework

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 13 below provides a visual representation of how these toolsets function together.

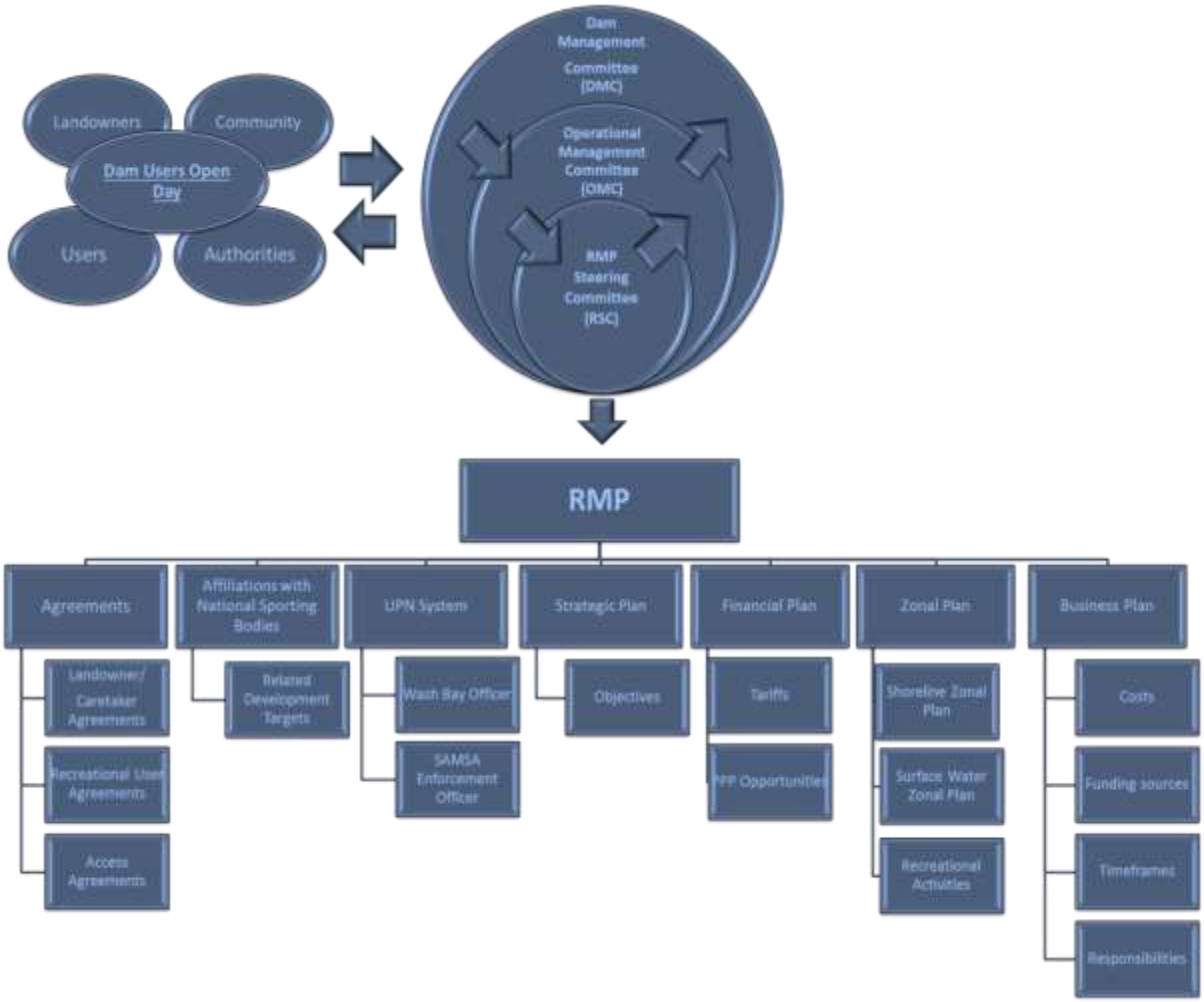

Figure 13: Institutional Framework

4.2.1 RMP Steering Committee (RSC)

The RSC is made up of representatives from National Government/Agencies. The main focus of this meeting is to ensure 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 the National Water Infrastructure Branch: Integrated Environmental Engineering (NWRIB: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. Figure 15 below provides details of the membership of the RSC.

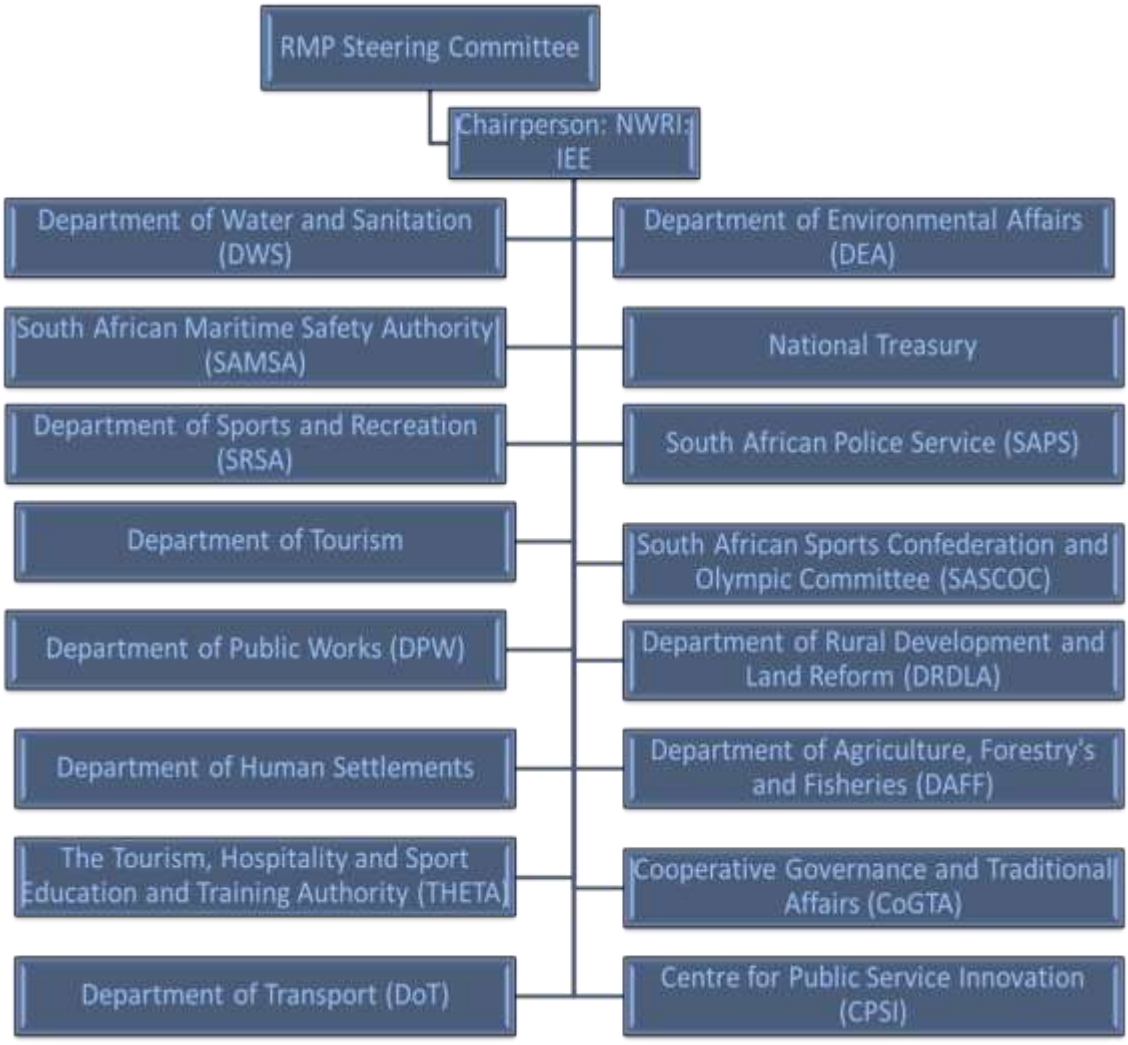

Figure 14: RSC Membership

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.

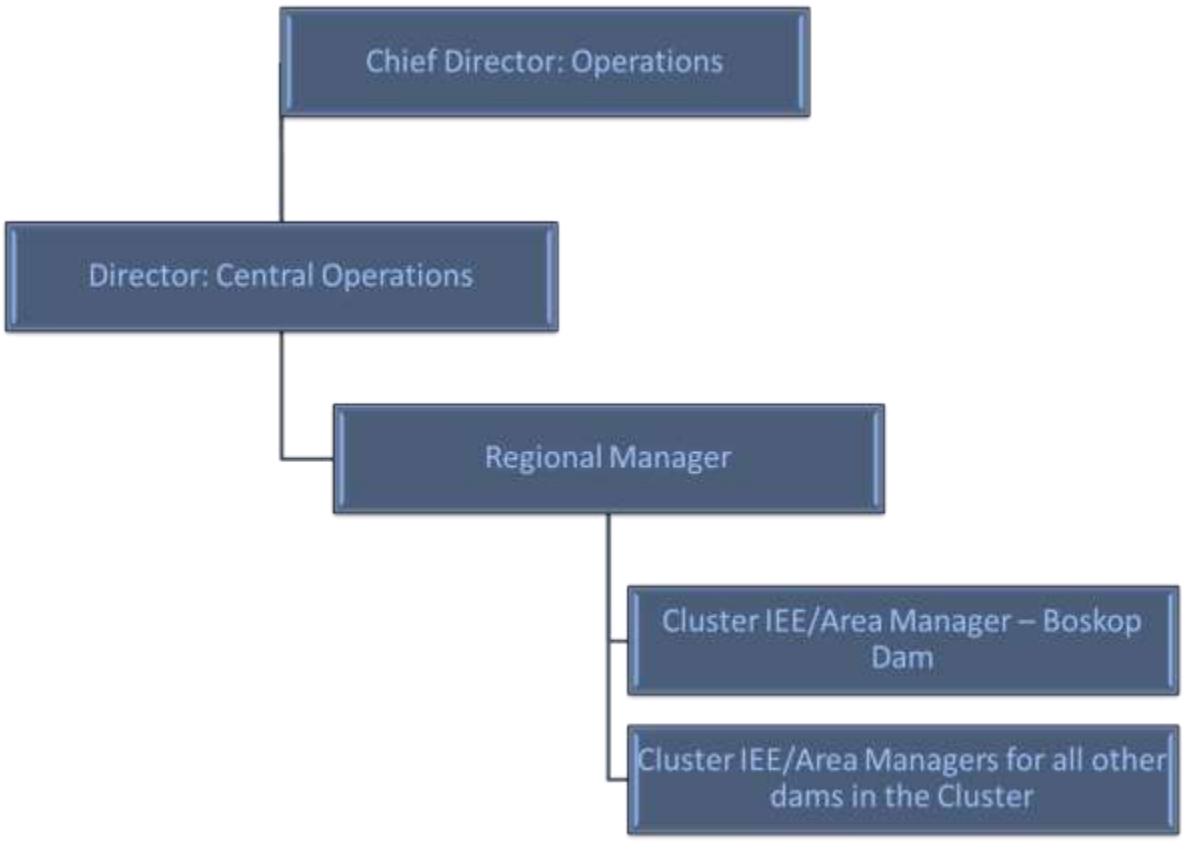

Figure 15: OMC Membership

4.2.3 Dam Management Committee (DMC)

The DMC is responsible for the day to day operations at the Dam and includes a larger pool of representatives. This committee is chaired by the delegated DWS Official. 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:

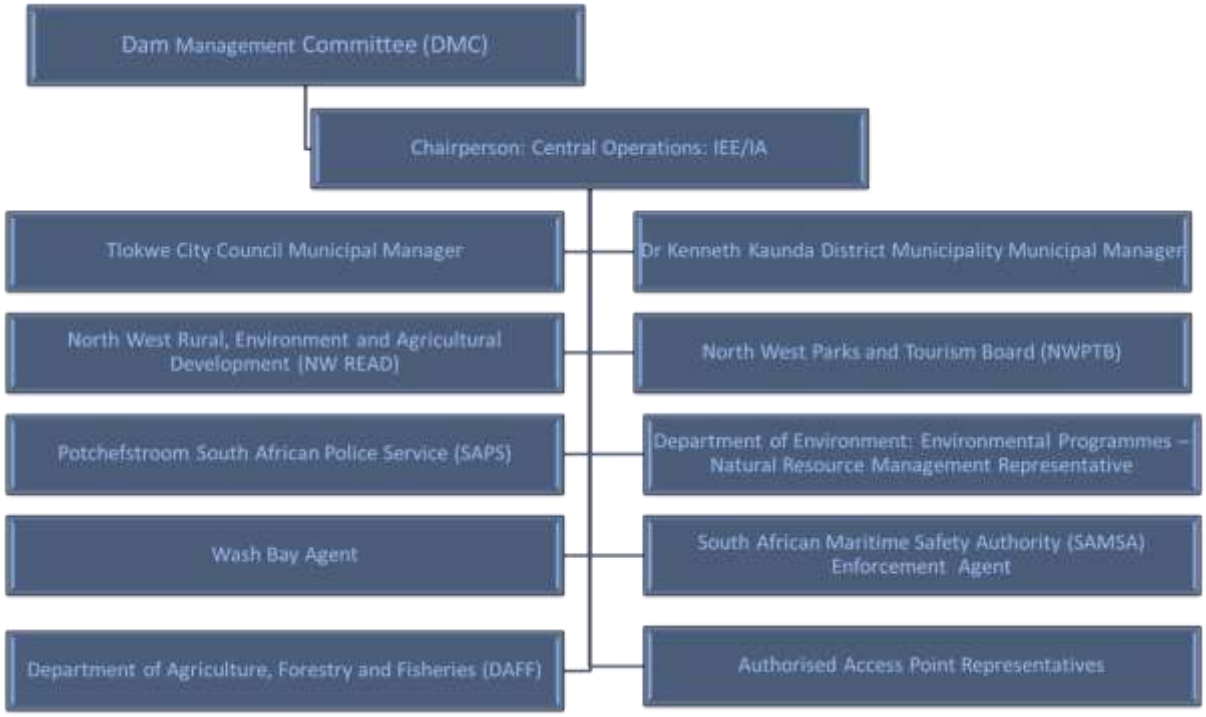

Figure 16: DMC Membership

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 (ToR) regarding roles and responsibilities. ToR is not required for the OMC as this is an existing reporting structure. The ToR provides 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 Boat Wash Bays.

4.2.4.2 Agreements

1.) Agreements between DWS and NWPTB:

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 Boskop Dam to the Transvaal Nature Conservation (now NWPTB) in 1974 for recreational purposes, subject to the continuation of lease agreements with several societies including notably the Boskop Yacht Club.

The existing agreement with the NWPTB (as the Implementing Agent – IA) needs to be updated in line with the RMP. In turn, all agreements between the NWPTB and other organisations and/or individuals must be updated in line with the RMP.

It should be noted that DWS reserves the right to appoint an Implementing Agent for the management of the Dam including the water surface and dam basin.

All agreements should be in line with the RMP requirements which as a minimum must achieve the following:

- Conditions on IA'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;
- Guidance on the use of the State Resource for Public-Private Partnerships (PPP) in line with Treasury's requirements;
- Safety management to be in line with SAMSA requirements;
- Targets and objectives for the management of the Dam;
- Roles and responsibilities regarding the following:
    - Maintenance of AtoN and Demarcation Markers;
    - Maintenance of Boat Wash Bays;
    - Maintenance of Recreational Infrastructure;
    - Maintenance of Fencing;
    - Maintenance of the UPN System including signage;

- Management of agreements with other recreational users;
- Responsibilities on monitoring development and access targets (as part 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 IA and any new recreational clubs, should be reviewed and accepted in writing by the DWS Central Operations Manager. 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
- Access points to be used must be stipulated. The RMP makes provision for two currently authorized access points (NWRI Training Centre and Boskop Nature Reserve) and two potential authorised access points (Boskop Yacht Club and Naturama). Currently, the only authorized access point is that of DWS. 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);
- 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, 1998 (Act no 36 of 1998);
- The extent of the rights to use the resource should be stipulated;
- Safety management to be in line with SAMSA requirements;
- Targets and objectives for the management of the Dam;
- 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;
- Conditions on the use of the Dam for small-scale fisheries projects; and
- 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 agreements must include a cancellation clause should community access targets not be met.
- 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 the next year.

2.) Recreational Use Agreements

Recreational Clubs must enter into an agreement with the IA who will be responsible for the surface water management of the Dam. All recreational use at the Dam must be through an appropriate legal framework. However all agreements must be approved in writing by DWS and the DMC.

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

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 should be should be put in place 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.

All adjacent landowners and clubs must be made aware that access to the surface water should only be through authorised access points. Accessing the surface water through unauthorised access points 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 the IA may also be necessary.

The Boat Wash Bay has be built on State Property as part of the CIWSP. A formal agreement is necessary between the IA and DEA on the management and maintenance of the facility. The agreement will be overseen by the DMC.

All agreements should be put in place 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

Boskop Dam is used for a number of competitive angling events as well as sailing.

All events must be managed through an event application process. While the application may be made to the IA, DWS and the DMC must approve the application. These applications must follow a specific template and will include 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, 2010 (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.

Boskop Yacht Club is already nationally affiliated, but the Westvaal Bassmasters Club is not currently affiliated to any organisation (for example the South African Bass Anglers Association). Should angling clubs wish to continue to operate at Boskop 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. Boskop Dam has a number of key challenges including water quality issues and unauthorised access and activities. In addition, Boskop Nature Reserve managed by NWPTB is in place already and therefore limits options for development. Based on these factors, no specific objective related to socio-economic was put in place. However a number of objectives have related actions which aim to improve recreational use at the Dam. These would have a related knock on effect. These include the following:

Improved Fishing Management

- Discussions between NWPTB and SASACC to be undertaken to discuss potential for SASACC to be responsible for management of the shoreline fishing area (this should include removal of Reeds).

Improved Recreational Use

- Sporting clubs to be affiliated to National bodies.
- Discussions between DSBC and NWPTB to take place regarding the potential for a partnership where development of deep sea fishing would take place at the Dam. The impact on the current zoning of the Dam as a no-wake zone would need to be discussed; and
- Events Management Plan to be developed and implemented.

Further, as discussed in the Financial Plan below, Boskop 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.

2.) Equitable Access

Boskop Dam is managed by NWPTB as part of Boskop Nature Reserve and therefore as part of this, there is a form of equitable access at the Dam. The main issue related to this is that many local community members are unaware of the opportunities at the Dam. There is also no specific tariff system that takes into account the socio-economic status of the local community around the Dam.

In order to deal with this, the BP includes an intervention which aims to determine the feasibility of a fee system for regular users, day visitors, schools, events, etc. The study will take into account the socio-economic status of the community. The BP also includes the implementation of a Subsistence/Small scale fisherman access card system which will ensure that local community members who would like to access the Dam to fish will not have to pay daily access fees.

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

The RMP also focuses on skills development and training through one of the objectives (and related actions items – listed below). This is vital in that equitable access is in place through Boskop Nature Reserve, however people are not aware of the opportunities available and therefore do not make use of the Dam.

Education and Skills Development

- Feasibility of a National Sailing School should be determined;

- Discussions between DWS and SASACC should take place to discuss the potential angling development initiatives at the Dam. These should be included in any agreements put in place;
- Dam Education programme to be initiated to teach youth about the benefits of the Dam;
- Skills training programmes including life guard training, first aid training, and biodiversity training for local community members; and
- The extent of the land owned by North West University should be determined and agreements to allow access for educational and research should be put in place.

The BP has a specific interventions 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. There is also an intervention linked to the feasibility of a National Sailing School.

4.3 Financial Plan

Boskop 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 BBBEE, LED and SMMEs. 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, Boskop 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, NWPTB generates an income from entrance fees for visiting the Nature Reserve, camping, game drives and fishing. There is an opportunity for NWPTB to generate an income from special events, filming and/or advertising, access to the Dam and fishing competitions.

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 Boskop 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 related to Boskop Yacht Club include:

- Dinghies: (Laser, Fireball, Flying Dutchman, Sprog, Finn, Gypsy, Optimist, Dabchick);
- Catamarans: Dart, Hobie, Halca; and
- Windsurfers

Public visitors also make use of the Dam at the Nature Reserve for:

- Bird-watching;
- Fishing from Shore – Recreational and Competitive Fishing
- Canoeing;
- Game drives; and
- Picnicking.

Power boats access the water from Naturama. However, it should be noted that the following speed restriction applies: ***Only motorised boats with less than 15 horsepower travelling at less than 8km/hr and no wake speed allowed at Boskop Dam.***

Due to the entire water surface being declared a no-wake zone, power boats must not exceed idling speed, with strong encouragement to use electric motors and only use petrol motors in case of emergency. Due to speed restrictions jet skis and similar recreational activities such as waterskiing are prohibited 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 scores utilised to determine viability are as follows:

Table 6: 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.**

Because water quality is an issue at the Dam, this limits the number of recreational activities that can be allowed at the Dam. However, the Dam lends itself to many sailing and windsurfing. Boskop Dam could position itself to become the National Sailing School in the country. It is within close proximity to Johannesburg, Rustenburg, Potchefstroom, and other economic hubs were sailing is a common sport. It could provide training for future National Olympic competitors. .

Table 7: 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	Hiking/ Walking Trail	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	UPN system already online	May be disturbed by noise from recreational users	N/A	Some hiking trails already available	At Boskop Nature Reserve	Not required	Access through Boskop Nature Reserve	Hiking already occurs at Boskop Dam	Entry fees to the nature reserve should cover maintenance of trails	3
	Camping at Boskop Nature Reserve	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	UPN system already online	May be disturbed by noise from recreational users	N/A	Facilities available	At Boskop Nature Reserve	Not required	Access through Boskop Nature Reserve	Bird-watching already occurs at Boskop Dam	Entry fees to the nature reserve	3
	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	UPN system already online	May be disturbed by noise from recreational users	N/A	Limited development allowed in the Nature Reserve	Required	Not required	Boskop nature Reserve or Private Land	None at present	PPPs	1
	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	UPN system already online	May be disturbed by noise from recreational users	N/A	N/A	At Boskop Nature Reserve	Not required	Access through Boskop Nature Reserve	Already occurs at Boskop Dam	Entry fees to the nature reserve	3
	Game viewing	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	UPN system already online	May be disturbed by noise from recreational users	N/A	Boskop nature Reserve	At Boskop Nature Reserve	Not required	Access through Boskop Nature Reserve	Already occurs at BNR	Entry fees to the nature reserve	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	UPN system already online	May be disturbed by noise from recreational users	N/A	Some hiking trails already available	At Boskop Nature Reserve	Not required	Access through Boskop Nature Reserve	Hiking already occurs at Boskop Dam	Entry fees to the nature reserve	3
Primary Contact	Open Water Swimming - Recreational	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Health risks from existing water quality issues and Invasive alien species	Health risks from existing water quality issues and Invasive alien species. Due to Reeds, there are no areas for swimming	N/A	N/A	N/A	Yes	No	N/A	Cell-phone reception available	UPN system already online	Zoning would need to be adjusted to accommodate swimmers	N/A	N/A	Ablution facilities and change rooms required	Required	Required	None at present	SwimSA, Telkom Splash or similar foundations	0
	Open Water Swimming – Development School	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Health risks from existing water quality issues and Invasive alien species	Health risks from existing water quality issues and Invasive alien species. Due to Reeds, there are no areas for swimming	N/A	N/A	N/A	Yes	No	N/A	Cell-phone reception available	UPN system already online	Zoning would need to be adjusted to accommodate swimmers	N/A	N/A	Ablution facilities and change rooms required	Required	Required	None at present	PPPs	0
	Snorkelling	N/A	N/A	Health risks from existing water quality issues and Invasive	Health risks from existing water quality issues and Invasive	Health risks from existing water quality issues and Invasive alien species. Due to Reeds, there are no areas for	N/A	N/A	N/A	Yes	No	May be a concern	Cell-phone reception available	UPN system already online	Zoning would need to be adjusted to accommodate snorkelers	N/A	N/A	Ablution facilities and change rooms required	Required	Required	None at present	PPPs	0

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	
				alien species	alien species	swimming																	
	Diving	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Health risks from existing water quality issues and Invasive alien species	Health risks from existing water quality issues and Invasive alien species. Due to Reeds, there are no areas for swimming	N/A	N/A	N/A	yes	No	May be a concern to safety and enjoyment	Cell-phone reception available	UPN system already online	Zoning would need to be adjusted to accommodate divers	N/A	Facilities and infrastructure required.	Ablution facilities and change rooms required	Required	Required	None at present	PPPs	0
Secondary Contact	Commercial Fisheries	N/A	N/A	Health risks from potential heavy metal contami-nation in fish	Health risks from potential heavy metal contami-nation in fish	N/A	Fishing of invasive species may assist indigenous populations	Nesting areas are close to preferred fishing spots	Maintenance of boats and equipment required to prevent contamination	Require for aquaculture	N/A	N/A	Cell-phone reception available	UPN system already online	May reduce fish stocks and interfere with competitive fishing	N/A	None currently	Required	Required	Required	None at present	PPPs	1
	Deep sea fishing	N/A	N/A	Health risks from potential heavy metal contami-nation in fish	Health risks from potential heavy metal contami-nation in fish	N/A	Fishing of invasive species may assist indigenous populations	Nesting areas are close to preferred fishing spots	Maintenance of boats and equipment required to prevent contamination	Require for aquaculture	N/A	N/A	Cell-phone reception available	UPN system already online	In conflict with current no-wake zonation.	N/A	None currently	Required	Required	Required	DSBC has expressed interest.	DSBC	1
	Shore Fishing	N/A	N/A	N/A	Use of pesticides in the vicinity of fishing areas may affect anglers	Fishing spots along the shoreline are limited by invasive reeds along the shoreline	None	None	None	N/A	N/A	N/A	Cell-phone reception available	UPN system already online	No	No	No	Currently available at BNR and Naturama, but new ventures may require additional facilities	Shoreline access required	Shoreline access required	Already occurs at Boskop Dam	N/A	3
	Tube Fishing	N/A	N/A	N/A	N/A	N/A	May be affected if zoning is not controlled	N/A	N/A	Zoning AtoN and Demarcation Markers required	Depth is suitable	Safety concern as not visible to bigger craft,flags and other safety measures required	Cell-phone reception available	UPN system already online	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	Shoreline access required	Shoreline access required	Already occurs at Boskop Dam	N/A	3
	Pontoon Fishing	N/A	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Weeds restrict access to parts of the Dam	May be affected if zoning is not controlled	May be affected if zoning is not controlled	N/A	Zoning AtoN and Demarcation Markers required	Depth is suitable	Safety concern as not visible to bigger craft,flags and other safety measures required	Cell-phone reception available	UPN system already online	May conflict with other anglers, zoning to prevent major conflict	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	At BNR or Naturama	At BNR or Naturama	None at present	N/A	2
	Bass Fishing	N/A	N/A	N/A	N/A	Weeds restrict access to	May be affected if zoning is	May be affected if zoning is not	Boat Wash Bays to	Zoning AtoN and Demarcation	Depth is suitable	Safety concerns over visibility	Cell-phone recepti	UPN system already online	May conflict with other anglers,	No	N/A	Currently available at BNR and	Current access at Naturama	Current access at Naturama	Already occurs at Boskop	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	
						parts of the Dam	not controlled	controlled	prevent contamination	Markers required		to preferred fishing locations to be addressed in the zoning plan	on available		zoning to prevent major conflict			Naturama, but new ventures may require additional facilities			Dam		
	Motorised Boats	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	Disturbance to local fauna if idling speed is exceeded	Disturbance to local fauna if idling speed is exceeded	Disturbance to local environment if idling speed is exceeded	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	No conflict as long as no-wake rule is followed	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	Current access at Naturama	Current access at Naturama	Already occurs at Boskop Dam	N/A	3
	Jet Powered Boats	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	Disturbance to local fauna if idling speed is exceeded	Disturbance to local fauna if idling speed is exceeded	Disturbance to local environment if idling speed is exceeded	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	No conflict as long as no-wake rule is followed	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	Current access at Naturama	Current access at Naturama	Already occurs at Boskop Dam	N/A	3
	Rigid Hulled Inflatable Boats (RHIB)	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	Disturbance to local fauna if idling speed is exceeded	Disturbance to local fauna if idling speed is exceeded	Disturbance to local environment if idling speed is exceeded	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	No conflict as long as no-wake rule is followed	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	Current access at Naturama	Current access at Naturama	Already occurs at Boskop Dam	N/A	3
	Jet Ski	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	Conflicts with no-wake rule at the Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	Access required	N/A	None at present	N/A	0
	Dragon Boats	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	Access required	Access required	None at present	N/A	2
	Slalom Canoe	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	None at present	N/A	2
	Fishing Canoe	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	Safety concern as not visible to bigger craft, flags and other safety measures required	Cell-phone reception available	UPN system already online	May conflict with other anglers	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	Occasional occurrence at Boskop Dam	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	
	Jet Ski Fishing	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	No jet skis allowed at the Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	N/A	N/A	None at present	N/A	0
	Wind Surfing	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	High-speed activities conflict with existing activities and sense-of-place	Yes	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	Current Activity	N/A	3
	Kite Surfing	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	N/A	N/A	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	Conflicts with the sense of place of the Dam	Yes	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	None at present	N/A	2
	Ski Jumping	N/A	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Weeds restrict access to parts of the Dam	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	Conflicts with the no-wake rule at Boskop Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	N/A	N/A	None at present	N/A	0
	Slalom Skiing	N/A	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Weeds restrict access to parts of the Dam	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	Conflicts with the no-wake rule at Boskop Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	N/A	N/A	None at present	N/A	0
	Ski and Wakeboard Boat	N/A	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Weeds restrict access to parts of the Dam	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	Conflicts with the no-wake rule at Boskop Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	N/A	N/A	None at present	N/A	0
	Kayaking Sprints	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	N/A	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	None at present	N/A	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	
	Kayaking Marathons	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Marathons require large dam. Due to the size of Boskop Dam, this activity is not feasible.	Depth is suitable	Marathons require large dam. Due to the size of Boskop Dam, this activity is not feasible.	Cell-phone reception available	UPN system already online	Marathons require large dam. Due to the size of Boskop Dam, this activity is not feasible.	N/A	Marathons require large dam. Due to the size of Boskop Dam, this activity is not feasible.	N/A	Marathons require large dam. Due to the size of Boskop Dam, this activity is not feasible.	Marathons require large dam. Due to the size of Boskop Dam, this activity is not feasible.	None at present	N/A	0
	Kayaking Water Polo	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers require	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	None at present	N/A	2
	Kayaking Touring	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	Safety concern as not visible to bigger craft, flags and other safety measures required	Cell-phone reception available	UPN system already online	None foreseen at present	No	Campsites at BNR	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	None at present	PPP with tour operator	2
	Kayaking Fishing	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	May be affected if zoning is not controlled	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	Safety concern as not visible to bigger craft, flags and other safety measures required	Cell-phone reception available	UPN system already online	May conflict with other anglers	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	Occasional use of the Dam for this purpose	N/A	3
	Paddle Ski	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	Safety concern as not visible to bigger craft, flags and other safety measures required	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	BNR	BNR	Occasional use of the Dam for this purpose	N/A	3
	Surf Ski	N/A	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	Conflicts with the no-wake rule at Boskop Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	N/A	N/A	None at present	N/A	0
	Pedal Boat	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	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	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	Currently available at BNR and Naturama, but new ventures may require	BNR	BNR	Established at Boskop Dam	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	
												other safety measures required						additional facilities					
	Hovercraft	N/A	N/A	N/A	N/A	Weeds restrict access to parts of the Dam	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	N/A	Depth is suitable	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	Cell-phone reception available	UPN system already online	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	N/A	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	N/A	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	None at present	N/A	0
	Stand Up Paddling	N/A	N/A	N/A	Health risks from existing water quality issues and Invasive alien species	Weeds restrict access to parts of the Dam	N/A	May be affected if zoning is not controlled	Boat Wash Bays to prevent contamination	Zoning AtoN and Demarcation Markers required	Depth is suitable	No concerns at this time	Cell-phone reception available	UPN system already online	None foreseen at present	No	N/A	At BNR or Naturama	BNR	BNR	None at present	N/A	2
	Parasailing	N/A	N/A	N/A	N/A	N/A	Disturbance to local fauna	Disturbance to local fauna	Disturbance to local environment	Zoning AtoN and Demarcation Markers required for all areas	Depth is suitable	N/A	Cell-phone reception available	UPN system already online	Conflicts with the no-wake rule at Boskop Dam	No	N/A	Currently available at BNR and Naturama, but new ventures may require additional facilities	N/A	N/A	None at present	N/A	0
	Sailing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Buoy-age already in place	Depth is suitable	Measures such as flags required to prevent danger to smaller crafts	Cell-phone reception available	UPN system already online	None foreseen at present	Yes	N/A	Available at BYC	BYC	BYC	Established at Boskop Dam	N/A	3
	Water Toys	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	UPN system already online	None foreseen at present	No	N/A	At BNR	Not required	Available through BNR and Naturama	Occasional use at Boskop 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	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	Cell-phone reception available	UPN system already online	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	N/A	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	N/A	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	Activities are not feasible as it would: (i) impact negatively on other activities (ii) would be a safety risk, and (iii) cannot be accommodated in terms of the zoning	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	N/A	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	UPN system already online	Conflicts with current recreational operating hours	N/A	N/A	N/A	Required	Required	Applications have been made in the past	PPP	1
	Junior Sailing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Buoy-age	Depth is		Cell-	UPN system	No	Yes,	Facilities	Available at	BYC	BYC	Proposal in		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	
	School									already in place	suitable	Measures such as flags required to prevent danger to smaller crafts	phone reception available	already online		typically winds are suitable	including boats are available	BYC			place from BYC		
	High Performance Water Sports Training Academy	N/A	N/A	See above for the impacts and require-ments of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	Cell-phone reception available	UPN system already online	See above for the impacts and requirements of each sport type	See above for the impacts and require-ments of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	See above for the impacts and requirements of each sport type	None at present		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 Boskop 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: 3.64403 $km^{2,}$ or 364 hectares

The Indiana Clean Lakes Program Factsheet suggests that:

U/A = There is a range of literature regarding the area required for different recreational users, which ranges between 1.6 ha (16 000 m^2) per boat to 16.1ha (0.161 km^2) per boat. For the purposes of this calculation, guidance has been taken from previous literature. We assume that canoeing, kayaking and sailing require approximately 3.23ha (32 300 m^2)/boat at any given time to prevent accidents and overcrowding. Powerboats at idling speed require approximately 4.04 ha (40 400m^2) per boat. As Boskop Dam is an established no-wake zone, with active fishing and yachting communities, for the purposes of this calculation it is assumed that boats on the water surface require approximately 3.64 ha (36 400 m^2) per boat for safety and enjoyment of the resource.

Given the well-known status of Boskop Dam as a recreational destination it is likely that visitors to the Dam would spend the majority of the day on the water and so we will assume Rf = 1.

The PCCs for Boskop Dam can therefore be calculated as:

PCC = A ÷ U/a x Rf
= 364 ÷ 3.64x1
= **100 craft** on the Dam at any time

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:

- Pollution of water in the Dam;
- Safety concerns of allowing recreation near to the Dam wall;
- Thick reeds along the banks of the Dam restricting movement;
- Restriction of use of areas of the Dam due to conservation and safety concerns.

Calculating the area of the surface of the Dam and removing the areas of restricted access, approximately 120 ha (1.2 km^2) of water surface remain available for recreation. This means that 66.6% of the Dam is not available for recreational use.

The RCC for Boskop Dam is therefore:

RCC = PCC x (100 – Cf1) % x
(100 – Cf2) % x … (100 – Cfn) %

Where Cf = a corrective factor expressed as a percentage. In this case all corrective factors have been consolidated.

RCC = 100 x (100 – 66.6)%
= **33.4 boats** on the Dam at any given time.

For special events, permits may be given to use an extra area of the Dam, provided that certain safety and conservation measures are taken into account. **This is at the discretion of the DMC.**

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 Boskop Dam has a formal, Nationally affiliated Yacht 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

In this case calculating ECC is not possible until such a point where the infrastructure capacity is known.

4.4.4 Water Surface Zonal Plan

The Zonal plan for the water surface at Boskop 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 types of activities occurring at surrounding Dams were also taken into account as ideally, the RMP aims to ensure that the unique features of the Dam are highlighted in the context of recreational use in the region. The purpose of this approach is to minimise conflict and to promote activities that are in line with sense of place.

Further, Boskop Dam has one of the two recognized South African Sailing clubs located at the Dam. The wind conditions are ideal for sailing and associated activities. Due to this and the fact that fishing is one of the main activities at a number of surrounding Dams, sailing and associated activities have been prioritized although a number of non-sailing activities are permitted at the Dam.

Another importance consideration in terms of the surface water zoning plan is the extent of the Invasive Aquatic Plant species. Survey Data was used to determine the extent of this infestation and to demarcate the main channel available for recreational use. This was combined with the conservation zone to create a No Go area which aims to manage the extent of the infestation.

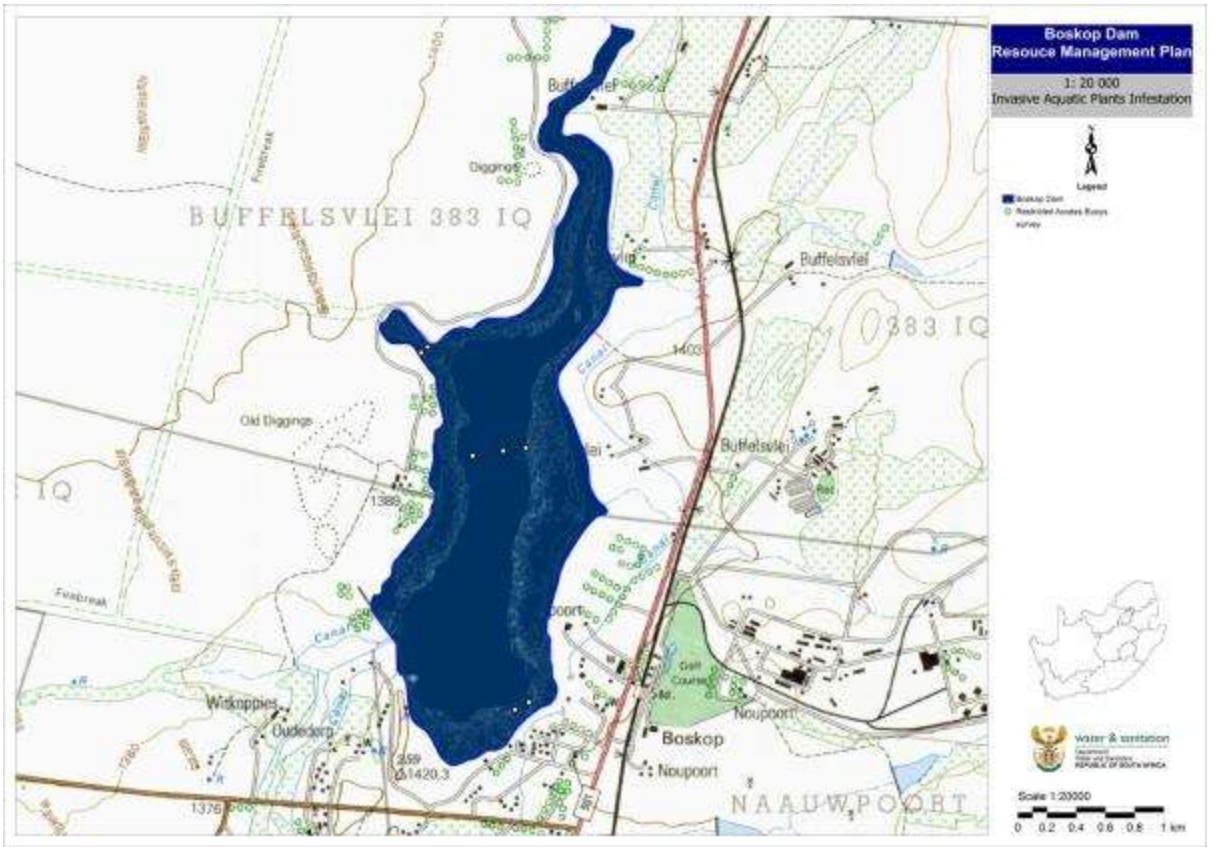

Figure 17: Extent of Infestation

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, provided that they follow the general rules of the Dam – i.e. no wake zone, idling speed only on motor boats;
- Zone B – No Access Zone – safety. This orange zone is a safety buffer along the Dam wall. No access to this area is to be permitted;
- Zone C – No Access Zone – Conservation and Invasive Plants. This blue zone is a No Go area for recreational use as it a favoured drinking spot for animals within the Nature Reserve. It also demarcates the extent of the Invasive Aquatic Plant infestation at the Dam;
- Zone D– Secondary Contact – Organised Sailing Mooring. This area is the mooring area for Boskop Yacht Club; and
- Zone E – Restricted Public Access – Private Property.

Detailed information of the current and potential activities together with activities that are not allowed in each zone is provided in the table below. Information on requirements for each zone is also provided.

It should be noted that due to the extent of the Invasive Aquatic Plant Infestation at the Dam and the presence of the Boskop Nature Reserve around the Dam, the speed of motorised boats is **strictly limited to less than 8km/hour and no wake and only boats with less than 15 horsepower are permitted.** Further, **strictly no access** is permitted in Zone B and Zone C.

Table 8: 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 - Combination	Motorised Boats, jet powered boats, RHIB – ***Only motorised boats with less than 15 horsepower travelling at less than 8km/hr and no wake speed allowed at Boskop Dam.*** Tube fishing Fishing canoe Wind surfing Kite surfing Kayak fishing Paddle ski Sailing Water toys Bass Fishing/Fishing from Boats Event fishing Recreational fishing	Dragon Boats Slalom Canoe Kayaking Sprints Kayaking Touring Pedal Boat House Boats Stand Up Paddling Pontoon Fishing Commercial fishing (dependent on feasibility study) Deep sea fishing (dependent on feasibility study) High Performance Water Training School Junior Sailing School	Boskop Yacht Club (once agreements are in place) Boskop Nature Reserve Naturama (once agreements are in place) North West University (should agreements be put in place)	Registered Safe for Water Vessel (where applicable) Valid Skipper's License (where applicable) First Aid Kit UPN date stamp UPN tag.	AtoN and Demarcation Markers; UPN System OPS Point Boat Wash Bay Rescue Boat available at all times Boat Wash Bay Officer Enforcement Officer Access point system to check UPN Tag and Date Stamp or new Boat Wash Bay Agreements with Boskop Yacht Club, NWPTB and Naturama and North West University
Zone B	No Access Zone - Safety	Management and maintenance activities	None	N/A	N/A	AtoN and Demarcation Markers
Zone C	No-Access Zone – Conservation and Invasive Plants	Management and maintenance activities Research Control and management of Invasive Aquatic Plants	None	N/A	N/A	Enforcement Officer Notice Boards AtoN and Demarcation Markers UPN System Management of Aquatic Invasive Plants
Zone D	Secondary Contact – Organised Sailing Mooring Area	Keelboat Moorings and launch Sailing	Launching of keelboats Sailing School DWS training centre activities as required	Boskop Yacht Club DWS training centre (for training activities)	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 Boat Wash Bay Rescue Boat available at all times Boat Wash Bay Officer Enforcement Officer Agreements with Boskop Yacht Club
Zone D	Secondary Contact – Restricted Public Access – Private Property	Access and use by private landowner ***Only motorised boats with less than 15 horsepower travelling at less than 8km/hr and no wake speed allowed at Boskop Dam.*** No public access	None	Naturama (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 Boat Wash Bay Rescue Boat available at all times Boat Wash Bay Officer Enforcement Officer Agreements with Naturama

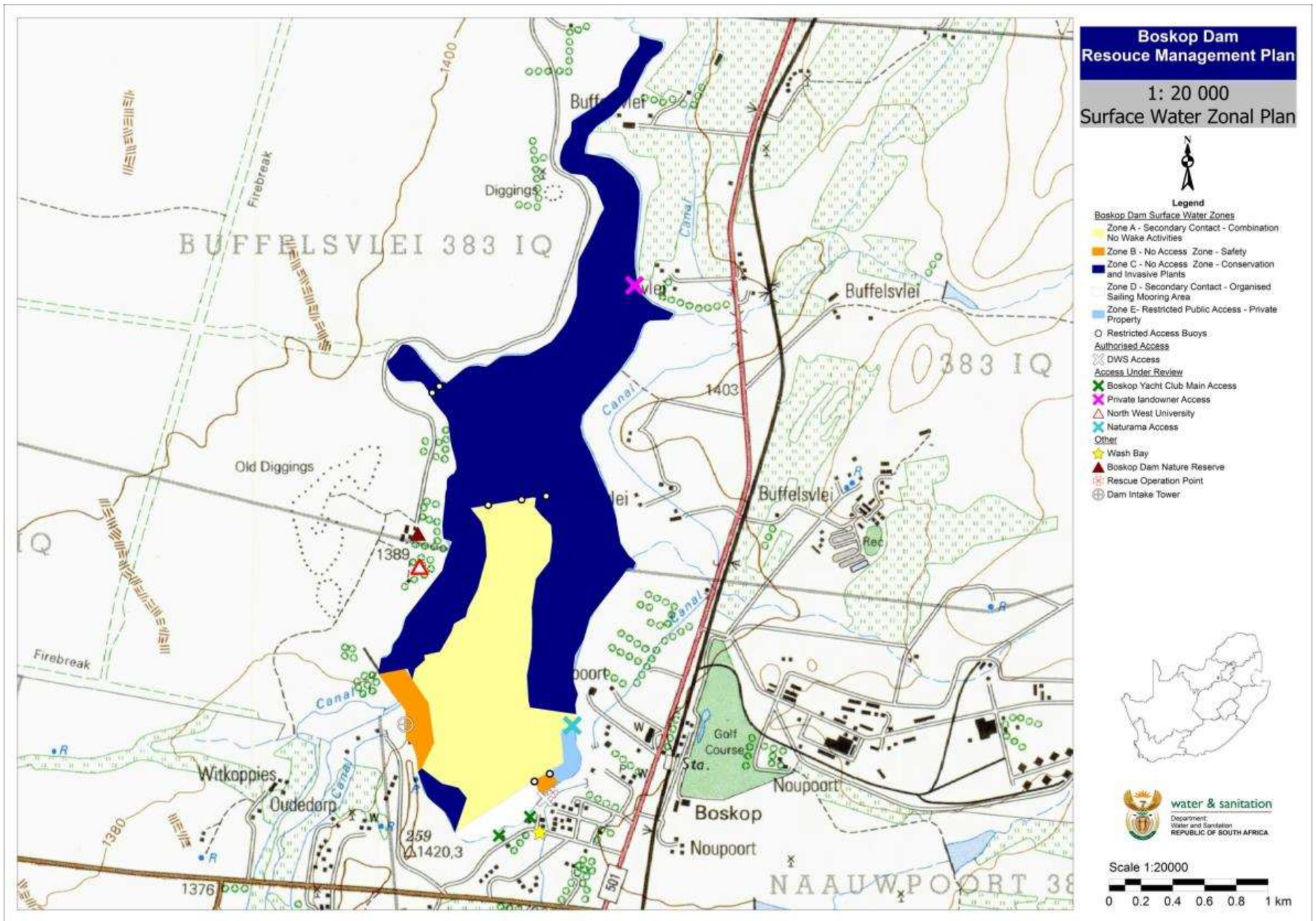

Figure 18: Map of the Water Surface Zonal Plan

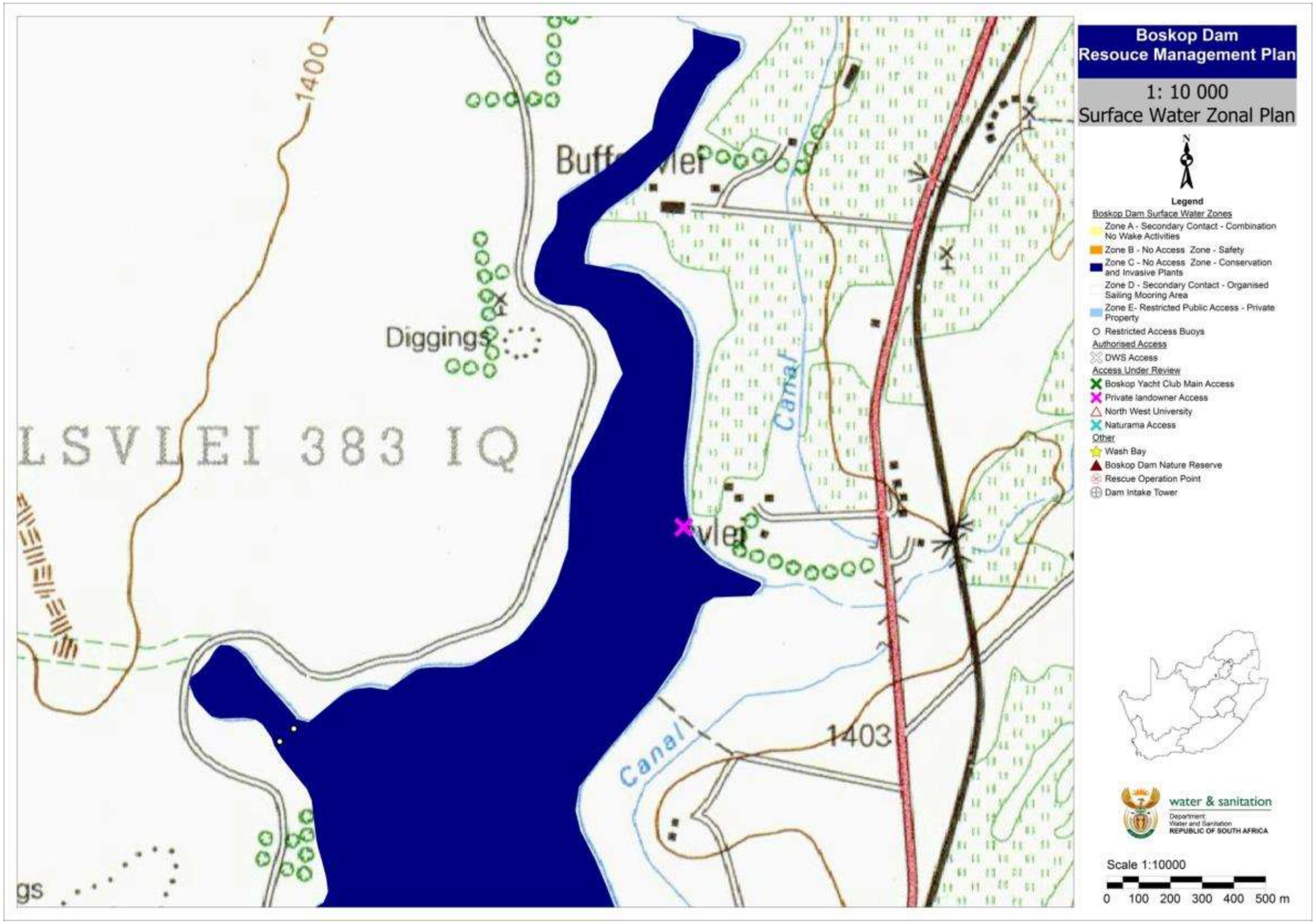

Figure 19: Map of the Water Surface Zonal Plan – Section 1

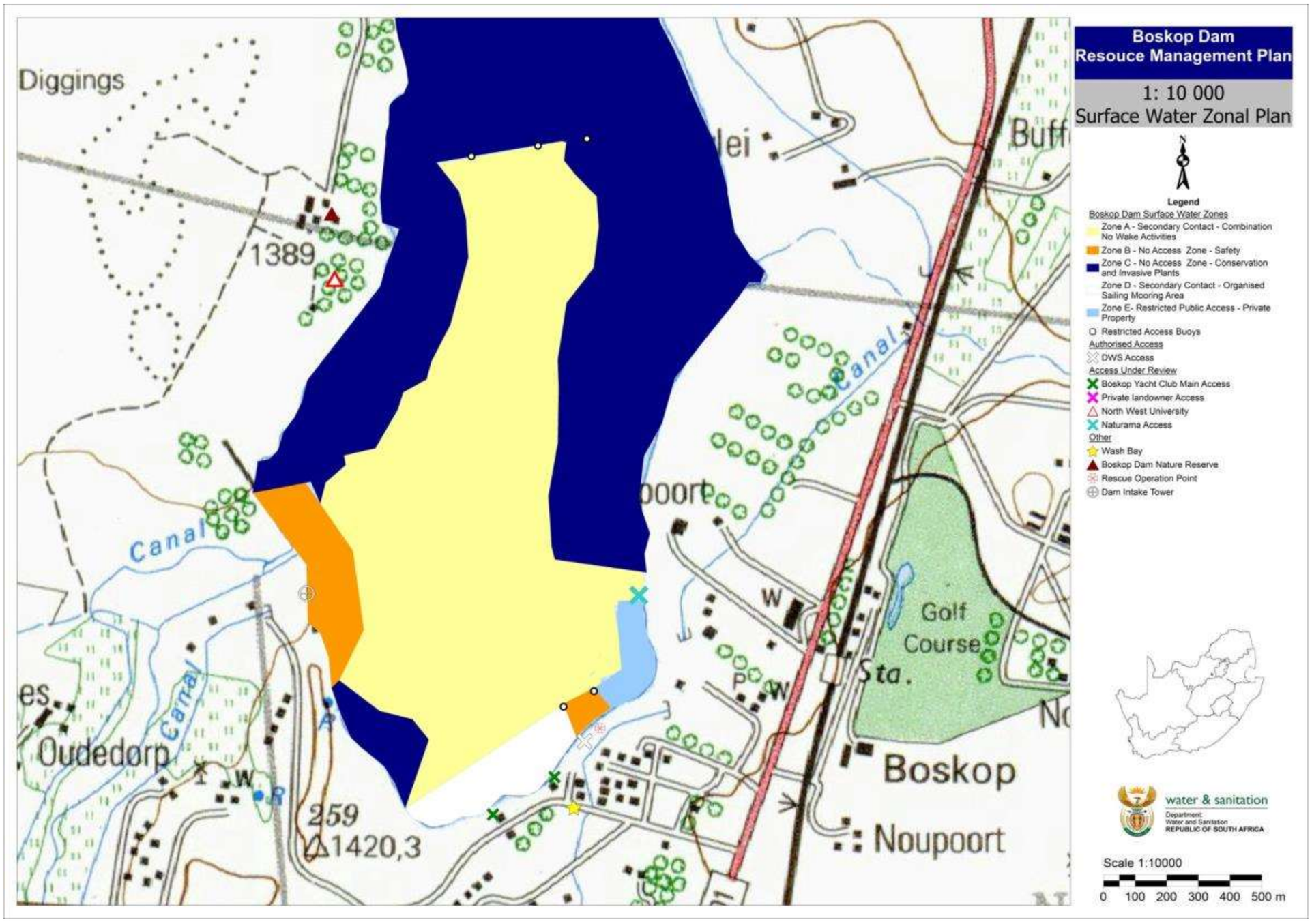

Figure 20: Map of the Water Surface Zonal Plan – Section 2

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.

The Shoreline Zonal Plan can only manage state owned land around the Dam. However, private land that is adjacent to the Dam has also been included to provide clarity and guidance. The state owned land around the dam is managed by NWPTB, DWS and Boskop Yacht Club.

The management zones include:

- Zone A - Conservation and Recreation/Tourism;
- Zone B – Development and Recreation;
- Zone C – No Public Access – Private Land; and
- Zone D- No Public Access – Management Only.

Zone A includes the majority of the state land around the Dam which falls part of the Boskop Dam Nature Reserve. This zone is for conservation and recreation activities.

This Zone includes three zones from the Boskop Dam Nature Reserve Zonation Plan including Low use areas (Very limited development, no construction and development limited to low traffic roads) and Sensitive areas (No development, activities limited to specially planned low impact hiking trails) and Medium use areas (Development limited to roads and/or low key development i.e. tented camps. All development should be proceeded by an environmental impact assessment).

Zone B allows for recreation and development of facilities for recreational purposes. This includes both smallscale developments. This zone corresponds to the Intensive visitor use area in the Boskop Dam Nature Reserve Zonation Plan. Development in this area should be limited to single level chalets or ablutions blocks, designed to merge with the environment and character of Boskop Dam Nature Reserve.

The definition of small scale in terms of the RMP is as follows:

A development for tourism, recreation, education and/or conservation purposes that is below the thresholds prescribed in GN 544, GN 545 or GN 546 of 18 June 2010.

Developments that are permitted include jetties, slipways, picnic areas, camping areas, walkways, bird hides and accommodation for less than 15 people.

Zone C is private land that adjoins the Dam. Access to the general public is not permitted. All adjacent landowners who wish to access the surface water will require an access agreement with DWS.

Zone D is a No–Go zone for the public. Access for management activities by DWS and NWPTB is permitted.

Zone E is for Education and Recreation. The land is for use by North West University. Smallscale development for education and recreation is allowed.

Permissible and non-permissible activities are detailed in the table below.

Table 9: Shoreline Management Zones

Zone Name	Zone Type	Permissible Activities	Requirements for Users	Requirements for DMC
Zone A	Conservation and Management	Hiking Bird watching Game viewing	Birding and game viewing must be undertaken in accordance with rules and Regulations of Boskop Nature Reserve Noise levels to be kept at a minimum. No littering No access to the shoreline from the Dam permitted	Updated agreements with NWPTB Removal of alien invasive terrestrial species
Zone B	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 Small-scale fisheries developments	Camping, birding, hiking, picnicking, shoreline fishing and access to the water must be done in accordance to access agreements and Boskop Nature Reserve rules and regulations 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 Boat Wash Bay at Boskop Yacht Club 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 C	Private Land	N/A	Access agreements with DWS.	Agreements with landowners detailing requirements regarding access.
Zone D	Management – No Public Access	Fire management Invasive alien species clearing Management of Dam Infrastructure	Caretaker agreemenst must be in place prior to use/management by adjacent landowners	Access to this area for strictly management purposes (i.e. DWS and NWPTB) Caretaker Agreements between DWS and Adjacent landowners should be drafted and include information on Fire Management, Management of Alien Invasive species
Zone E	Education and Recreation	Expansion of facilities/infrastructure for recreation and education Access to surface water for educational and recreational purposes Smallscale developments	Camping, birding, hiking, picnicking, shoreline fishing and access to the water must be done in accordance to access agreements and Boskop Nature Reserve rules and regulations 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 Boat Wash Bay at Boskop Yacht Club All activities to be formalised and agreements drafted before the expansion of existing facilities No private slipways to be built without approval	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 Da Land Matters to be clarified.

Zone Name	Zone Type	Permissible Activities	Requirements for Users	Requirements for DMC
			from DWS. In addition Section 21 (c). and (i) Water Use License Application (WULAs) would be required	

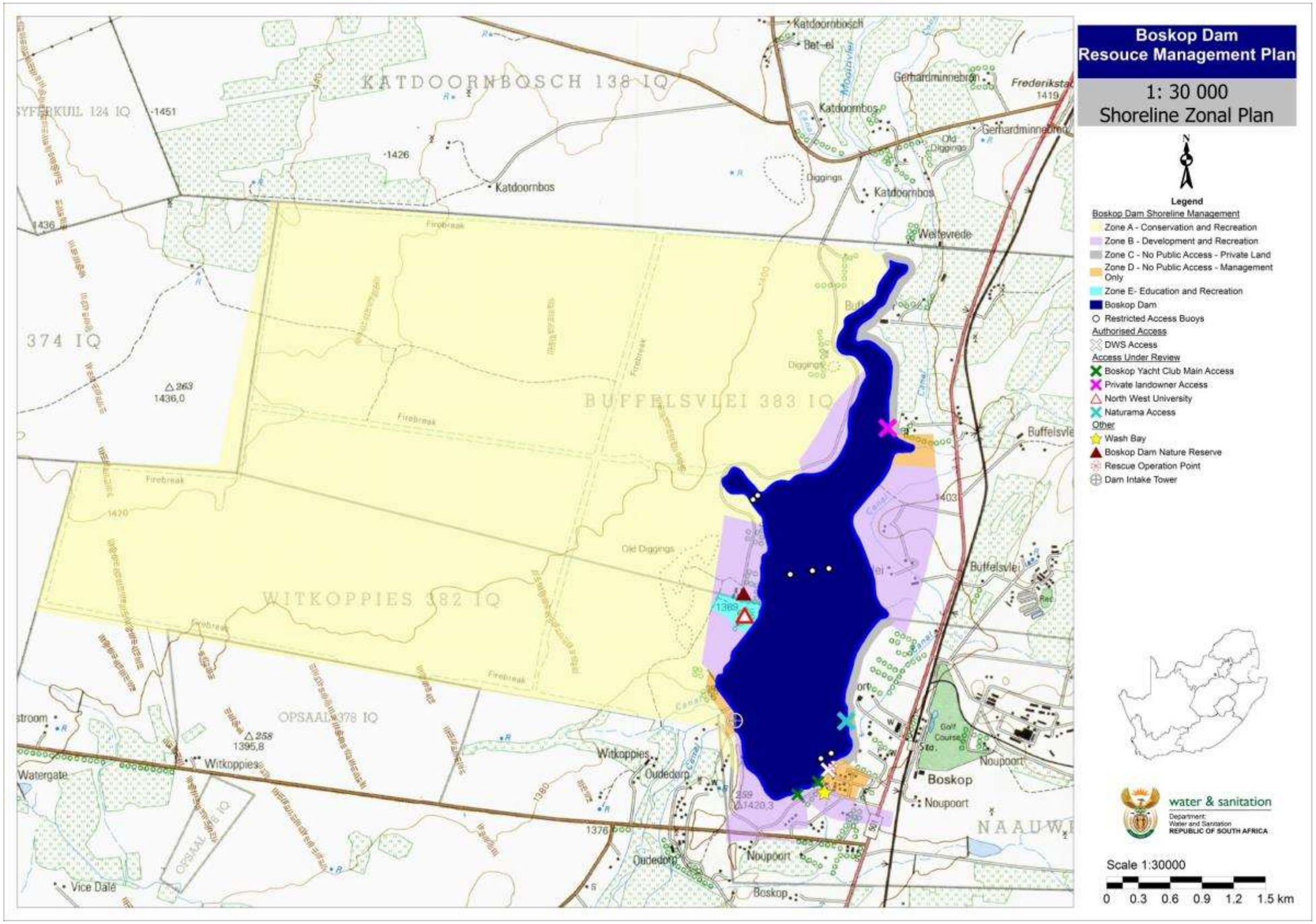

Figure 21: Shoreline Zonal Map

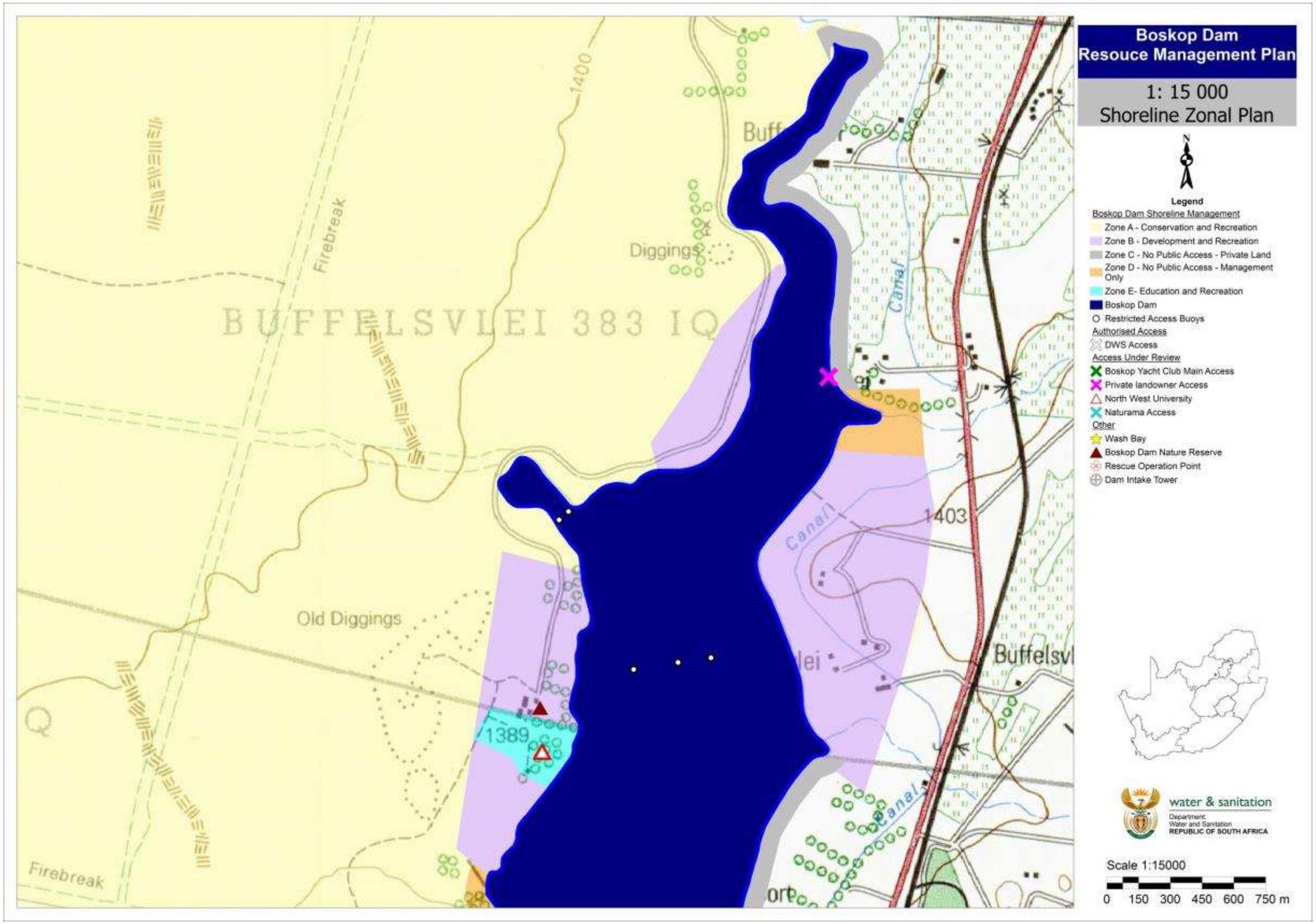

Figure 22:: Shoreline Zonal Map – Section 1

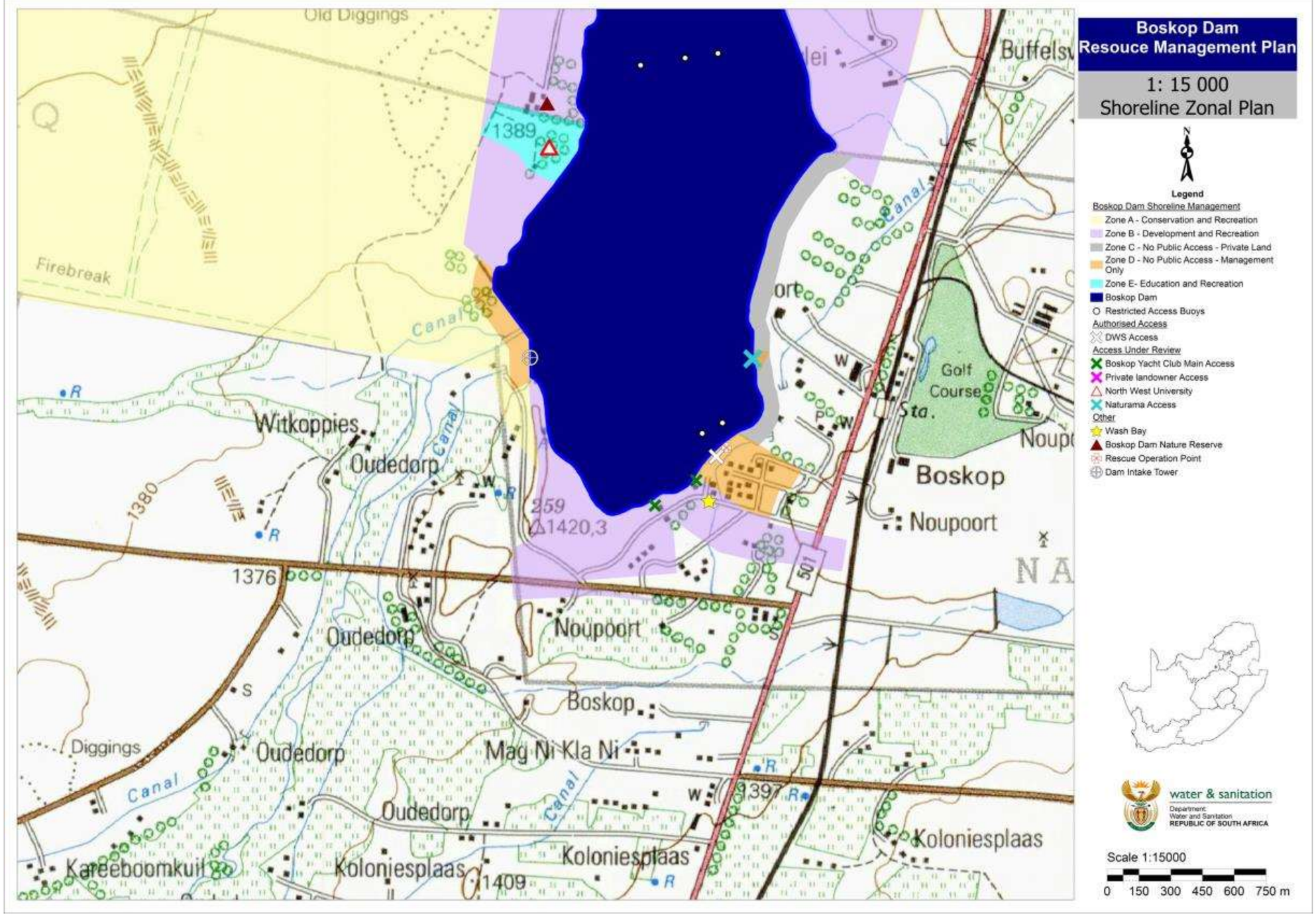

Figure 23: Shoreline Zonal Map – Section 2

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 Resource Management	Regulation of mine effluent and new mining rights near the Dam	Heavy metal concentrations increasing in the Dam would create a risk to the community of Potchefstroom and increase water treatment costs substantially	The RMP must be considered by planning officially before mining rights are granted. Mitigating measures and effluent quality must be monitored and enforced	DMR, DEA, DWS DMC, NWPTB
	Repair and maintenance of canals from the Dam to water treatment works	Water is transported via uncovered canals from Boskop Dam to Potchefstroom for treatment. The condition of the canals pollutes the water and increases treatment costs	Discussions between Tlokwe Municipality and DWS to come to an agreement over responsibility for maintenance of the canals	Tlokwe LM DWS
	Enforcement of current CIWSP programme to prevent introduction and spread of aquatic invasive plant species	Aquatic weeds can cause harm to indigenous aquatic ecosystems and increased populations of these weeds can stop the use of the water surface	The CIWSP programme has been launched at Boskop Dam. Boat Wash Bays must be built at all legal access points	DWS, DMC, NWPTB
	Management of Invasive alien species	Invasive species decrease water availability and can have numerous negative impacts. The Reeds can also increase fire risks in the area.	Alien Invasive Species Management plan to be compiled and implemented.	NWPTB, DWS, DEA, DMC
	Water Quality Management Plan to address the impact of agricultural and mining pollution	Heavy metal concentrations increasing in the Dam would create a risk to the community of Potchefstroom and increase water treatment costs substantially	A Water Quality Management Plan should be developed and implemented	DWS
	Recreation maintained at levels that do not disturb local fauna	Boskop Nature Reserve has a primary purpose of conservation, loud boats disturbing sensitive breeding areas and watering holes conflict with conservation goals	Strict enforcement of zonal plans and buoyage	DMC, NWPTB
	Agreements between NWPTB and Boskop Yacht Club to allow the club to remove invasive plant species in the vicinity of the clubhouse	Boskop Yacht club has been maintaining a section of land next to the clubhouse for several years and removing alien vegetation. They would like to extend this area in order to remove black wattle trees up to the road.	Create lease agreements with the yacht club that fit all of the specifications for a successful lease	Boskop Yacht Club NWPTB DMC

Objective category/major objective	What	Why	How	Who
Improved Fishing Management	Implement Access Permit System to allow Fisherman to access Restricted Area Zone	The northern part of the Dam has been zoned as restricted access to ensure management of alien invasive species and prevent conflict between shoreline anglers and motor boats.	Permit system to be compiled Discussions between all authorised access point representatives to take place to explain permit system and ensure enforcement	NWPTB DMC DWS
	Discussions between NWPTB and SASACC to be undertaken to discuss potential for SASACC to be responsible for management of the shoreline fishing area (this should include removal of Reeds)	Shoreline fishing was very popular in the past however due to decreased area available for angling (because of the reed infestation) there is decreased used. SASACC has shown interest in the potential co-management of the angling area.	Discussions between NWPTB and SASACC regarding potential agreement for managing of shoreline fishing area should take place.	NWPTB SASACC DMC
	Sustainable Fishing Management Plan to be compiled and implemented. This plan should take into account NEMBA legislation as well as the economic benefits of recreational and event angling at the Dam. As part of this study, a Fish Survey should be undertaken to determine the state of the resource	The draft NEMBA Alien Species Lists will require a catch and destroy policy for Carp and Bass in Nature Reserves. However these regulations have not yet been promulgated. Further, recreational and event angling is known to have positive economic benefits. A sustainable fishing plan offers an opportunity to take into account new legislation (if necessary) as well as the economic benefits of sustainable recreational use.	A sustainable fishing management plan to be compiled and implemented.	DWS DEA NWPTB
Improved Management, Safety and Policing	Implementation of standardised and harmonised AtoN and Demarcation Markers	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 Relevant Parties
	Visible policing of the Dam to provide a sense of control and regulation	Current users of the water surface often ignore regulations and zoning and there is no mechanism to correct this	Creation of a DMC. Clear defining of roles, responsibilities and powers of regulatory parties. Regular patrols on the Dam and checking of permits and licenses	NWPTB DMC
	Development of a clear institutional framework, clarifying responsibilities of Tlokwe City Council, DWS and NW Parks and Tourism	Unclear mandates and informal arrangements have led to confusion over the powers and responsibilities of each party	Review of all lease agreements, mandates and responsibilities. Development of networks of responsibility	Tlokwe City Council, DWS and NWPTB

Objective category/major objective	What	Why	How	Who
	New leases with recreational users formalising terms of recreational use New agreements eliminating or authorising current arrangements	Leases are outdated and unclear and do not fulfil the conditions of Best Practice for lease agreements	New lease agreements to be drafted between DWS all users of the Dam that require a lease agreement to access the water	Affected Parties NWPTB DMC DWS
	Control of access	Access to the Dam is not strictly controlled with boats launched off the banks without requiring a slipway. Safety concerns also exist since boats have been seen on the water at night	Establishment of DMC to ensure regulated and equitable access	DWS, NWPTB, Boskop Yacht Club, DoT/SAMSA
	Development of a unified rulebook for recreation on the Dam	Currently no consistency in rules and regulations between different groups of recreational water users	DMC to develop a rulebook based on existing management regulations and practices. This includes the zonal plan from the RMP, the operating hours at which the safety boat can monitor the water surface and the no-wake zone rule established by the nature reserve	DMC
	Maintenance of infrastructure at the nature reserve	Stakeholders report that they are unhappy with the level of maintenance seen at the nature reserve	An investigation into infrastructure to prioritise areas that require improved maintenance	NWPTB
	Formal Institutional Management System to be implemented	There is no formal institutional structure in place	DWS to facilitate the implementation of DMC, OMC and RSC	DWS
	All land matters to be addressed and illegal access points to be closed.	There are a number of land matters that need to be addressed	DWS to address all land matters	DWS NWPTB North West University Denel
	Trained Safety officer with authority is required	There is a number of illegal activities taking place at the Dam. Enforcement of the rules is difficult unless there is a Safety officer/Enforcement officer which has a mandate to ensure rules are followed. This should also include prevention of vandalism	DMC to determine mechanisms to ensure safety officer/enforcement officer has authority	DMC
	Formalised agreements with adjacent landowners, recreational clubs etc. should be put place. These agreements should include RMP requirements as well as requirements for policing and safety	There are no access agreements formalising access to the Dam. This can result in conflict.	Discussions to take place and agreements to be drawn up.	DWS Adjacent landowners

Objective category/major objective	What	Why	How	Who
	Declare a no-wake zone over the entire Dam	To minimise disturbance from recreation and allow for safe use of the water surface by different types of crafts	Shown on zonal maps. Enforcement by officials	DWS, NWPTB, all operators on the Dam
	Regular patrols to prevent night-time unauthorised entry to the Dam	Use of the Dam after dark is prohibited for safety reasons, but recently illegal access after dark has happened several times, endangering people and in some cases children	Visible patrols on the water at night to discourage potential recreational boat users	NWPTB SAPS
	Formalised responsibilities of rescue boats	The rescue boat is currently managed by Boskop Yacht club, but there is no official mandate which means there are no guidelines as to the powers and responsibilities of rescue boats	The DMC must discuss the roles and responsibilities of the safety boat and draw up a formal agreement	DMC
	Regulation of areas out of line-of-sight of rescue boats	The curve in the river at the inlet to the Dam is a favoured bass fishing area, but it is also out of the line of site of the rescue boat and near to a camping area along the banks	This area is zoned for no access without permits. Should there be a fishing contest or even that requires use of the area, then application must be made to management at the nature reserve and safety measures must be implemented on the day	Angling clubs, NWPTB
	Enforcement of current CIWSP programme	The CIWSP has been introduced at Boskop Dam and has proved very successful in alerting emergency services	Sign-boards with maps must be updated with the new RMP zonal plan, Boat Wash Bays must be used before access to the water is allowed	DMC, all operators on the Dam
Education and recreation	Encouraging students at NWU to participate in recreational activities on the Dam	The Dam's proximity to NWU makes it an ideal location for recreation and will assist in reaching recreational potential	Discussions between the university and authorities at the Dam regarding forming sports clubs that can sue the Dam to train	NWPTB Boskop Yacht Club DWS NWU SASCOC
	Development of outreach programmes to local previously disadvantaged communities	The Dam is currently used by a small group of people. Outreach programmes will benefit the surrounding community and promote equitable access. This should also include information programmes to prevent vandalism by different user groups	All recreational operators on the Dam must make educational and outreach programmes available to the surrounding community	All operators on the Dam
	Encourage the use of the Dam for recreation	The Dam has huge recreational potential that is not being met	Use of outreach and training programmes, improvement in management and maintenance of infrastructure	All operators on the Dam

Objective category/major objective	What	Why	How	Who
	Feasibility of a National Sailing School should be determined	The Dam has very good winds and there is an opportunity for a National Sailing School to be developed	Feasibility study to be undertaken	DWS
Improved Recreational Use	Discussions between DSBC and NWPTB to take place regarding the potential for a partnership where development of deep sea fishing would take place at the Dam. The impact on the current zoning of the Dam as a no-wake zone would need to be discussed	DSBC has shown interest in developing the Dam and using it for deep see fishing training. The Dam is currently a no wake zone and thus discussions with NWPTB need to take place.	Discussions between DSBC, NWPTB and DWS should take place. Agreements to be put in place if required.	DWS NWPTB DSBC
	Sporting clubs to be affiliated to National bodies	To ensure development and training targets are met.	Discussions between Sporting Bodies and Clubs Clubs to become affiliated	DMC Recreational Clubs National Bodies
	Event management plan to be instituted	There is no formal event management plan in place	Event management plan to be put in place in line with the RMP	DMC NWPTB DWS
Management of Development Pressure	DMC to comment on all Environmental Impact Assessments that may have an impact on the Dam	There are a number of developments in the catchment which may negative impacts on the Dam. Through active participation, the DMC can ensure the impacts on the Dam are assessed.	DMC to include NWPTB and NW READ and to comment on EIAs and BARs in the area	DMC NWPTB NW READ
	DMC should involve representatives from the Tlokwe Local Municipality and North West Department of Economic Development, Environment, Conservation and Tourism so that non compliances can be reported to the relevant Compliance units. The UPN System must take into account environmental non compliances	Non compliances in terms of NEMA legislation are often not reported and thus can result in negative impacts.	DMC to include NWPTB and NW DEDECT DMC to report non compliances	DMC NWPTB NW READ

5 WAY FORWARD

5.1 Compilation of Business Plans

Based on the strategic objectives identified for Boskop Dam, a suite of Business Plans were developed. The Business Plan 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 vision in the RMP process has identified 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 Business Plans 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 Business Plans are updated annually.

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