

**OMATAKO DAM-VON BACH PIPELINE SCHEME**

**ENVIRONMENTAL MANAGEMENT PLAN**

**Date:**  
April 2020

**Prepared by:**  
NamWater, Private Bag 13389, Windhoek, Namibia  
Contact Person: N.P du Plessis  
Tel: +264-6171 2093  
Email: [Plessisn@namwater.com.na](mailto:Plessisn@namwater.com.na)

Table of Contents

LIST OF ABBREVIATIONS .....III

1. PURPOSE OF THE EMP ..... 1

2. INTRODUCTION ..... 2

3. EXISTING OMATAKO DAM - VON BACH WATER PIPELINE INFRASTRUCTURE ..... 4

    3.1 Water Source ..... 4

    3.2 Disinfection..... 4

    3.3 Dams..... 4

    3.4 Pipe Work ..... 4

    3.5 Reservoirs ..... 5

    3.6 Power Supply and Control System ..... 5

    3.7 Maintenance..... 5

    3.8 Pumps..... 5

    3.9 Air Valves ..... 5

    3.10 Pressure Gauges and Transducers ..... 5

    3.11 Reservoirs ..... 6

    3.12 Pipe Breaks/leaks..... 6

    3.13 Maintenance..... 6

    3.14 Pumps..... 6

    3.15 Air Valves ..... 6

    3.16 Pressure Gauges and Transducers ..... 6

    3.17 Reservoirs ..... 6

    3.18 Pipe Breaks/leaks..... 6

4. BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT ..... 8

    4.1 Climate ..... 8

        4.1.1 Precipitation ..... 8

        4.1.2 Temperature ..... 8

    4.2 Topography and Geology ..... 8

    4.3 Natural Flora ..... 8

    4.4 Fauna..... 8

5. THE LEGAL ENVIRONMENT ..... 9

    5.1 The Constitution of the Republic of Namibia..... 9

    5.2 Environmental Assessment Policy (1995) ..... 9

    5.3 Environmental Management Act (No 7 of 2007) (EMA) ..... 9

    5.4 EIA Regulations Government Notice No. 30, promulgated on 6 February 2012 . 10

    5.5 Water Act 54 of 1956 and Water Resources Management Act 11 of 2013 ..... 10

6. RESPONSIBLE PARTIES ..... 11

7. ENVIRONMENTAL MANAGEMENT PLAN ..... 12

8. MANAGEMENT ACTIONS ..... 13

|       |   |    |
|-------|---|----|
| 8.1   | Operation and Maintenance phase of the Omatako Dam - Von Bach Water Pipeline Scheme ..... | 13 |
| 8.1.1 | Introduction .....  | 13 |
| 8.2   | Maintenance Procedures.....   | 15 |
| 8.3   | Facility Management and Operations .....  | 15 |
| 8.4   | Routine Maintenance and Repairs .....   | 15 |
| 8.5   | Environmental Awareness.....  | 15 |
| 8.6   | Waste and Pollution Management.....   | 15 |
| 8.6.1 | Waste and Pollution Prevention .....  | 15 |
| 8.6.2 | Hazardous Materials.....  | 16 |
| 8.6.3 | Noise Management.....   | 16 |
| 8.7   | Health and Safety.....  | 16 |
| 9.    | SITE CLOSURE AND REHABILITATION.....  | 18 |
| 10.   | NAMWATER ENVIRONMENTAL CODE OF CONDUCT .....  | 19 |
| 11.   | REFERENCES .....  | 24 |
|       | ANNEXURE 1: GRIEVANCE PROCEDURE AND REGISTRATION FORM .....                               | 25 |

## LIST OF ABBREVIATIONS

|                 |                                      |
|-----------------|--------------------------------------|
| <b>AIDS</b>     | Acquired Immune Deficiency Syndrome  |
| <b>CoC</b>      | Code of Conduct                      |
| <b>DEA</b>      | Directorate of Environmental Affairs |
| <b>EMA</b>      | Environmental Management Act         |
| <b>EMP</b>      | Environmental Management Plan        |
| <b>HIV</b>      | Human Immunodeficiency Virus         |
| <b>I&amp;AP</b> | Interested and Affected Parties      |
| <b>MET</b>      | Ministry of Environment and Tourism  |
| <b>NEM</b>      | NamWater Environmental Manager       |
| <b>MSDS</b>     | Material Safety Data Sheet           |
| <b>NWQG</b>     | Namibian Water Quality Guidelines    |
| <b>NWQS</b>     | Namibian Water Quality Standards     |
| <b>STI's</b>    | Sexually Transmitted Infections      |

## **1. PURPOSE OF THE EMP**

This Environmental Management Plan (EMP) has been compiled and updated for the management of potential environmental impacts during the operation, and decommissioning phases of the existing Omatako Dam - Von Bach Water Pipeline Scheme. Best practice is proposed for the generic issues of construction management and supervision as well as the on-going management and operation of the water supply scheme.

In terms of the Environmental Assessment Policy of 1994 and the Environmental Management (Act No 7 of 2007) (EMA), the activities required for the construction of the proposed project requires authorization from the Directorate of Environmental Affairs at the Ministry of Environmental and Tourism (MET: DEA).

An Environmental Clearance Certificate (ECC) was originally issued in 2017 and this EMP serves as an application for the renewal of the ECC.

## 2. INTRODUCTION

The Omatako dam to Von Bach Scheme is located in the Otjozondjupa region. The Omatako dam is situated approximately 100 km from both Okahandja to the south and Otjiwarongo to the north. The outlet for the pipeline scheme is upstream from the Von Bach dam, which is situated 6 km south-east of Okahandja.

The main purpose of the Omatako dam to Von Bach pipeline scheme is to convey raw-water from Omatako Dam to Von Bach Dam

**The scheme consists of 3 components:**

### **Omatako dam**

The Omatako dam was designed to serve as a flood catchment dam on the Omuramba Omatako. In addition to the flood catchment, the dam also acts as a balancing dam for the water transported via the Eastern National Western Carrier (ENWC).

The operation of the scheme was modified in 1995 to allow water from the ENWC canal to be transported directly to the Omatako base pump station. The provision of an independent pump set to the outlet tower also afforded the opportunity to pump the dead storage of the dam to Von Bach dam.

Water abstracted through the outlet tower is piped through the dam wall to Omatako base pump station, located below the dam wall.

### **Omatako – Otukarru – Pump Mains Section**

The Omatako – Otukarru pumping main consist of the Omatako base pump station, Omatako Booster pump station, the connecting pipeline between the pump stations, the reservoir at Omatako booster pump station and the Otukarru pressure break reservoir.

At Omatako base pump station the water can be abstracted from either the Omatako dam outlet tower or directly from the canal and pumped to Omatako booster pump station, approximately 35 km south the Omatako dam. From Omatako booster pump station the water is pumped another 35 km south to the Otukarru pressure break reservoir.

### **Otukarru – Von Bach Gravity Mains**

From the Otukarru pressure break reservoir, water is transported to Von Bach dam via a 25 km long gravity main. The gravity pipeline ends in a tributary of the Swakop River, 6 km north-east of the Von Bach dam wall and 8 km west of Okahandja.

The location of Omatako Dam-Von Bach is depicted in **Figure 1**.

The EMP is for an existing scheme and it is therefore only for the operation and maintenance of the scheme.

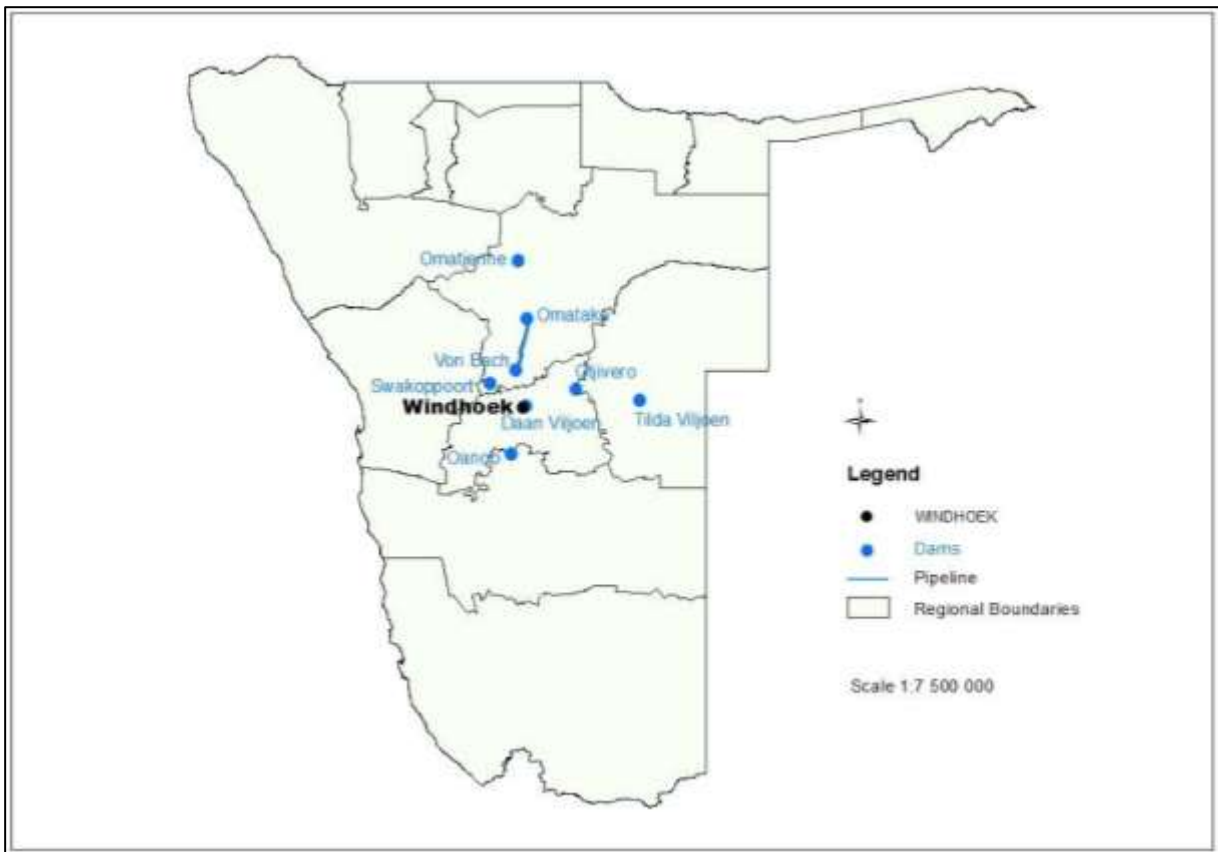


Figure 1: Omatako Dam-Von Bach Pipeline Location Map

### **3. EXISTING OMATAKO DAM - VON BACH WATER PIPELINE INFRASTRUCTURE**

#### **3.1 Water Source**

The Omatako dam is the main water source and is fed primarily from the Omuramba Omatako and Ehamano River basins with a catchment area of roughly 5 320 km<sup>2</sup>.

In addition to the flood catchment, the dam also acts as a balancing dam for the water transported via the ENWC canal that terminates on the northern side of the Omatako dam wall.

At Omatako dam there are 12 staff housing units which are supplied with water from a borehole via an elevated water tank. Some of the houses are occupied by NamWater personnel, while the remaining houses are rented by private individuals or government.

Water for utility use at Omatako base pump station is from a salty borehole close to the pump station. The water is pumped into the elevated plastic tank next to the borehole.

Water for the caretaker's house at the Omatako booster pump station is also fed from a borehole and pumped into an elevated water tank at the house.

A schematic layout of the existing infrastructure is indicated in **Figure 2** below.

#### **3.2 Disinfection**

Since the Omatako-Von Bach system is a raw water supply scheme, no chlorination is applied. Water is pumped from the Omatako dam into the Swakop River upstream of the Von Bach dam, with a number of open reservoirs along the way.

As for the staff housing, water from the borehole is chlorinated using floating chlorine dispensers inside the elevated tanks.

#### **3.3 Dams**

The Omatako Dam is situated approximately 100 km north of Okahandja and some 160 km north of Windhoek. It is located on the Omatako River. The dam has a fairly high surface area/volume ratio and hence is subject to high evaporation losses. Water is therefore transferred to the Von Bach Dam (located on the Swakop River) as quickly as possible from where it supplies Windhoek

The outlet works consist of a wet-well type outlet tower with three variable level sluice gated (spindle/hand wheel operated) openings which lead to a 1000 mm diam. concrete pipe beneath the embankment. The openings are protected with a trash screen on the outside. Upstream and downstream control on the pipe is by means of a 1000 mm diam. gate valve. The upstream control valve is located in a control room adjacent to the outlet tower.

A floating pump system was installed after completion of the dam itself, to allow abstraction of the dead storage volume in the dam.

The upstream slope protection of the dam embankment comprises of rip-rap rock. Monitoring of the dam's safety over the years included dam crest settlement surveys and measurement of seepage through the foundation in manholes at the downstream toe and at v-notches.

#### **3.4 Pipe Work**

The 70 km long pipeline from the Omatako base pump station to Otukaru pressure break reservoir is a 1 200 mm diam. pre-stressed concrete pipe (Class 220A – 60A). Air release valves are



mostly 200 mm diam. double orifice air release valves spaced at 600 m intervals and the scour valves are 250 mm diam. The design capacity of the pipe is indicated as 7 200 m<sup>3</sup>/h.

From Otukaru pressure break reservoir the pipeline is a pre-stressed 1 050 mm diam. concrete pipe for 13 km, reduces to a 940 mm diam. for the next 9 km and for the last 2 km the pipe is 900 mm diam. asbestos cement. The design capacity of the pipeline is 8 000 m<sup>3</sup>/h. The last 12 km of the pipeline is located mainly above ground due to the nature of the terrain, with short sections below ground in rivers and road crossings. The pipe is supported above ground on concrete pedestals. The outlet is a square concrete box in the river bed from where the water flows to the Swakop River and into the dam.

### **3.5 Reservoirs**

The storage facilities consist of the reservoir at Omatako booster pump station and the Otukaru pressure break reservoir.

The reservoir at Omatako booster pump station is situated close to the D2116 on the farm Okamaja. It consists of a round concrete reservoir without a roof. The reservoir has a full service capacity of 4 747 m<sup>3</sup>, a draw down capacity of 2 706 m<sup>3</sup> and the capacity at the emergency stop level is 2 040 m<sup>3</sup>.

### **3.6 Power Supply and Control System**

Pump control at the pump stations is by telemetry and operation is controlled from the Von Bach NamWater station.

The Kirloskar pumps have variable speed drives which allow for accurate control during start and stopping of the individual pumps to reduce pipeline surge effects.

The power supply for the Omatako Base Pump Station is a NamPower 10 MVA 66/11 kV substation located adjacent to the pump station yard. The maximum demand authorised for the pump station is 3000 kVA (2400 kW).

### **3.7 Maintenance**

Maintenance is done by a permanent NamWater team.

### **3.8 Pumps**

All motors bearings should be lubricated with a high-temperature lithium-based grease after 3000 hours.

If a pump/s were out of operation for six months, lubrication is required before service commence on all motor bearings.

### **3.9 Air Valves**

The valves must be opened monthly to be descaled and cleaned to ensure effective operation. The service intervals will depend on the severity of the conditions.

### **3.10 Pressure Gauges and Transducers**

The gauge cocks must be turned monthly to bleed-off air and ensure accurate readings. Turning prevents scale accumulation which prevents the gauge cock from functioning. The operational or service intervals will depend on the severity of the conditions.

### **3.11 Reservoirs**

The reservoirs should be checked for leaks and other damages on a monthly basis. If leaks are detected, it should be fixed immediately.

### **3.12 Pipe Breaks/leaks**

Monthly monitor of pipes should be done to avoid wastage of water in an event a major pipe break. The pipeline corridor for maintenance work is 10 m by 5 m.

### **3.13 Maintenance**

Maintenance is done by a permanent NamWater team.

### **3.14 Pumps**

All motors bearings should be lubricated with a high-temperature lithium-based grease after 3000 hours.

If a pump/s were out of operation for six months, lubrication is required before service commence on all motor bearings.

### **3.15 Air Valves**

The valves must be opened monthly to be descaled and cleaned to ensure effective operation. The service intervals will depend on the severity of the conditions.

### **3.16 Pressure Gauges and Transducers**

The gauge cocks must be turned monthly to bleed-off air and ensure accurate readings. Turning prevents scale accumulation which prevents the gauge cock from functioning. The operational or service intervals will depend on the severity of the conditions.

### **3.17 Reservoirs**

The reservoirs should be checked for leaks and other damages on a monthly basis. If leaks are detected, it should be fixed immediately.

### **3.18 Pipe Breaks/leaks**

Monthly monitor of pipes should be done to avoid wastage of water in an event a major pipe break. The pipeline corridor for maintenance work is 10 m by 5 m.

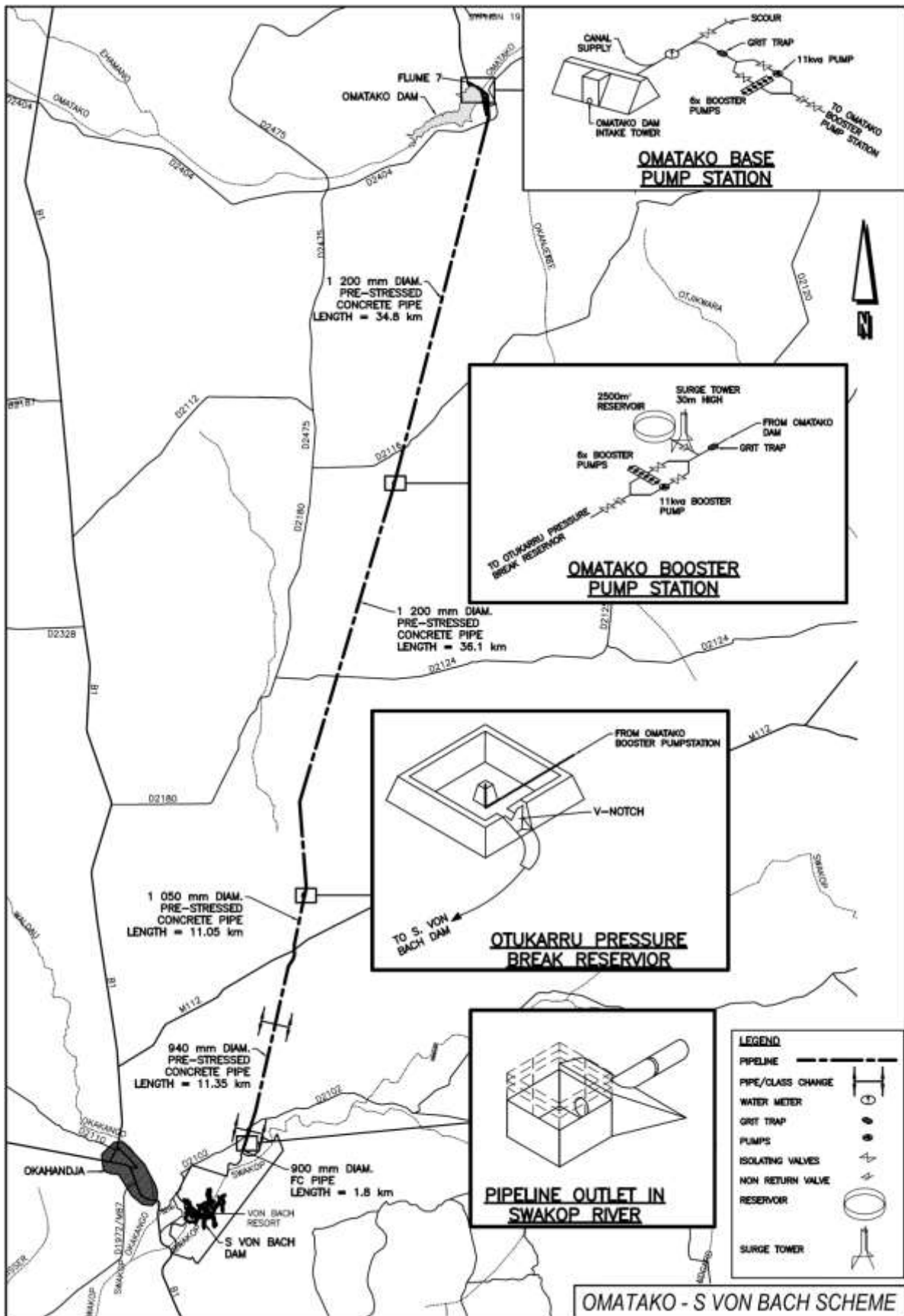


Figure 2: Omatako Dam-Von Bach – Ombinda Scheme Schematic

## 4. BRIEF DESCRIPTION OF THE RECEIVING ENVIRONMENT

The baseline description provided below focuses on the receiving environment:

### 4.1 Climate

The climate varies from semi-arid to sub-humid and is particularly dominated by the dry Sub-tropical High Pressure Zone. The area is influenced by the Botswana Anticyclone during summer and the South Atlantic Anticyclone in winter. During the winter months, the South Atlantic Anticyclone is regularly replaced by Temperature Zone cold fronts from the south, resulting in spells of low temperatures. During the summer months, the Botswana Anticyclone is occasionally replaced by the Inter-Tropical Convergence Zone from the North-east, resulting in thunder showers (Enviro Dynamic, 2010).

#### 4.1.1 Precipitation

The highest rainfall per month received usually occurs in February and there is about 40 days of rain per year. The annual rainfall for Okahandja is approximately 350 mm. The rainfall frequency is irregular and can vary by 40% per annum (Enviro Dynamic, 2010).

The humidity of the area ranges from 10-20% during September and 70-80% during March. The variance in humidity during the day is high with an up to 40% difference in one day.

The average annual evaporation is about 2100 mm which results in an average annual water deficit of up to 1900 mm (Enviro Dynamic, 2010).

#### 4.1.2 Temperature

The average annual temperature in the Omatako-Von Bach area is 19.47 °C. The coldest month is July with average minimum temperatures of 4°C, with December being the hottest month with average maximum temperatures of up to 34°C. The area receives between 10 to 20 days of frost annually. Extreme daily and seasonal variations are the norm for the central part of the country.

### 4.2 Topography and Geology

The landscape is classified as being in the Khomas Hochland Plateau region, which is rolling hills in the west with many summit heights equivalent reflecting older land surfaces. The topography falls off to the east as the Kalahari is approached.

The geology in the area consists of alluvial soil surface cover and the subsurface geology consisting of fractured mica schist, minor quartzite, graphitic schist and marble of the Kuiseb Formation in the Swakop Group. Groundwater flows in a westerly direction, along fractures and faults.

### 4.3 Natural Flora

The study area falls on the edge of a narrow band of Thorn-bush Shrub-land wedging into predominant Highland Shrub-land. The area is categorised as having a good grazing and browse availability. Dominant tree species are *Acacia erioloba* (Camel Thorn), *Acacia erubescens* (Yellow-bark Acacia), *Acacia karroo* (Sweet-thorn) and *Acacia mellifera* (Black-Thorn). There is some limited bush encroachment by *Acacia mellifera*. (Goldblatt et al., 1998).

### 4.4 Fauna

The study area does fall within the Acacia Tree-and-shrub Savanna sub-biome, which caters for the occurrence of the following faunal species: Kudu (*Tragelaphus strepsiceros*), Eland (*Taurotragus oryx*), Oryx (*Oryx gazelle*), Impala (*Aepyceros melampus*), Waterbuck (*Kobus*

*ellipsiprymnus*) and the Mountain Zebra (*Equus zebra*). The diversity of the bird species is high with up to 230 species recorded within the area (Enviro Dynamic, 2010).

## **5. THE LEGAL ENVIRONMENT**

A legal review was done and the key laws of concern include those which protect the ecological integrity of the Omatako Dam - Von Bach ecosystem and its water resource, including the Water Act of 1954 and the Water Resources Management Act of 2004, and applicable international treaties such as the Convention on Biological Diversity. These laws and conventions place Namibia under an obligation to conserve the ecological integrity of the Omatako Dam - Von Bach ecosystem for the sustainable use by Namibians.

### **5.1 The Constitution of the Republic of Namibia**

There are two clauses contained in the Namibian Constitution that are of particular relevance to sound environmental management practice, viz. articles 91(c) and 95(l). In giving effect to articles 91(c) and 95(l) of the Constitution of Namibia, general principles for sound management of the environment and natural resources in an integrated manner have been formulated. The formulation of these general principles resulted in the Namibia's Environmental Assessment Policy of 1994. To give statutory effect to this Policy, the Environmental Management Act was approved in 2007, and gazetted as the Environmental Management Act (Act No. 7 of 2007) (herein referred to as the EMA. As the organ of state responsible for management and protection of its natural resources, MET: DEA is committed to pursuing the 13 principles of environmental management that is set out by Part 2 of the Act.

To summarise, Articles 91(c) and 95(l) refer to:

- Guarding against over –utilisation of biological natural resources;
- Limiting over-exploitation of non-renewable resources;
- Ensuring ecosystem functionality
- Protecting Namibia's sense of place and character;
- Maintaining biological diversity and
- Pursuing sustainable natural resource use.

### **5.2 Environmental Assessment Policy (1995)**

Cabinet endorsed Namibia's Environmental Assessment Policy in 1995 as the first formal effort in Namibia to regulate the application of environmental impact assessments and environmental management. Amongst others, the Policy provides a procedure for conducting EIA's which sets out to:

- Better inform decision makers and to promote accountability of decisions taken;
- Strive for a high degree of public participation and involvement of all sectors of the Namibian community during the execution of the EIA;
- Take into account the environmental costs and benefits of projects and programmes;
- Promote sustainable development in Namibia;
- Ensure that anticipated adverse impacts are minimized and that positive impacts are maximized.

### **5.3 Environmental Management Act (No 7 of 2007) (EMA)**

The Environmental Management Act (EMA) was promulgated in 2007 by Parliament and gives effect to the Environmental Assessment Policy. The Act specifies the environmental assessment procedures to be followed as well as the listed activities (activities that require an EIA).

Of relevance to this project are the following listed activities, as provided in Section 27 of this Act, which include:

- Water use and disposal;
- Transportation

#### **5.4 EIA Regulations Government Notice No. 30, promulgated on 6 February 2012**

The regulations, promulgated in terms of the EMA, were promulgated on 6 February 2012 and indicated certain activities that require an Environmental Clearance from MET: DEA prior to commencing.

#### **5.5 Water Act 54 of 1956 and Water Resources Management Act 11 of 2013**

The Water Resources Management Act 11 of 2013 is presently without regulations; therefore the Water Act 54 is still in force. The Act provides for the management and protection of surface and groundwater resources in terms of utilisation and pollution.

## 6. RESPONSIBLE PARTIES

NamWater's Environmental Manager is primarily responsible for the implementation of the EMP during the operational and maintenance phases.

### 6.1 NamWater

NamWater, as the implementing agency, is responsible for:

- Ensuring that the objects of the EMP are being obtained;
- Ensuring that all environmental impacts are managed according to the environmental principles of avoiding, minimizing, mitigating and rehabilitation. This will be achieved by successful implementation of the EMP;
- Ensuring that appropriate monitoring and compliance auditing are executed;
- Ensuring that the environment is rehabilitated to its natural state as far as possible.

NamWater shall ensure that all employees attend an Environmental, Awareness Training Course. This course shall be structured to ensure that attendees:

- Become familiar with the environmental controls contained in the EMP;
- Are made aware of the need to conserve water and minimise waste;
- Are made aware of NamWater's Code of Conduct;
- Are aware that a copy of the EMP is readily available at the plant and that all staff are aware of the location and have access to the document;
- Are informed that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) will be placed at prominent locations throughout the site.

## **7. ENVIRONMENTAL MANAGEMENT PLAN**

An Environmental Management Plans (EMP) is an important tool focusing on the management actions that are required to ensure environmental compliance of a particular project.

EMP implementation is a cyclical process that converts mitigation measures into actions and through cyclical monitoring, auditing, review and corrective action, ensures conformance with stated EMP aims and objectives. Monitoring and auditing, feedback for continual improvement ensures that environmental performance has been provided and corrective action is taken for an effective EMP.

The main aim of this EMP is to ensure that the project complies with the goals of the Namibian Environmental Management Act (No. 7 of 2007); and, more specifically, to provide a framework for implementing the management actions as described in the EMP for the operational and maintenance phases of the scheme. Best practice is proposed for the operation of the scheme.

There are some environmental impacts that cannot be avoided. These environmental impacts require mitigation, and in order to mitigate against these impacts an EMP is required. The EMP aims to ensure best practises are implemented and environmental degradation is avoided through appropriate environmental protection, adherence to legal requirements and maintaining good community relationships.

MET indicated that EMP's for existing operations are sufficient.

The project activities are grouped according to the different operational processes and stages. Most of the impacts can be reduced through good housekeeping.



## **8. MANAGEMENT ACTIONS**

### **8.1 Operation and Maintenance phase of the Omatako Dam - Von Bach Water Pipeline Scheme**

#### **8.1.1 Introduction**

The Operational Phase Section relates to the management and mitigation measures required to ensure that the continuation of the bulk water supply network and the maintenance of the infrastructure is operated in a manner that demonstrates responsible, precautionary environmental management.

The EMP will address specific areas of concern in terms of the long-term environmental management of the affected environment and is intended to serve as a guide to the on-going management of the water supply scheme site as well as the affected environment. The EMP will therefore aim to provide NamWater with the necessary tools to ensure that the potential impacts on the natural environment of the site during the operation of the water supply scheme are minimised. Moreover, it will aim to ensure that the infrastructure is operated and maintained according to Best Practice, in an environmentally sensitive and sustainable manner, and that the operation of the infrastructure does not result in reasonably avoidable environmental impacts.

**Table 2: Operation and Maintenance Phase Management Table**

| Issue                                | Objective  | Strategy   | Actions   | Time frame  |
|--------------------------------------|--|--|---|---|
| Maintenance and emergency procedures | To ensure correct procedures are in place to avoid environmental impacts associated with maintenance activities as well as proactive intervention to avoid, and if required, to respond to emergencies | <ul style="list-style-type: none"> <li>• Establish environmentally sensitive and technically sound maintenance procedures as well as reporting structures.</li> <li>• Compile a staff competency assessment and training programme.</li> <li>• Establish emergency procedures to ensure appropriate response and minimise potential risk to the biophysical and social environment.</li> </ul> | <ol style="list-style-type: none"> <li>1. Establish regular reporting procedures on maintenance</li> <li>2. Undertake regular inspection and maintenance of all infrastructure to ensure in working order and to assess damaged / deficient equipment, as per the O&amp;M Manual.</li> <li>3. Review, and if necessary, revise maintenance manual.</li> <li>4. Establish emergency procedures guidelines for the blockage/failure, flooding, contaminant removal and disinfection, power failure and fire of the scheme.</li> <li>5. Implement the response procedures when emergency incident occurs.</li> <li>6. Complete the incident report checklist in the case of emergency and keep with monitoring records for submission.</li> <li>7. Undertake annual education course for all operational staff.</li> <li>8. Review, and if necessary revise emergency manual.</li> </ol> | <p>Bi-monthly for the lifespan of infrastructure as per the maintenance manual.</p> <p>Bi-annually for lifespan of works.</p> <p>When emergency incident occurs.</p> <p>Emergency incident</p> <p>Annually for lifespan of operation.</p> <p>Annually for lifespan of operation</p> <p>Annually for lifespan of operation</p> |

## **8.2 Maintenance Procedures**

The optimal operation and effective maintenance of all the scheme components is important in protecting the environment and ensuring that resources are not wasted and environmental incidents arising out of equipment or infrastructure failures, are avoided. Operation and Maintenance Manuals are available for the Omatako Dam - Von Bach water pipeline. The manuals provide a detailed guidance on the operation of all machinery and associated systems as well as related maintenance procedures, including maintenance schedules. Implementation of this manuals by NamWater will facilitate the proactive management of potential risks and thus result in impacts on the receiving environment being averted.

The maintenance procedures set out in the manuals, provides specific guidance in terms of the monitoring and maintenance of the scheme components. These procedures will specify the equipment item and specific component of each piece of equipment requiring checking, the scope and nature of the check that is to be carried out including detailed instructions related to the specific check, and the programme for conducting each check.

## **8.3 Facility Management and Operations**

NamWater shall ensure that sufficient budget allocations and provisions are made available to ensure that the infrastructure can be adequately operated and maintained. NamWater must also attend to damage to the scheme components resulting in water loss as a matter of high priority.

## **8.4 Routine Maintenance and Repairs**

The condition of the infrastructure shall be inspected routinely and a maintenance list compiled. Identified, preventative maintenance issues shall be undertaken as soon as possible. Any wastes arising from the repair and maintenance work must be removed and disposed-off at a designated waste deposal site as part of the operation.

## **8.5 Environmental Awareness**

Instilling a sense of environmental awareness and consideration in all employees, but especially those involved with the scheme operations is vital to the overall success of any environmental management plan. It is therefore recommended that a general environmental awareness course for the Scheme Staff Members, who may be required to carry out duties on the scheme, be undertaken.

## **8.6 Waste and Pollution Management**

### **8.6.1 Waste and Pollution Prevention**

To prevent the improper disposal of waste and to prevent pollution, the following management actions shall be enforced:

- All waste will be removed to an appropriate waste dump.
- No waste should be buried.
- General Waste: Includes waste paper, plastic, cardboard, harmless organic (e.g. vegetables) and domestic waste.
- No littering will be allowed. The plant area will be kept free of waste at all times.
- Provide sufficient waste bins at worksites. Make sure that all waste is removed from the worksites.

- Hazardous Substances include: sewerage, fuels, lubrication oils, hydraulic and brake fluid, solvents, paints, anticorrosives, insecticides and pesticides, chemicals, acids etc. It should be disposed of at designated hazardous disposal sites.
- Contaminated soil should be stored in drums and taken to the nearest appropriate waste dumpsite.
- Do not change oil on uncovered ground. Drip trays will be used to catch oil when vehicles are repaired in the field.
- Used oil and hydraulic fluids will not be discarded on the soil or buried. It will be removed from site and taken back to an appropriate dump.
- In the event of a hazardous spill:
  - ✓ Immediately implement actions to stop or reduce the spill.
  - ✓ Contain the spill.
  - ✓ Arrange implementation of the necessary clean-up procedures.
  - ✓ Collect contaminated soil, water and other materials and dispose it at an appropriate waste dumpsite.
- Used solvents and grease should be stored in drums or other suitable containers. It should be sealed and recycled or disposed at an appropriate disposal site.
- Hazardous waste should not be burnt.
- Bunding, concrete slabs and/or other protective measures should be installed where hazardous materials are handled.
- Ensure that the staff are informed and have information pertaining to the management of spills or ingestion.

### **8.6.2 Hazardous Materials**

Where hazardous materials are required for repair and maintenance work (including fuels and oils), care will be taken to ensure that a competent individual is appointed to enforce the responsible use of such materials. The operational staff or maintenance teams shall carry a copy of the relevant Material Safety Data Sheet (MSDS) whenever using such materials. The Scheme Supervisor shall ensure that persons working with hazardous materials have been trained in the handling of such substances, as well as in emergency procedures to be followed in the event of an accidental spillage or medical emergency. Maintenance teams shall also carry a spill kit containing the appropriate neutralizing chemicals, absorbent materials and other relevant equipment required to undertake a clean-up of any spill that may occur.

### **8.6.3 Noise Management**

During maintenance operations, all silencing mechanisms on all equipment must be in a good state of repair. Except for in emergency situations, no amplified sound may be broadcast. All routine maintenance shall be restricted to daylight hours.

## **8.7 Health and Safety**

To minimise the risk of HIV infection and the increase of STI's and the occurrence injuries the following management actions shall be enforced:

- Provide an AIDS awareness programme to all the staff.

- Make sure that all staff are equipped and know how to use safety and protective gear. This includes hard hats, goggles, hearing protectors, dusk masks, steel-toed shoes etc.
- Keep a comprehensive first aid kit at Scheme.
- Establish an emergency rescue system for evacuation of serious injured people.
- Emergency procedures for accidents should be communicated to all employees.
- Dangerous areas must be clearly marked and access to these areas controlled or restricted.
- Good driving and adherence to safety rules will result in a minimum number of road and workplace accidents.
- Fire extinguishers must be available at all refuelling sites. Staff should be trained to handle such equipment.
- Nobody is allowed to dispose a burning or smouldering object in an area where it may cause the ignition of a fire.
- Hazardous substances must be kept in adequately protected areas to avoid soil, air or water pollution.
- Work areas, such as these for the maintenance of equipment, must be on concrete slabs.
- Explosives should be stored according to the prescribed regulations.

## 9. SITE CLOSURE AND REHABILITATION

Rehabilitation is the process of returning the land in a given area that has been disturbed by construction and earthworks to some degree of its former state, or an otherwise determined state. Many projects, if not all, will result in the land becoming degraded to some extent. However, with proper rehabilitation most impacts associated with the reservoir construction project, could be mitigated and restored to an acceptable level. Poorly rehabilitated construction areas provide a difficult legacy issue for governments, communities and companies, and ultimately tarnish the reputation of operators as a whole.

Objectives of proper site closure and rehabilitation include the following:

- Reduction or elimination of the need for a long-term management program to control and minimise the long-term environmental impacts;
- Clean-up, treatment or restoration of contaminated areas (e.g. soils contaminated by oil or fuel spills, concrete spills, etc.). Excavation of contaminated material and disposal thereof in an acceptable manner.

Rehabilitation measures to implement:

- a. A site inspection will be held quarterly by the scheme supervisor after every maintenance work during operation of the scheme. Rehabilitation will be done to the satisfaction of the ENV section and MET.
- b. Frequent inspections of the scheme and effective follow-up procedures, to prevent minor defects from becoming major repair jobs.
- c. Make sure all soil polluted during maintenance work is properly stored in drums and removed to an appropriate waste dump.
- d. Make sure all windblown litter is removed once maintenance has seized.
- e. Make sure that all potential hazards (i.e. the sewerage pit) are properly closed and left in a safe and neat position.

Rehabilitation will be completed when the above have be achieved.

## 10. NAMWATER ENVIRONMENTAL CODE OF CONDUCT

### **What is an Environmental Code of Conduct?**

It is a set of rules that everybody has to follow in order to minimise damage to the environment.

### **What is the ENVIRONMENT?**

The ENVIRONMENT means the surroundings within which people live. The ENVIRONMENT is made up of the **soil, water, plants, and animals** and those characteristics of the soil, water, air, and plant and animal life that influence **human health and well-being**. **People and all human activities** are also part of the environment and have to be considered during the operation of the Scheme.

### **Do these ENVIRONMENTAL RULES apply to me?**

YES, The Environmental Rules apply to EVERYBODY. This includes all permanent, contract, or temporary workers as well as any other person who visits the Scheme. Every person will be required to adhere to the Environmental Code of Conduct.

### **ALL PERSONNEL must study and keep to the Environmental Code of Conduct**

The SCHEME SUPERVISOR will issue warnings and will discipline ANY PERSON who breaks any of the Environmental Rules. Repeated and continued breaking of the Rules will result in a disciplinary enquiry and which may result in that person being asked to leave the Scheme permanently.

### **What if I do not understand the ENVIRONMENTAL RULES?**

ASK FOR ADVICE, if any member of the WORKFORCE does not understand, or does not know how to keep any of the Environmental Rules, that person must seek advice from the SCHEME SUPERVISOR. The PERSON that does not understand must keep asking until he/she is able to keep to all the Environmental Rules.

### **Safety and Security**

1. Only enter and exit roadways and construction areas at demarcated entrances.
2. Wear protective clothing and equipment as per signboards at the Scheme and according to instructions from your SCHEME SUPERVISOR.
3. Report to your SCHEME SUPERVISOR if you see a stranger or unauthorised person in the construction area.
4. Never enter any area that is out of bounds or that is demarcated as dangerous without permission of your SCHEME SUPERVISOR.
5. Never climb over any fence or enter private property without permission of the landowner or your SCHEME SUPERVISOR.
6. Do not remove any vehicle, machinery, equipment, or any other object from the construction site without the permission of your SCHEME SUPERVISOR.
7. Keep clear of blasting sites. Follow the instructions of your SCHEME SUPERVISOR.
8. Never enter or work in the Scheme while under the influence of alcohol or other intoxicating substances.

9. All staff should know the emergency procedures in case of accidents.

### **Waste Disposal**

10. Learn the difference between different types of waste, namely:
- general waste, and
  - hazardous waste.

Containers will be provided for different types of wastes.

**General Waste includes waste paper, plastic, cardboard, harmless organic (e.g. Vegetables) and domestic waste**

**Hazardous Waste includes objects, liquids or gases that are potentially dangerous or harmful to any person or the environment. Sewage, fuel, tyres, diesel, oils, hydraulic and brake fluid, paints, solvents, acids, soaps and detergents, resins, old batteries, etc. are all potentially hazardous.**

11. Learn how to identify the containers for the different types of wastes. Only throw general waste into containers, bins or drums provided for general waste.
12. Recycle drums, pallets and other containers.
13. Never bury or burn any waste on site, all waste is to be disposed in allocated refuse disposal containers, bins or bags.
14. Never overfill any waste container. Inform your SCHEME SUPERVISOR if you notice a container that is nearly full.
15. Do not litter.
16. Do not bury litter or rubbish in the backfill trench.



### **Plants and Animals**

21. **Do not ever pick any plants, or catch any animal.** People caught with plants or animals in their possession will be handed to the authorities for prosecution.
22. Never feed, tease, play with, or set devices to trap any animal or livestock. Wild animals are not to be domesticated.
23. Keep off the rock outcrops unless given specific permission by the SCHEME SUPERVISOR to be there.
24. Never cut down any tree or branches for firewood.
25. Never leave rubbish or food scraps or bones where it will attract animals, birds, or insects.
26. Rubbish must be thrown into allocated waste disposal bins/bags.
27. Always close the gates behind you.

### **Preventing Pollution**

28. Only work with hazardous materials in bunded areas.
29. Never discard any hazardous substances such as fuel, oil, paint, solvent, etc. into stream channels or onto the ground. Never allow any hazardous substances to soak into the soil.
30. Clean up spills immediately.
31. Immediately report to your SCHEME SUPERVISOR when you spill, or notice any hazardous substance overflow, leak or drip or spill on site, into the streambeds or along the road.
32. Immediately report to your SCHEME SUPERVISOR when you notice any container, which holds hazardous substances overflow, leak or drip. Spillage must be prevented.
33. Only wash vehicles, equipment and machinery, containers and other surfaces at work site areas designated by your SCHEME SUPERVISOR.
34. Do not change oil on uncovered surfaces.
35. If you are not sure how to transport, store, use, or get rid of any hazardous substances ask your SCHEME SUPERVISOR for advice.

### **Health**

36. Drink lots of clean water every day.
37. Use toilets that have been provided.
38. Take the necessary precautions to avoid contracting HIV / AIDS. Condoms are available at most Clinics.
39. Inform your SCHEME SUPERVISOR when you are sick.
40. Do not work with any machinery when you are sick.
41. If you are working in malaria areas, you must take the necessary precautions.

### **Dust Control**

42. Do not make any new roads or clear any vegetation unless instructed to do so by your SCHEME SUPERVISOR.
43. Keep to established tracks and pathways.
44. Keep within demarcated work areas.

### **Saving Water**

47. Always use as little water as possible. Reduce, re-use and recycle water.
48. Never leave taps or hose pipes running. Close all taps after use.

49. Report any dripping or leaking taps and pipes to your SCHEME SUPERVISOR.

#### **Working Hours**

50. You may only work on weekends and after hours with the consent of the SCHEME SUPERVISOR.

#### **Archaeological and Cultural Objects**

52. If you find any archaeological, cultural, historical or pre-historical object on the construction site you must immediately notify your SCHEME SUPERVISOR.
53. Never remove, destroy, or disturb any cultural, historical, or pre- historical object on site.

**Cultural and Historical Objects include old buildings, graves or burial sites, milestones, old coins, beads, pottery and military objects.**

**Pre-Historical objects include fossils and old bones, old human skeletal remains, pieces of pottery and old tools and implements.**

#### **Sensible Driving**

54. Tracks and roads should be kept to a minimum. Where possible follow existing roads.
55. No off-road driving is allowed.
56. Never drive any vehicle without a valid licence for that vehicle class and do not drive any vehicle that is not road-worthy.
57. Never drive any vehicle when under the influence of alcohol.
58. **Always** keep your headlights on when driving on dusty roads.
59. Keep to the roads as specified by your SCHEME SUPERVISOR. Vehicles may only be driven on demarcated construction roads. Drivers should always use three point turns, “u-turns” are not allowed. Do not cut corners.
60. Do not drive on rocky outcrops.

#### **Noise**

61. Keep noise levels as low as possible.
62. Do not operate noisy equipment outside normal working hours.

#### **Fire Control**

63. Do not make open fires, use a drum or tin and do not collect any vegetation to burn.
64. Do not smoke or make fires near refuelling depots or any other area where fuel, oil, solvents, or paints are used or stored. Fireplaces should be at a safe distance from fuel and explosive storage sites as well as vehicle parking sites.
65. Cigarette butts should always be thrown in allocated refuse bins. Make sure that the cigarette butt is out before throwing it into the bin.
66. Immediately notify your SCHEME SUPERVISOR if you see an unsupervised fire at the campsite or construction site.

#### **Dealing with Environmental Complaints**

67. If you have any complaint about dangerous working conditions or potential pollution to the environment, talk to your SCHEME SUPERVISOR.

68. If any person complains to you about noise, lights, littering, pollution, or any harmful or dangerous condition, immediately report this to your SCHEME SUPERVISOR.

**NP du Plessis**  
**Tell: 061-71 2093**  
**Cell: 081 127 9040**

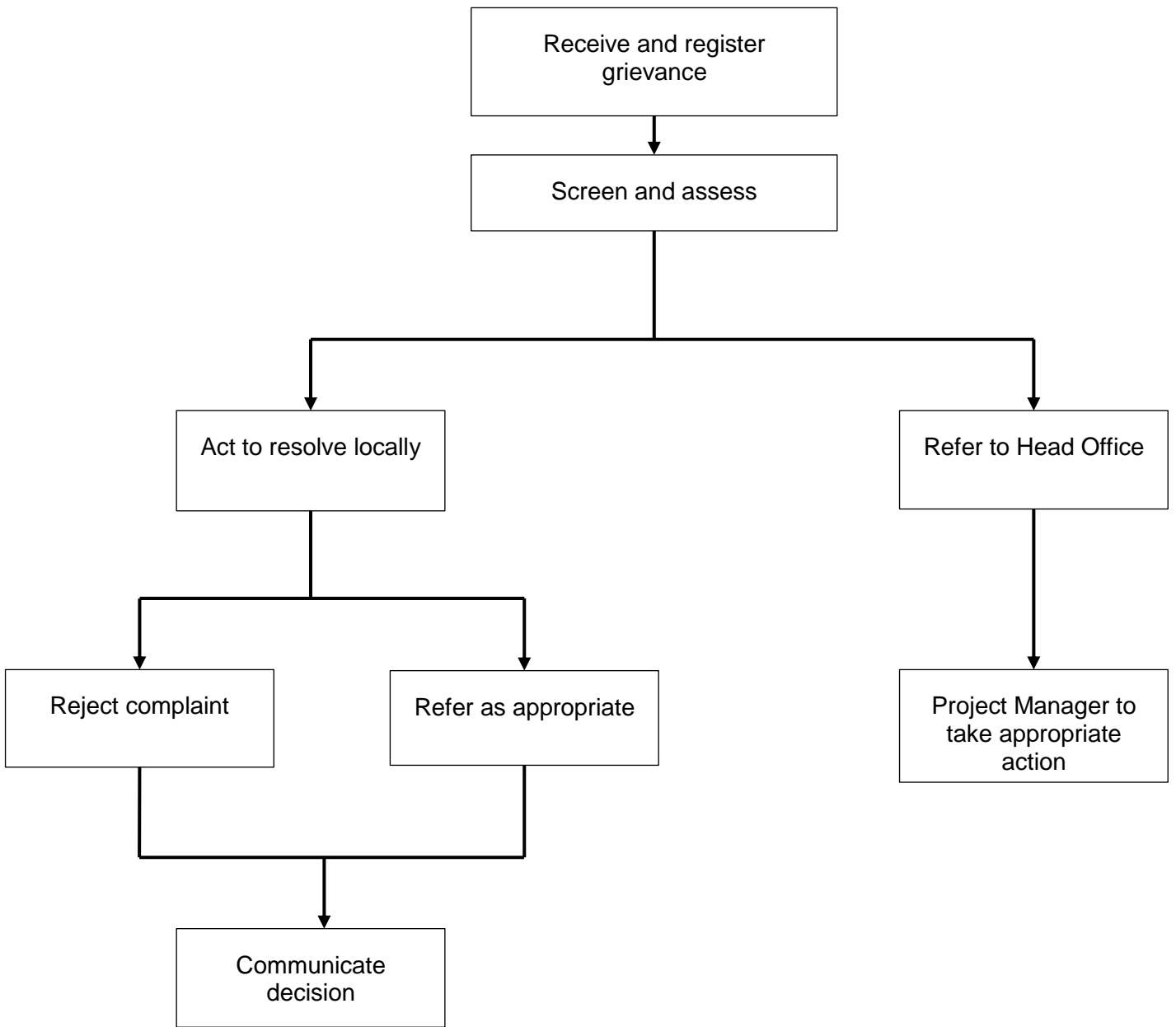
**OR**

**Jolanda Murangi**  
**Tell: 061-71 2105**  
**Cell: 081 144 1528**

## 11. REFERENCES

1. Barnard, P., C.J. Brown, A.M. Jarvis, and A. Robertson. 1998. Extending the Namibian protected areas network to safeguard hotspots of endemism and diversity. *Biodiversity and Conservation* 7: 31-547.
2. Department of Water Affairs and Forestry. 2005. Environmental Best Practice Specifications: Construction. Pretoria.
3. Department of Water Affairs and Forestry. 2005. Environmental Best Practice Specifications: Site Management and Rehabilitation. Pretoria.
4. Goldblatt, P., P. Bernhardt, and J.C. Manning. 1998. Pollination of petaloid geophytes by monkey beetles (Scarabaenidae: Rutelinae: Hopliini) in southern Africa. *Annals of the Missouri Botanical Garden* 85: 215-230.
5. Khomas Regional Council (KCR). 2015. Khomas Regional Development Profile. Windhoek, Namibia.
6. Mendelsohn, J., Jarvis, A., Roberts, C. & Robertson, T. 2002. Atlas of Namibia: a portrait of the land and its people. Ministry of Environment & Tourism / David Philip: Cape Town.
7. Mendelsohn, J., Jarvis, A., Roberts, C., & Robertson, T. 2009. Atlas of Namibia: A portrait of the land and its people. Cape Town, South Africa: Sunbird Publishers (PTY) LTD.
8. Simmons, R. E., M. Griffin, R. E. Griffin, E. Marais, and H. Kolberg. 1998. Endemism in Namibia: patterns, process and predictions. *Biodiversity and Conservation* 7: 513-530.

**ANNEXURE 1: GRIEVANCE PROCEDURE AND REGISTRATION FORM**



Grievance Registration

| Grievance Registration   |                           |
|--|---------------------------|
| Case No:   | Date:                     |
| Name of complainant:   | Cell no:                  |
|  | Email address:            |
| Details of grievance: (Date, location, persons involved, frequency of occurrence, effects of ensuing situation, etc) |                           |
| Name of person recording grievance:  | Cell number:              |
| Proposed date of response:   |                           |
| Signature of recording person:   | Signature of complainant: |
| Date of redress:   |                           |
| Decision and action:   |                           |