Acknowledgements

The project team would like to acknowledge and thank the following for their contribution to the compilation of the RMP for Vanderkloof Dam.

- Centre for Public Service Innovation (CPSI) and the Cooperative Inland Waterways Safety Programme for inputs into the RMP;
- Members of the Keurtjieskloof Community who attended the Focus Group;
- Stakeholders who attended and contributed at the Public Meeting;
- Government Departments/Agency Representatives who attended and contributed to the Authority Meeting and RMP;
- Renosterberg Tourism Forum;
- Doornkloof Nature Reserve;
- Rolfontein Nature Reserve;
- South African Maritime Safety Authority (SAMSA);
- Northern Cape Department of Environment and Nature Conservation (DENC);
- Free State Department of Economic Development, Tourism and Environmental Affairs (FS-DETEA);
- Vanderkloof Boat Club;
- Vanderkloof Eskom Power Station;
- Basin Manager for Vanderkloof Dam (Department of Water and Sanitation);
- District Councillor for Pixley Ka Seme;
- Vanderkloof SAPS;
- Northern Cape SAPS; and
- Vanderkloof Hengel Klub.
# Title and Approval Page

## Recommended:

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Executive Summary

According to the Guidelines for the Compilation of Resource Management Plans (2006), the main aim of Resource Management Plans 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 explained 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 RMP 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.

Vanderkloof Dam is the second largest Dam in South Africa and was built as part of the Orange River Scheme. The main aim of the scheme is to provide a solution to chronic water shortages and to generate hydro-electricity.

The Dam is primarily used for irrigation but also supplies the urban requirements of Koffiefontein, Ritchie, Jacobsdal, Vanderkloof town, Keurtjeskloof and Petrusville. The electricity generated at Vanderkloof Dam feeds into the Eskom National Grid to supply power for peak and emergency demand periods, as well as base load energy when excess water might pose a flood risk.

Vanderkloof Dam is the longest Dam in South Africa (approximately 100km in length) and traverses some of the most pristine areas in the country. The Dam is used by the informal Vanderkloof Angling Association and Vanderkloof Boat Club as well as by adventure kayakers who often kayak from Gariep to Vanderkloof. Most of the recreational use of the Dam is relatively informal with no national affiliation of any clubs. The Dam is primarily used during the December and April holidays where a number of users travel from around the country. To a lesser extent, some users also travel to the Dam for weekends. There are also two nature reserves on the Northern Cape side of the Dam (Doornkloof and Rolfontein Nature Reserve) both of which are managed by the Department of Environment and Nature Conservation.
The process followed to compile the Resource Management Plan is detailed in the figure below.

![Figure 1: RMP Process (DWA, 2006)](image)

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 RMP through the establishment of a Vision for the Dam with a number of Key Objectives.

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

- Implementation of the Institutional Plan including the formation of a Dam Management Committee, Operations Management Committee and Resource Management Plan Steering Committee.

As part of this Institutional Plan, it is vital that all agreements are updated to take into account the findings of the RMP.

- Implementation of the Unique Positioning Number and Wash Bay System at the Dam. Rental System for Personal Locator Beacons and permits for Restricted Area access are also to be instituted.

- Implementation of standardised and harmonised Aids to Navigation and Demarcation Markers.
- All illegal access points should then be closed or agreements with adjacent landowners should be put in place governing access to the Dam.
- A detailed Hydrographic Survey of the Dam should also be undertaken. This information should be used in the House Boat Feasibility Study.
- Upgrade of the Vanderkloof Wastewater Treatment Works.
- Improved management of fishing should take place including a study into the small mouth yellowfish population, formalised area for angling and a detailed feasibility study should be undertaken to determine whether small-scale fisheries are feasible. If so a Public Private Partnership (PPP) could be initiated.
- A Public Private Partnership process should be undertaken to formalise the Vanderkloof Resort Picnic Area. Ensuring equitable access to the Dam is the main aim of this objective.
- Feasibility studies should be undertaken for House Boats, Water Planes and Vanderkloof Dam Walking Trail. Should they be feasible, these activities would be managed through agreements with Department of Environment and Nature Conservation.
- Education programmes should be instituted by the Dam Management Committee to encourage community members to utilise Vanderkloof Dam. Additional coordination with SwimSA should take place and the possibility of a school for swimming development should be discussed.
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<td>AGIS</td>
<td>Agriculture Geographical Information System</td>
</tr>
<tr>
<td>AtoN</td>
<td>Aids to Navigation</td>
</tr>
<tr>
<td>BAR</td>
<td>Basic Assessment Report</td>
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<td>BBBEE</td>
<td>Broad-Based Black Economic Empowerment</td>
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<td>BP</td>
<td>Business Plan</td>
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<td>CARA</td>
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<td>CCA</td>
<td>Carrying Capacity Assessment</td>
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<td>CIWSP</td>
<td>Cooperative Inland Waterways Safety Programme</td>
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<td>CITES</td>
<td>Convention on International Trade of Endangered Species of Wild Fauna and Flora</td>
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<td>COGTA</td>
<td>Department of Cooperative Governance and Traditional Affairs</td>
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<td>Centre for Public Service Innovation</td>
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<td>DAFF</td>
<td>Department of Agriculture, Forestry and Fisheries</td>
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<td>DEA</td>
<td>Department of Environmental Affairs</td>
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<td>Department of Environment and Nature Conservation</td>
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<td>DMC</td>
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<td>Department of Minerals Resources</td>
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<td>DoT</td>
<td>Department of Transport</td>
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<td>DWS</td>
<td>Department of Water and Sanitation</td>
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<td>FIRE</td>
<td>Finance, Insurance, Real Estate</td>
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<tr>
<td>FS-DETEA</td>
<td>Free State Department of Economic Development, Tourism and Environmental Affairs</td>
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<td>GGP</td>
<td>Gross Geographic Product</td>
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<td>GVA</td>
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<td>Ha</td>
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<td>IALA</td>
<td>International Association of Marine Aids to Navigation and Lighthouse Authorities</td>
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<td>IDP</td>
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<td>I&amp;APs</td>
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<td>LAAP</td>
<td>Local Accountable AtoN Parties</td>
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<td>LAC</td>
<td>Limits of Acceptable Change</td>
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<td>NTU</td>
<td>Nephelometric Turbidity Units</td>
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<td>SANBI</td>
<td>South African National Biodiversity Institute</td>
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<td>SAPS</td>
<td>South African Police Service</td>
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<td>SAR</td>
<td>Sodium Absorption Ratio</td>
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<td>Unique Positioning Number (used in the CIWSP)</td>
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1. WHAT IS A RMP AND WHY IS IT NECESSARY?

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

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

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

The RMP lays the foundation required to consolidate objectives for the resource, within the framework of existing policy priorities. The RMP also informs decision-making which may have a direct impact on the resource. Further, the RMP creates a platform to unlock economic potential of the Dam without compromising recreational use of the Dam. Recreational use includes activities which range from leisure and 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:
Each Government Department has its suite of legislation to govern its use and management of the Dam. The RMP consolidates these roles and functions into a coherent management platform.

The RMP presents the twenty-year vision of the Dam which is distilled into 5 year goals and annual business plans. 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 Water Management Area (WMA)

Due to the size of the Dam and its importance as part of the Orange River Scheme, information is provided at the Water Management Area (WMA) level instead of a catchment level.

Vanderkloof Dam is located within the Upper Orange Water Management Area (UOWMA) and is one of the main Dams in the Orange-Vaal drainage basin. The UOWMA is predominantly in the Free State Province, but also flows through parts of the Eastern and Northern Cape Provinces. It borders on Lesotho in the east and six other WMAs.

Although, the landscape is mostly flat, between 1000 and 1500 metres in elevation, many tributaries originate at altitudes of nearly 3000 metres in the Drakensberg highlands (Alexander and van Wyk, 2005).

The climate in the WMA is cool to temperate and ranges from semi-arid to arid. Rainfall mainly occurs as summer thunder showers, and reduces dramatically from as high as 1 000 mm per year in South Africa at locations in the east to about 200 mm per year in the west. In Lesotho, which is the source of most of the water in the UOWMA, rainfall varies between 600 mm to approximately 1500 mm per year (Basson and Rossouw, 2003).

The geology mainly consists of sedimentary rocks of the Karoo Supergroup, with relatively little water bearing capacity. Soils are generally shallow with arable soils mostly found in the north-eastern areas (Basson and Rossouw, 2003).

2.1.1. Surface Water and River Systems

The Orange River originates in Lesotho as the Senqu River and contributes close to 60% of surface water yield in the UOWMA. Large transfer schemes characterize this catchment, with 70% of the yield transferred to other WMAs. Transfers out of the UOWMA include transfers to the Upper Vaal WMA (Lesotho Highlands Water Project), to the Fish/Tsitsikamma WMA (Orange-Fish Tunnel) and to the Lower Vaal WMA (Orange-Vaal Transfer) and from the Orange and Caledon Rivers to the adjacent Modder-Riet catchment (River Health Programme, 2003).

Major Dams on the Orange River include the Katse, Mohale, Gariep and Vanderkloof Dams.

The overall health assessments of the rivers in the Free State Region are fair to poor. Some of the upper reaches of the river are good to fair, deteriorating downstream as the impact of human activities becomes more evident. Most of the rivers in the study area have no flow during the dry winter months (River Health Programme, 2003).

Based on information by Murray et al. (2011), most of the rivers in the WMA are moderately to largely modified. Rivers coming of Vanderkloof Dam (e.g. Hondeblaf) are Class E – not in an acceptable condition. The most prominent modification to the instream habitat of the Orange River is the channel, bed and flow modification as a result of Gariep and Vanderkloof Dams (Heath and Brown, 2007).

Water abstraction for agricultural irrigation has influenced the flow and water quality in the catchment. The middle and lower reaches (from Kraai/Orange River confluence to Vanderkloof Dam) is critically modified as a result of flow regulation (Heath and Brown, 2007).

2.1.2. Land Use

Small nature reserves, including private game reserves and conservancies, mostly about 10 to 100 km$^2$, are scattered throughout the study area, often close to or around major Dams. However, mining, agriculture and manufacturing drive the economy of the study area. Gold production dominates the mining sector and the Free State contributes almost a third of South Africa’s gold production.

2.1.3. Water Quality

The Upper Orange River is a turbid system (approximate turbidity of 232NTU). The Gariep
and Vanderkloof Dams act as sediment traps as the electrical conductivity values are lower below these Dams (DWAF 1999; Heath and Brown 2007). The pH recorded in the Orange River is alkaline. The sodium, magnesium and Sodium Absorption Ratio (SAR) values indicate an increasing trend down the river (Heath 2004). These trends are due to the influence of return flows of irrigated lands down the river (Heath and Brown, 2007).

The Upper Orange River could be classified as mesotrophic with algal blooms occurring occasionally in the Dams in the WMA. Four algal families are mostly present in the Upper Orange River namely Cyanobacteria, Bacillariophyceae, Chlorophyceae and Euglenophyceae (Venter, 2000).

2.1.4. Human Settlements

According to the Pixley Ka Seme Integrated Development Plan (IDP) (2011), a number of local municipalities within the District have a housing backlog.

Currently, no major housing developments are planned. In general, human settlements in the area are small and sporadic. The main towns are Petrusville; Vanderkloof; Phillipstown; Philipolis; Fauresmith; Noupoort; Colesburg and De Aar.

2.1.5. The Social Environment

The UOWMA contributes approximately 5% to the Gross Domestic Product (GDP) of South Africa. The largest contributing sectors in terms of Gross Geographic Product (GGP), as per 1997 figures, are (DWAF, 2004):

- Government 24.6%
- Finance 16.0%
- Trade 15.7%
- Transport 14.4%

There are no distinct primary drivers to stimulate strong economic growth in the WMA. Potential for economic growth can be found in the agricultural sector converting to higher value products, such as from grains to orchard crops and cut flowers, and through further processing and packaging. Growth in the transport sector, given the strategic central location of Bloemfontein, is likely to be stimulated by increasing economic activity elsewhere in the country (Basson and Rossouw, 2003).

2.1.6. Tourism Potential

Vanderkoof Dam and the surrounding area have a rich array of natural attractions. In particular, these include a unique combination of natural scenery, floral diversity and Dams. Some of the more significant attractions are:

- Rolfontein Nature Reserve;
- Doornkloof Nature Reserve;
- Tiger Sanctuary outside Philipolis;
- Vanderkloof Dam Wall;
- Vanderkloof Hydro-Power Station;
- Adventure tours along the Orange River;
- Fishing;
- Game viewing;
- Bird Watching;
- Luckoff Dutch Reformed Church which is 100 years old (1892) and built out of stones from the area. In front of the City Hall stands a gas lamp that was used as a streetlight in earlier years; and
- Gunpowder houses from the Anglo-Boer War Monument - Commemorating the Groot Trek, +/- 3 km outside the town on the Fauresmith road.

2.1.7. Catchment Management Agency

There is currently no Catchment Management Agency in place.

2.1.8. 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 Government’s waterways and watercourses, including its dams. DWS, its delegated public sector partner, or a delegated water management institution, has therefore the responsibility to provide the required fixed
and/or floating Aids to Navigation (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 SAMS.

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

There is currently no adequate, standardised and harmonised fixed and floating AtON and Demarcation Markers in place.

2.2. Purpose of Vanderkloof Dam

Vanderkloof Dam is one of many Dams built as part of the Orange River Scheme. The main purpose of the Dam is threefold, namely:

- To secure water supply in the area;
- To provide water for irrigation; and
- To generate hydro-electricity.

The electricity generated at Vanderkloof Dam feeds into the Eskom National Grid to supply power for peak and emergency demand periods, as well as base load energy when excess water might pose a flood risk (Eskom, 2010).

The scheme consists of two main canals, namely; The Orange–Riet Transfer Canal and the Ramah Canal:

The Orange–Riet Transfer Scheme abstracts water from Vanderkloof Dam to be transferred to the Riet River Catchment via the Orange–Riet canal which is 112.6 km long. The primary purpose of the Orange–Riet canal is the need to steady the supply of sufficient water for both the peak daily as well as the annual water demand (Mare, 2007). The water is largely used for irrigation to 3 787 ha of land next to the canal, water is also provided to the Riet River Settlement near Jacobsdal (7 812 ha), the Scholtzburg Irrigation Board (637.1 ha), Richie Irrigation Board (96.8 ha) and the Lower Riet Irrigation Board. Water from the canal is also used to meet the urban requirements of Koffiefontein, Ritchie and Jacobsdal.

The remainder of the Vanderkloof Canal, running along the Orange River, is known as the Ramah Branch Canal and supplies water to irrigation areas along the right bank of the Orange River.

Vanderkloof Dam also supports requirements all the way to the mouth of the Orange River (at the Atlantic Ocean) approximately 1400 km away, including river-flow control, flood control, hydroelectric power generation (Eskom) and storage of water for urban and irrigation use. The releases are primarily used for irrigation but also supply the urban requirements of Ritchie, Jacobsdal and Koffiefontein (including mining).

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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.”
Table 1: Orange River Basin Water Requirements including Requirements from Vanderkloof Dam
(http://www.dwaf.gov.za/orange/waterreq.aspx)

<table>
<thead>
<tr>
<th>Description of water requirement</th>
<th>Annual requirement (million m³/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation</td>
<td></td>
</tr>
<tr>
<td>Upstream of Gariep (36 400 ha / 364 km²)</td>
<td>395</td>
</tr>
<tr>
<td>Supplied locally in Riet and Modder (7 100 ha / 71 km²)</td>
<td>70</td>
</tr>
<tr>
<td>Directly from Gariep and Vanderkloof (24 300 ha / 243 km²)</td>
<td>278</td>
</tr>
<tr>
<td>To Eastern Cape through Orange/Fish Tunnel (52 700 ha / 527 km²)</td>
<td>627</td>
</tr>
<tr>
<td>Lower Orange River in South Africa (63 790 ha)</td>
<td>751</td>
</tr>
<tr>
<td>Lower Orange River in Namibia (2 270 ha / 22.7 km²)</td>
<td>39</td>
</tr>
<tr>
<td>Total from the Orange River excluding the irrigation in the Vaal River basin upstream of the Vaal/Riet confluence (179 640 ha / 1796. Km²)</td>
<td>2 160</td>
</tr>
<tr>
<td>Urban/Industrial Demands</td>
<td></td>
</tr>
<tr>
<td>Orange River upstream of Vanderkloof Dam</td>
<td>70</td>
</tr>
<tr>
<td>Eastern Cape demands through Orange/Fish Tunnel</td>
<td>20</td>
</tr>
<tr>
<td>Downstream of Vanderkloof Dam including Namibia</td>
<td>40</td>
</tr>
<tr>
<td>Total urban/industrial demands</td>
<td>130</td>
</tr>
<tr>
<td>Other Requirements/return flows</td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>300</td>
</tr>
<tr>
<td>River evaporation losses (varies with flow)</td>
<td>960</td>
</tr>
<tr>
<td>Return flows from irrigation</td>
<td>.50</td>
</tr>
<tr>
<td>Total other requirements</td>
<td>1 210</td>
</tr>
<tr>
<td>Total Orange River Requirements</td>
<td>3500</td>
</tr>
</tbody>
</table>

2.3. Overview of the Dam

Vanderkloof Dam falls within four separate municipalities namely, Letsemeng Local Municipality (LM) and Kopanong LM in the Free State and Umsobomvu LM and Renosterberg LM in the Northern Cape. Below, is an overview of the Dam and the Upper Orange Catchment:

Table 2: Overview of Vanderkloof Dam (Eskom, 2010; Mare, 2007)

<table>
<thead>
<tr>
<th>Catchment Details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Upper Orange Catchment Area</td>
<td>48 595km²</td>
</tr>
<tr>
<td>Upper Orange Mean Annual Runoff (MAR)</td>
<td>1450m³/annum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dam Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of completion</td>
<td>1977</td>
</tr>
<tr>
<td>Purpose</td>
<td>Storage of water for irrigation and urban use as well as hydro-electrical power</td>
</tr>
<tr>
<td>River</td>
<td>Orange</td>
</tr>
<tr>
<td>Nearest Town and Province</td>
<td>Vanderkloof, Northern Cape</td>
</tr>
<tr>
<td>Type</td>
<td>Double Curvature Concrete Arch</td>
</tr>
<tr>
<td>Net Storage capacity</td>
<td>3 236 million m³</td>
</tr>
<tr>
<td>Wall height</td>
<td>108m</td>
</tr>
<tr>
<td>Crest length</td>
<td>770m</td>
</tr>
<tr>
<td>Material content of Dam wall</td>
<td>Concrete – 1 116 million m³</td>
</tr>
<tr>
<td>Surface area of Dam at full supply</td>
<td>13 300 ha (133km²)</td>
</tr>
<tr>
<td>Owner, designer and construction</td>
<td>Department of Water and Sanitation</td>
</tr>
<tr>
<td>Yield and Assurance</td>
<td>204 million m³</td>
</tr>
<tr>
<td>Length of the Dam</td>
<td>114km</td>
</tr>
<tr>
<td>Depth of the Dam</td>
<td>To be Confirmed – Underwater survey will take place in 2014</td>
</tr>
</tbody>
</table>

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2.4. Legislative Framework

The RMP forms the overarching framework for the management of Vanderkloof 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 Vanderkloof 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);
- The Free State Tourism Authority Act, 2011 (Act 4 of 2011)
- Nature and Environmental Conservation Ordinance (No 19 of 1974)
- Northern Cape Tourism Entity Act, 2008 (Act 5 of 2008)
- South African National Biodiversity Institute (SANBI) Biodiversity GIS information; 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 Government Waterworks for recreational purposes.

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

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

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

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

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

In addition, the only water use entitlement that currently applies to RWU is Schedule 1 of the Act. Currently the Act is silent on Commercial RWU (although the Strategic Plan for Commercialisation (2009) does deal with Commercial RWU) and thus it is necessary for the RMP to provide guidance this regard.

2.4.2 GN 654 of May 1964

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

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

The Regulations provide guidance on access control, use of firearms and other weapons, speed limits, parking areas, trading, reserved areas, fire management, hygiene, camping and accommodation, access to works, photography, safety rules, reckless and unseemly conduct, damage to property, prohibited areas, protection of fauna and flora, swimming, angling, boat Regulations, water skiing and hydroplaning; and general rules.
2.4.3 Water Services Act (Act 108 of 1997)

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

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

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

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

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

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

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

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

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

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

The National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities.

Chapter 4, Part 2 of the Biodiversity Act provides a listing of species as threatened or protected. If a species is listed as threatened, it must be further classified as critically endangered, endangered or vulnerable. The Act defines these classes as follows:
• **Critically endangered species:** any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.

• **Endangered species:** any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.

• **Vulnerable species:** any indigenous species facing an extremely high risk of extinction in the medium-term future; although it is not a critically endangered species or an endangered species.

• **Protected species:** any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category will include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Certain restricted activities are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the Act are keeping, moving, having in possession, importing and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007 along with the Regulations on Threatened or Protected Species. Many Dams around South Africa are likely to have threatened or protected species. The management of these species in line with NEMBA must be taken into account in the RMP and by managers at the Dam.

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

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

<table>
<thead>
<tr>
<th>Species</th>
<th>Category/Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common carp</td>
<td>a. 1b in National Parks, Provincial Reserves, Mountain Catchment Areas and Forestry Reserves declared in terms of the Protected Areas Act.</td>
</tr>
<tr>
<td></td>
<td>b. 2 for release into a dam within a discrete catchment system in which it occurs.</td>
</tr>
<tr>
<td></td>
<td>c. 3 in all rivers, wetlands, natural lakes and estuaries in which it occurs.</td>
</tr>
<tr>
<td></td>
<td>Subject to b, common carp is not listed for dams within discrete catchment systems in which it occurs.</td>
</tr>
</tbody>
</table>

Vandekloof Dam is unique in that there appears to be no records for Bass at the Dam although Carp is commonly found. The entire Dam falls within a protected area and thus release of Bass at the Dam is not allowed.

Common carp is exempted listed as category 2 for a period of two years from the date upon which this notice takes effect, from requiring a Permit for any restricted activity in terms of the Act or Alien and Invasive Species Regulations, 2014, provided a person is in possession of a valid Provincial Permit issued in terms of Provincial legislation where required for the species.

2.4.8 **The National Environmental Management: Biodiversity Act (Act 10 of 2004): Alien and Invasive Species Regulations (GN 33683 of 19 July 2013)**

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

These species management programmes must stipulate the following:

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

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

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

2.4.9 The Municipal Systems Act (Act 32 of 2000)

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

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

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

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

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

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

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

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

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

2.4.12 Treasury Regulations of 15 March 2005

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

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

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

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

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

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

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

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

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

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

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

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

2.4.16 The Free State Tourism Authority Act, 2011 (Act 4 of 2011)

The Free State Tourism Authority Act (Act 4 of 2011) mandates the Free State Tourism Authority to achieve four important goals, namely:

- Marketing of tourism,
- Promotion of tourism;
- Development of sustainable tourism within the province; and
- Promotion of major sports events to promote tourism.

2.4.17 (Free State) Nature Conservation Ordinance, 1969 (Act 8 of 1969)

The Act provides for the conservation of fauna and flora and the hunting of animals. The Act also deals with fishing, the requirement for fishing licenses and management of Nature Reserves.

2.4.18 Nature and Environmental Conservation Ordinance (No 19 of 1974)

The aim of the Nature and Environmental Conservation Ordinance, 1974 was to consolidate and amend the laws relating to nature and environmental conservation including the establishment of the Department of Nature and Environmental Conservation, establishment of provincial and local nature reserves, protection of fish in inland waters, management of angling, management of noxious aquatic weeds and protection of wildlife and flora.

2.4.19 Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009)

The purpose of the ordinance is to provide for the sustainable utilization of wild animals, plants and aquatic biota as well as to provide the implementation of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES).
2.4.20 Northern Cape Tourism Entity Act, 2008 (Act 5 of 2008)

To provide for the establishment of a tourism marketing and promotion entity for the Northern Cape Province.

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 IDPs of the Letsemeng, Kopanong, Umsobomvu and Renosterberg Local Municipalities;
- The Water Services Development Plan (WSDPs) of the Renosterberg LM, Letsemeng LM; and Kopanong LM;
- 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 (NGP), 2012; and
- The Cooperative Inland Waterways Safety Programme (CIWSP).

2.5.1. The Cooperative Inland Waterways Safety Programme (CIWSP)

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

Vanderkloof 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 2: Relationship between the RMP and Planning Initiatives
2.6. Socio-Economic Environment

Vanderkloof Dam falls within four separate municipalities namely, Letsemeng LM, Kopanong LM in the Free State and Umsobomvu LM and Renosterberg LM in the Northern Cape. In order to understand the social environment of the Dam, it is important to take all four local municipalities into account.

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

2.6.1. Population

There are 38 629 people in Letsemeng LM. The population of 15 – 34 age groups and the 35-64 age group accounts for 35 percent and 30 percent of the population respectively. This means that 65 percent of the Letsemeng population are of working age.

In Kopanong, out of a population of 49 171 persons, 64 percent of the population are between the ages of 15 and 64. Similarly, Umsobomvu LM has a population of 28 375 of which 63 percent of the population are of working age.

Renosterberg LM has the smallest population of 10 976 persons. 61 percent of the population are between 15 and 65 years of ages.

All four LMs have similar population patterns. On average 31 percent of the population are between the ages 0 – 14. Thirty-four percent of the population are aged 15-34. Combined 65 percent of the population around Vanderkloof Dam are below the age of 35.

2.6.2. Education

Table 3 below shows the education statistics for the four municipalities. On average, 10 percent of the population have not attended school, 38 percent of the population have some secondary education while 4 percent have higher education.

2.6.3. Employment

Kopanong LM has the lowest unemployment rate of the four municipalities of 15 percent. Renosterberg LM has an unemployment rate of 34 percent which is the highest of the four municipalities (Table 4).

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+

Table 5 below shows monthly income per person for each municipality. In Letsemeng LM and Kopanong LM, 40 percent and 36 percent of the population respectively earn in the low income bracket respectively. Over 50 percent of the population earn in the low income bracket for these two municipalities. Less than 10 percent of the population is in the high income bracket.

In Umsobomvu LM, 47 percent of the population earn no income while 41 percent earn in the low income bracket.

No information was found in the Community Survey for Renosterberg LM.
Table 3: Education Level of the Populations of Letsemeng, Koponong, Umsobomvu and Renosterberg LMs

<table>
<thead>
<tr>
<th></th>
<th>Letsemeng</th>
<th>Koponong</th>
<th>Umsobomvu</th>
<th>Renosterberg</th>
</tr>
</thead>
<tbody>
<tr>
<td>No schooling</td>
<td>11%</td>
<td>9%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Some primary</td>
<td>28%</td>
<td>28%</td>
<td>28%</td>
<td>31%</td>
</tr>
<tr>
<td>Completed primary</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Some secondary</td>
<td>25%</td>
<td>27%</td>
<td>25%</td>
<td>24%</td>
</tr>
<tr>
<td>Grade 12/Std 10</td>
<td>11%</td>
<td>13%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>Higher</td>
<td>3%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Un-specified</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>N/A</td>
<td>15%</td>
<td>14%</td>
<td>12%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 4: Employment Status of the Populations of Letsemeng, Koponong, Umsobomvu and Renosterberg LMs

<table>
<thead>
<tr>
<th>Employment Status for 2011</th>
<th>Letsemeng</th>
<th>Koponong</th>
<th>Umsobomvu</th>
<th>Renosterberg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed - Formal and informal</td>
<td>9568</td>
<td>12029</td>
<td>4474</td>
<td>1771</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2898</td>
<td>2174</td>
<td>2880</td>
<td>908</td>
</tr>
<tr>
<td>Not economically active</td>
<td>11287</td>
<td>16278</td>
<td>6421</td>
<td>3382</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>23.25%</td>
<td>15.31%</td>
<td>39.16%</td>
<td>33.89%</td>
</tr>
</tbody>
</table>

Table 5: Monthly Income Levels of the Populations of Letsemeng, Koponong, and Umsobomvu LMs

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Letsemeng</th>
<th>Koponong</th>
<th>Umsobomvu</th>
<th>Renosterberg</th>
</tr>
</thead>
<tbody>
<tr>
<td>No income R0</td>
<td>40%</td>
<td>36%</td>
<td>47%</td>
<td>-</td>
</tr>
<tr>
<td>Low Income R1 - R3 200</td>
<td>52%</td>
<td>53%</td>
<td>41%</td>
<td>-</td>
</tr>
<tr>
<td>Middle Income R3 201 - R 25 600</td>
<td>5%</td>
<td>6%</td>
<td>7%</td>
<td>-</td>
</tr>
<tr>
<td>High Income R25 601+</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>-</td>
</tr>
<tr>
<td>Response not given</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>-</td>
</tr>
<tr>
<td>Institutions</td>
<td>2%</td>
<td>1%</td>
<td>4%</td>
<td>-</td>
</tr>
</tbody>
</table>

2.6.5. Gross Value Added

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

Quantec Research defines the major sectors into Primary Sector, which is extractive, Secondary Sector, made up of manufacturing and the Tertiary Sector, which comprises of services. The Figure below shows the GVA per sector for 2011. This data is taken from Quantec Research and the variables are explained below.
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 (FIRE);
- Community, social and personal services; and
- General Government.

GVA differs significantly per LM. Kopanang LM contributes the most to GVA at R1 353.2. The largest contributing sectors are Finance, Insurance, Real Estate (FIRE) and business services, general government and transport, storage and communication.

In Letsemeng LM total GVA accounts for R1 086.74. The largest contributing sector to the municipalities GVA is FIRE. The manufacturing and general government sectors contribute 14 percent each to GVA.

FIRE is also the largest contributing sector to the GVA of Umsobomvu LM and is closely followed by general government. Trade, catering and accommodation also contribute significantly to the GVA. In total, Umsobomvu LM GVA totals R1 353.2 million.

Renosterberg LM has the smallest GVA among the four municipalities which total R 200.47 million. The largest contributing sector is also FIRE. Other contributing sectors include agriculture and general government.

Table 6: GVA Contribution of Each Sector in the Four LMs

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Letsemeng</th>
<th>Kopanong</th>
<th>Umsobomvu</th>
<th>Renosterberg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forestry and fishing</td>
<td>13%</td>
<td>10%</td>
<td>11%</td>
<td>18%</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>7%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>14%</td>
<td>8%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Electricity, gas and water</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>Construction</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Wholesale and retail trade, catering and accommodation</td>
<td>5%</td>
<td>8%</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>Transport, storage and communication</td>
<td>8%</td>
<td>15%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>Finance, insurance, real estate and business services</td>
<td>20%</td>
<td>27%</td>
<td>20%</td>
<td>22%</td>
</tr>
<tr>
<td>Community, social and personal services</td>
<td>13%</td>
<td>12%</td>
<td>13%</td>
<td>8%</td>
</tr>
<tr>
<td>General government</td>
<td>14%</td>
<td>15%</td>
<td>19%</td>
<td>17%</td>
</tr>
<tr>
<td>Total GVA</td>
<td>1086.74</td>
<td>1353.20</td>
<td>406.09</td>
<td>200.47</td>
</tr>
</tbody>
</table>

2.7. Development Potential

In terms of Vanderkloof town, tourism is one of the main attractions and the majority of residents want to see an increase in tourism to the area. To that end, the town developed a comprehensive website which highlights a number of activities and festivals.

In addition, some residents have formed the Renosterberg Tourism Forum which aims to take advantage of the tourism potential of the area.
The following tourist attractions are currently on offer according to the Vanderkloof Dam website (www.vanderkloofDam.co.za):

- Boating tours;
- Dam wall tours;
- Eskom Power Station tours;
- Fish Eagle Safaris;
- Rolfontein Nature Reserve;
- Fishing;
- Rowing;
- Tennis;
- Bushman Paintings;
- VTC Information Centre / museum;
- DRC church office; and
- Defence Exhibitions.

On a larger scale, the "Diamond and Wine Route" is a relatively popular tourist attraction. Despite this, the development potential of the Dam is relatively untapped. Currently, most users of the Dam visit during December and April and the number of boats on the water is usually relatively low especially in relation to the size of the Dam. The Northern Cape Department of Environment and Nature Conservation (DENC) is currently upgrading the Rolfontein and Doornkloof Nature Reserves. There is further potential to develop the eco-tourism sector in the area.

2.8. Access and Infrastructure

The main access point to the Dam is through the Vanderkloof Boat Club and to a lesser extent, the Vanderkloof Resort. There is also a remnant of a road which acts as a slipway at the entrance of the town. A number of the adjacent landowners are able to reverse their boats in without a formal slipway and this illegal access is difficult to police or prevent. Both Rolfontein and Doornkloof Nature Reserves also have access to the Dam. Both nature reserves feel that there is an opportunity for a house boat to link the two areas.

A historical discrepancy where access to the Dam was not equitable has carried over in general attitudes to the Dam. This is reinforced by the current use of the Dam which generally requires the use of a boat and thus restricts use by more marginalized community members.

Further, there are no formalized community programs for people of Keurtjieskloof and the fee structure for the resort is seen as restrictive to the community. Although entrance to the Resort is approximately R8/person. The Keurtjieskloof community would like access to the Dam to fish daily and not for recreational use, in which case the entrance fee is considered unaffordable.

An area near the Dam wall was earmarked for use by the community as a picnic/braai area and for fishing. Previously, a community swimming pool was built by the LM however it is unusable. There are no ablution facilities at this site.

The Vanderkloof Resort is not maintained at an optimal level. Although there is overnight accommodation at the resort, some of the chalets need to be upgraded.

2.9. Biophysical Environment

2.9.1. Water Quality

The sewage purification plant, located in the town is operating beyond its design capacity. The plant overflows into the Dam which has an impact on the water quality in the Dam.

Further, there is some evidence that water quality is impacted by activities in the catchment and has resulted in some heavy metals in the Dam. The Dam itself acts as a sediment trap.

2.9.2. Aquatic Invasive Plant Species

There are currently no significant invasive aquatic weeds in Vanderkloof Dam. *P. pectinatus* is problematic on the Orange River and *C. demersum* is a cosmopolitan weed present in Vanderkloof Dam but not in significant populations. There is a risk of reed infestation from upstream in the Orange River and a potential of re-infestation by the power generation plant on the Dam (DEA, 2012).

Historically, South Africa’s waters have been invaded by a number of aquatic macrophytes that have detrimental economic and environmental effects. The worst of these
include water hyacinth (*Eichhornia crassipes Solms-Laub.*), parrot’s feather (*Myriophyllum aquaticum* (Vell.) Verdc.), salvinia (*Salvinia molesta* D.S. Mitchell), water lettuce (*Pistia stratiotes* L.), and red water fern (*Azolla filiculoides* Lamarck). The majority of these species however are under acceptable control.

Of concern is that recent studies have shown that South Africa however is home to a number of emerging invasive aquatic species. Submerged macrophytes in South Africa such as Brazilian/dense waterweed, *Egeria densa* Planch. and spiked/Eurasian watermilfoil, *Myriophyllum spicatum* L. are seen to be a potential threat to water quality and biodiversity in aquatics systems. There is great potential for these species to spread further, and for others, such as cabomba, *Cabomba caroliniana* A.Gray (Cabombaceae), and Canadian water weed, *Elodea canadensis* Mitch. (Hydrocharitaceae), to invade waterways due to the nature of South Africa’s aquatic systems.

For example, *Hydrilla verticillata* was first recorded in South Africa in 2006 and is only found at Pongolapoort Dam in KwaZulu-Natal. Based on surveys of Dam users and climate data, Coetzee *et al.*, (2009) found that most of South Africa had the potential to become infested. Although Vanderkloof Dam occurs in an area which is unlikely to become infested, a focus on prevention is required at State Dams throughout South Africa.

### 2.9.3. Fauna

There are a number of important fish species which occur in Vanderkloof Dam including, *Barbus holubi* or the small mouth yellowfish, *Barbus kimberleyensis* or largemouth yellowfish, *Labeo capensis* (Orange River Mudfish), *Labeo umbratus* (The Muggel). *Gephyroglanis sclateri* (The Rock-Catfish) and *Clarias gariepinus* (The North African Catfish).

Threats to indigenous fish species include:

- Alluvial diamond mining -Increase the siltation of the river and destroys the spawning sites of the fish.
- Agricultural return flows and Sewage inflows -Decrease the dissolved oxygen which results in massive fish kills
- Invasive alien species -Predate on the larval indigenous fish -Compete for habitat and food availability
- Illegal netting -Destructive method of fishing which catches threatened fish species.
- Natural Causes/Floods -During the opening of sluice gates, fish get trapped in pools when a water level subsides and die in isolated pools.

In addition, there are a number of sensitive species that occur in Rolfontein Nature Reserve including Rhino, which is endangered.

There is also a pair of breeding Fish Eagles near the Seekooi River. Currently, there is uncontrolled access to the site which may stress the birds and decrease the chance of viable breeding.

### 2.10. Current Institutional Arrangement

#### 2.10.1. Official Institutional Structure

DWS is the official custodian of all surface water in South Africa. DWS entered into an agreement with the previous Cape Province Nature Conservation body to manage land within the purchase boundary on the Cape side of the Dam as well as to manage the surface water of the entire Dam. When the Northern Cape Province came into effect, this function fell to the DENC.

Two nature reserves occur along the Dam on western (Northern Cape) side. These are Rolfontein Nature Reserve (to the north, near Vanderkloof town) and Doornkloof Nature Reserve to the south. At the Rolfontein Nature Reserve, some patrolling and management of the Dam did occur. However, due to a lack of trained skippers and more recently, the fact that the patrol vessel is considered unsafe to use in the water, the nature reserve no longer undertakes any patrols. At the Doornkloof Nature Reserve, some patrols do occur along the boundary of the reserve. These management
duties do not extend along the length of the Dam.

The land within the purchase boundary of the Dam on the Free State side of the Dam is officially managed by the FS-DETEA. However, FS-DETEA does not have a presence in the area. In addition, the purchase boundary is landlocked by private properties and thus does not lend itself to land management.

With regards to access, the Vanderkloof South African Police Service (SAPS) office is an integral part of the management and control of the Dam. Currently all vessels report to the police station for a safety check. Once completed, vessels enter the Dam through the Vanderkloof Boat Club. The Vanderkloof SAPS unit has one patrol vessel and one skipper and runs regular patrols along the length of the Dam.

Other important government structures that have an official management role include SAMSA, the Department of Public Works and the Department of Sports and Recreation.

2.10.2. Informal Institutional Structure

Currently, there is no formal agreement in place with the Vanderkloof Boat club. The Boat club itself is informal in nature although there is some movement to affiliate to a national association. The membership of the club includes a number of pensioners as well as members who do not live full time in Vanderkloof but rather commute there for weekends and holidays.

2.10.3. Management of the Water Surface

Management of the water surface and infrastructure (including the required AtoN and demarcation markers) are maintained by DWS. DENC and SAPS also play a role in management of the water surface. DENC (in the form of Rolfontein and Doornkloof Nature Reserves) undertake some patrols along the Dam. However, these are limited to the extent of the nature reserves only. Vanderkloof SAPS currently undertakes all patrols along the length of the Dam.

Because there is no specific agreement with the Vanderkloof Boat Club, there are no specified requirements related to safety and access to the Dam. The rules and responsibilities of either party are somewhat unclear especially in light of the standardised AtoN and demarcation markers requirements. 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.

Further, the wash bay system, as part of the CIWSP, is built within the Vanderkloof Boat Club area. The operation and management of the system will be by agreement.

2.10.4. Access

Currently the main access to the Dam is through the Vanderkloof Boat Club although this is not formalised. Access to the Dam also occurs at the Vanderkloof Resort and Doornkloof Nature Reserve. There is also an old slipway which is not controlled.

Management of access is by Vanderkloof SAPS and all vessels must report to the Police Station before entering the Dam.

Access for angling has been difficult. In the past, angling events have been held at Rolfontein Nature Reserve at the Bird Sanctuary Area. Due to the distance from town, this area is not very popular for events.

Subsistence anglers also access the Dam via a walk over fence near the Bird Sanctuary Area and then walk to the shoreline.

The Vanderkloof Hengel Klub (VHK) has also in the past used the area known as “Vrystaat Kant” as an angling area however this has been recently closed.

There is no formalised community access area although there are picnic areas at the Vanderkloof Resort.

2.10.5. Permits

Currently, there is no specific permit system is place other than the requirement of DENC for a Freshwater Angling License for fishing.
While all vessels report to the Vanderkloof SAPS for a safety check prior to entering the Dam there is no specific permit system for boats/kayaks travelling the length of the Dam.

2.10.6. Safety

Currently, the Vanderkloof SAPS is responsible for safety at the Dam and undertake patrols and safety checks on all vessels.

Although, caretaker agreements do not deal specifically with safety, they deal with a number of safety related issues such as fire breaks and fire fighting. During the dry seasons, such agreements are integral to the overall safety of those using the Dam. Some adjacent landowners have built slipways to launch their boats from the properties into the Dam.

2.10.7. Overnight facilities

Overnight facilities are provided by the Vanderkloof Holiday Resort.

A number of bed and breakfast/guest house accommodation is available in Vanderkloof.

Accommodation is also available at the Rolfontein Nature Reserve where tented camps are available for an organized group of 40 people and less. Facilities include tents, mattresses, a gas fridge, gas cooker, and separate male/female ablutions. Camping with own tents within the tent camp boundaries are also available. The tent camp has an outside lapa that can also be hired separately for functions. There are 2 hikers' huts on the reserve, which can sleep up to 8 persons. These are equipped with beds and mattresses. Each hut has an outside toilet.

A town house equipped with a stove, fridge, basic kitchen utensils, as well as beds, mattresses, linen, a lounge with television, and hot and cold running water, can accommodate up to 9 persons. However, bookings are subject to requirements for official purposes.

The Department of Environmental Affairs and Nature Conservation (DENC) has allocated approximately R48 million for the upgrade of these facilities. The upgrade will include the following:

- Construction of new fishing camp;
- Family fishing lodge;
- Picnic and braai areas;
- Bird hide;
- Staff accommodation;
- 15km 4x4 tourist road;
- 7km of new hiking trails;
- Construction of sewage reticulation;
- Construction of scenic canoe launch; and
- Renovation of existing hiker’s huts to a group camp.

Accommodation to the south includes Doornkloof Nature Reserve which has also undergone a revitalization programme and includes a new assistant reserve manager’s residence, eight houses earmarked for permanent department employees, a new administration block with a conference centre, as well as a fisherman’s lodge, overnight camp site, picnic spots and visitors chalets.

The old staff accommodation will be renovated to house school tours and environmental education sessions.

2.10.8. Event Management

There is no official permit system for events however events are usually facilitated through the DWS Regional Office.

2.11. Users and Uses of Vanderkloof Dam

2.11.1. The Orange River Project

The main user of water in the Lower Orange River (and indeed of all the catchment), is the Orange River Project (ORP), which was first proposed in 1962 to irrigate thousands of hectares especially in the Eastern Cape, Northern Cape and Free State areas (Alexander and van Wyk, 2005). This project depends on flows from the Vanderkloof and Gariep Dams.

In addition, water from the Orange River is used to solve water quality problems in the Vaal River at Douglas, and is used to generate peak power for the Eskom Network at the Gariep and
Vanderkloof Dams. The ORP also supplies water to cities and small towns such as Upington, Prieska, Port Elizabeth, Grahamstown, Alexander Bay and Port Nolloth.

2.11.2. Storage and Provision of High-Quality Drinking Water

One of the main uses of Vanderkloof Dam is to provide high quality drinking water to the Riets River Catchment including Koffiefontein, Ritchie and Jacobsdal (Mare, 2007).

2.11.3. Storage and Provision of Irrigation Water

Vanderkloof Dam also provides irrigation water to farmers in the Riet River Catchment Area (Eskom, 2010; Mare, 2007).

The following irrigation boards obtain water via the Orange-Riet Canal:

- Scholtzburg Irrigation Board (637.1 ha);
- Richie Irrigation Board (96.8 ha); and
- Lower Riet Irrigation Board (3937.1ha).

In addition, the Orange-Riet Canal supplies water for irrigation to 3787 ha of irrigation next to the canal. The Vanderkloof canal also provides water to irrigation areas along the right bank of the Orange River (Mare, 2007).

Vanderkloof Dam also supports requirements all the way to the mouth of the Orange River (at the Atlantic Ocean) approximately 1400 km away, including river-flow control, flood control, hydropower generation (Eskom) and storage of water for urban and irrigation use. The releases are primarily used for irrigation but also supply the urban and mining requirements.

2.11.4. Recreational Use

Vanderkloof Dam is the second largest Dam in South Africa. In addition it is approximately 100km in length and traverses some of the most pristine areas in the country. The Vanderkloof Boat Club has approximately 72 members who use the Dam.

In addition, angling is very popular at the Dam. This includes shore angling and light boat angling for species such as Carp, Barbel, Mudfish and Yellow Fish by VHK. Bass fishing is not common at the Dam.

The Dam is also used by adventure kayakers who often kayak from Gariep to Vanderkloof. Most of the recreational use of the Dam is relatively informal with no national affiliation by any clubs.

The Dam is primarily used during December and April where a number of users travel from around the country. To a lesser extent, some users also travel to the Dam over the weekends.

2.11.5. Conservation

The majority of the land around the Dam is used for conservation purposes. According to Agriculture Geographic Information System (AGIS) (2007), the area surrounding the Dam on the Northern Cape side (and to a lesser extent on the Free State side) has protected status.

2.11.6. Events at Vanderkloof Dam

Due to the length of the Dam, it is used for Rowing Sprint Regattas for the University Sports South Africa (USSA). Athletes from the following universities participate in the events:

- University of Johannesburg;
- University of Cape Town;
- University of Pretoria;
- Nelson Mandela Metropolitan University;
- University of the Witwatersrand;
- University of Stellenbosch;
- Rhodes University; and
- University of Kwa-Zulu Natal Pietermaritzburg.

In addition, an annual Water Festival takes place at the Vanderkloof Holiday Resort. A jet ski fun run, boating “Skattejag”, outdoor expo, marathon, strong man competition and Miss Water Festival competition are some of the events which take place.

A Diamond Bike Rally is also held at Vanderkloof Dam. VHK also holds angling events at the Dam.
2.11.7. Educational Programmes

There are no formalised education programmes held at Vanderkloof Dam at this moment. The Vanderkloof Angling Club did hold some educational programmes in the past.

2.11.8. Other Attractions

At an informal level, DWS sometimes takes tours into the Dam Wall.

2.12. Catchment Interactions

A number of factors influence the Dam namely:

- Land use in the catchment (especially agriculture);
- Recreational use (water sports and angling);
- Management of Infrastructure (such as WWTWs);
- Aquatic Invasive plant species;
- Alien invasive fish species; and
- Subsistence fishing.

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 Vanderkloof Dam is informed by the needs, interests, requirements and uses of the Dam. Stakeholders agreed that sustainable and cooperative use of the resource is a high priority to ensure that all can enjoy clean water for a multiple of uses. Main concerns centred around institutional arrangements and developing tourism potential.

At a Focus Group Meeting at the Keurtjieskloof community it was highlighted that access to the Dam by the local community is limited. There were many reasons for this including prohibitive costs and the main area for access is controlled by the Boat Club. As most local community members do not own boats, they cannot gain access to this area. In addition, access through the resort is expensive. Affordable and equitable access is required to ensure that the Dam is enjoyed by all. The need for institutional arrangements to manage the Dam was also noted and cooperation is required. The Dam is seen as an important resource for education and skills training. The vision for the Dam is therefore:

"Harmonious and Collective Management of Our Unique and Clean Resource to Ensure Sustainable Development and Equitable Access to Benefit us All".

3.2. Objectives

The vision was distilled into the following 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).

**Proper Safety and Policing**

- The implementation of standardised and harmonised AtoN and Demarcation Markers as directed by SAMSA should be undertaken;
- A SAMSA Enforcement officer should be appointed to ensure rules and regulations are followed by all users of the Dam;
- Additional resources and capacity is required by the Vanderkloof SAPS;
- Doornkloof at Rolfontein Nature Reserve both require a vessel and registered skipper so that they can undertake patrols of the Surface Water;
- Formalised institutional agreements are required;
- A Wash Bay system with safety checks should be instituted;
- The Unique Positioning System (UPN) system to be implemented; and
- A Personal Locator Beacon (PLB) system to be implemented for users wishing to enter the restricted area of the Dam.

**Improved Water Quality**

- Discussions between DWS and Municipality regarding the Vanderkloof Wastewater Treatment Works (WWTW) should be undertaken; and
- Monitoring protocol to be set up to ensure maintenance or improvement of current water quality.

**Management of fishing**

- Management of large mouth yellowfish population;
- Demarcated area for Angling club and the potential for management of the Vrystaat Kant area to be leased by the
Vanderkloof Angling Club to be determined;

- Some form of formalisation of angling club to be determined;
- Feasibility of a Permit system for fishing to be determined (in addition to DENC fresh water angling fishing permit); and
- Feasibility of small scale fisheries at the Dam to be assessed.

**Formalised Education and Skills programmes**

- Feasibility of opening a Swimming/Rowing School to be determined (co funding mechanisms should be also be researched);
- Development of skills training programme at the Dam; and
- Clubs to be affiliated to National Associations under South African Sports Confederation and Olympic Committee (SASCOC) and thus incorporate training and development as per SASCOC requirements.

**Improved Institutional Arrangements and Management**

- It is suggested that a three tier management system is formed to incorporate different stakeholders;
- Discussions between DWS and FS-DETEA to ensure that caretaker agreements are in place with adjacent landowners should be undertaken;
- Discussions between DENC and DWS regarding management of the surface water and land on the Northern Cape side should be updated to include the findings of the RMP;
- Fire management associations to be formed to ensure quick response to fires;
- Event management system should be compiled and implemented;
- Rates for events and advertising should be determined; and
- Agreements to manage clubs on State Land should be drawn up and include the findings of the RMP. Rental of State Land should take into account current market related values.

**Improved Equitable Access**

- Information programmes to be implemented by DMC to educate local community about the benefits of the Dam;
- Picnic areas to be upgraded and maintained;
- Feasibility of subsiding local access to the Dam to be explored (including potential community access card); and
- Access for education programmes to be subsidized.

**Management of Development Pressure**

- DMC to play active role in Basic Assessments (BAR) and Environmental Impact Assessments (EIAs) and to act as a custodian for the Dam;
- DMC should involve representatives from FS-DETEA and DENC so that non compliances can be reported to Compliance unit; and
- Development pressure and commenting on BARs and EIAs should be included in the Dam Management Committee (DMC), Operations Management Committee (OMC) and RMP Steering Committee’s (RSC) agenda and discussed at each meeting.

**Increased Recreational Use**

- Creation of functioning DMC including DENC and FS-DETEA and all mandated stakeholder;
- Demarcated area for angling to be maintained;
- Fishing permits system to be implemented;
- Potential for PPP for management of the Public picnic area at the Vanderkloof Resort to be assessed; and
- Picnic areas to be formalized.
**Improved Tourism**

- Feasibility of PPP for House Boat, Water Plane, etc. to be assessed;
- Funding for road signage, website, tourism initiatives to be determined;
- Formalisation of Eskom power station tours; and
- Formalisation of Dam wall tours.

**Improved Resource Management**

- Fish eagle area to be restricted;
- Management and containment of aquatic invasive species;
- Fire management plan to be developed for state land including farmer and taking into account impacts of fire on erosion and siltation;
- Alien invasive plants (terrestrial and aquatic) to be managed through partnerships with DENC, FS-DETEA; Steering Committee and Working for Water; and
- The use of wash bays to prevent spread of aquatic invasive plants.
4. HOW DO WE GET THERE?

4.1. How does the RMP Work?

The overarching framework for the Vanderkloof Dam RMP is presented in Figure 3. 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 can further be broken down into four main areas 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 is based on an existing reporting structure between the Area Managers, Regional Managers and Directors of each Operation. It also allows for communication between the Director of each Operation and the Chief Director: Operations. The DMC will include stakeholders who have an official management role at the Dam. All three committees will be chaired by the DWS. The DMC will also hold quarterly Open Days to ensure all users have an opportunity to discuss issues. This Open Day will also allow for open communication between the DMC and users of the Dam.

The Institutional Plan will include requirements for agreements, development targets (in relation to community development of water sports) and information on the affiliations required. More detailed information on the 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. This information is then used to produce a 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 for each zone.

The activities are presented in Table 8 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 then used to produce the BP or each objective. The detailed Strategic Plan is provided in Chapter 4.5.
Figure 3: 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 4 below provides a visual representation of how these toolsets function together.
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 5 below provides details of the membership of the RSC.

![Figure 5: RSC Membership](image-url)
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 6: CMC Membership](image)
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 or IA. The DMC is involved in the management of the UPN System as part of the Cooperative Inland Waterways Safety Programme (CIWSP) and includes the following representatives:

![DMC Membership Diagram]

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 are not required for the OMC as this is an existing reporting structure. The ToR provide guidance on the following management aspects:

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

4.2.4.2. Agreements

1.) Agreements between DWS and Provincial Authorities:

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. As DWS signed over management of Vanderkloof Dam surface water and land on the Northern Cape side to the Cape Province (now Northern Cape Province) in 1985, and the management of the land on the Free State side to the Orange Free State Province (now Free State Province) in 1988, these provincial authorities have the mandate to sign agreements regarding the management of the Dam.

However, that said, the agreements signed in 1985 and 1988 do not provide guidance regarding equitable access, public private partnerships, development targets, safety requirements etc. It is therefore suggested that the first objective of the RMP is to update these agreements in line with the RMP requirements. These agreements should be updated within the next year.

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 provincial authority’s mandate to enter into agreements with other parties on the use of the surface water for recreational use;
- Guidance regarding provincial authority’s roles and functions regarding the management of the resource (for example, the need for FS-DETEA to sign agreements with adjacent landowners to ensure management of the land adjacent to the Dam on the Free State side);
- 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 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 provincial authority and any new recreational clubs, should be reviewed and accepted in writing by the DWS Operations Manager for the Region. They should also be presented to the DMC prior to signature to ensure the vision and objectives of the RMP are met.

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

▪ Clear start and end dates and terms of renewal/extension;
▪ Rights and obligations of both parties;
▪ Access points to be used must be stipulated. The RMP makes provision for three potential access points (Vanderkloof Resort, Doornkloof Nature Reserve and Vanderkloof Boat Club). 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);
▪ The Provincial Authority’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;
▪ 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 Provincial Authority 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 Provincial Authority. All agreements must be finalised within one year of the RMP being gazetted.

Further, all clubs or associations must be affiliated to a national sporting body (recognised by SASCOC). Both Vanderkloof Boat Club and Vanderkloof Angling Club would need to be affiliated. However, in order to ensure that the costs of national affiliation do not restrict membership, a period of 3 years should be provided to allow these clubs to negotiate with the relevant structure regarding annual fees and to build up memberships.

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.

This is especially important in regards to Free State land management as currently FS-DETEA is unable to properly manage the land adjacent to the Dam as this land is land-locked by private property. In addition, there is no dedicated FS-DETEA official in the Vanderkloof area.

It is suggested that management of land adjacent to the Dam (on the Free State side) should be through a caretaker agreements between FS-DETEA and adjacent landowners. In this way, there will be a legal mechanism to ensure that all land management requirements are met.

Vanderkloof Angling Club has also shown interest in leasing shoreline in the Free State for Angling events. Discussions regarding the potential for this should be undertaken and if necessary a lease agreement should be put in place. This agreement should take into account land management practices and include conditions regarding management of litter, access and management of invasive species etc. The angling club would be responsible for
negotiating access to the shoreline via private property (as the shoreline is landlocked).

Agreements must be developed with appropriate legal advice and consultation.

All agreements 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.

Agreements regarding access should be signed with the following parties:

- Doornkloof Nature Reserve;
- Rolfontein Nature Reserve;
- Vanderkloof Resort; and
- Vanderkloof Boat Club.

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

Historically Doornkloof Nature Reserve has informal access to the Dam. There is no formal slipway in place and there are no immediate plans for more formalised access. However, in light on the need for access to Dam and the opportunities for recreational use, a formalised access point and wash bay is required.

Any additional wash bays must be approved by DWS. Management of these wash bays must be in line with SAMSA and DEA requirements and the cost will not be borne by DWS or DEA.

In contrast, Rolfontein Nature Reserve does not have a formalised slipway although this is planned for the future. As Rolfontein is in close proximity to Vanderkloof Town, it is suggested that in the future, should a formalised slipway be built (and is approved by DWS), no additional wash bay is required. Instead, all boats using the new slipway would need to go through the Vanderkloof Boat Club wash bay prior to accessing Rolfontein. Staff at Rolfontein would then check that both the UPN access tag and date slip were in place.

A similar system is suggested for Vanderkloof Resort as it is also close to the Vanderkloof Boat Club. Thus, all visitors entering the resort with a boat or canoe would need to produce their access tag and date slip to be checked by resort staff.

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

Vanderkloof Dam is used for a number of competitive events.

All events must be managed through an event application process. While the application may be made to the Provincial Authority, 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 with a national body. These national bodies have specific development targets.

The two main recreational associations in Vanderkloof Dam are: 1.) Vanderkloof Boat Club and 2.) Vanderkloof Angling association. Neither are currently nationally affiliated and thus there are no development targets in place. Both these associations should become affiliated within the next year.

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 beneficiary 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 beneficiary are consolidated below.

1.) Socio-Economic Development

Socio-economic development is a key aspect of the RMP. The vision for the Vanderkloof Dam has a strong focus on sustainable development and there are two specific objectives (and a number of smaller actions) related to this including:

**Increased Recreational Use**

- Demarcated area for angling to be put in place and maintained;
- Fishing permits system to be implemented;
- Potential for PPP for management of the Public picnic area at the Vanderkloof Resort to be assessed; and
- Picnic areas to be formalized.

**Improved Tourism**

- Feasibility of PPP for House Boat, Water Plane and Hiking trail etc. to be assessed;
- Funding for road signage, website, tourism initiatives to be determined;
- Formalisation of Eskom power station tours; and
- Formalisation of Dam wall tours.

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

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

- A balance between high and small cap opportunities is required to ensure that revenue generation occurs together with the promotion of equitable access and job creation at the Dam; and
- While the tariff structure can be used for revenue generation, it should not be used to deny people access to the dam.

The BP for Vanderkloof Dam has four interventions linked to increasing tourism.

In addition, as another form of socio-economic development, the feasibility of small-scale fisheries should be determined. Currently, Rhodes University has completed a pre-feasibility study and has found that there is an
opportunity for local community fishermen. This would create an income and also provide a form of protein to a number of families. A specific intervention in the BP is specifically related to small-scale fisheries.

2.) Equitable Access

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

**Improved Equitable Access**

- Information programmes to be implemented by DMC to educate local community about the benefits of the Dam;
- Upgrade of Picnic/Braai Areas;
- Feasibility of subsiding local access to the Dam to be explored (including potential community access card); and
- Access for education programmes to be subsidized.

Vanderkloof Dam is managed by DENC as part of Rolfontein and Doornkloof Nature Reserve and therefore as part of this, there is a form of equitable access at the Dam. There is also a municipality run Resort in the town. 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. Local community members are therefore often marginalised.

In order to deal with this, the BP includes an intervention which aims to implement Local Community Access Card which takes into Account Socio-economic Status of the Community as well as an education and awareness programme to encourage use of the Dam.

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 to ensure that local communities benefit from the Dam.

**Formalised Education and Skills programmes**

- Feasibility of opening a Swimming/Rowing School to be determined (co funding mechanisms should be also be researched);
- Development of skills training programme at the Dam; and
- Clubs to be affiliated to National Associations under South African Sports Confederation and Olympic Committee (SASCOC) and thus incorporate training and development as per SASCOC requirements.

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 Swimming/Rowing School.
4.3. Financial Plan

Vanderkloof 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, Vanderkloof 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 the Dam can generate an income from:

- Entrance fees for local community members;
- Entrance fees and access for sporting activities;
- Special events; and
- Filming and/or advertising.

While the tariff structure 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, sliding scale, cross subsidy fee structure and/or contractual obligations which ensure equitable access must be considered when setting a fee.

4.4. Zonal Plan

The Zonal Plan for Vanderkloof 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 section 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 Vanderkloof Boat Club include:

- Powerboats;
- Fishing (from boats);
- Ski and wakeboarding;
- Water toys such as tubes; and
- Jet Skiing.

Bank Angling is the main activity of Vanderkloof Angling Association.

In addition, there are a number of activities which are not associated to the clubs or associations. These include:

- Rowing regatta’s;
- Canoe sprints;
- Kayak tours;
- Swimming; and
- Shore fishing.

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 7: Scores for Recreational Use**

<table>
<thead>
<tr>
<th>Score</th>
<th>Meaning</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not Feasible</td>
<td>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.</td>
</tr>
<tr>
<td>1</td>
<td>Likely to be Feasible however feasibility study is required.</td>
<td>Feasibility Study is required</td>
</tr>
<tr>
<td>2</td>
<td>Likely to be Feasible</td>
<td>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</td>
</tr>
<tr>
<td>3</td>
<td>Current use</td>
<td>Benefits outweigh impacts. No feasibility study is required</td>
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</tbody>
</table>

Based on the table below the following commercial activities have been assessed as potential commercial activities that require further feasibility assessments.

- Hiking Trail between Doornkloof and Rolfontein Nature Reserve;
- House Boat linking Doornkloof and Rolfontein Nature Reserve;
- Formalised Picnic Area/PPP at Vanderkloof Resort;
- Formalised Picnic Areas/Working for Dams opportunity;
- Formalised Kayak Tours PPP linking Gariep Dam to Vanderkloof Dam (to be assessed further as part of Gariep Dam RMP);
- Open Water Swimming/Rowing School;
- Small Scale Fishery; and
- Water Planes.
### Table 8: Potential and Current Recreational Activities

<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Activity</th>
<th>Operational Management Issues</th>
<th>Environmental Impacts on Recreational Use</th>
<th>Recreational Impacts on the Environment</th>
<th>Safety Requirements</th>
<th>Conflicts with current activities</th>
<th>Recreational Requirements</th>
<th>Legal Requirements</th>
<th>Economic Viability</th>
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<td>Game viewing (Doornkloof and Rolfontein)</td>
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<td>Access to water</td>
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<td>Picnic Areas – Vanderkloof Dam</td>
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<td>Possible disturbances</td>
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<td>Hydrographic surveys required to determine which areas have the required depth</td>
<td>A level change required to impact swimming and surfing. A hydrographic survey is required to determine which areas have the required depth</td>
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**VANDERKLOOF DAM FINAL RESOURCE MANAGEMENT PLAN**

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PG 52
## Operational Management Issues
<table>
<thead>
<tr>
<th>Activity</th>
<th>Change in Water Level</th>
<th>Environmental Impacts on Water Quality</th>
<th>Recreational Use Impacts on the Environment</th>
<th>Safety Requirements</th>
<th>Recreational Requirements</th>
<th>Legal Requirements</th>
<th>Economic Viability</th>
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<td>N/A</td>
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</tbody>
</table>

### Table Entries
- Open Water Discharge (N/A): Water level changes are not expected to impact swimming areas and recreational activities are allowed. Hydrographic survey will be undertaken in 2014 and will confirm swimming area position.
- Dam Breach (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
- Shore Fishing (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
- Subsurface Fishing (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
- Secondary Contact (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
- Tube Fishing (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
- Pontoons Fishing (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
- Bass Fishing (N/A): Zonal Plan has planned area for fishing. Hydrographic survey will be undertaken in 2014 and will confirm fishing area position.
<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Activity</th>
<th>Change in Water Level</th>
<th>Water Quality (Coli)</th>
<th>Health Impacts</th>
<th>Recreational Use Impact on Fish Species</th>
<th>Fish Spawning</th>
<th>Bird Nesting</th>
<th>Rhino</th>
<th>Ash &amp; Deformation Marks</th>
<th>Water Depth</th>
<th>Visibility</th>
<th>Radio Signal</th>
<th>Emergency Response</th>
<th>Conflicts with current activities</th>
<th>Winds required</th>
<th>Accommodation / Facilities</th>
<th>Abolition facilities</th>
<th>Access to water</th>
<th>Access to Land</th>
<th>Interest in the activity</th>
<th>Funding Opportunities</th>
<th>Score</th>
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<td>Motorised Boats</td>
<td>N/A N/A</td>
<td>N/A 2006 &amp; 2010: Cell-levels were 60-100/100 which is below the RWGO of 120. Therefore full contact recreational activities are allowed. In 2009, present value were below RWGOS values.</td>
<td>N/A Zonal Map has documented for motorised boats</td>
<td>N/A N/A</td>
<td>N/A Zonal Plan has zoned area for motorised boats</td>
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<td>N/A 2006 &amp; 2010: Cell-levels were 60-100/100 which is below the RWGO of 120. Therefore full contact recreational activities are allowed. In 2009, present value were below RWGOS values.</td>
<td>N/A Zonal Map has documented for motorised boats</td>
<td>N/A N/A</td>
<td>N/A Zonal Plan has zoned area for motorised boats</td>
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<td>N/A 2006 &amp; 2010: Cell-levels were 60-100/100 which is below the RWGO of 120. Therefore full contact recreational activities are allowed. In 2009, present value were below RWGOS values.</td>
<td>N/A Zonal Map has documented for motorised boats</td>
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<td>Dragon Boats</td>
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<td>N/A 2006 &amp; 2010: Cell-levels were 60-100/100 which is below the RWGO of 120. Therefore full contact recreational activities are allowed. In 2009, present value were below RWGOS values.</td>
<td>N/A Zonal Map has documented for motorised boats</td>
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<td>Water Quality (E Coli)</td>
<td>Health Impacts</td>
<td>Aquatic Invasiv e Species</td>
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<td>Rhino</td>
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<td>Access to water</td>
<td>Access to Land</td>
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<td>Funding Opportunities</td>
<td>Score</td>
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</table>

**Note:** The table continues, but the provided text does not include all the data. The table is likely part of a larger document discussing specific activities, their impacts, and management issues related to water quality, safety, and other regulatory requirements. The table is used to assess the suitability of the activities based on various criteria such as water quality, safety, and legal requirements.
<table>
<thead>
<tr>
<th>Contact Type</th>
<th>Activity</th>
<th>Change in Water Level</th>
<th>Environmental Impacts on Recreational Use</th>
<th>Recreational Use Impacts on the Environment</th>
<th>Safety Requirements</th>
<th>Recreational Requirements</th>
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<td>Water Quality (SI mg l⁻¹)</td>
<td>Health Impacts</td>
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<td>Rhino</td>
<td>Ash and Deformation Markers</td>
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<tr>
<td>Hovercraft</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stand Up Paddling</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boat Paragliding</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sailing</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Toys</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flying Logs/Water Flumes</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House Boats</td>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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PG 57
4.4.3. Carrying Capacity

Carrying Capacity Assessments (CCA) and setting of Limits of Acceptable Change (LAC) aims to provide an effective management tool which focuses on the impact of activities on resources.

Although there are various understandings of the terms, Cifuentes (1992) and Ceballos-Lascurain (1996) provide some practical guidelines regarding the use of these as management tools. The methodology described in this research report follows the process provided by DWS which consists of six steps, namely:

- Analysis of recreation and water resource management policies;
- Analysis of objectives of the water resource;
- Analysis of current recreational water use;
- Definition, strengthening or modification of policies regarding recreational water use management;
- Identification of factors influencing recreational water use; and
- Determination of the recreational water use carrying capacity.

As informal operations are established at the Dam in the form of Vanderkloof Boat Club, the formalising of operations is essential. 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 Vanderkloof 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

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: 119.1 km², or 11 910 hectares (ha)

U/A = There is a range of literature regarding the area required for different recreational users, which ranges between 1.61 ha per boat to 16.1 ha per boat. For the purposes of this calculation, considering that most of the activity on the Dam is relatively similar and no problems have been recorded thus far, an estimate of 4.04ha (44 000m²) per high-speed boat and 4.04ha per idle boat is an acceptable area per user. As half of the users are idle/stationary and half are involved in high-speed activity we can use an intermediate value of 6.07 ha per boat (60700m²/boat) as U/a.

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

The PCC for Vanderkloof Dam can therefore be calculated as:
PCC = 11 910 ÷ 6.07 x 1

PCC = 1962 boats on the Dam.

However, this is based on the full length of the Dam and is therefore not realistic.

**Real Carrying Capacity (RCC)**

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

- Bird sanctuary areas;
- Fish Eagle Breeding areas (this is a deadslow area and thus restricts the number of boats);
- Safety concerns in small and restricted channels;
- Safety concerns such as lack of cell phone signal past Hondeblaf (permit only areas);
- Safety concerns of allowing recreation near to the Dam wall;
- One of the main limiting factors in regards to recreational use is the number of picnic spots. Currently there are no formalised picnic spots however the recreational users do know of some areas where the terrain is flat enough to have a picnic.

Calculating the area of the surface of the Dam, adding a buffer-zone at the Dam wall and both bird sanctuary areas as well as restricting the use of powerboats to Honderblaf, allows for us to determine the real carrying capacity of the water surface with approximately 4617ha (46km²) of the water surface remaining available for recreation. This means that 61.23 % of the Dam is not available for recreational use.

The RCC for Vanderkloof Dam is therefore:

\[
RCC = PCC \times (100 - Cf1) \% \times (100 - Cf2) \% \times ... (100 - Cf_n)\%
\]

Where Cf = a corrective factor expressed as a percentage.

\[
RCC = 1962 \times (100 - 61.23)\%
\]

RCC = 760 boats on the Dam at any given time

*Based on water surface.*

However, in order to determine the real carrying capacity in terms of picnic spots we need to look at the number of picnic spots available.

According to Moeller (1965), the maximum number of campsites and picnic spots should be approximately 50 per 2ha. However, due to the steep nature of the terrain around the Dam, there are only eight sites which are flat enough to have a picnic before the Hondeblaf restricted area begins. Thus in reality, there are 235ha (2.35km²) available for picnics. With 25 picnic spots per ha this would result in 5875 picnic spots. If on average, one boat carried 5 people, then the RCC calculated above would be sufficient.

**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 Vanderkloof Dam has a boat club which is not yet nationally affiliated nor highly formalised, currently only one safety check point (Vanderkloof SAPS) and no formal management capacity based on staff and budget, the ECC is effectively zero as there is no specific budget or staff (i.e MC = 0) (see equation below).

\[
ECC = \left[[\text{Infrastructure Capacity} \times MC] / \text{RCC}\right]
\]

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 management infrastructure has been created at the Dam.

What must be emphasised at this point is that the carrying capacity of 760 boats on the Dam is very large (even in light of the size of the Dam), and thus the management budget and staff must be clarified and formalised before large scale
recreational endeavours are promoted. As discussed in the section above, formalised institutional arrangements must be in place before there is a planned increase in tourism and recreational use.

4.4.4. Water Surface Zonal Plan

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

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

The overall zonal map is provided in Figure 8 below. Due to the length of the Dam, maps of each section have been provided (Figure 9 to 11).

The zones are as follows:

- Zone A: Secondary Contact Activities – Combination
- Zone B – Full Contact Activities;
- Zone C – Safety/No- Go Zone;
- Zone D – Secondary Contact: Jet Ski Only Zone;
- Zone E – Secondary Contact: Motorised Boats and Related Activities Zone;
- Zone F – Secondary Contact - No Impact Activity Zone;
- Zone G – Secondary Contact: Restricted/Permit Only Zone; and

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.
Table 9: Surface Water Management Zones

<table>
<thead>
<tr>
<th>Zone Name</th>
<th>Contact Type</th>
<th>Permissible Activities - Current</th>
<th>Permissible Activities Potential</th>
<th>Access Point</th>
<th>Safety Requirements for Users</th>
<th>Safety Requirements for DMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone A</td>
<td>Secondary Contact – Combination (no wake)</td>
<td>Motorised Boats – No Wake zone Canoeing Kayaking Rowing Tubing Fishing from boats</td>
<td>Small scale fisheries Dragon Boats Slalom Canoe Fishing Canoe Kayaking Sprints Kayaking Marathons Kayaking Touring Kayaking Fishing Paddle Ski Pedal Boat House Boats Stand Up Paddling; Shore Fishing Tube Fishing Paddle Ski</td>
<td>Vanderkloof Boat Club Vanderkloof Resort (Have to go through Wash Bay first and UPN tag and date stamp need to be checked)</td>
<td>Registered Safe for Water Vessel Valid Skipper’s License First Aid Kit UPN date stamp UPN tag</td>
<td>AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforcement Officer SAPS Patrols of Water Surface Vanderkloof Resort requires system to check UPN Tag and Date Stamp</td>
</tr>
<tr>
<td>Zone B</td>
<td>Full Contact (swimming)</td>
<td>Swimming - recreational Swimming – development school</td>
<td>Vanderkloof Boat Club Vanderkloof Resort</td>
<td>N/A</td>
<td>N/A</td>
<td>AtoN and Demarcation Markers UPN system OPS point Rescue Boat available at all times</td>
</tr>
<tr>
<td>Zone C</td>
<td>No Go Zone – Dam Wall</td>
<td>None</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>AtoN and Demarcation Markers</td>
</tr>
<tr>
<td>Zone D</td>
<td>Secondary Contact (Jet Ski)</td>
<td>Jet Ski</td>
<td>Vanderkloof Boat Club</td>
<td>Registered Safe for Water Vessel UPN date stamp UPN tag.</td>
<td>AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times Wash Bay Officer Enforcement Officer SAPS Patrols of Water Surface</td>
<td></td>
</tr>
<tr>
<td>Zone Name</td>
<td>Contact Type</td>
<td>Permissible Activities - Current</td>
<td>Permissible Activities Potential</td>
<td>Access Point</td>
<td>Safety Requirements for Users</td>
<td>Safety Requirements for DMC</td>
</tr>
<tr>
<td>-----------</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>Zone E</td>
<td>Secondary Contact (Motorised Boats)</td>
<td>Bass Fishing Motorised Boats; Jet Powered Boats; RHIB</td>
<td>Jet Powered Boats; Vanderkloof Boat Club; Vanderkloof Resort (Have to go through Wash Bay first) and UPN tag and date stamp need to be checked)</td>
<td>Vanderkloof Boat Club; Vanderkloof Resort (Have to go through Wash Bay first) and UPN tag and date stamp need to be checked)</td>
<td>Registered Safe for Water Vessel; Valid Skipper’s License; First Aid Kit; UPN date stamp; UPN tag.</td>
<td>AtoN and Demarcation Markers; UPN System; OPS Point; Wash Bay; Rescue Boat available at all times; Wash Bay Officer; Enforcement Officer; SAPS Patrols of Water Surface; Vanderkloof Resort requires system to check UPN Tag and Date Stamp)</td>
</tr>
<tr>
<td>Zone F</td>
<td>Secondary Contact (No impact)</td>
<td>Motorised Boats – Dead Slow zone Canoeing; Kayaking Rowing; Tubing; Kayaking Touring Pedal Boat Stand Up Paddling;</td>
<td>Kayaking Touring Pedal Boat Stand Up Paddling;</td>
<td>Vanderkloof Boat Club; Vanderkloof Resort (Have to go through Wash Bay first) and UPN tag and date stamp need to be checked)</td>
<td>Registered Safe for Water Vessel; Valid Skipper’s License; First Aid Kit; UPN date stamp; UPN tag.</td>
<td>AtoN and Demarcation Markers; UPN System; OPS Point; Wash Bay; Rescue Boat available at all times; Wash Bay Officer; Enforcement Officer; SAPS Patrols of Water Surface; Vanderkloof Resort requires system to check UPN Tag and Date Stamp) Should studies be undertaken to show that this is not a fish breeding area, there is potential for this zone to be opened for fishing.</td>
</tr>
<tr>
<td>Zone G</td>
<td>Secondary Contact - Restricted</td>
<td>Motorised Boats Canoeing; Rowing; Kayaking Marathons Kayaking Touring Kayaking Fishing Fishing from boats</td>
<td>House Boats Vanderkloof Boat Club Vanderkloof Resort (Have to go through Wash Bay first) and UPN tag and date stamp need to be checked) Doornkloof Nature Reserve (with Wash Bay in Place or using Vanderkloof Boat Club Wash Bay)</td>
<td>Registered Safe for Water Vessel; Valid Skipper’s License; First Aid Kit; UPN date stamp; UPN tag; Restricted Area permit; Personal Locator Beacon (on loan from Doornkloof Nature Reserve or Vanderkloof SAPS); Extra Petrol</td>
<td>AtoN and Demarcation Markers; UPN System; OPS Point; Wash Bay; Rescue Boat available at all times; Wash Bay Officer; Enforcement Officer; SAPS Patrols of Water Surface; Vanderkloof Resort requires system to check UPN Tag and Date Stamp) Doornkloof Nature Reserve requires Wash Bay Personal Locator Beacons must be purchased and available on loan from Vanderkloof SAPS and Doornkloof Nature Reserve</td>
<td></td>
</tr>
<tr>
<td>Zone Name</td>
<td>Contact Type</td>
<td>Permissible Activities - Current</td>
<td>Permissible Activities Potential</td>
<td>Access Point</td>
<td>Safety Requirements for Users</td>
<td>Safety Requirements for DMC</td>
</tr>
<tr>
<td>-----------</td>
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<td>---------------------------------</td>
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<td>-------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Zone H</td>
<td>Secondary Contact (No Impact – Doornkloof)</td>
<td>Canoe Kayaking Rowing Swimming</td>
<td>House Boats</td>
<td>Doornkloof Nature Reserve (with Wash Bay in Place or using Vanderkloof Boat Club Wash Bay)</td>
<td>Registered Safe for Water Vessel Valid Skipper’s License First Aid Kit UPN date stamp UPN tag; Restricted Area permit</td>
<td>Reseerve; Permit System for Entering Restricted Area</td>
</tr>
<tr>
<td>Zone I</td>
<td>Dead Slow Zone</td>
<td>Mooring Entering of exiting bay area at dead slow speed</td>
<td></td>
<td>Vanderkloof Boat Club Wash Bay)</td>
<td>Registered Safe for Water Vessel Valid Skipper’s License First Aid Kit UPN date stamp UPN tag; Restricted Area permit</td>
<td>AtoN and Demarcation Markers UPN System OPS Point Wash Bay Rescue Boat available at all times; Wash Bay Officer Enforcement Officer SAPS Patrols of Water Surface Doornkloof Nature Reserve requires Wash Bay</td>
</tr>
<tr>
<td>Zone J</td>
<td>No Go Zone – Safety Buffer</td>
<td>None</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>AtoN and Demarcation Markers</td>
</tr>
</tbody>
</table>
Figure 8: Map of the Water Surface Zonal Plan
Figure 9: Map of the Water Surface Zonal Plan – Section 1
Figure 10: Map of the Water Surface Zonal Plan – Section 2
Figure 11: Map of the Water Surface Zonal Plan – Section 3
4.4.5. **Shoreline Zonal Plan**

In addition to the surface water zonal plan above, an integral part of the RMP is shoreline zoning. This provides guidance on what activities (if any) are allowed in the land adjacent to the Dam.

The Shoreline Zonal Plan can only manage state owned land around the Dam. For this reason, all properties directly adjacent to the Dam that are state owned have been included in this plan. In some cases, these properties are large and extend out while other times, the state land forms a very thin border around the Dam.

The management zones include:

- Zone A - Conservation and Recreation/Tourism
- Zone B - Development and Recreation
- Zone C - Management – No Access to the Public

Zone A includes the majority of Rolfontein and Doornkloof Nature Reserves and focuses mainly on conservation and ecotourism activities such as camping, hiking, birding and game viewing. Development of this area is not allowed. This ensures that the pristine and unique character of the landscape is not transformed (mapped in yellow below).

Zone B allows for conservation, recreation and development allowing for the potential development of the following:

- Vanderkloof Boat Club (i.e. ablution facilities);
- Wash Bay and Slipway at Doornkloof Nature Reserve;
- Wash Bay and Slipway at Rolfontein Nature Reserve;
- Formalised Picnic areas;
- Swimming/Rowing Development Schools
- Upgrade/Development of Vanderkloof Resort;
- Upgrade/Development of Rolfontein Nature Reserve; and

Zone B is mapped in purple below.

Zone C provides for land management of state land but does not allow public use or access. This includes the area around the Dam wall, the Vanderkloof Eskom Power station and the majority of the adjacent land on the Free State side. Zone C is mapped in orange below.

Permissible and non-permissible activities are detailed in the table below.
### Table 10: Shoreline Management Zones

<table>
<thead>
<tr>
<th>Zone Name</th>
<th>Zone Type</th>
<th>Permissible Activities</th>
<th>Requirements for Users</th>
<th>Requirements for DMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone A</td>
<td>Conservation and Recreation/Tourism</td>
<td>Hiking, Camping, Birding, Game viewing, Possible Future Hiking Trial joining Doornkloof Nature Reserve and Rolfontein Nature Reserve</td>
<td>Camping, hiking, birding and game viewing must be undertaken in accordance with rules and Regulations of Doornkloof and Rolfontein Nature Reserve.</td>
<td>Feasibility of potential hiking trail between Rolfontein and Doornkloof Nature Reserve should be assessed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Camping allowed only in designated areas.</td>
<td>Noise levels to be kept at a minimum.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Camps, hiking, birding and game viewing must be undertaken in accordance with rules and Regulations of Doornkloof and Rolfontein Nature Reserve.</td>
<td>No littering.</td>
</tr>
<tr>
<td>Zone B</td>
<td>Recreation and Development</td>
<td>Development of facilities/infrastructure for recreation, Development of facilities/infrastructure for development/training, Development of facilities/infrastructure for tourism, Fishing, Camping/ Accommodation, Birding, Game Viewing, Picnicking, Operations related to small scale subsistence fisheries, Access to surface water for recreational purposes</td>
<td>Camping, hiking, birding and game viewing must be undertaken in accordance with rules and Regulations of Doornkloof and Rolfontein Nature Reserve.</td>
<td>Enforcement Officer to check all designated picnic spots.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Camping allowed only in designated areas.</td>
<td>Feasibility of employing local community members as part of “Working For Dams” programme to be assessed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Noise levels to be kept at a minimum.</td>
<td>Potential jobs include management of picnic sites/picking up of any litter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No littering at Picnic spots.</td>
<td>SAPS Patrols of Water Surface;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Access to surface water only through approved access points (Vanderkloof Boat Club, Vanderkloof Resort and Doornkloof Nature Reserve).</td>
<td>Doornkloof Nature Reserve requires Wash Bay.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>All users to go through Wash Bay at Vanderkloof Boat Club.</td>
<td>DMC must ensure that all developments have been approved by DWS and DENC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Requirements of National Water Act and National Environmental Management Act must be taken into account.</td>
</tr>
<tr>
<td>Zone C</td>
<td>Management – No Public Access</td>
<td>Fire management, Invasive alien species clearing, Management of Dam Infrastructure, Management of Power Station</td>
<td>None</td>
<td>Access to this area for strictly management purposes (i.e. DWS, Eskom, DENC FS-DETEA, Fire Management Association).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Caretaker Agreements between FS-DETEA and Adjacent landowners should be drafted and include information on Fire Management, Management of Alien Invasive species.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Agreements to ensure that adjacent landowners do not have access to the Dam.</td>
</tr>
</tbody>
</table>
Figure 12: Shoreline Zonal Map
Figure 14: Shoreline Zonal Map – Section 2
Figure 15: Shoreline Zonal Map – Section 3
4.5. Strategic Plan

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

<table>
<thead>
<tr>
<th>Objective category/major objective</th>
<th>What</th>
<th>Why</th>
<th>How</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper Safety and Policing Management</td>
<td>Implementation of standardised and harmonised AtoN and Demarcation Markers</td>
<td>Improve safety of navigation.</td>
<td>Implement AtoN and Demarcation markers as required. Agreements between SAMSA, DWS, LAAPs and other relevant parties to be concluded</td>
<td>SAMSA DWS Relevant Parties</td>
</tr>
<tr>
<td></td>
<td>Formalised position to assist in monitoring/alerting SAPS of safety issues</td>
<td>To provide assistance in monitoring/policing at the Dam.</td>
<td>Appointment of SAMSA Enforcement Officer at the Dam. The officer will be able to utilise the UPN system to alert SAPS of any illegal activity.</td>
<td>CIWSP DWS SAMSA</td>
</tr>
<tr>
<td></td>
<td>Additional resources for Vanderkloof SAPS</td>
<td>To assist in policing the full extent of Vanderkloof Dam. Currently there is only one vessel and one skipper available.</td>
<td>Implementation of the SAPS Plan “Establishment of Inland Water policing Unit: Kimberly to Upington” (Ref – 3/1/5/1/32).</td>
<td>SAPS</td>
</tr>
<tr>
<td></td>
<td>Additional resources for Rolfontein Nature Reserve (DENC).</td>
<td>To allow DENC (through Rolfontein Nature Reserve) to provide a patrol function on Vanderkloof Dam.</td>
<td>Ensure Rolfontein Nature Reserve vessel is safe to use on the water. If necessary a new vessel should be purchased. Ensure training of a Rolfontein Nature Reserve Skipper.</td>
<td>DENC</td>
</tr>
<tr>
<td></td>
<td>Formalised system for Safety Checks at the Vanderkloof Boat Club.</td>
<td>Currently, Vanderkloof SAPS does all safety checks on vessels however there is no agreement in place to ensure that the Vanderkloof Boat Club only allows access after the Safety Check is completed. In addition, there is no agreement in place to govern the relationship between SAPS and the Boat Club.</td>
<td>Implementation of the UPN System. Safety Checks to be undertaken at the Wash Bay. Wash Bay officer to be trained to undertake Safety Checks. Vanderkloof SAPS to undertake spot checks to ensure safety checks are being done correctly. The Boat Club is to be the ROP. The Boat Club must nominate members to be volunteer Safety Officer over the weekend.</td>
<td>CIWSP DWS SAPS</td>
</tr>
<tr>
<td>Objective category/major objective</td>
<td>What</td>
<td>Why</td>
<td>How</td>
<td>Who</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------</td>
<td>-----</td>
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<td>-----</td>
</tr>
<tr>
<td><strong>Formalised system for access and safety checks at Vanderkloof Resort.</strong></td>
<td>Currently, Vanderkloof SAPS does all safety checks on vessels however there is no agreement in place to ensure that Vanderkloof Resort will ensure all users have been through the safety check. In addition, as the new wash bay will be located at Vanderkloof Boat Club, there is a need for a formalised system to ensure that access through Vanderkloof Resort is managed correctly.</td>
<td>Training of Vanderkloof Resort staff member to check that all vessels accessing the Dam at the resort have the UPN tag and date stamp. Vanderkloof SAPS to undertake spot checks to ensure that Vanderkloof Resort is checking all vessels have UPN tag.</td>
<td>Renosterberg Local Municipality (Management of Vanderkloof Resort) SAPS</td>
<td></td>
</tr>
<tr>
<td><strong>Formalised Safety System in place at the Dam.</strong></td>
<td>To ensure all recreational users have the correct licenses and that all vessels are water-worthy.</td>
<td>Implementation of the UPN System. Safety Checks to be undertaken at the Wash Bay. Wash Bay officer to be trained to undertake Safety Checks. Vanderkloof SAPS to undertake spot checks to ensure safety checks are being done correctly. Doornkloof Nature Reserve will require separate wash bay</td>
<td>CISWP SAPS DWS DENC</td>
<td></td>
</tr>
<tr>
<td><strong>Formalised Safety System in place at Doornkloof Nature Reserve</strong></td>
<td>Currently Doornkloof Nature Reserve does not have a formalised slipway however boats access the Dam through a natural slipway. Due to the distance from Vanderkloof, a separate Safety System is required.</td>
<td>Formalised slipway and wash bay to be built (approved by DWS) Safety Checks to be undertaken at the Wash Bay. Wash Bay officer to be trained to undertake Safety Checks. Business Plan to be provided</td>
<td>DENC</td>
<td></td>
</tr>
<tr>
<td>Objective category/major objective</td>
<td>What</td>
<td>Why</td>
<td>How</td>
<td>Who</td>
</tr>
<tr>
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<tr>
<td>Formalised Permit system for use of Restricted Area</td>
<td>Due to length of the Dam and poor/no radio signal it is be dangerous for users of the Dam to traverse the full length of the Dam.</td>
<td>Recreational users to request permits from Vanderkloof SAPS; Permits only to be approved with proof of water-worthy vessel, skipper’s license, extra petrol (if required) and rental of Personal Locator Beacon (PLB); Doornkloof Nature Reserve to ensure all users of the Dam planning to travel to the Dam wall have requisite PLB</td>
<td>DWS DENC SAPS</td>
<td></td>
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<tr>
<td>Personalised Locator Beacon (PLB) rental system</td>
<td>Due to the length of the Dam and poor/no radio signal, traversing the Dam can be dangerous. It also utilised police resources for rescue operations. The PLB system will ensure quick response to any emergencies.</td>
<td>PLB to be purchased and available for rental from Vanderkloof SAPS and Doornkloof Nature Reserve</td>
<td>DWS DENC SAPS</td>
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<tr>
<td>All unofficial access points to be closed or legalised through an access agreement.</td>
<td>There are number of natural and formal slipways which have been surveyed recently. Access though these slipways are not authorised through agreements with DWS. Agreements are required to authorise this use. Should no agreements be put in place, the access points should be closed.</td>
<td>Agreements to be signed. Yearly surveys to be undertaken to ensure no further slipways are built.</td>
<td>DWS SAPS</td>
<td></td>
</tr>
<tr>
<td>Improved water quality</td>
<td>Upgrade of Vanderkloof WWTW</td>
<td>The WWTW is under capacity and this impacts water quality.</td>
<td>Discussions between DWS and Renosterberg Local Municipality regarding upgrade of WWTW.</td>
<td>DWS Renosterberg Local Municipality</td>
</tr>
<tr>
<td></td>
<td>Monitoring protocol to be set up at the Dam.</td>
<td>To ensure water quality at the Dam does not deteriorate.</td>
<td>DWS to set up monitoring protocol.</td>
<td>DWS</td>
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<tr>
<td>Objective category/major objective</td>
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<tr>
<td>Water Pollution study should be undertaken to determine sources of pollution into the Dam.</td>
<td>Vanderkloof Dam has higher than normal metal concentrations. The source of this needs to be determined.</td>
<td>Appoint specialist to undertake study.</td>
<td>DWS</td>
<td></td>
</tr>
<tr>
<td>Management of Largemouth yellowfish population</td>
<td>Largemouth yellowfish populations have shown some decline and are protected species.</td>
<td>Coordination between DWS, DENC and DAFF to appoint specialist to undertake specialist study. It may be possible to coordinate with Rhodes University and allow PhD or MSc studies on the population. Detailed feasibility study to determine whether small-scale subsistence fishery is feasible.</td>
<td>DWS DENC DAFF</td>
<td></td>
</tr>
<tr>
<td>Small scale Subsistence fishery for Small mouthed Yellowfish population.</td>
<td>Recent feasibility study by Rhodes University suggests that there is a market for small scale fisheries in the area. In addition, previous studies have shown that removal of medium size classes of fish would be beneficial to both Small and Large Mouthed Yellowfish populations. In addition, it would provide economic benefit to the local community.</td>
<td>Detailed Large and Small mouthed Yellowfish Population study required to determine population status in Vanderkloof Dam, Rural Fisheries programme (as per Rhodes University Study) to be undertaken.</td>
<td>DAFF DWS DENC FS-DETEA</td>
<td></td>
</tr>
<tr>
<td>Demarcated area for Angling Club</td>
<td>The Angling Club does not have access to demarcated angling area.</td>
<td>The Zonal Plan has suggested some areas for development and recreation. Agreements between DENC, DWS and Angling Club required. It is suggested that the area known as Vrystaat Kant is leased to the VHK for their use.</td>
<td>DMC DWS DENC VHK</td>
<td></td>
</tr>
<tr>
<td>Feasibility Study for Co-Funded Rowing and Swimming Development School</td>
<td>The length of the Dam lends itself for development of fishing and rowing.</td>
<td>Feasibility study for Rowing and Swimming School; Coordination between DMC and SwimSA and RowSA and SASCO to determine availability of funds.</td>
<td>DMC RowSA SwimSA,</td>
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<td>Objective category/major objective</td>
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<tr>
<td>Vanderkloof Boat Club and Vanderkloof Hengel Klub to become affiliated to National Sporting Bodies and meet required development targets.</td>
<td>National Sporting bodies have development targets which will ensure that both clubs are developing the community around the Dam.</td>
<td>Agreements between DENC and Clubs to have national affiliation requirement. DMC to ensure that all clubs have become affiliated within a year. Clubs will have 3 years to become affiliated so that they can negotiate with national bodies regarding the membership fees</td>
<td>Vanderkloof Boat Club VHK DMC</td>
<td></td>
</tr>
<tr>
<td>Agreements with Vanderkloof Boat Club, VHK and Vanderkloof Resort to take into account access for skills training.</td>
<td>Access to water for skills training is required.</td>
<td>All agreements must allow skills training programmes to take place.</td>
<td>DMC</td>
<td></td>
</tr>
<tr>
<td>Wash Bay Officers and SAMSA Enforcement Officers to be trained.</td>
<td>The Wash Bay Officer and SAMSA Enforcement Officer require the requisite training. This will also serve as skills development.</td>
<td>DEA Working For Water to provide Wash Bay Officer Training; SAMSA to provide Vessel Safety Training to Wash Bay Officer SAMSA to provide SAMSA enforcement officer training.</td>
<td>DEA SAMSA DMC</td>
<td></td>
</tr>
<tr>
<td>First Aid Training for Enforcement Officers and Wash Bay Officers.</td>
<td>First Aid Training for Enforcement Officers will ensure enforcement officers are trained as first responders. It will also allow for skill development.</td>
<td>First Aid Training Programme to be developed.</td>
<td>DMC CIWSP</td>
<td></td>
</tr>
<tr>
<td>Improved institutional arrangements and management</td>
<td>Agreements with DENC and FS-DETEA to be updated.</td>
<td>Current agreements do not take into account equitable access, development or safety.</td>
<td>New agreements to be drafted by DWS in consultation with DENC and FS-DETEA.</td>
<td>DWS DENC FS-DETEA</td>
</tr>
<tr>
<td>Agreements between DENC and Clubs to be drafted.</td>
<td>No current agreements in place.</td>
<td>New agreements to be drafted by DENC in consultation with DWS and recreational clubs.</td>
<td>DENC DWS</td>
<td></td>
</tr>
<tr>
<td>Co-Management Agreements between FS-DETEA and Adjacent landowners.</td>
<td>To ensure land on the Free State side is managed.</td>
<td>New agreements to be drafted by FS-DETEA in consultation with DWS and adjacent landowners</td>
<td>FS-DETEA DWS</td>
<td></td>
</tr>
<tr>
<td>Formation of Fire Management Association.</td>
<td>To ensure all fires are managed in the correct way.</td>
<td>DMC to meet with landowners and form Fire Management Association.</td>
<td>DMC</td>
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<td>Objective category/major objective</td>
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<tr>
<td>Formation of Dam Management Committee (DMC).</td>
<td>To ensure management of recreation at Vanderkloof Dam.</td>
<td>CISWP programme to set up DMC together with UPN System.</td>
<td>CIWSP DWS</td>
<td></td>
</tr>
<tr>
<td>Formation of RMP Steering Committee.</td>
<td>To ensure high level guidance and monitoring of DMC and UPN System.</td>
<td>CISWP Programme to set up RSC together with UPN System.</td>
<td>CIWSP DWS</td>
<td></td>
</tr>
<tr>
<td>Agreements between SAMSA, DWS, LAAPs and other relevant parties to be concluded.</td>
<td>No current agreements in place</td>
<td>New agreements to be drafted by SAMSA, in consultation with DWS and other relevant parties</td>
<td>SAMSA DWS Relevant Parties</td>
<td></td>
</tr>
<tr>
<td>Implementation of local community access card which takes into account socio-economic status of the community.</td>
<td>To ensure access to the Dam is equitable.</td>
<td>Agreement obligations to include access for community members.</td>
<td>DMC</td>
<td></td>
</tr>
<tr>
<td>Information programmes to be implemented by DMC to educate local community about benefits of the Dam.</td>
<td>To increase community use of the Dam.</td>
<td>Co-funding opportunities with SwimSA to be researched. Education programme to be rolled out in schools and churches.</td>
<td>DMC</td>
<td></td>
</tr>
<tr>
<td>PPP for formalised Picnic Area within Vanderkloof Resort (together with management of the Resort).</td>
<td>To increase community use of the Dam.</td>
<td>PPP process to be implemented.</td>
<td>DMC RSC DWS</td>
<td></td>
</tr>
<tr>
<td>Upgrade of Braai/Picnic Area.</td>
<td>To increase community use of the Dam.</td>
<td>Discussions between DWS, DENC and Renosterberg LM.</td>
<td>DWS DMC DENC Renosterberg LM</td>
<td></td>
</tr>
<tr>
<td>DMC to have dedicated agenda item regarding EIAs and developments in the area.</td>
<td>To ensure DMC is aware of all developments around the Dam.</td>
<td>Agenda item regarding developments to be included DMC to discuss and comment on all EIA’s in the area.</td>
<td>DMC</td>
<td></td>
</tr>
<tr>
<td>Demarcated area for angling.</td>
<td>The angling association does not have a demarcated area for angling.</td>
<td>RMP has suggested some areas which area useful for recreation and development. DMC to initiate discussions with DENC and Vanderkloof Resort and ensure proper agreements are in place.</td>
<td>DMC</td>
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<td>Objective category/major objective</td>
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<td>House Boats to link Rolfontein Nature Reserve to Doornkloof Nature Reserve.</td>
<td>Unlock Economic potential of the Dam.</td>
<td>Feasibility Study to be undertaken; Hydrographic survey to be undertaken; Agreements between DWS and DENC.</td>
<td>DMC DWS DENC</td>
<td></td>
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<tr>
<td>Water Planes.</td>
<td>Unlock Economic potential of the Dam.</td>
<td>Feasibility Study to be undertaken; Hydrographic survey to be undertaken; Agreements between DWS and DENC (if linked to Nature Reserves); PPP process for private party (dependent on expression of interest).</td>
<td>DMC DWS DENC</td>
<td></td>
</tr>
<tr>
<td>Hiking Trail between Doornkloof and Rolfontein Nature Reserves</td>
<td>Unlock Economic potential of the Dam.</td>
<td>Feasibility Study to be undertaken; Hydrographic survey to be undertaken; Agreements between DWS and DENC.</td>
<td>DMC DWS DENC</td>
<td></td>
</tr>
<tr>
<td>Picnic Area at Vanderkloof Resort</td>
<td>Unlock Economic potential of the Dam.</td>
<td>Feasibility Study to be undertaken; PPP for Management of Resort and Picnic Areas.</td>
<td>DMC DWS Renosterberg LM</td>
<td></td>
</tr>
<tr>
<td>Picnic Areas around Dam</td>
<td>Unlock Economic potential of the Dam.</td>
<td>RMP has identified possible picnic areas; WULA’s to be acquired if necessary. Agreements with recreational clubs to take into account management.</td>
<td>DMC DWS DENC</td>
<td></td>
</tr>
<tr>
<td>Improved tourism</td>
<td>PPP to manage Vanderkloof Resort</td>
<td>The resort is an economic opportunity that requires private funding and management to ensure it is profitable.</td>
<td>PPP process.</td>
<td>DWS</td>
</tr>
<tr>
<td>Improved Road Signage</td>
<td>The road signage to the Dam is difficult to read and needs to be upgraded.</td>
<td>PPP process related to Vanderkloof Resort to include road signage improvements. Discussions with Department of Transport.</td>
<td>DMC DWS Department of Transport</td>
<td></td>
</tr>
<tr>
<td>Formalisation of Eskom power station tours</td>
<td>The Eskom power station offers an unique opportunity for tourism.</td>
<td>DWS and Eskom to meet and discuss possibility of tours. Possible Small Cap PPP to manage tours (together with Dam wall tours).</td>
<td>DMC DWS Eskom</td>
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<tr>
<td>Objective category/major objective</td>
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<tr>
<td>Natural Resource Management</td>
<td>Formalisation of Dam Wall Tours</td>
<td>The Vanderkloof Dam wall offers a unique opportunity for tourism.</td>
<td>DWS and Eskom to meet and discuss possibility of tours. Possible Small Cap PPP to manage tours (together with power station tours).</td>
<td>DMC</td>
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<td>DWS</td>
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<td>A Containment Plan for Invasive Fish Species such as Carp should be developed and implemented so that the economic benefits of recreational angling can be achieved without the further spread of these species to other valuable water resources</td>
<td>Carp is a Category I(b) invasive species which can provide economic benefits through recreational angling. Based on new draft legislation, a containment plan/catch and destroy plan for Carp is required (should the legislation be promulgated).</td>
<td>A Containment Plan for Carp should be compiled taking into account NEMBA requirements</td>
<td>DMC DEA</td>
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<td>DWS</td>
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<td>FS-DETEA</td>
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<td>DENC</td>
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<td></td>
<td>Water quality monitoring to determine sources of pollution</td>
<td>Current status quo of water quality suggests that recreational use is acceptable. This needs to be monitored to ensure no change.</td>
<td>DWS to set up monitoring protocol for Vanderkloof Dam.</td>
<td>DWS</td>
</tr>
<tr>
<td></td>
<td>Management of Alien Invasive Aquatic Species</td>
<td>Currently the Dam does not have an aquatic Invasive alien species problem. This needs to be maintained.</td>
<td>Wash Bays</td>
<td>DMC</td>
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<td>DWS</td>
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5. WAY FORWARD

5.1. Compilation of Business Plans

Based on the strategic objectives identified for Vanderkloof 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

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.
6. REFERENCES


Alexander, R.A. and Van Wyk, D.I. 2005. Pre-feasibility study into measures to improve the management of the lower orange river and to provide for the future developments along the border between South Africa and Namibia. DWAF Report Number PB 0003/00/4403


DWAF. 2002. Lower Orange Water Management Area (LOWMA)- Water Resources Situation Assessment. Report No. 14000/00/0101. A project undertaken by V3 Consulting Engineers (Pty), Department of Water Affairs and forestry, Pretoria, South Africa by A.J. Smook, D.J. Pournara and A.R. Craig. 34 pp. + appendices


