

**TITLE:** OVERVLAKTE EIENDOM (PTY) LTD – SEMPLE DAM

**AUTHOR:** Johannes Claassens

**ISSUE:** Draft Environmental Impact Assessment Report (Version 1)

---



.....  
Johannes Claassens  
Environmental & Conservation Consultant  
P. O. Box 960  
FAUNA PARK  
0787



## ***Executive Summary***

*Noordgrens Boerdery owner of the farm Overvlakte 125 MS requested Tua Conserva Environmental & Conservation (Pty) Ltd to undertake an Environmental Impact Assessment (EIA) for the proposed extension of the existing Semple dam. The EIA Report fulfills the basic principles of Integrated Environmental Management (IEM) and has been conducted in compliance with the latest environmental legislation. The intention is to satisfy the Environmental Authorities and to present a document with relevant information to assist LEDET in their assessment of this project. These together with the motivation for the project are essential to justify the need for the development activity and to help accommodating some of the public and stakeholders concerns, through an Interested and Affected Parties Process. The idea of the extension of the existing Semple dam is to be able to store the allocated water rights that the developer has from Department of Water and Sanitation. The specific location of Semple dam makes it possible that the dam can be extended to accommodate the volumes. Out of a planning perspective this makes sense financially and also for management of the water. What however has to be tested is the ability of the receiving environment to accommodate the development and also to assess alternative sites or options.*

*The dam will consist of a zoned earth fill embankment. The extension of Semple dam will have a storage capacity of approximately 3 150 000 million cubic meters. The dam will be used for the storage of water from the Limpopo River that will be pumped during high flow periods. The dam will be registered with Department of Water Affairs for agricultural purposes only. Interested and affected parties could be divided in two categories, the first are those from surrounding farms and secondly MC Mining. Issues and concerns raised by the first category were inclined towards water and biodiversity. The second category was more inclined to the effect the development will have on the possible influence on the option that MCM hold on a portion on which the dam will be developed. Thirdly is there issues related to archaeological sites.*

*The objective of constructing a dam is to use is as a storage dam in which water during high flow peaks are pumped from the Limpopo river to be used during low flow periods. Water from the catchment area (59.1km<sup>2</sup>) of the unnamed drainage line will also be stored. This drainage line only flow when it storms and is called ephemeral drainages. Currently the irrigation water is subtracted from some 41 sandpit-and borehole extraction points situated in the Limpopo River or on the riverbank. The arrangement of storage of water in impoundments as described by Freeman (2005), see below, will ensure a better quality of water and also*

*lessen the pressure on the ecological reserve of the Limpopo river in the drier periods (read as low flow periods).*

*Freeman (2005) described the supply of water as follows....."South Africa gets a large portion of its water supply from its rivers, and the amount of water that is present in our rivers varies greatly from time to time, causing the supply to be unreliable. There are two main ways in which this variability of supply can be managed. One, is to store river water and control how and when it is released. The other, is to transfer river water from an area that has an abundant supply, to an area that has very little. River water is stores or "impounded" when a dam is built on a river; it is transferred in something called an "interbasin transfer scheme" (IBT)". It is the same approach that Noordgrens Boerdery follows to provide water for their farming activities.*

*There are three strategic issues that should be considered in this application. Firstly is the using of water in a sustainable way ensuring sustainable food production. Secondly the process has an off-set that can also benefit the ecological processes of the Limpopo River. Thirdly is that more water will reach downstream waterusers, such as Musina Municipality. Holistically the above three strategic issues combine in a collective front against the pressures on the areas environmental resources.*

*The impact of the dam and the inundation area will have an impact on habitat, fauna, vegetation-and cultural resources most of which can be mitigated plus the off-set by subtracting less water in the low-flow period of the river and thus pacing less stress on the riparian vegetation and the ecological reserve for the river. Also will the downstream availability of water be more secure in the low flow period.*

*In the final comment period by interested and affected parties no critical comments was received. MC Mining support the proposed project as forwarded in this report. Musina Municipality also supports the project as well as the adjoining farmers.*

*The area surveyed for this application was previously assessed for the mining activities. An environmental authorisation was issued for the mining activities.*

DRAFT ENVIRONMENTAL IMPACT REPORT FOR PROPOSED EXPANSION OF THE  
 SEMPLE DAM ON RESTANT OF THE FARM OVERVLAKTE 125 MS, MUSINA  
 LOCAL MUNICIPALITY WITHIN VHEMBE DISTRICT, LIMPOPO PROVINCE

LEDET Project registration no: 12/1/9/2-V64 NEAS Ref no: LIM/EIA/0000549/2018

|  |    |
|--|----|
| <i>Executive Summary</i> .....   | 2  |
| REFERENCES .....   | 5  |
| APPENDICES .....   | 5  |
| 1 INTRODUCTION .....   | 7  |
| 1.1 General .....  | 7  |
| 1.2 Project objective.....   | 7  |
| 1.3 Applicant and developer .....                                      | 7  |
| 1.4 Information on EAP .....   | 7  |
| 2 LEGAL AND POLICY REQUIREMENTS .....                                  | 9  |
| 3 DESCRIPTION OF PROPOSED ACTIVITY .....                               | 12 |
| 3.4 Project locality .....   | 12 |
| 3.5 Description of activity.....                                       | 12 |
| 4. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED .....           | 13 |
| 4.1 Present environment.....   | 13 |
| 4.1.1 Landuse .....  | 13 |
| 4.1.2 Topography .....   | 13 |
| 4.1.3 Climate.....   | 14 |
| 4.1.4 Regional Geology .....   | 14 |
| 4.1.5 Soil characteristics .....                                       | 14 |
| 4.1.6 Biological aspects .....   | 14 |
| 5. PUBLIC PARTICIPATION PROCESS.....                                   | 15 |
| 5.1 Objectives of public involvement program.....                      | 15 |
| 5.2 List of interested and affected parties .....                      | 15 |
| 5.3 Interested parties process .....                                   | 15 |
| 5.4 Approach to Public Involvement Program .....                       | 16 |
| 5.5 Draft Scoping Report & Plan of Study .....                         | 17 |
| 5.6 Comments on Draft Environmental Impact Report.....                 | 17 |
| 6. NEED AND DISERABILITY OF ACTIVITY.....                              | 18 |
| 7. CONSIDERATION OF ALTERNATIVES .....                                 | 19 |
| 7.6.1 No-go alternative .....  | 22 |
| 7.6.2 Demand alternatives.....   | 22 |
| 7.6.3 Activity alternatives .....                                      | 22 |
| 7.6.4 Process alternatives .....                                       | 23 |
| 7.6.5 Location alternatives .....                                      | 23 |
| 8. SPECIALIST REPORTS.....   | 23 |
| 8.1 Preliminary Design Report for the Raising of Semple Dam.....       | 23 |
| 8.2 Archaeological Report. ....  | 24 |
| 8.2.2 Standing Working Plan (SWP): Archaeology .....                   | 24 |
| 8.3 Ecological-and Red Data Report .....                               | 24 |
| 8.4 Water Resource Study- new impoundment for Noordgrens Landgoed..... | 25 |

|      |   |    |
|------|---|----|
| 8.5  | Environmental Management Plan (EMP).....  | 25 |
| 9.   | ADVANTAGES AND DISADVANTAGES OF THE PROPOSED ACTIVITY AND ALTERNATIVES ON THE ENVIRONMENT AND COMMUNITY ..... | 25 |
| 9.1  | Advantages of the proposed activity and alternatives.....   | 25 |
| 9.2  | Disadvantages of the proposed activity and alternatives .....   | 26 |
| 10.  | ENVIRONMENTAL IMPACT DETERMINATION AND EVALUATION .....   | 26 |
| 10.1 | Assessment method.....  | 26 |
| 10.2 | Aspects, related impacts, significance and proposed mitigation measures .....                                 | 28 |
| 10.3 | Potential significant impacts .....   | 64 |
| 11.  | DESCRIPTION OF ASSUMPTIONS .....  | 64 |
| 12.  | OPINION ON FACTS .....  | 64 |
| 13.  | ENVIRONMENTAL STATEMENT .....   | 65 |
| 13.3 | Comparative assessment of advantages and disadvantages.....   | 66 |
| 14.  | AUTHORISATION OF ACTIVITY AND CONDITIONS.....   | 66 |

## REFERENCES

## APPENDICES

Appendix A: Locality & Layout plan

Appendix B: Specialist Reports

B1: Detail Design Report for the Construction of Semple Dam

B1(a) Site Locality

B1(b) Design Drawings

B1(c) Flood Hydrological Report of the Proposed Upgraded Semple Dam

B1(d) Rubble Masonry

B1(e) DWS Application: Proof

B1(F) Geotechnical Investigation Report

B2: Archaeological Report

B2(a) Standing Working Plan (SWP): Archaeological

B3: Ecological and Red Data Report

B4: Water Resource Study-New Impoundment for Noordgrens Landgoed

B5: Environmental Management Plan (EMP)

Appendix C: Public Participation Process

COMENTS& RESPONSE REGISTER

C1: Submission of Draft Scoping

C2: Submission of Draft EIA Report

Appendix D: MC Mining; Competent Persons Report

Appendix E: Memorandum of Understanding

## **ABBREVIATIONS**

|       |   |
|-------|---|
| LEDET | Department of Economic Development, Environment and Tourism<br>Limpopo province |
| DWS   | Department of Water and Sanitation  |
| EIA   | Environmental Impact Assessment   |
| EMP   | Environmental Management Plan   |
| I&AP  | Interested & Affected Parties   |
| LIHRA | Limpopo Heritage Resources Agency   |
| MCM   | MC Mining   |
| SAHRA | South African Heritage Association  |
| SWP   | Standing Working Procedure  |
| TFCA  | Trans Frontier Conservation Area  |

DRAFT ENVIRONMENTAL IMPACT REPORT FOR PROPOSED EXPANSION OF THE  
SEMPE DAM ON RESTANT OF THE FARM OVERVLAKTE 125 MS, MUSINA  
LOCAL MUNICIPALITY WITHIN VHEMBE DISTRICT, LIMPOPO PROVINCE

Project registration number: 12/1/9/2-V64 NEAS REF: LIM/EIA0000549/2018

## 1 INTRODUCTION

### 1.1 General

This report contains the results of an on-site investigation for the proposed expansion dam as mentioned in the application for authorization in terms of Regulation 983, Listing Notice 1, Activity 48(iv), 50 and 66. Regulation 984, Listing Notice 2, Activity 15 and Regulation 985 Listing Notice 3, Activity 23 (i)(a) of the National Environmental Management Act, 1998 (Act no. 107 of 1998) and in respect the assessment process applicable.

### 1.2 Project objective

The Environmental Impact Report (EIR) was done to supply the Department of Economic Development, Environmental and Tourism (LEDET) with the necessary information to make a decision regarding the EIR and the issuing of an environmental authorisation.

### 1.3 Applicant and developer

Noordgrens Landgoed (Pty) Ltd.

Represented by Mr W.A. Dillman

Contact: Tel: 015-533 3007/6/8

Fax: 086 693 0972

Cell: 083 488 5522

E-mail: noordgrens@lantic.net

### 1.4 Information on EAP

#### 1.4.1 Details of EAP

Tua Conserva Environmental and Conservation Services cc

P. O. Box 960

FAUNA PARK

POLOKWANE

0787

Represented by: Mr. J. Claassens

Contact : Cell: 082 885 9118

E-mail: tuaconserva@gmail.com

#### 1.4.2 Experience of EAP

Mr. Claassens is a South African-based career nature conservationist with 43 years' experience in Southern Africa, e.g. South Africa, Botswana, Zambia, Namibia (Eastern-Capriivi) and Mozambique. He has two relevant tertiary- and one postgraduate qualification in Conservation-, Game and Veld Management as well as Public Administration.

Mr Claassens worked for 23 years in governmental Conservation, Environmental and Tourism institutions. His current and past scope of work includes conducting Scoping and Environmental Impact Assessments (Housing, Water supply, Electricity supply, Road structures, Industrial development, Land reform and farming projects for successful land claims), as well as State of the Environment Assessments (SoeR), Environmental Spatial Development Framework, Strategic Environmental Assessments, Project Management and Ecological-and Conservation Management Surveys with management plans. A CV is attached.



## 2 LEGAL AND POLICY REQUIREMENTS

| INTERNATIONAL                     |   |   |
|-----------------------------------|---|---|
| ENVIRONMENT AND NATURAL RESOURCES | Convention to Combat Desertification (CCD)          | <p>The United Nations Convention on the Combating of Desertification defines land degradation as the : “reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland or range, pasture, forest and woodlands in arid, semi-arid and dry sub-humid areas, resulting from land uses or from a process or combination of processes, including processes, arising from human activities and habitation pattern, such as the:</p> <ul style="list-style-type: none"> <li>• long-term loss of natural vegetation;</li> <li>• soil erosion caused by wind/water, and</li> <li>• deterioration of the physical, chemical and biological or economic properties of soil.</li> </ul>  |
|                                   | Convention on Biological Diversity (CBD)            | <p>The CBD aims to effect international co-operation in the conservation of biological diversity and to promote the sustainable use of living natural resources worldwide. Membership of this convention has led to the publication of the White Paper on the Conservation, and Sustainable Use of South Africa’s Biodiversity (DEAT 1997), which aims to ensure the sustainable use of biodiversity in all sectors, including industry (DEAT 1999).</p>  |
| NATIONAL                          |   |   |
| CONSTITUTIONAL RIGHTS             | The Constitution of South Africa (Act 108 of 1996). | <p>Introduces a Constitutional framework for post 1974 South Africa. Chapter 2;</p> <p><b><u>Environment:</u></b></p> <p>Section 24: Everyone has the right-</p> <ol style="list-style-type: none"> <li>a. to an environment that is not harmful to their health or well-being; and</li> <li>b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that : <ol style="list-style-type: none"> <li>i. prevent pollution and ecological degradation;</li> <li>ii. promote conservation; and</li> <li>iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</li> </ol> </li> </ol> <p><b><u>Justice Administrative Action</u></b></p> <p>Section 33</p> |

|  |  |  |
|--|--|--|
| ENVIRONMENTAL , CONSERVATION AND NATURAL RESOURCES | National Environmental Management Act (Act No. 107 of 1998) (NEMA)       | <p>The State must respect, protect, promote and fulfil the social, economic and Environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities;</p> <ul style="list-style-type: none"> <li>• sustainable development requires the integration of social, economic and environmental principles.</li> <li>• everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –</li> <li>• prevent pollution and ecological degradation;</li> <li>• promote conservation.</li> </ul> |
|  | National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)   | The Waste Act promote effective waste management practices through the promotion of the waste management hierarchy which prioritises waste avoidance, reuse, recycling, recovery and treatment, and disposal as a last resort.   |
|  | National Environmental Management: Biodiversity Act (Act No. 10 of 2004) | <p>The objectives of this Act are –</p> <p>(a) within the framework of the National Environmental Management Act, to provide for –</p> <ul style="list-style-type: none"> <li>(i) the management and conservation of biological diversity;</li> <li>(ii) the use of indigenous biological resources in a sustainable manner; and</li> <li>(iii) the fair and equitable sharing among stakeholders of benefits arising.</li> </ul>  |
|  | NEMA Threatened Ecosystems in South Africa                               | The objectives are to reduce the rate of ecosystem and species extinction. This includes further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to preserve witness sites of exceptionally high conservation value.  |
|  | Environmental Conservation Act No 73 Of 1989                             | <ul style="list-style-type: none"> <li>❖ Waste disposal practices (S20)</li> <li>❖ National Noise Control Regulations (GN R154 dated 10 January 1992)</li> </ul>   |
|  | National Heritage Resources Act 25 of 1999                               | <ul style="list-style-type: none"> <li>❖ Stipulates assessment criteria and categories of heritage resources according to their significance (S7)</li> <li>❖ Provides for the protection of all archaeological and palaeontological sites, and meteorites</li> </ul>   |

|  |   |   |
|--|---|---|
|  |   | <p>(S35)</p> <ul style="list-style-type: none"> <li>❖ Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36)</li> <li>❖ Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38)</li> </ul> <p>Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)</p>   |
|  | The National Water Act (Act No. 36 of 1998)                     | <p>The National Water Act is important because it provides a framework to protect the natural water resources against over exploitation and to ensure that there is water for social and economic development and water for the future (DWA). Water resources are water bodies such as rivers, streams, wetlands, estuaries and groundwater. The National Water Act aims to protect, use, develop, conserve, manage and control water resources as a whole. Rivers, dams, wetlands, the surrounding land, groundwater, as well as human activities that influence them, will be managed as one cycle. One of the principles of the Act is sustainability which includes ensuring that the environment is protected.</p> |
|  | National Forests Act (Act No. 84 of 1998)                       | <p>Natural forests and woodlands form an important part of that environment and need to be conserved and developed according to the principles of sustainable management;<br/>Parliament therefore enacts the following law:<br/><i>Prohibition of destruction of natural forests and the destruction of indigenous trees in any natural forest.</i><br/><i>Prohibition on destruction of trees in natural forests</i></p>  |
|  | National Veld and Forest Fire Act 101 of 1998                   | Regulates veld and forest fires   |
|  | Animal Diseases and Parasites Act No 35 of 1984                 | This act prescribes the controls to be implemented for diseases designated by the act or its amendments as “controlled” (e.g. Animal Disease Control disease), or any disease not currently present in South Africa. The Directorate of Veterinary Services of the Department of Agriculture is responsible for the implementation of the controls laid down in the act.  |
|  | Conservation of Agricultural Resources Act (Act No. 43 of 1983) | The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water  |

|   |  |   |
|---|--|---|
|   |  | sources, and by the protection of the vegetation and the combating of weeds and invader plants. |
|   | Fencing Act No 31 of 1963                                | Regulates all matters relating to fencing   |
| <b>PROVINCIAL</b>                               |  |   |
| <b>ENVIRONMENTAL<br/>&amp;<br/>CONSERVATION</b> | Limpopo Environmental Management Act No 7 of 2003 (LEMA) | Regulates provincial conservation issues  |

### 3 DESCRIPTION OF PROPOSED ACTIVITY

#### 3.4 Project locality

The project is situated approximately 61 kilometres west of Musina, on the Restant of the farm Overvlakte 125 MS, in the district of Vhembe in the Limpopo Province.

The proposed new Semple dam will be situated in an unnamed ephemeral watercourse, a tributary of the Limpopo River.

The co-ordinates (WGS84) of the proposed dam site are Latitude **22° 10' 7.98"** and Longitude **29° 37'7.32"**.

**Locality Map** is attached as Appendix A.

#### 3.5 Description of activity

A description of work to be carried out can be summarized as follows with the Main Features supplied in Fig.1 (as taken from Preliminary Design Report paragraph 2 attached as Appendix B1):

- Raising of existing embankment by providing additional backfilling on the downstream side and top of the crest for approximately 970m.
- Forming of a new embankment with cut-off core trench for approximately 1500m.
- New main flood spillway on right bank (open side channel) to accommodate the design flood discharge.
- New emergency spillway on left bank (open side channel) to accommodate extra design flood discharge.
- Installation of a new 400 mm diameter Class 9 uPVC outlet pipe encased in reinforced concrete, equipped with closing mechanisms on the downstream sides
- Installation of toe drains with V-notch measuring structures
- Grass establishment (hydro-seeding) on entire embankment after construction

**Figure 1: Main Features after proposed expansion of Semple Dam**

|                                      |                                   |
|--------------------------------------|-----------------------------------|
| Type of dam                          | <b>Zoned Earth-fill structure</b> |
| Level of non-overspill crest (NOC)   | <b>508.00 m</b>                   |
| Full supply level                    | <b>506.00 m</b>                   |
| Total freeboard                      | <b>2 m</b>                        |
| Maximum wall height                  | <b>14 m</b>                       |
| Main Spillway: Type of spillway      | <b>Side Channel Spillway</b>      |
| Main Spillway width                  | <b>30 m</b>                       |
| Emergency Spillway: Type of spillway | <b>Side Channel Spillway</b>      |
| Emergency Spillway width             | <b>115 m</b>                      |
| Crest width                          | <b>4.0 m</b>                      |
| Embankment length                    | <b>2 615 m</b>                    |
| Upstream slope gradient              | <b>1(V):3,0 (H)</b>               |
| Downstream slope gradient            | <b>1(V):2,0 (H)</b>               |
| Storage capacity                     | <b>4 695 794 m<sup>3</sup></b>    |
| Water surface area at FSL            | <b>1 054 132 m<sup>2</sup></b>    |

#### 4. DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED

##### 4.1 Present environment

##### 4.1.1 Landuse

Overvlakte 125 MS: Citrus and Game farm

##### 4.1.2 Topography

The development falls within the Limpopo river valley. The topography is relatively flat with low sandstone hills parallel to the Limpopo River and shallow valleys to the south that drains the inland plateau.

The site has a drop from south to north.

#### 4.1.3 Climate

The project falls within the Northern Arid Climate Region. It is described as lower than average (300 – 500 mm p.a.) and somewhat erratic precipitation for the Savanna type regions, with semi-arid and hot conditions in the Limpopo and Olifants River basins. Rainy season lasts from about November to March, with the peak falling in January. Winds are light to moderate and blow mostly from the north-eastern sector. Almost frost free.

#### 4.1.4 Regional Geology

The geology of the area in the immediate vicinity of the proposed dam wall is characterized mainly by alluvial soil. The hill's Lithology is described as fine grained whitish to pinkish and red mottled argillaceous sandstone of the Clarens formation in the Karoo Supergroup (1:250 000 Geological Series: 2228 Alldays). Alluvial soils are found in the low lying drainage lines with sandy soils on the higher lying areas.

#### 4.1.5 Soil characteristics

The site is covered with a 50 to 300mm dark reddish to reddish brown sandy soil with roots. The reddish sandy gravel soil is underlain by Metaquartzite which is part of the Beit Bridge Complex.

#### 4.1.6 Biological aspects

##### 4.1.6.1 Vegetation

Biome: Savannah

Physiographic region: Limpopo valley

Veldtype: Acocks Veld Type no. 15, which is classified as Mopane veld. This Veldtype is well represented in declared conservation areas as well as private game farms.

##### 4.1.6.2 Fauna

The project area, as a whole, has in effect been utilised (human interference) over a period of time due to:

- Farming activities;
- Erection of fences;
- Development of infrastructure;
- Human settlement;

➤ Military activities.

This isolation resulted in the disruption of natural and historic migration (macro- and micro) of larger, medium and smaller mammals. The small mammal species were able to survive in small quantities in relation to the available habitat and external impacts. Larger herbivores were reintroduced by the current owner after erection of game fences according to exemption specifications. Larger carnivores include leopard.

## 5. PUBLIC PARTICIPATION PROCESS

### Appendix C

#### 5.1 Objectives of public involvement program

The objectives of the Public Involvement Program were to:

- Inform IAPs and authorities and obtain their concerns, attitudes and perceptions.
- Provide an opportunity for IAPs to identify alternatives.
- Ensure that the IAPs concerns, attitudes and perceptions are addressed in the study.

#### 5.2 List of interested and affected parties

Documentation related to the Interested and Affected Parties process were attached to the Draft Scoping Report & Plan of Study.

The interested parties can be categorized in the following groups e.g.:

- ❑ Musina Local Municipality – Environmental Management
- ❑ Vhembe District Municipality – Environmental section
- ❑ MC Mining;
- ❑ Department of Water Affairs;
- ❑ Department of Agriculture, Forestry and Fisheries;
- ❑ Farming neighbours.
- ❑ Department Economic Development, Environment and Tourism;
- ❑ SANDF
- ❑ SAHRA/LIHRA

#### 5.3 Interested parties process

The broad aim of the public involvement process is to provide interested and affected parties (I&AP), authorities and specialist interest groups the opportunity to identify

issues and concerns regarding the development of new resort projects. The participation process also assists in the identification of ways in which concerns can be addressed and alternatives considered.

#### 5.4 Approach to Public Involvement Program

The Public Involvement Programme was undertaken as illustrated in the following flow diagram:

| <b>Table 1: Process followed with I&amp; AP</b> |  |  |   |
|---|--|--|---|
| <b>ACTION</b>                                   | <b>METHOD</b>  | <b>DATE &amp; TIME</b>                                       | <b>RESULTS</b>  |
| Advertisements: News Paper                      | A notice was placed in the main body of the Zoutpansberger.  | 1 <sup>st</sup> December 2017                                | Original copies of advertisements was included in the Draft Scoping & Plant of Study report.<br>Response received: None                 |
| Advertisements: Notices                         | Posters:<br><ul style="list-style-type: none"> <li>• Musina Local Municipality</li> <li>• Entrance to Noordgrens Landgoed</li> <li>• Entrance road to dam</li> </ul> | Attached on the 7 <sup>th</sup> December 2017                | Response received: None<br>Original copies were included in die Draft Scoping Report & Plan of Study.                                   |
| Notifications to I&AP                           | Notifications were send by e-mail. Refer to register   | 29/11/2017<br>30/11/2017<br>5/2/2018                         | Response received by e-mail. Has been listed in register.<br>Original copies were included in die Draft Scoping Report & Plan of Study. |
| Public Meeting                                  | Letters of invitations were send by:<br><ul style="list-style-type: none"> <li>• E-mail</li> </ul><br>Open meeting was held  | 31/01/2018<br>5/02/2018<br>9/02/2018<br><br>21 February 2018 | Response was received by e-mail. See response Register.<br><br>Minutes has been kept.   |



|                               |   |  |  |
|-------------------------------|---|--|--|
|                               | at the office of Noordgrens Landgoed (Pty) Ltd., Co-ordinates were supplied.<br>Refer to Register |  | Attendance register has been kept. Was distributed to I%AP's, refer to Register.<br>Comments were received from Mr J. Sparrow from MC Mining.<br>See Response Register<br>Original copies were included in die Draft Scoping Report & Plan of Study. |
| Draft Scoping & Plan of Study | Distributed to:<br>- Registered I&AP's<br>- LEDET   | 14 <sup>th</sup> March 2018<br>16 <sup>th</sup> March 2018 | Only one response was received from Musina Local Municipality.<br>A copy of the letter as well as the Registers will be attached to the Draft EIA report.  |

**The whole Public Participation Process were included in the Draft Scoping Report & Plan of Study.**

#### 5.4 Draft Scoping Report & Plan of Study

The Scoping report was send by e-mail on 14<sup>th</sup> March 2018 to the following parties:

- Mr J. Sparrow & F. Chauke – MC Mining
- Mr PMJ Verwey & J. Steenkamp – DAFF
- Me Taka Mihloti – DWS
- Lt.Col. D.C. Moore – SANDF
- Mrs R. Kutama – Musina Local Municipality
- Mr A.S. Mulibana – Vhembe District Municipality
- Mr J. Willemse, mr J. Pretorius & mr P. Esterhuyse – Neighbouring farmers

See attached Register of Report send – Appendix C1

#### 5.5 Comments on Draft Scoping Report & Plan of Study

Only one comment was received from Musina Local Municipality.  
See attached Register of Response. Appendix C1.

#### 5.7 Submission of Draft Environmental Impact Report

See attached Register of Submission of Draft EIA report: Appendix C2.

## 6. NEED AND DISERABILITY OF ACTIVITY

The Limpopo River is currently used as water source for a wide spectrum of water users that starts in the west. The water users include farming, starting in North-West Province, all along the river (irrigation), mining and electricity in the west (Thabazimbi and Lephalale region), mining at Venetia, with Musina Local Municipality also a prominent water user downstream. Vegter (2001, p3) mentions that Region 3: Limpopo Granulite\_gneiss Belt “...is practically solely dependent on groundwater.” And later on”...Musina town obtains its water supply from wells in the sand of the Limpopo river.” Colvin et. al. (June 2007, p24) mentions that “...Aquifer Dependent Ecosystems health (ADE) is in particular important in this trans-boundary area where it forms an important keystone ecosystem. There is also growing demand for water for human-use and irrigation from this internationally shared aquifer and the main water source is the groundwater in the alluvial aquifer.”

In Table 1 below the sources of water and the total Annum Allocation is supplied.

**Figure 2: Water Source Breakdown**

| PROPERTY                    | SOURCE    |           | TOTAL<br>m <sup>3</sup> /ANNUM |
|-----------------------------|-----------|-----------|--------------------------------|
|                             | SURFACE   | BOREHOLE  |                                |
| Overvlakte                  | 1 526 320 | 381 580   | 1 907 900                      |
| Semple                      | 1 031 710 | 6 554 397 | 7 586 107                      |
| Noordgrens                  | 847 553   | 882 147   | 1 729 700                      |
| TOTAL m <sup>3</sup> /ANNUM | 3 405 583 | 7 818 124 | 11 223 707                     |
| Percentage of water /source | 30.34%    | 69.66%    |                                |

Noordgrens Boerdery has experienced the Limpopo River as a farming enterprise in many forms, from droughts to floods. Noordgrens Boerdery need water in quantity and quality and their experience forced them to ensure a constant supply of water, an off-set for Noordgrens Boerdery is that the dam will also collect water from the catchment of the unnamed watercourse. This approach is further divined by that they will store the water in the proposed expansion of Semple dam so that it is available throughout the year, especially during the winter. The storage of the water will be from the primary source, Limpopo River, when they will pump water when the river is in high flood. A secondary source is the well-field. Water from rain in the catchments area will also contribute (off-set), as tertiary source (although considered as insignificant), to the storage of water in the dam. This approach will result that water is available for irrigation in the winter and early summer periods. The seasonal demand for water supply-and needs is important when there is no surface flow in the Limpopo River and

water is subtracted from the sub-surface water thus placing stress on the ADE of the Limpopo river. Also in this period is the irrigation of citrus important.

## 7. CONSIDERATION OF ALTERNATIVES

### PROCESS IMPLEMENTATION

Key criteria when identifying alternatives are that they should be “practicable”, “feasible”, “relevant”, “reasonable” and “valuable”.

The above was attained by and/or during:

- Pre-feasibility stage
- Map evaluation based on task parameters
- Site visits with team members
- Consultation with interested and affected parties
- Environmental field surveys
- Design options
- Economic/cost implications
- Measuring against attaining primary objective(s)

### 7.1 Activity alternative

| <b>ACTIVITY ALTERNATIVES</b>    |  |
|---------------------------------|--|
| <b>KEY WORDS</b>                | Activity alternative is also known as project alternative  |
| <b>PROJECT TEAM INVOLVEMENT</b> |  |
| <b>Professional</b>             | <b>Role</b>  |
| Engineer                        | Objectives of: <ul style="list-style-type: none"> <li>• Design;</li> <li>• Safety</li> </ul>   |
| Client                          | <ul style="list-style-type: none"> <li>• Use of allocated water storage</li> <li>• Contribution to agriculture value chain</li> </ul>          |
| Environmental                   | <ul style="list-style-type: none"> <li>• Compliance with biodiversity</li> <li>• NEMA legislation</li> </ul>                                   |
| <b>CONSIDERATIONS</b>           |  |
| <b>Specific considerations</b>  | <b>Specific motivation</b>   |
| (i) Keep status quo             | Not an option as storage of water is a priority for sustainable farming  |
| (ii) Use groundwater-and/or     | <ul style="list-style-type: none"> <li>• Not an option due to water availability from both sources in late-winter and early summer.</li> </ul> |

|   |   |
|---|---|
| sand-pit pumping stations   | <ul style="list-style-type: none"> <li>Water quality also is a problem</li> </ul> |
| <b>Motivation</b> <ul style="list-style-type: none"> <li>i) The best way to secure a constant source of water of good quality is by storage.</li> <li>ii) The quality is ensured by storage.</li> <li>iii) Water for downstream users is also ensured.</li> <li>iv) It impacts less on biodiversity.</li> </ul> |   |

## 7.2 Design alternative

| <b>DESIGN ALTERNATIVES</b>      |  |
|---------------------------------|--|
| <b>KEY WORDS</b>                | Consideration are construction materials, aesthetics, and attempting to optimise on design to be included and accepted as part of the project description  |
| <b>PROJECT TEAM INVOLVEMENT</b> |  |
| <b>Professional</b>             | <b>Role</b>  |
| Professional team               | To ensure facilities which comply with legislation and SANS codes<br><br>Environmental objective: Environmental acceptable and compliance  |
| Client and EAP                  | Measure design alternatives for best option as required for maximum effectiveness and attaining objectives.  |
| Client                          | Objectives <ul style="list-style-type: none"> <li>(i) Strategic objectives               <ul style="list-style-type: none"> <li>Provide a safe dam for storage</li> <li>Comply with national legislation/standards</li> </ul> </li> <li>(ii) Operational objectives               <ul style="list-style-type: none"> <li>Maintenance of a soft footprint system infrastructure</li> <li>Water according to quantity and quality needs</li> </ul> </li> </ul> |
| <b>CONSIDERATIONS</b>           |  |
| <b>Specific considerations</b>  | <b>Specific motivation</b>   |
| Design of facilities            | <u><b>Environmental</b></u><br>Prevent negative impacts on receiving environment: <ul style="list-style-type: none"> <li>(i) Minimum removal of natural vegetation;</li> <li>(ii) Compliance with animal health</li> </ul>   |
| Configuration of facilities     | Can be implemented on a footprint without any environmental constraints or parameters by engineering design.   |
| Prevention of erosion           | Stormwater design  |

## 7.3 Location alternative

| <b>LOCATION ALTERNATIVES</b> |
|------------------------------|
|------------------------------|

|                                 |  |
|---------------------------------|--|
| KEY WORDS                       | Consideration are location in area, receiving environment, construction materials, aesthetics, and attempting to optimise on design to be included and accepted as part of the project description |
| <b>PROJECT TEAM INVOLVEMENT</b> |  |
| <b>Professional</b>             | <b>Role</b>  |
| Client                          | <ul style="list-style-type: none"> <li>• Compliance with legislation and standards</li> <li>• High visibility</li> <li>• Productive use of agriculture land</li> </ul>                             |
| Professional team               | Assess receiving environment for correct placement of location in receiving environment  |
| <b>CONSIDERATIONS</b>           |  |
| <b>Specific considerations</b>  | <b>Specific motivation: Environmental</b>  |
| Location                        | Comply with Clients needs  |
| Landuse                         | No change in landuse   |
| Management                      | Terrain can be managed   |
| Execution of proposal           | Approval by LEDET and DWS  |

#### 7.4 Process alternative

|                                 |   |
|---------------------------------|---|
| <b>PROCESS ALTERNATIVES</b>     |   |
| KEY WORDS                       | Best Practicable Environmental Option (BPEO) in considering alternatives for: <ul style="list-style-type: none"> <li>• Technology</li> <li>• Equipment</li> </ul>   |
| <b>PROJECT TEAM INVOLVEMENT</b> |   |
| <b>Professional</b>             | <b>Role</b>   |
| Client                          | Obtaining objectives  |
| Environmental                   | Environmental objective: <ul style="list-style-type: none"> <li>• Environmental compliance</li> <li>• Conservation and biodiversity compliance</li> <li>• Best practices during construction phase</li> <li>• Best practices during operational phase (maintenance)</li> <li>• Ensuring environmental compliance by maintenance programme by implementing an environmental monitoring end compliance plan.</li> </ul> |
| <b>CONSIDERATIONS</b>           |   |
| <b>Specific considerations</b>  | <b>Specific motivation</b>  |
| Using technology                | Implement an Environmental Management Plan with Monitoring program  |

#### 7.5 No-Go alternative

| <b>NO-GO ALTERNATIVES</b>       |   |
|---------------------------------|---|
| <b>KEY WORDS</b>                | Also known as the “no-action” alternative.<br>It assumes that the activity does not go ahead, implying a continuation of the current situation or status quo. |
| <b>PROJECT TEAM INVOLVEMENT</b> |   |
| <b>Professional</b>             | <b>Role</b>   |
| Client                          | This is not an option as the objectives of storing allocated water will not be attained.  |
| Environmental                   | The receiving environment does not have a high risk factor or constraint  |
| <b>CONSIDERATIONS</b>           |   |
| <b>Specific considerations</b>  | <b>Specific motivation</b>  |
| National objectives             | Compliance with legislation   |
| Socio-economic                  | Provide security in water supply<br><br>Provide security for jobs in rural areas  |

## 7.6 Alternatives discussion

The alternatives discussed indicate that the expansion of Semple dam will be a positive contributor to the farming economy, sustainable landuse-, natural resources and rural job security on farm(s).

### 7.6.1 No-go alternative

This option can only be considered if the assessment and/or the other professional studies revealed a fatal flaw in the process and or where no other planning guidelines could correct or mitigate identified issues and/or flaws. The single most important issue is the consent from MC Mining that there is a working agreement for the area that will be inundate of the farm on which they have the mining rights.

### 7.6.2 Demand alternatives

The demand for the dam is motivated by the need of constant water throughout the year and to be able to store the allocated water. The dam will provide the water security needed for providing water in periods with low rain and when Limpopo River is in low flow.

### 7.6.3 Activity alternatives

Currently water is supplied from sand-pit wells in the Limpopo River and from wells on riverbank from which water is pumped throughout the year. During the winter-and early

summer periods this places stress on the water from the river, which is mainly sub-surface. There are two alternatives, the first being where the farming activities is stepped down and secondly the building of the dam. The first alternative still places the ecological reserve of the river under stress (more so in low rainfall periods) and also influences the water users downstream, e.g. Musina town and farming downstream. The **second alternative is a holistic approach** where water in peak flow periods is stored for later use and the stress on the Limpopo River relieved in the low flow periods. This is also in the rainfall period which helps to allow more storage of water.

#### 7.6.4 Process alternatives

A smaller dam will not be economically viable in the construction costs as well as retaining sufficient water for the irrigation. The process of pumping water during peak flow periods as well as using run-off water during the rain season is contributing to preserving the rivers ecological reserve sources. Thus the water resource-use is diversified and also ensures that recharge of groundwater takes place.

#### 7.6.5 Location alternatives

The proposed location (expansion) is the only option for placing of the dam which has the minimum impact on the receiving environment and also that will not contribute to sterilise areas.

## 8. SPECIALIST REPORTS

Below is a list of specialist Reports with abbreviated findings.

### 8.1 Preliminary Design Report for the Raising of Semple Dam.

This report was compiled by PG Consulting Engineers (Pty) Ltd. Attached as **Appendix B (1)**.

- The Preliminary Design supports the expansion.

Attached to the above Reports and/or maps was also supplied as Appendices, and is listed below:

#### 8.1.1 Appendix B1(a): Site Locality

- The terrain is suitable for the expansion location.

#### 8.1.2 Appendix B1(b): Design Drawings

- The drawings supports the expansion proposal.

8.1.3 Appendix B1(c): Flood Hydrological Report of the Proposed Upgraded Semple Dam

- Supply guidelines for *Recommended Design Flood (RDF)* for spillways.
- Supply guidelines for *Safety Evaluation Discharge (SED)* for Regional Maximum Flood.

Both are related to the water from the ephemeral stream(s).

8.1.4 Appendix B1(d): Rubble Masonry Concrete Report

- Guidelines to be used for construction with material from the site area.

8.1.5 Appendix B1(e): Semple Dam Registration and Classification Information

- Proof of DWS process.

8.1.6 Appendix B1(f): Geotechnical Investigation Report

Supply proof of suitable material from site area for construction purposes. Below is an extract of the findings and recommendations:

- (i) The site "...creates an ideal site for the proposed dam wall...".
- (ii) Silty clay material from within the dam storage area may be used for construction of dam wall.

8.2 Archaeological Report.

8.2.1 This report was compiled by R&R Cultural Resource Consultants. Attached as **Appendix B2**.

Below is a summary of the findings and recommendations:

- i) From a heritage resources management point of view, there is are provisions that have to be taken before construction.
- ii) A Phase 2 will have to be conducted.

8.2.2 Standing Working Plan (SWP): Archaeology

- (i) Attached find the SWP for implementation on the project. **Appendix B2(a)** .

8.3 Ecological-and Red Data Report

This report was compiled by Tua Conserva Environmental & Conservation Services cc. Attached as **Appendix B3**.



Below is a summary of the findings and recommendations:

- (i) No Red Data species will be lost.
- (ii) Habitat and vegetation will be lost, new water habitat will however be created.  
It will provide a “reserve” for water associated species.
- (iii) That a competent environmental control officer is appointed for the duration of the project. This must be made a condition.

#### 8.4 Water Resource Study- new impoundment for Noordgrens Landgoed

Report compiled by BioAssets and attached as **Appendix B4**.

- (i) All the streams investigated are ephemeral drainage systems.
- (ii) No wetted areas to support riparian vegetation were found.
- (iii) No fishways are needed due to ephemeral nature of drainage systems.
- (iv) Minimum erosion was observed, irrespective of the aforementioned erosion should still be monitored.
- (v) Water quality must be monitored.
- (vi) An Action Plan: Bank Stabilisation must be formulated for the extraction point on the Limpopo riverbank.
- (vii) Monitoring Plan for the above Action Plan as well as for fish and macro invertebrate are implemented twice a year.

#### 8.5 Environmental Management Plan (EMP)

Attached find the EMP for implementation on the project. **Appendix B5**.

### 9. ADVANTAGES AND DISADVANTAGES OF THE PROPOSED ACTIVITY AND ALTERNATIVES ON THE ENVIRONMENT AND COMMUNITY

#### 9.1 Advantages of the proposed activity and alternatives

- i. The proposed expansion of Semple dam will ensure a constant quality water supply for the current farming activities.
- ii. The products produced and supplied to the agriculture industry will ensure agriculture produce and related socio-economic benefits for related businesses.
- iii. Both the above points contribute to the socio-economic aspects of the community.

- iv. The proposed new dam will be advantageous as a storage dam where water will be stored to relieve pressure on the Limpopo River system during the dry/or low flow periods.
- v. The dam will create a new open water habitat for fauna and flora species.
- vi. The dam will result in placing less stress on the ecological reserve of the Limpopo River.

## 9.2 Disadvantages of the proposed activity and alternatives

- i) Natural vegetation will be lost and habitat for species will be lost.
- ii) Protected tree species will be destroyed located on the footprint area.

# 10. ENVIRONMENTAL IMPACT DETERMINATION AND EVALUATION

## 10.1 Assessment method

The assessment of impacts will largely be based on DEA's (1998) Guideline Document: EIA Regulations. The assessment will consider impacts arising from the planning, construction and operation phases of the proposed project both before and after the implementation of appropriate mitigation measures. Due to the inherent difficulties involved in attaching significance ratings to impacts, it is proposed that the evaluation of the significance of impacts be done according to the rating system described below.

In any process of identifying and recognizing impacts, one must recognize that the determination of impact significance is inherently an anthropocentric concept. Duinker and Beanlands, (1986) in DEAT 2002. Thompson (1988), (1990) in DEAT 2002 stated that the significance of an impact is an expression of the cost or value of an impact to society.

However, the tendency is always towards a system of quantifying the significance of the impacts so that it is a true representation of the existing situation on site. This will be done by using where ever possible, legal and scientific standards which are applicable. The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The *consequence matrix* use parameters like *severity*, *duration* and *extent* of impact as well as *compliance* to standards. Values of 1-5 are assigned to the parameters that are added and averaged to determine the overall consequence. The same process is followed with the *likelihood* that consists of two parameters namely *frequency* and *probability*. The overall consequence and the overall likelihood are then multiplied to give values ranging from 1 to 25. These values as shown in the following table are then used to rank the significance. It must be said however that in the end, a subjective judging of an impact can still be done, but the reasons for doing so must be qualified.

**Table 1: Significance ratings (Plomp 2004)**

| Significance                                      | Low   | Low-Medium | Medium  | Medium-High | High  |
|---|-------|------------|---------|-------------|-------|
| Overall<br>Consequence<br>X Overall<br>Likelihood | 1-4.9 | 5-9.9      | 10-14.9 | 15-19.9     | 20-25 |

**Description of the parameters used in the matrixes**

**Severity**

- Low Low cost/high potential to mitigate. Impacts easily reversible, non harmful insignificant change/deterioration or disturbance to natural environments.
- Low-medium Low cost to mitigate Small/potentially harmful Moderate change/deterioration or disturbance to natural environment.
- Medium Substantial cost to mitigate. Potential to mitigate and potential to reverse impact. Harmful Significant change/ deterioration or disturbance to natural environment.
- Medium-high High cost to mitigate. Possible to mitigate Great/Very Harmful Very significant change/deterioration or disturbance to natural environment.
- High Prohibitive cost to mitigate. Little or no mechanism to mitigate. Irreversible. Extremely Harmful Disastrous change/deterioration or disturbance to natural environment.

**Duration**

- Low Up to one month
- Low-medium One month to three months
- Medium Three months to one year
- Medium-high One to ten years
- High Beyond ten years

**Extent**

- Low Footprint area
- Low-medium Area directly bordering the footprint area
- Medium Areas adjoining to west, east and south.

|  |   |
|--|---|
| Medium-high  | Surrounding farming areas/Musina town   |
| High   | Regional National and International   |
| <b>Frequency</b>   |   |
| Low  | Once/more a year or once/more during operation  |
| Low-medium   | Once/more in 6 months   |
| Medium   | Once/more a month   |
| Medium-high  | Once/more a week  |
| High   | Daily   |
| <b>Probability</b>   |   |
| Low  | Almost never/almost impossible  |
| Low-medium   | Very seldom/highly unlikely   |
| Medium   | Infrequent/unlikely/seldom  |
| Medium-high  | Often/Regularly/Likely/Possible   |
| High   | Daily/Highly likely/definitely  |
| <b>Compliance</b>  |   |
| The following criteria are used during the rating of possible impacts. |   |
| Low  | Best Practice   |
| Low-medium   | Compliance  |
| Medium   | Non compliance/conformance to Policies etc-Internal                                   |
| Medium-high  | Non-compliance/conformance to Legislation etc-External                                |
| High   | Directive, prosecution of closure or potential for non-renewal of licenses or rights. |

## 10.2 Aspects, related impacts, significance and proposed mitigation measures

The assessment ordained the issues into main grouping characteristics where after they were assessed. Below is a chronological list of the groupings with the number of issues under each listed which was assessed.

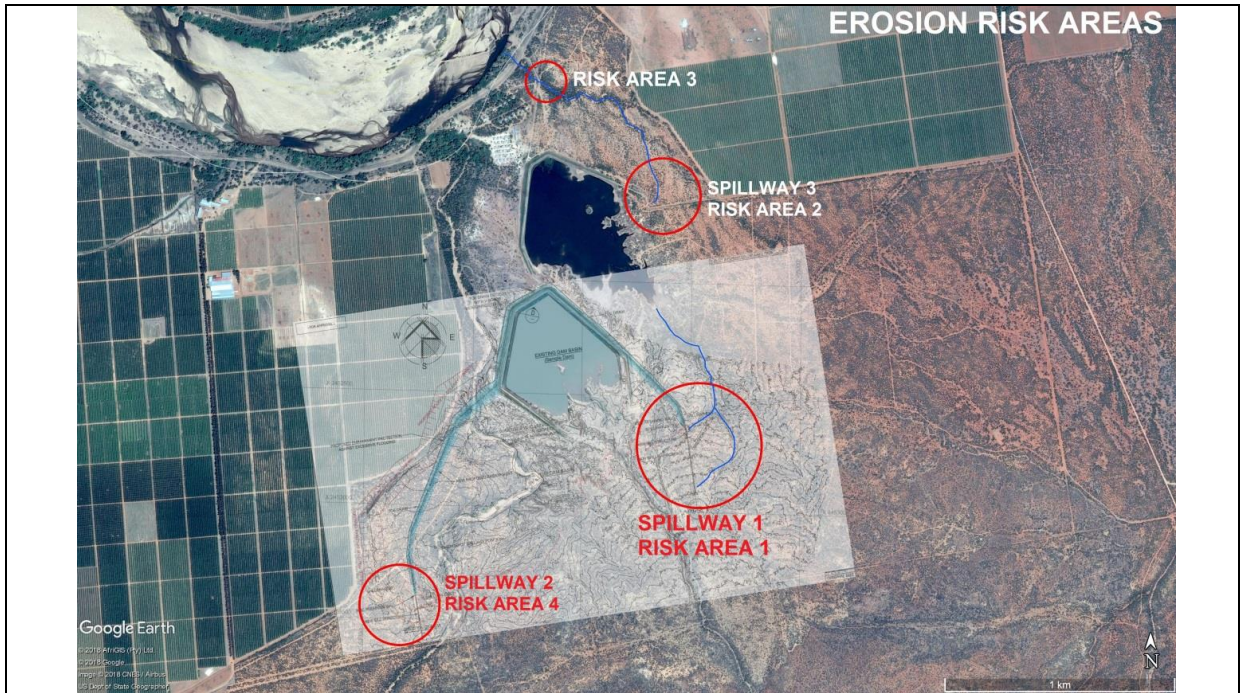
|   |      |
|---|------|
| 1. Biophysical Characteristics                    | : 10 |
| 2. Ecological Characteristics                     | : 5  |
| 3. Current and Potential Land-use Characteristics | : 2  |
| 4. Cultural Characteristics                       | : 1  |
| 5. Socio-economic Characteristics                 | : 2  |
| 6. Infrastructure Characteristics                 | : 3  |
| 7. Pollution Characteristics                      | : 1  |
| 8. Risk and Hazard Characteristics                | : 1  |
| 9. Health and Safety Characteristics              | : 0  |
| 10. Cumulative and Synergistic Characteristics    | : 1  |

Assessment start on next page.

## 1. BIOPHYSICAL CHARACTERISTICS

| BIOPHYSICAL CHARACTERISTICS   |                 |          |                         |                     |                  |        |     |      |
|---|-----------------|----------|-------------------------|---------------------|------------------|--------|-----|------|
| Land: Substrata   |                 |          |                         |                     |                  |        |     |      |
| <b>PHASE</b>  |                 |          | Design and construction |                     |                  |        |     |      |
| <b>CONFIDENCE</b>   |                 |          | High: Positive          |                     |                  |        |     |      |
| <b>EXTENT</b>   |                 |          |                         | <b>RISK</b>         |                  |        |     |      |
| Site Specific   | Local           | Regional | National                | Yes                 |                  | No     |     |      |
| <b>PROBABILITY</b>  |                 |          |                         | <b>SIGNIFICANCE</b> |                  |        |     |      |
| Definite  | Highly probable | Probable | Improbable              | Low                 | L-M              | Medium | M-H | High |
| <b>STATUS &amp; INTENSITY</b>   |                 |          |                         |                     |                  |        |     |      |
| Major   |                 | Moderate |                         | Minor               |                  |        |     |      |
| +5  | +4              | +3       | +2                      | +1                  | Positive         |        |     |      |
| -5  | -4              | -3       | -2                      | -1                  | Negative         |        |     |      |
| <b>DURATION</b>   |                 |          |                         |                     | <b>FREQUENCY</b> |        |     |      |
| Transient   | Short-term      | Medium   | Long-term               | Permanent           | High             | Med    | Low |      |
| <b>ISSUE</b>  |                 |          |                         |                     |                  |        |     |      |
| Nature of substrata found at project area   |                 |          |                         |                     |                  |        |     |      |
| <b>NATURE OF IMPACT</b>   |                 |          |                         |                     |                  |        |     |      |
| <ul style="list-style-type: none"> <li>Material not suitable for dam-wall construction</li> </ul>   |                 |          |                         |                     |                  |        |     |      |
| <b>AFFECTED AREAS</b>   |                 |          |                         |                     |                  |        |     |      |
| Footprint for project area  |                 |          |                         |                     |                  |        |     |      |
| <b>MITIGATION:</b>  |                 |          |                         |                     |                  |        |     |      |
| <p><u>Material constraints:</u><br/>           An initial Phase 1 Geotechnical survey was conducted and indicated that material is suitable for construction. To further identify suitable material Phase 2 Geotechnical survey will be conducted to identify pockets of material best suitable for construction. A professional company to conduct these surveys and tests has been identified and will be appointed after necessary authorisations have been received.</p> <p><u>Recommendations:</u></p> <ol style="list-style-type: none"> <li>Appointment of professional company for further surveying during construction.</li> <li>Spoil material to be used in erosion control.</li> </ol> |                 |          |                         |                     |                  |        |     |      |

| BIOPHYSICAL CHARACTERISTICS  |                 |          |            |              |           |        |     |      |
|--|-----------------|----------|------------|--------------|-----------|--------|-----|------|
| Land: Erosion  |                 |          |            |              |           |        |     |      |
| <b>PHASE</b>   |                 |          |            |              |           |        |     |      |
| <b>CONFIDENCE</b>  |                 |          |            |              |           |        |     |      |
| EXTENT   |                 |          |            | RISK         |           |        |     |      |
| Site Specific  | Local           | Regional | National   | Yes          |           | No     |     |      |
| PROBABILITY  |                 |          |            | SIGNIFICANCE |           |        |     |      |
| Definite   | Highly probable | Probable | Improbable | Low          | L-M       | Medium | M-H | High |
| STATUS & INTENSITY   |                 |          |            |              |           |        |     |      |
| Major  |                 | Moderate |            | Minor        |           |        |     |      |
| +5   | +4              | +3       | +2         | +1           | Positive  |        |     |      |
| -5   | -4              | -3       | -2         | -1           | Negative  |        |     |      |
| DURATION   |                 |          |            |              | FREQUENCY |        |     |      |
| Transient  | Short-term      | Medium   | Long-term  | Permanent    | High      | Med    | Low |      |
| ISSUE  |                 |          |            |              |           |        |     |      |
| Erosion  |                 |          |            |              |           |        |     |      |
| NATURE OF IMPACT   |                 |          |            |              |           |        |     |      |
| Erosion will degrade the receiving environment and cause secondary-and tertiary impacts.   |                 |          |            |              |           |        |     |      |
| AFFECTED AREAS   |                 |          |            |              |           |        |     |      |
| <p><b><u>What was found?</u></b><br/> Area surrounding footprint of project and areas linked directly or indirectly to the footprint, which includes the following:</p> <ul style="list-style-type: none"> <li>• Primary spillways (2);</li> <li>• Emergency spillway (1);</li> <li>• Dam-wall slopes;</li> <li>• Channelled water;</li> <li>• Roads</li> </ul> <p>Continue on following page.</p> |                 |          |            |              |           |        |     |      |



Channelled flow: With the previous design seepage occurred which was channelled which had to be repaired. Remediation measures was taken.

Roads: The roads did not show serious erosion problems.

Dam embankments: The dam-walls were covered with herbaceous growth which stabilised the surfaces with no erosion evident.

### MITIGATION:

#### **Mitigating recommendations:**

- (i) Spill-ways
  - a. The channelled flow (from spill-ways) of surface water must be designed according to engineering stormwater guidelines.
  - b. Energy breakers and water dissipaters must be ensure to spread the water over a larger outlet area to prevent scouring of surface.
- (ii) Roads
  - a. The management roads related to the dam area must be designed to prevent erosion.
  - b. Any altered water flow influencing the management roads should be designed to allow for water flow connectivity. Refer to design drawings below. This design will also allow for when the Limpopo River is flood (1:10 year and more).
  - c. During construction roads has to be kept to the footprint. Any deviations on this instruction by the contractor will be penalised; refer to EMP for design.
- (iii) Dam-wall slopes
  - a. Slopes must to be seeded/planted with *Cynodon* cultivars as on existing dam-walls. See image below.



Image illustration desired state of dam-wall after construction.

| BIOPHYSICAL CHARACTERISTICS  |                 |                              |            |           |              |        |             |      |  |
|--|-----------------|------------------------------|------------|-----------|--------------|--------|-------------|------|--|
| Sense of place in receiving environment  |                 |                              |            |           |              |        |             |      |  |
| <b>PHASE</b>   |                 | Construction and operational |            |           |              |        |             |      |  |
| <b>CONFIDENCE</b>  |                 | High (50-100%)               |            |           |              |        |             |      |  |
| EXTENT   |                 |                              |            |           | RISK         |        |             |      |  |
| Site Specific  | Local           | Regional                     | National   | Yes       |              |        | No          |      |  |
| PROBABILITY  |                 |                              |            |           | SIGNIFICANCE |        |             |      |  |
| Definite   | Highly probable | Probable                     | Improbable | Low       | Low-Medium   | Medium | Medium-High | High |  |
| STATUS & INTENSITY   |                 |                              |            |           |              |        |             |      |  |
| Major  |                 | Moderate                     |            | Minor     |              |        |             |      |  |
| +5   | +4              | +3                           | +2         | +1        |              |        | Positive    |      |  |
| -5   | -4              | -3                           | -2         | -1        |              |        | Negative    |      |  |
| DURATION   |                 |                              |            |           | FREQUENCY    |        |             |      |  |
| Transient  | Short-term      | Medium                       | Long-term  | Permanent |              | High   | Med         | Low  |  |
| T  | S               | M                            | L          | P         |              | H      | M           | L    |  |
| COMPLIANCE   |                 |                              |            |           |              |        |             |      |  |
| Construction: High<br>Operational: High  |                 |                              |            |           |              |        |             |      |  |
| ISSUE  |                 |                              |            |           |              |        |             |      |  |
| Wrong placing in receiving environment regards: <ul style="list-style-type: none"> <li>Landuse</li> <li>Sterilising land</li> </ul>  |                 |                              |            |           |              |        |             |      |  |
| NATURE OF IMPACT   |                 |                              |            |           |              |        |             |      |  |
| <ul style="list-style-type: none"> <li>In contrast with approved landuse</li> <li>Fragmentation of biological communities</li> </ul> |                 |                              |            |           |              |        |             |      |  |
| AFFECTED AREAS   |                 |                              |            |           |              |        |             |      |  |



The footprint of the actual structure and direct surroundings used for access and infrastructure

### BACKGROUND INFORMATION

#### Background information:

The proposed expansion is directly adjoining the actual footprint of existing dam and associated farming infrastructure and has been planned and designed to be integrated with the existing structure of Semple dam. The area has been subjected to human interference since m with a marked increase from the early 1950's.

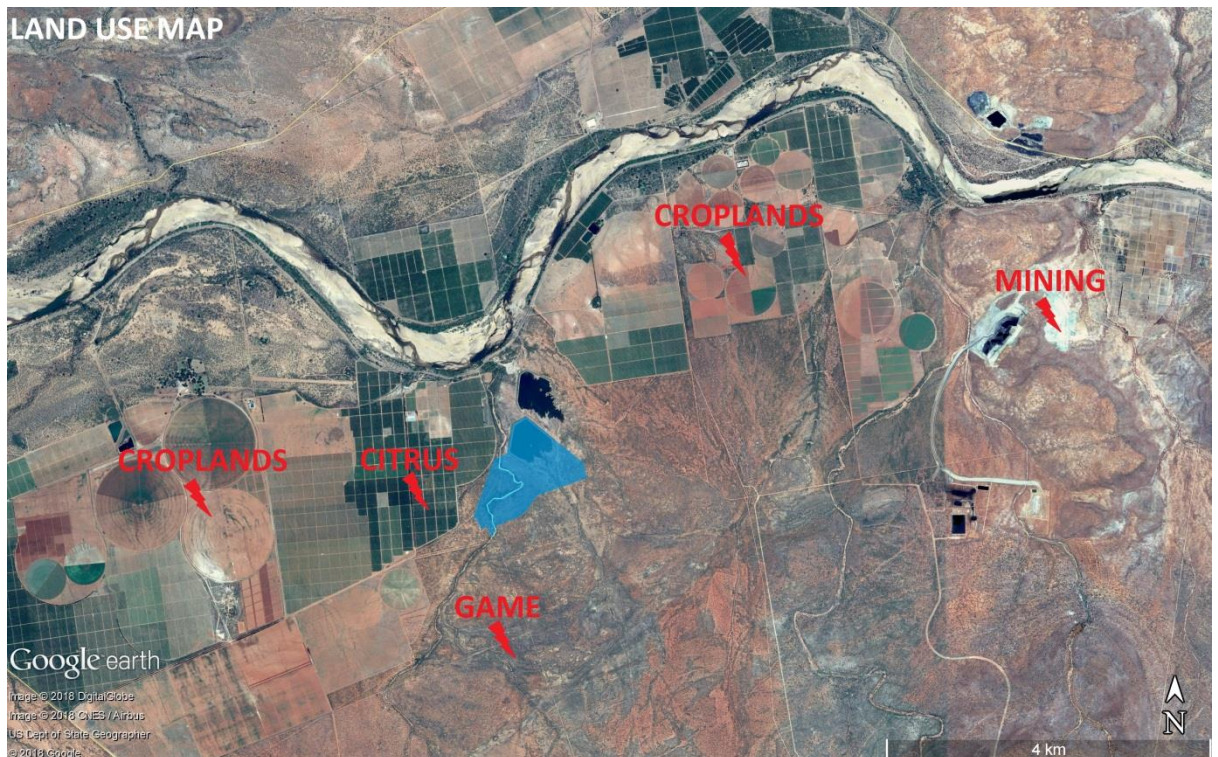
#### Status before new expansion:

Google images (prior to development and dated back to 2004) indicates that minimum vegetation has been partly removed for infrastructure such as roads, pipelines and parking/id-1940's when farmers was established in the area. The vegetation cannot be considered as pristine due to the above as was confirmed with field surveys.

Large indigenous trees are present in close proximity to the structure indicating that preservation of trees is important to the developer. The vegetation is described as Mopane Bushveld (Low & Rebelo, 1996) with large parts being conserved in various provincial-and national reserves-and parks.

#### What was found:

- (i) The environmental landscape has already been transformed.
- (ii) The footprint area was subjected to human influence over time.
- (iii) Pollution built-up and/or signs of pollutions of significance were not found to be common.
- (iv) The activity is in line with the landuse.
- (v) Where terrestrial habitat was lost (dam water surface area) it was replaced by new aquatic habitat. Which supports various aquatic life forms and associated systems (new populations, food-chains etc)



View of surrounding land-uses

### MITIGATION:

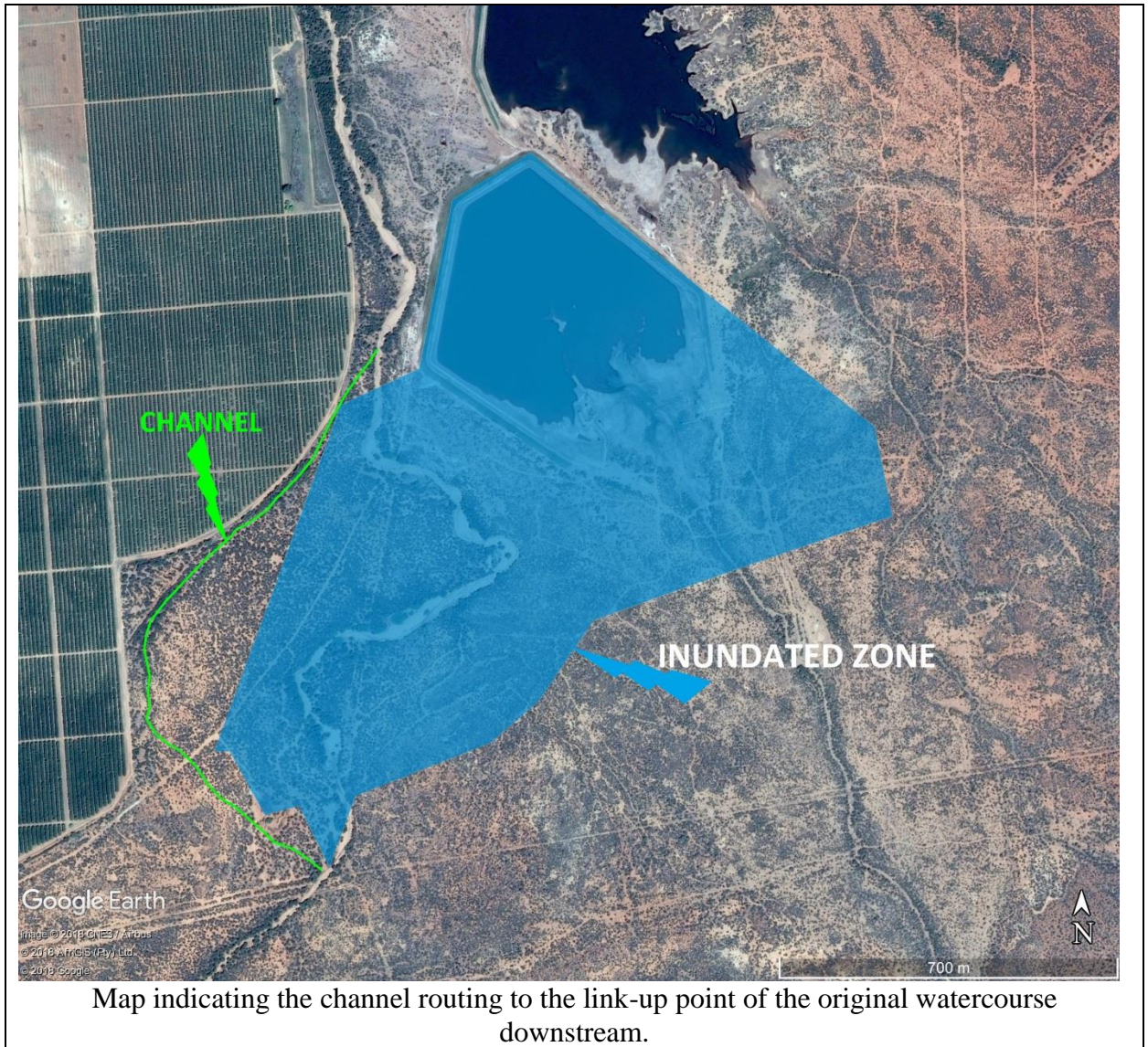
#### What is recommended for mitigation:

- (i) That an aquatic monitoring program for the aquatic habitat is implemented.
- (ii) That the vegetation in the inundated dam is removed to prevent organic matter (decomposing) influencing the water quality.
- (iii) That the recommendations made in the respective reports are implemented.

| BIOPHYSICAL CHARACTERISTICS   |                 |          |                              |              |            |        |             |      |
|---|-----------------|----------|------------------------------|--------------|------------|--------|-------------|------|
| Sense of place: Location  |                 |          |                              |              |            |        |             |      |
| <b>PHASE</b>  |                 |          | Construction and operational |              |            |        |             |      |
| <b>CONFIDENCE</b>   |                 |          | High (50-100%)               |              |            |        |             |      |
| EXTENT  |                 |          |                              | RISK         |            |        |             |      |
| Site Specific   | Local           | Regional | National                     | Yes          |            |        | No          |      |
| PROBABILITY   |                 |          |                              | SIGNIFICANCE |            |        |             |      |
| Definite  | Highly probable | Probable | Improbable                   | Low          | Low-Medium | Medium | Medium-High | High |
| STATUS & INTENSITY  |                 |          |                              |              |            |        |             |      |
| Major   |                 | Moderate |                              | Minor        |            |        |             |      |
| +5  | +4              | +3       | +2                           | +1           | Positive   |        |             |      |
| -5  | -4              | -3       | -2                           | -1           | Negative   |        |             |      |
| DURATION  |                 |          |                              |              | FREQUENCY  |        |             |      |
| Transient   | Short-term      | Medium   | Long-term                    | Permanent    | High       | Med    | Low         |      |
| COMPLIANCE  |                 |          |                              |              |            |        |             |      |
| <b>Construction: High</b>   |                 |          |                              |              |            |        |             |      |
| <b>Operational: High</b>  |                 |          |                              |              |            |        |             |      |
| ISSUE   |                 |          |                              |              |            |        |             |      |
| Destruction and/or removal of vegetation with protected status.   |                 |          |                              |              |            |        |             |      |
| NATURE OF IMPACT  |                 |          |                              |              |            |        |             |      |
| (i) Removal of protected species  |                 |          |                              |              |            |        |             |      |
| (ii) Destruction of Red Data species  |                 |          |                              |              |            |        |             |      |
| AFFECTED AREAS  |                 |          |                              |              |            |        |             |      |
| The footprint of the actual structure and direct surroundings used for access and infrastructure  |                 |          |                              |              |            |        |             |      |
| BACKGROUND INFORMATION  |                 |          |                              |              |            |        |             |      |
| <b>Sense of placing in the receiving environment</b>  |                 |          |                              |              |            |        |             |      |
| Refer also to image in previous aspect.   |                 |          |                              |              |            |        |             |      |
| The proposed expansion will be directly adjoining to the existing Semple dam.   |                 |          |                              |              |            |        |             |      |
| The location is outside of the 1:100 floodline of the Limpopo River.  |                 |          |                              |              |            |        |             |      |
| The vegetation that will be affected is dry-land riparian vegetation which does not differ from the adjoining Mopane woodland.  |                 |          |                              |              |            |        |             |      |
| There is an existing road infrastructure on this portion of the farm.   |                 |          |                              |              |            |        |             |      |
| The sense of location of the project area was found to be conducive for:  |                 |          |                              |              |            |        |             |      |
| <ul style="list-style-type: none"> <li>• Minimum disturbance of productive land;</li> <li>• Minimum sterilising of productive land;</li> <li>• Minimum fragmentation of productive land;</li> <li>• Placing in close proximity to existing farming infrastructure;</li> <li>• Minimum impact on receiving environment.</li> <li>• Protected tree species was found.</li> <li>• No Red Data flora or fauna was found.</li> <li>• An Archaeological site was identified that needs to be assessed by a Phase 2 excavation.</li> </ul> |                 |          |                              |              |            |        |             |      |
| MITIGATION:   |                 |          |                              |              |            |        |             |      |
| (i) The high impact zone, e.g. the dam-wall and inundated area can be restricted by defining the footprint area prior to construction by a double strand fence.   |                 |          |                              |              |            |        |             |      |
| (ii) A proper stormwater plan should be implemented to receive the water from the hardened surfaces and seepage from the dam.   |                 |          |                              |              |            |        |             |      |
| (iii) Protected trees in footprint area can only be removed by a permit from DAFF.  |                 |          |                              |              |            |        |             |      |
| (iv) The Phase 2 Archaeological excavation should be completed before construction can be allowed on the specific site.   |                 |          |                              |              |            |        |             |      |
| (v) Implement the EMP.  |                 |          |                              |              |            |        |             |      |

| BIOPHYSICAL CHARACTERISTICS   |                 |                              |            |              |           |        |     |      |
|---|-----------------|------------------------------|------------|--------------|-----------|--------|-----|------|
| Freshwater Systems: Natural drainage patterns   |                 |                              |            |              |           |        |     |      |
| <b>PHASE</b>  |                 | Construction and operational |            |              |           |        |     |      |
| <b>CONFIDENCE</b>   |                 | High/Positive                |            |              |           |        |     |      |
| EXTENT  |                 |                              |            | RISK         |           |        |     |      |
| Site Specific   | Local           | Regional                     | National   | Yes          |           |        | No  |      |
| PROBABILITY   |                 |                              |            | SIGNIFICANCE |           |        |     |      |
| Definite  | Highly probable | Probable                     | Improbable | Low          | L-M       | Medium | M-H | High |
| STATUS & INTENSITY  |                 |                              |            |              |           |        |     |      |
| Major   |                 | Moderate                     |            | Minor        |           |        |     |      |
| +5  | +4              | +3                           | +2         | +1           | Positive  |        |     |      |
| -5  | -4              | -3                           | -2         | -1           | Negative  |        |     |      |
| DURATION  |                 |                              |            |              | FREQUENCY |        |     |      |
| Transient   | Short-term      | Medium                       | Long-term  | Permanent    | High      | Med    | Low |      |
| ISSUE   |                 |                              |            |              |           |        |     |      |
| Development near rivers and watercourse ( 32 m)   |                 |                              |            |              |           |        |     |      |
| NATURE OF IMPACT  |                 |                              |            |              |           |        |     |      |
| Possible impacts on river/watercourse banks<br>Destruction of sensitive vegetation<br>Pollution by construction activities  |                 |                              |            |              |           |        |     |      |
| AFFECTED AREAS  |                 |                              |            |              |           |        |     |      |
| Where the proposed expansion of the dam-wall will cross the unnamed watercourse and the area of the watercourse that will be inundated.   |                 |                              |            |              |           |        |     |      |
| MITIGATION:   |                 |                              |            |              |           |        |     |      |
| <p><u>Status quo:</u><br/>The proposed project is ±1,200 m from the Limpopo River and outside any riparian-or wetland zone. It does however influence ±1,530 m of an ephemeral watercourse were the watercourse will be channelled around the footprint area.</p> <p><u>Recommendations for mitigation:</u></p> <ol style="list-style-type: none"> <li>1. The watercourse is channelled to link up with an existing minor-watercourse which enters downstream with the original natural watercourse.</li> <li>2. The necessary DWS applications are lodged.</li> <li>3. That a route as assessed for the channel is surveyed when the construction surveying is done for the dam.</li> </ol> <p><u>The expected outcome of mitigation:</u><br/>Is that the epherical watercourse flow is re-routed to support the watercourse downstream as indicated in the map below.</p> |                 |                              |            |              |           |        |     |      |





Map indicating the channel routing to the link-up point of the original watercourse downstream.

| BIOPHYSICAL CHARACTERISTICS  |                 |               |            |              |           |        |     |      |
|--|-----------------|---------------|------------|--------------|-----------|--------|-----|------|
| Freshwater systems: Rivers and associated riparian zones and wetlands  |                 |               |            |              |           |        |     |      |
| PHASE  |                 | Operational   |            |              |           |        |     |      |
| CONFIDENCE   |                 | High-positive |            |              |           |        |     |      |
| EXTENT   |                 |               |            | RISK         |           |        |     |      |
| Site Specific  | Local           | Regional      | National   | Yes          |           |        | No  |      |
| PROBABILITY  |                 |               |            | SIGNIFICANCE |           |        |     |      |
| Definite   | Highly probable | Probable      | Improbable | Low          | L-M       | Medium | M-H | High |
| STATUS & INTENSITY   |                 |               |            |              |           |        |     |      |
| Major  |                 | Moderate      |            | Minor        |           |        |     |      |
| +5   | +4              | +3            | +2         | +1           | Positive  |        |     |      |
| -5   | -4              | -3            | -2         | -1           | Negative  |        |     |      |
| DURATION   |                 |               |            |              | FREQUENCY |        |     |      |
| Transient  | Short-term      | Medium        | Long-term  | Permanent    | High      | Med    | Low |      |
| ISSUE  |                 |               |            |              |           |        |     |      |
| Impacting on water flow affecting water reaching riparian-and floodplains  |                 |               |            |              |           |        |     |      |
| NATURE OF IMPACT   |                 |               |            |              |           |        |     |      |
| Water extraction from riverbed in low flow periods will lower the available water in the streambed as well as in the aquifer which will place water stress on the riparian zone. Connectivity of floodwater flow on floodplains is impeded and altered.  |                 |               |            |              |           |        |     |      |
| AFFECTED AREAS   |                 |               |            |              |           |        |     |      |
| Where development is in close proximity (32m and less) to water courses, riverbanks and floodplains  |                 |               |            |              |           |        |     |      |
| MITIGATION:  |                 |               |            |              |           |        |     |      |
| <p><u>What was found:</u><br/> The expansion of the dam of the dam is situated outside the riparian zone and floodplains. The extraction point (existing) is situated on the riverbank and is designated a Critical Biodiversity Area (CBA), it is not related to the water resources associated with the proposed site for the proposed expansion of the existing impoundment.<br/> No Red Data flora and fauna species was found with some protected plants.</p> <p><u>Recommendations for mitigation:</u></p> <ol style="list-style-type: none"> <li>1. Normal erosion prevention measures on the road to the proposed project area.</li> <li>2. Implement any measures as described in the EMP.</li> </ol> |                 |               |            |              |           |        |     |      |

**BIOPHYSICAL CHARACTERISTICS**

**Freshwater systems: Water quality**

**PHASE** Operational

**CONFIDENCE** High

**EXTENT** **RISK**

|               |       |          |          |     |    |
|---------------|-------|----------|----------|-----|----|
| Site Specific | Local | Regional | National | Yes | No |
|---------------|-------|----------|----------|-----|----|

**PROBABILITY** **SIGNIFICANCE**

|          |                 |          |            |     |     |        |     |      |
|----------|-----------------|----------|------------|-----|-----|--------|-----|------|
| Definite | Highly probable | Probable | Improbable | Low | L-M | Medium | M-H | High |
|----------|-----------------|----------|------------|-----|-----|--------|-----|------|

**STATUS & INTENSITY**

|       |          |       |
|-------|----------|-------|
| Major | Moderate | Minor |
|-------|----------|-------|

|    |    |    |    |    |          |
|----|----|----|----|----|----------|
| +5 | +4 | +3 | +2 | +1 | Positive |
|----|----|----|----|----|----------|

|    |    |    |    |    |          |
|----|----|----|----|----|----------|
| -5 | -4 | -3 | -2 | -1 | Negative |
|----|----|----|----|----|----------|

**DURATION** **FREQUENCY**

|           |            |        |           |           |      |     |     |
|-----------|------------|--------|-----------|-----------|------|-----|-----|
| Transient | Short-term | Medium | Long-term | Permanent | High | Med | Low |
|-----------|------------|--------|-----------|-----------|------|-----|-----|

**ISSUE**

Change of water quality

**NATURE OF IMPACT**

Change/alter the water quality the impoundment and impact on liveforms found in open water habitat

**AFFECTED AREAS**

Impoundment area

**MITIGATION:**

Important information for consideration:

- (i) The applicant has to comply with Euro-Gap specifications.

What was found?

The impounded areas of the existing Semple dam showed signs of high organic material and were visible in the aquatic water plants forming enclosed surface areas. The remnants of the trees are most probably the catalyst for this and can have an influence on the water quality. The footprint of the proposed new impounded footprint has a profusion of vegetation.



View of remaining vegetation



View of aquatic vegetation





View of vegetation on area of proposed new inundated area



View of vegetation along watercourse illustrating the structure

When vegetation is not removed nutrients will build-up which results in organic pollution from organic material left in the basin can occur. The more plant material, and in specific trees left *in-situ* will result quicker build-up of nutrients. Below is an abbreviated explanation.

“*Microcystis* is a genus of freshwater cyanobacteria which includes the harmful algal bloom *Microcystis aeruginosa*. The cyanobacteria can produce neurotoxins and hepatotoxins, such as microcystin and cyanopeptolin.

The term “microcystin” refers to a group of liver toxins that are produced by many species of cyanobacteria. The name microcystin comes from the genus *Microcystis*, one of the most widely known genera that produce this widespread toxin. *Microcystis aeruginosa*, a photosynthesizing freshwater cyanobacterium, is the most common producer of toxic microcystin and is often associated with eutrophic freshwater systems, where they form large, toxic blooms. *Microcystis aeruginosa* is single-celled bacterium that forms colonies ranging from a few individuals to millions of bacteria and can group together to create blue-green layers of scum on the surface of freshwater systems (e.g Lake Hartebeespoort). This scum blocks light from reaching the bottom of the water column and can lead to hypoxic zones due to the overconsumption of oxygen during the decomposition of dead cyanobacterial cells.”

Recommendations for mitigation:

The three points below should be mentioned as conditions.

1. The removal of the vegetation out of the inundated area will prevent the organic materials influence on the water quality.
2. It is recommended that a monitoring programme is made a condition and initiated when construction has been completed and dam filled with water.
3. The monitoring should include both dams; the smaller Overvlakte-and extended Semple dams and the well-field.



**BIOPHYSICAL CHARACTERISTICS**

Climate: Flooding (and floodlines)

**PHASE** Operational

**CONFIDENCE** High-Definite

**EXTENT** **RISK**

|               |       |          |          |     |    |
|---------------|-------|----------|----------|-----|----|
| Site Specific | Local | Regional | National | Yes | No |
|---------------|-------|----------|----------|-----|----|

**PROBABILITY** **SIGNIFICANCE**

|          |                 |          |            |     |     |        |     |      |
|----------|-----------------|----------|------------|-----|-----|--------|-----|------|
| Definite | Highly probable | Probable | Improbable | Low | L-M | Medium | M-H | High |
|----------|-----------------|----------|------------|-----|-----|--------|-----|------|

**STATUS & INTENSITY**

|       |  |          |  |       |  |
|-------|--|----------|--|-------|--|
| Major |  | Moderate |  | Minor |  |
|-------|--|----------|--|-------|--|

|    |    |    |    |    |          |
|----|----|----|----|----|----------|
| +5 | +4 | +3 | +2 | +1 | Positive |
|----|----|----|----|----|----------|

|    |    |    |    |    |          |
|----|----|----|----|----|----------|
| -5 | -4 | -3 | -2 | -1 | Negative |
|----|----|----|----|----|----------|

**DURATION** **FREQUENCY**

|           |            |        |           |           |      |     |     |
|-----------|------------|--------|-----------|-----------|------|-----|-----|
| Transient | Short-term | Medium | Long-term | Permanent | High | Med | Low |
|-----------|------------|--------|-----------|-----------|------|-----|-----|

**ISSUE**

Development within 32m development from riverbank or in riparian zone and possible flood zones.

**NATURE OF IMPACT**

Rivers, riparian vegetation and floodplains is designated as Critical Biodiversity Area (CBA) related to water resources

**AFFECTED AREAS**

The proposed development site is not situated in one of the above mentioned water related resources.

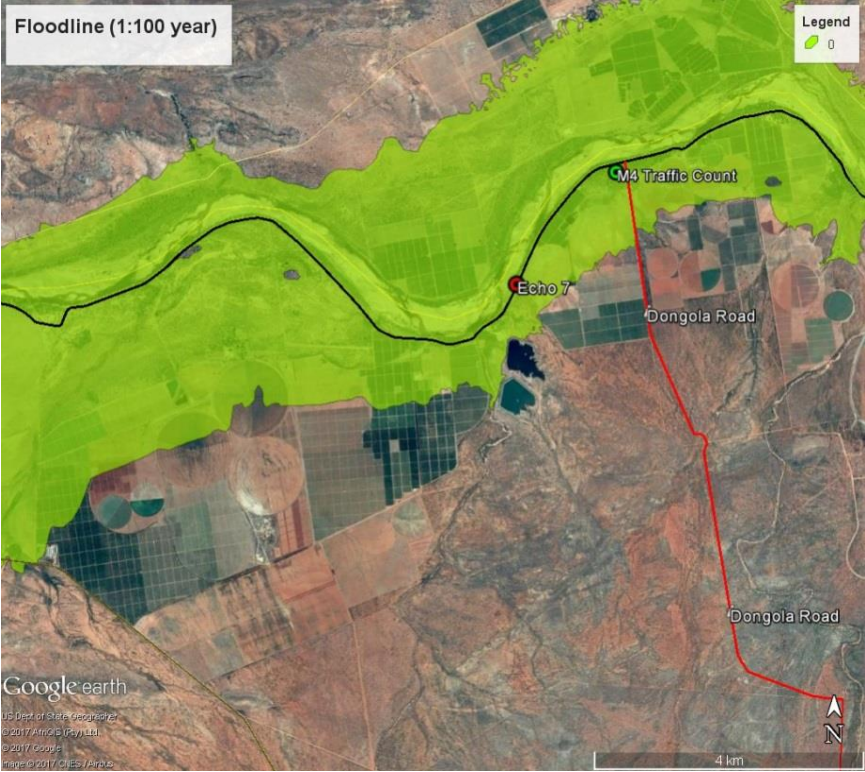
**MITIGATION:**

What was found:

The proposed expansion is outside the 1:100 year floodline.

No riparian vegetation is found on project area.

No riverbank or floodplain along the Limpopo River is found on the project area.



Map with 1:100 year floodline indicated.

Mitigating recommendations:

1. No construction site or any related activity to be placed in 1:100 year floodline area.

| BIOPHYSICAL CHARACTERISTICS  |                 |                         |            |              |            |           |             |      |
|--|-----------------|-------------------------|------------|--------------|------------|-----------|-------------|------|
| Pollution: Terrestrial   |                 |                         |            |              |            |           |             |      |
| <b>PHASE</b>   |                 | Construction            |            |              |            |           |             |      |
| <b>CONFIDENCE</b>  |                 | High (50-100%)-positive |            |              |            |           |             |      |
| EXTENT   |                 |                         |            | RISK         |            |           |             |      |
| Site Specific  | Local           | Regional                | National   | Yes          |            |           | No          |      |
| PROBABILITY  |                 |                         |            | SIGNIFICANCE |            |           |             |      |
| Definite   | Highly probable | Probable                | Improbable | Low          | Low-Medium | Medium    | Medium-High | High |
| STATUS & INTENSITY   |                 |                         |            |              |            |           |             |      |
| Major  |                 | Moderate                |            | Minor        |            |           |             |      |
| +5   | +4              | +3                      | +2         | +1           |            |           | Positive    |      |
| -5   | -4              | -3                      | -2         | -1           |            |           | Negative    |      |
| DURATION   |                 |                         |            |              |            | FREQUENCY |             |      |
| Transient  | Short-term      | Medium                  | Long-term  | Permanent    |            | High      | Med         | Low  |
| COMPLIANCE   |                 |                         |            |              |            |           |             |      |
| <b>Construction:</b> Low-medium (Compliance)   |                 |                         |            |              |            |           |             |      |
| ISSUE  |                 |                         |            |              |            |           |             |      |
| Pollution by construction equipment  |                 |                         |            |              |            |           |             |      |
| NATURE OF IMPACT   |                 |                         |            |              |            |           |             |      |
| (i) Pollution of land by construction equipment spilling diesel/oil/hydraulic fluids   |                 |                         |            |              |            |           |             |      |
| (ii) Pollution by product/construction waste   |                 |                         |            |              |            |           |             |      |
| AFFECTED AREAS   |                 |                         |            |              |            |           |             |      |
| Footprint area   |                 |                         |            |              |            |           |             |      |
| MITIGATION:  |                 |                         |            |              |            |           |             |      |
| <p><u>What was found?:</u><br/>The area has been subjected to human interference with little signs of pollution.</p> <p><u>What is recommended for mitigation:</u></p> <ul style="list-style-type: none"> <li>(i) Implementing the EMP can mitigate the occurrence of pollution during construction.</li> <li>(ii) Independent <i>Environmental Auditing</i> during construction phase.</li> <li>(iii) No servicing of construction machinery on site.</li> <li>(iv) Drip trays must be issued for each construction machine.</li> <li>(v) Diesel bowser site has to be constructed as per specifications in EMP.</li> </ul> |                 |                         |            |              |            |           |             |      |

| BIOPHYSICAL CHARACTERISTICS  |                 |                              |            |              |            |          |             |      |
|--|-----------------|------------------------------|------------|--------------|------------|----------|-------------|------|
| Natural systems: Biodiversity and ecological systems   |                 |                              |            |              |            |          |             |      |
| PHASE  |                 | Construction and operational |            |              |            |          |             |      |
| CONFIDENCE   |                 | High (50-100%)               |            |              |            |          |             |      |
| EXTENT   |                 |                              |            | RISK         |            |          |             |      |
| Site Specific  | Local           | Regional                     | National   | Yes          |            | No       |             |      |
| PROBABILITY  |                 |                              |            | SIGNIFICANCE |            |          |             |      |
| Definite   | Highly probable | Probable                     | Improbable | Low          | Low-Medium | Medium   | Medium-High | High |
| STATUS & INTENSITY   |                 |                              |            |              |            |          |             |      |
| Major  |                 | Moderate                     |            | Minor        |            |          |             |      |
| +5   | +4              | +3                           | +2         | +1           |            | Positive |             |      |
| -5   | -4              | -3                           | -2         | -1           |            | Negative |             |      |
| DURATION   |                 |                              |            |              | FREQUENCY  |          |             |      |
| Transient  | Short-term      | Medium                       | Long-term  | Permanent    | High       | Med      | Low         |      |
| COMPLIANCE   |                 |                              |            |              |            |          |             |      |
| <b>Construction: Medium (Compliance)</b>   |                 |                              |            |              |            |          |             |      |
| <b>Operational: High (Compliance)</b>  |                 |                              |            |              |            |          |             |      |
| ISSUE  |                 |                              |            |              |            |          |             |      |
| Influence on the biodiversity of the area and influences on habitats and system functionality  |                 |                              |            |              |            |          |             |      |
| NATURE OF IMPACT   |                 |                              |            |              |            |          |             |      |
| Destruction of sensitive habitat that supports biodiversity  |                 |                              |            |              |            |          |             |      |
| AFFECTED AREAS   |                 |                              |            |              |            |          |             |      |
| Project footprint area   |                 |                              |            |              |            |          |             |      |
| BACKGROUND INFORMATION   |                 |                              |            |              |            |          |             |      |
| <b>What was found:</b>   |                 |                              |            |              |            |          |             |      |
| (i) Surrounding area   |                 |                              |            |              |            |          |             |      |
| <ul style="list-style-type: none"> <li>The project area does not infringe on designated Critical Biodiversity Areas or influence it.</li> <li>The proposed expansion will not inhibit on any natural biological processes and influence ecosystems.</li> </ul>   |                 |                              |            |              |            |          |             |      |
| (ii) Project area  |                 |                              |            |              |            |          |             |      |
| <ul style="list-style-type: none"> <li>The footprint area of the project is situated in close proximity to existing footprint area (Semple dam) defined by previous farming infrastructure activities.</li> <li>The footprint area has been totally altered to an aquatic habitat and the expansion can be described as a phased development.</li> </ul> |                 |                              |            |              |            |          |             |      |
| MITIGATION:  |                 |                              |            |              |            |          |             |      |
| <b>Recommendation:</b>   |                 |                              |            |              |            |          |             |      |
| (a) Define the footprint and demarcate area before construction commences.   |                 |                              |            |              |            |          |             |      |

## ECOLOGICAL CHARACTERISTICS


| ECOLOGICAL CHARACTERISTICS   |                 |          |               |              |           |        |     |      |
|--|-----------------|----------|---------------|--------------|-----------|--------|-----|------|
| Vegetation: Flora protection   |                 |          |               |              |           |        |     |      |
| <b>PHASE</b>   |                 |          | Construction  |              |           |        |     |      |
| <b>CONFIDENCE</b>  |                 |          | High-Positive |              |           |        |     |      |
| EXTENT   |                 |          |               | RISK         |           |        |     |      |
| Site Specific  | Local           | Regional | National      | Yes          |           |        | No  |      |
| PROBABILITY  |                 |          |               | SIGNIFICANCE |           |        |     |      |
| Definite   | Highly probable | Probable | Improbable    | Low          | L-M       | Medium | M-H | High |
| STATUS & INTENSITY   |                 |          |               |              |           |        |     |      |
| Major  |                 | Moderate |               | Minor        |           |        |     |      |
| +5   | +4              | +3       | +2            | +1           | Positive  |        |     |      |
| -5   | -4              | -3       | -2            | -1           | Negative  |        |     |      |
| DURATION   |                 |          |               |              | FREQUENCY |        |     |      |
| Transient  | Short-term      | Medium   | Long-term     | Permanent    | High      | Med    | Low |      |
| ISSUE  |                 |          |               |              |           |        |     |      |
| Damage, destruction or poisoning of rare-, endangered- or protected species  |                 |          |               |              |           |        |     |      |
| NATURE OF IMPACT   |                 |          |               |              |           |        |     |      |
| Indiscriminate construction work outside defined footprints areas  |                 |          |               |              |           |        |     |      |
| AFFECTED AREAS   |                 |          |               |              |           |        |     |      |
| Footprint area for system, water extraction points, turn-around areas, stockpile/ lay-down areas, alternative access construction roads and construction camps   |                 |          |               |              |           |        |     |      |
| MITIGATION:  |                 |          |               |              |           |        |     |      |
| <p><u>What was found?</u><br/>           Protected tree species do occur on the project area.<br/>           No specific plant communities or importance occur on the project area.<br/>           The vegetation is well represented in protected areas as well as adjoining farms.</p> <p><u>Mitigating recommendations:</u></p> <ul style="list-style-type: none"> <li>(i) Permits to remove/destroy protected species (from DAFF) have to be applied before construction commences.</li> <li>(ii) Protected plants near the footprint, has to be assessed individually after the surveyor has done his lay-out on the wall's footprint, to evaluate the possibility to leave the plants in-situ.</li> <li>(iii) Any measures mentioned in the EMP has to be implemented.</li> <li>(iv) An appointed EO should be appointed for the construction-and rehabilitation phase.</li> </ul> |                 |          |               |              |           |        |     |      |

| ECOLOGICAL CHARACTERISTICS   |                 |          |                      |              |           |          |     |      |
|--|-----------------|----------|----------------------|--------------|-----------|----------|-----|------|
| Vegetation: Vegetation communities of conservation/ scientific importance  |                 |          |                      |              |           |          |     |      |
| <b>PHASE</b>   |                 |          | Construction         |              |           |          |     |      |
| <b>CONFIDENCE</b>  |                 |          | Low-Medium: negative |              |           |          |     |      |
| EXTENT   |                 |          |                      | RISK         |           |          |     |      |
| Site Specific  | Local           | Regional | National             | Yes          |           | No       |     |      |
| PROBABILITY  |                 |          |                      | SIGNIFICANCE |           |          |     |      |
| Definite   | Highly probable | Probable | Improbable           | Low          | L-M       | Medium   | M-H | High |
| STATUS & INTENSITY   |                 |          |                      |              |           |          |     |      |
| Major  |                 | Moderate |                      | Minor        |           |          |     |      |
| +5   | +4              | +3       | +2                   | +1           |           | Positive |     |      |
| -5   | -4              | -3       | -2                   | -1           |           | Negative |     |      |
| DURATION   |                 |          |                      |              | FREQUENCY |          |     |      |
| Transient  | Short-term      | Medium   | Long-term            | Permanent    | High      | Med      | Low |      |
| ISSUE  |                 |          |                      |              |           |          |     |      |
| A Red Data species occurs in the area  |                 |          |                      |              |           |          |     |      |
| NATURE OF IMPACT   |                 |          |                      |              |           |          |     |      |
| The specie is not prominent and detail distribution is un-known  |                 |          |                      |              |           |          |     |      |
| AFFECTED AREAS   |                 |          |                      |              |           |          |     |      |
| Project area and direct surroundings   |                 |          |                      |              |           |          |     |      |
| MITIGATION:  |                 |          |                      |              |           |          |     |      |
| <p><u>Background information:</u><br/> One Red Data herbaceous specie that could possibly occur on the area has been identified. The specie <i>Schoenefeldia transiens</i> was found nearby previously. The specie was not found due to the site specific habitat requirements of the plant. Surveys did not indicate sensitive vegetation communities.</p> <p><u>Recommendation:</u><br/> (i) Erect a demarcation fence on the full-board level of dam to ensure that no movement occurs outside the footprint.</p> |                 |          |                      |              |           |          |     |      |

| ECOLOGICAL CHARACTERISTICS   |                 |                              |           |              |          |        |     |      |
|--|-----------------|------------------------------|-----------|--------------|----------|--------|-----|------|
| Fauna: Species conservation  |                 |                              |           |              |          |        |     |      |
| PHASE  |                 | Construction and Operational |           |              |          |        |     |      |
| CONFIDENCE   |                 | Medium (15-49%)              |           |              |          |        |     |      |
| EXTENT   |                 |                              |           | RISK         |          |        |     |      |
| Site Specific  | Local           | Regional                     | National  | Yes          |          |        | No  |      |
| PROBABILITY  |                 |                              |           | SIGNIFICANCE |          |        |     |      |
| Definite   | Highly Probable | Probable                     | Unlikely  | Low          | L-M      | Medium | M-H | High |
| STATUS & INTENSITY   |                 |                              |           |              |          |        |     |      |
| Major  |                 | Moderate                     |           | Minor        |          |        |     |      |
| +5   | +4              | +3                           | +2        | +1           | Positive |        |     |      |
| -5   | -4              | -3                           | -2        | -1           | Negative |        |     |      |
| DURATION   |                 |                              |           |              | RISK     |        |     |      |
| Transient  | Short-term      | Medium                       | Long-term | Permanent    | Yes      |        | No  |      |
| ISSUE  |                 |                              |           |              |          |        |     |      |
| Survival of rare/endangered animals  |                 |                              |           |              |          |        |     |      |
| NATURE OF IMPACT   |                 |                              |           |              |          |        |     |      |
| Species can be destroyed by construction activities and during operational phase by vehicle movement   |                 |                              |           |              |          |        |     |      |
| AFFECTED AREAS   |                 |                              |           |              |          |        |     |      |
| Along footprint of system  |                 |                              |           |              |          |        |     |      |
| MITIGATION:  |                 |                              |           |              |          |        |     |      |
| <p><u>What was found?</u><br/> No Red Data species was found during surveys.<br/> The possibility that protected species can occur on or near the project area is a possibility.<br/> The project area is surrounded by natural vegetation with areas for species to move freely away or around the project area.<br/> The project area is located in a portion of the farm used for game farming.<br/> There are no habitat restrictions for species in the small-, medium-and large size range.</p> <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> <li>(i) The measures as listed in the EMP should be implemented.</li> <li>(ii) The EO should monitor each site that will be excavated before such activity commences.</li> <li>(iii) An inspection report should be kept with photo references.</li> </ul> |                 |                              |           |              |          |        |     |      |

| ECOLOGICAL CHARACTERISTICS  |                 |          |                              |           |              |          |             |      |
|---|-----------------|----------|------------------------------|-----------|--------------|----------|-------------|------|
| Fauna: Influence of activities/behaviour on wildlife  |                 |          |                              |           |              |          |             |      |
| <b>PHASE</b>  |                 |          | Construction and operational |           |              |          |             |      |
| <b>CONFIDENCE</b>   |                 |          | High (50-100%)               |           |              |          |             |      |
| EXTENT  |                 |          |                              |           | RISK         |          |             |      |
| Site Specific   | Local           | Regional | National                     | Yes       |              | No       |             |      |
| PROBABILITY   |                 |          |                              |           | SIGNIFICANCE |          |             |      |
| Definite  | Highly probable | Probable | Improbable                   | Low       | Low-Medium   | Medium   | Medium-High | High |
| STATUS & INTENSITY  |                 |          |                              |           |              |          |             |      |
| Major   |                 | Moderate |                              | Minor     |              |          |             |      |
| +5  | +4              | +3       | +2                           | +1        |              | Positive |             |      |
| -5  | -4              | -3       | -2                           | -1        |              | Negative |             |      |
| DURATION  |                 |          |                              |           | FREQUENCY    |          |             |      |
| Transient   | Short-term      | Medium   | Long-term                    | Permanent | High         | Med      | Low         |      |
| COMPLIANCE  |                 |          |                              |           |              |          |             |      |
| <b>Construction: High</b>   |                 |          |                              |           |              |          |             |      |
| <b>Operational: High</b>  |                 |          |                              |           |              |          |             |      |
| ISSUE   |                 |          |                              |           |              |          |             |      |
| Influencing the natural populations of species  |                 |          |                              |           |              |          |             |      |
| NATURE OF IMPACT  |                 |          |                              |           |              |          |             |      |
| (i) Destruction of habitat  |                 |          |                              |           |              |          |             |      |
| (ii) Creating an artificial food source for scavengers  |                 |          |                              |           |              |          |             |      |
| AFFECTED AREAS  |                 |          |                              |           |              |          |             |      |
| Area surrounding the project area.  |                 |          |                              |           |              |          |             |      |
| MITIGATION:   |                 |          |                              |           |              |          |             |      |
| <u>Background information:</u>  |                 |          |                              |           |              |          |             |      |
| The development is situated south of the Limpopo River.   |                 |          |                              |           |              |          |             |      |
| The project area is not situated in a natural corridor.   |                 |          |                              |           |              |          |             |      |
| Game does occur on the portion of farm where the development is planned.  |                 |          |                              |           |              |          |             |      |
| 100 ha can be considered as "lost" as potential grazing.  |                 |          |                              |           |              |          |             |      |
| <u>What was found:</u>  |                 |          |                              |           |              |          |             |      |
| (i) The grazing capacity is approximately 12-16ha/LSU.  |                 |          |                              |           |              |          |             |      |
| (ii) The developer acquired a portion of the farm Bergen op Zoom 124 MS which provides suitable habitat and grazing for the game species. |                 |          |                              |           |              |          |             |      |
| <u>What is recommended for mitigation:</u>  |                 |          |                              |           |              |          |             |      |
| (i) That the developer ensures that correct carrying capacity guidelines for game is used.  |                 |          |                              |           |              |          |             |      |



| ECOLOGICAL CHARACTERISTICS   |                 |          |                              |  |          |        |     |      |
|--|-----------------|----------|------------------------------|--|----------|--------|-----|------|
| Natural and Semi-natural: Communities Species conservation/diversity   |                 |          |                              |  |          |        |     |      |
| <b>PHASE</b>   |                 |          | Construction and Operational |  |          |        |     |      |
| <b>CONFIDENCE</b>  |                 |          | Medium (15-49%)              |  |          |        |     |      |
| EXTENT   |                 |          |                              | RISK   |          |        |     |      |
| Site Specific  | Local           | Regional | National                     | Yes  |          |        | No  |      |
| PROBABILITY  |                 |          |                              | SIGNIFICANCE   |          |        |     |      |
| Definite   | Highly Probable | Probable | Unlikely                     | Low  | L-M      | Medium | M-H | High |
| STATUS & INTENSITY   |                 |          |                              |  |          |        |     |      |
| Major  |                 | Moderate |                              | Minor  |          |        |     |      |
| +5   | +4              | +3       | +2                           | +1   | Positive |        |     |      |
| -5   | -4              | -3       | -2                           | -1   | Negative |        |     |      |
| DURATION   |                 |          |                              |  | RISK     |        |     |      |
| Transient  | Short-term      | Medium   | Long-term                    | Permanent  | Yes      |        | No  |      |
| ISSUE  |                 |          |                              |  |          |        |     |      |
| Survival of rare/endangered animals/wildlife   |                 |          |                              |  |          |        |     |      |
| NATURE OF IMPACT   |                 |          |                              |  |          |        |     |      |
| Species can be destroyed and/or influenced by human activities during construction and/or during operational phase by incorrect management.  |                 |          |                              |  |          |        |     |      |
| AFFECTED AREAS   |                 |          |                              |  |          |        |     |      |
| Along footprint of system, the remaining portion of the farm and the water habitat created.  |                 |          |                              |  |          |        |     |      |
| MITIGATION:  |                 |          |                              |  |          |        |     |      |
| <p><u>What was found?</u><br/>           During surveys the species associated with semi-arid savannah was found and included grazers and browsers with spoor of leopard also found.<br/>           Interestingly a rubbing-stone was also found used by larger mammals where they rub against after wallowing in mud to remove external parasites. Based on the size and height of the stone it is obvious that it could include only two specific species, e.g. buffalo and black-rhinoceros. Both not found in the area but still preserved in formal protected parks and game farms.</p> |                 |          |                              |  |          |        |     |      |
|  |                 |          |                              |  |          |        |     |      |
|  |                 |          |                              | Rubbing stone  |          |        |     |      |
| <u>Recommendations:</u>  |                 |          |                              |  |          |        |     |      |
| (i) Impacts can be mitigated by implementing the EMP.<br>(ii) Control to test whether EMP is implemented is by audit inspections by EO.<br>(iii) The monitoring of the establishing of species in the new water habitat can supply valuable conservation data for species in the area. The presence of Red Data Bird species such as: <ul style="list-style-type: none"> <li>• Pell's Fishing Owl;</li> <li>• Various storks;</li> <li>• Various herons.</li> </ul>  |                 |          |                              |  |          |        |     |      |



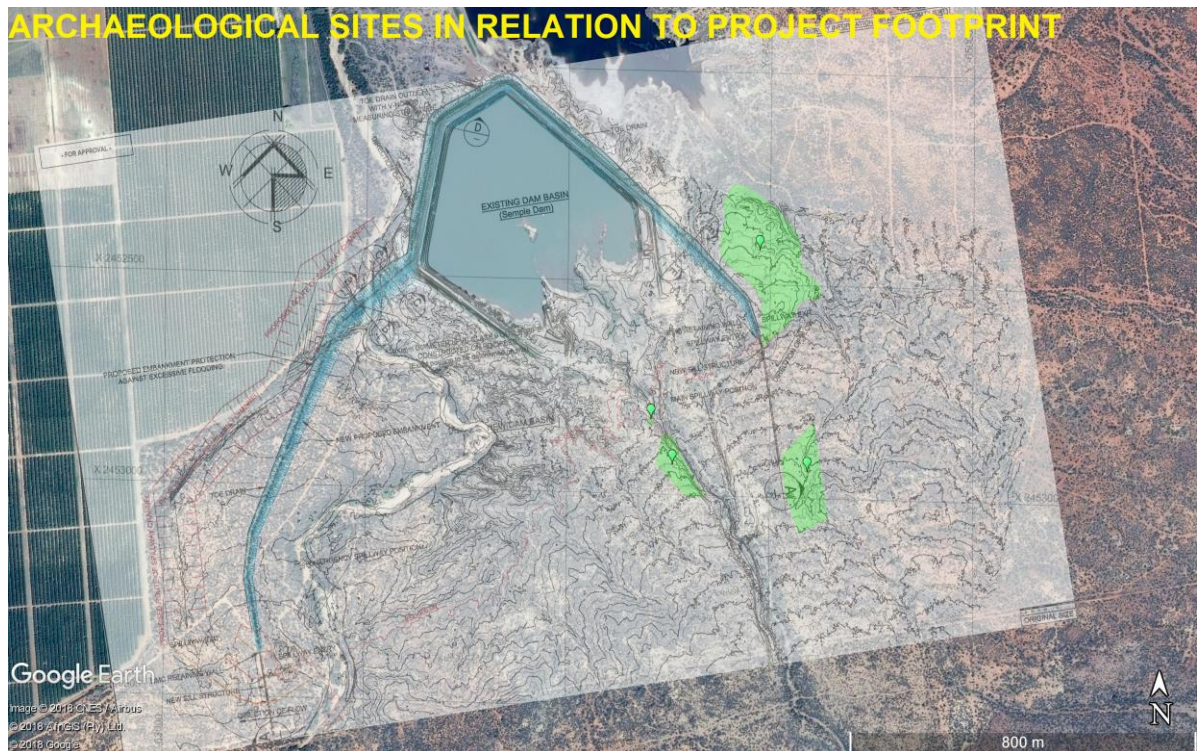
### 3 CURRENT AND POTENTIAL LAND-USE

| CURRENT AND POTENTIAL LANDUSE CHARACTERISTICS   |                 |                              |           |           |              |          |        |     |      |
|---|-----------------|------------------------------|-----------|-----------|--------------|----------|--------|-----|------|
| Aspect: General landuse and character   |                 |                              |           |           |              |          |        |     |      |
| <b>PHASE</b>  |                 | Construction and Operational |           |           |              |          |        |     |      |
| <b>CONFIDENCE</b>   |                 | Medium (15-49%)              |           |           |              |          |        |     |      |
| EXTENT  |                 |                              |           |           | RISK         |          |        |     |      |
| Site Specific   | Local           | Regional                     | National  |           | Yes          | No       |        |     |      |
| PROBABILITY   |                 |                              |           |           | SIGNIFICANCE |          |        |     |      |
| Definite  | Highly Probable | Probable                     | Unlikely  |           | Low          | L-M      | Medium | M-H | High |
| STATUS & INTENSITY  |                 |                              |           |           |              |          |        |     |      |
| Major   |                 | Moderate                     |           |           | Minor        |          |        |     |      |
| +5  | +4              | +3                           | +2        |           | +1           | Positive |        |     |      |
| -5  | -4              | -3                           | -2        |           | -1           | Negative |        |     |      |
| DURATION  |                 |                              |           |           | RISK         |          |        |     |      |
| Transient   | Short-term      | Medium                       | Long-term | Permanent |              | Yes      | No     |     |      |
| ISSUE   |                 |                              |           |           |              |          |        |     |      |
| Development not related to agriculture  |                 |                              |           |           |              |          |        |     |      |
| NATURE OF IMPACT  |                 |                              |           |           |              |          |        |     |      |
| Zoned Agriculture land-use is used for non-related agricultural activities. It can lead to the collapse of productive agricultural activities which in turn can cause negative socio-economic impacts in deep-rural areas where work opportunities are rare.  |                 |                              |           |           |              |          |        |     |      |
| AFFECTED AREAS  |                 |                              |           |           |              |          |        |     |      |
| Project area and surrounding farming areas in general.  |                 |                              |           |           |              |          |        |     |      |
| MITIGATION:   |                 |                              |           |           |              |          |        |     |      |
| <p><u>What was found?</u><br/>           MC Mining indicated that they have a mining right on a portion of the project area for future utilization.<br/>           The documents received and information from MC Mining's respondent (Mr J. Sparrow) indicated that the right to mine will only be activated in approximately 30 years.<br/>           MC Mining does not have an objection to the proposed project but indicated that some agreement should be made. This was done in a <i>Memorandum of Understanding</i> between the two parties.</p> <p><u>Recommendations:</u></p> <p>(i) That the MoU is made a condition in the authorisation document.</p> |                 |                              |           |           |              |          |        |     |      |

| CURRENT AND POTENTIAL LANDUSE CHARACTERISTICS   |                 |          |            |              |          |      |     |
|---|-----------------|----------|------------|--------------|----------|------|-----|
| Aspect: Future use of dams  |                 |          |            |              |          |      |     |
| <b>PHASE</b>  |                 |          |            |              |          |      |     |
| <b>CONFIDENCE</b>   |                 |          |            |              |          |      |     |
| EXTENT  |                 |          |            | RISK         |          |      |     |
| Site Specific   | Local           | Regional | National   | Yes          |          |      |     |
| S   | L               | R        | N          | No           |          |      |     |
| PROBABILITY   |                 |          |            | SIGNIFICANCE |          |      |     |
| Definite  | Highly probable | Probable | Improbable | Low          | Medium   | High |     |
| D   | HP              | P        | IP         | L            | M        | H    |     |
| STATUS & INTENSITY  |                 |          |            |              |          |      |     |
| Major   |                 | Moderate |            | Minor        |          |      |     |
| +5  | +4              | +3       | +2         | +1           | Positive |      |     |
| -5  | -4              | -3       | -2         | -1           | Negative |      |     |
| DURATION  |                 |          |            | FREQUENCY    |          |      |     |
| Transient   | Short-term      | Medium   | Long-term  | Permanent    | High     | Med  | Low |
| T   | S               | M        | L          | P            | H        | M    | L   |
| ISSUE   |                 |          |            |              |          |      |     |
| In 30 years MC Mining can start mining on the portion occupied by the new expansion   |                 |          |            |              |          |      |     |
| NATURE OF IMPACT  |                 |          |            |              |          |      |     |
| Water for farming activities will be influenced   |                 |          |            |              |          |      |     |
| AFFECTED AREAS  |                 |          |            |              |          |      |     |
| Noordgrens Boerdery activities  |                 |          |            |              |          |      |     |
| MITIGATION:   |                 |          |            |              |          |      |     |
| <p><u>Background</u></p> <p>Water is a natural resource that will always be in demand. MC Mining has the right for future mining on a part of the project area. This is explained in Competent Persons Report for MC Mining, attached as Appendix D. The options for MC Mining to implement their rights is to:</p> <ol style="list-style-type: none"> <li>(i) Buy the project area form Noordgrens Boerdery and then to: <ol style="list-style-type: none"> <li>a. Rehabilitate the dam and start mining;</li> <li>b. Reconfiguration of the damwal to exclude the mining portion;</li> <li>c. To keep the dam as is and use the water for mining.</li> </ol> </li> </ol> <p>The two parties, e.g. Noordgrens Boerdery and MC Mining had a meeting to address the issue of the mining rights future implementation. It was agreed that a <i>Memorandum of Understanding</i> is drafted between the two parties. This <i>MoU</i> will address the future decommissioning of the dam.</p> <p><u>Recommendation:</u></p> <ol style="list-style-type: none"> <li>(i) A <i>Memorandum of Understanding</i> is attached to this application. The decision is for MC Mining to make (in the future) when after 30 years whether and when they decide to mine.</li> <li>(ii) The <i>MoU</i> is made a condition of the environmental authorisation. The Draft document is attached as Appendix E.</li> </ol> |                 |          |            |              |          |      |     |

## 4 CULTURAL RESOURCES

| CULTURAL CONSIDERATIONS  |                 |                              |            |              |            |          |             |      |
|--|-----------------|------------------------------|------------|--------------|------------|----------|-------------|------|
| Aspect: Disturbance of archaeological-or graves  |                 |                              |            |              |            |          |             |      |
| <b>PHASE</b>   |                 | Construction and operational |            |              |            |          |             |      |
| <b>CONFIDENCE</b>  |                 | High (50-100%)               |            |              |            |          |             |      |
| EXTENT   |                 |                              |            | RISK         |            |          |             |      |
| Site Specific  | Local           | Regional                     | National   | Yes          |            | No       |             |      |
| PROBABILITY  |                 |                              |            | SIGNIFICANCE |            |          |             |      |
| Definite   | Highly probable | Probable                     | Improbable | Low          | Low-Medium | Medium   | Medium-High | High |
| STATUS & INTENSITY   |                 |                              |            |              |            |          |             |      |
| Major  |                 | Moderate                     |            | Minor        |            |          |             |      |
| +5   | +4              | +3                           | +2         | +1           |            | Positive |             |      |
| -5   | -4              | -3                           | -2         | -1           |            | Negative |             |      |
| DURATION   |                 |                              |            |              | FREQUENCY  |          |             |      |
| Transient  | Short-term      | Medium                       | Long-term  | Permanent    | High       | Med      | Low         |      |
| COMPLIANCE   |                 |                              |            |              |            |          |             |      |
| National Heritage Resources Act, Act 25 of 1999, Section 38 (1)<br>The area does not trigger the minimum requirements for the Act.   |                 |                              |            |              |            |          |             |      |
| ISSUE  |                 |                              |            |              |            |          |             |      |
| Compliance with legislation  |                 |                              |            |              |            |          |             |      |
| NATURE OF IMPACT   |                 |                              |            |              |            |          |             |      |
| Possible damage or destruction to archaeological or grave sites  |                 |                              |            |              |            |          |             |      |
| AFFECTED AREAS   |                 |                              |            |              |            |          |             |      |
| Project footprint area   |                 |                              |            |              |            |          |             |      |
| BACKGROUND INFORMATION   |                 |                              |            |              |            |          |             |      |
| An archaeological site has been identified on the project area.<br>The site is also mentioned in an archaeological report conducted by MC Mining previously.<br>The site has to be further investigated as recommended by SAHRA. |                 |                              |            |              |            |          |             |      |



The archaeological sites are the indicated green areas.

### MITIGATION:

#### **What is recommended for mitigation:**

- (i) A Phase 2 survey will have to be conducted.
- (ii) The applicant (developer) will appoint the specialist(S) to conduct said survey.
- (iii) The locations of the sites are located in the footprint area with main focus areas of construction and situated in the full-board catchment area of the dam. Therefore the sites have be properly demarcated before any construction can commence by a fence to prevent any damage to the site until such time as it has been successfully cleared.
- (iv) Construction cannot commence before the above sites has been successfully cleared.
- (v) A development site lay-out plan for construction has to be compiled before commencing with construction by the applicant, Project Engineer and Contractor. Said plan will be approved by the ECO. This plan will be made part of the EMP.

## 5 SOCIO-ECONOMIC CHARACTERISTICS

| SOCIO-ECONOMIC CHARACTERISTICS  |                 |          |           |           |                              |             |     |      |  |
|---|-----------------|----------|-----------|-----------|------------------------------|-------------|-----|------|--|
| Aspect: Demographic location and influence  |                 |          |           |           |                              |             |     |      |  |
| <b>PHASE</b>  |                 |          |           |           | Construction and Operational |             |     |      |  |
| <b>CONFIDENCE</b>   |                 |          |           |           | Medium (15-49%)              |             |     |      |  |
| <b>EXTENT</b>   |                 |          |           |           | <b>RISK</b>                  |             |     |      |  |
| Site Specific   | Local           | Regional | National  | Yes       |                              |             | No  |      |  |
| <b>PROBABILITY</b>  |                 |          |           |           | <b>SIGNIFICANCE</b>          |             |     |      |  |
| Definite  | Highly Probable | Probable | Unlikely  | Low       | L-M                          | Medium      | M-H | High |  |
| <b>STATUS &amp; INTENSITY</b>   |                 |          |           |           |                              |             |     |      |  |
| Major   |                 | Moderate |           | Minor     |                              |             |     |      |  |
| +5  | +4              | +3       | +2        | +1        |                              | Positive    |     |      |  |
| -5  | -4              | -3       | -2        | -1        |                              | Negative    |     |      |  |
| <b>DURATION</b>   |                 |          |           |           |                              | <b>RISK</b> |     |      |  |
| Transient   | Short-term      | Medium   | Long-term | Permanent |                              | Yes         |     | No   |  |
| <b>ISSUE</b>  |                 |          |           |           |                              |             |     |      |  |
| Provision of work in deep-rural area  |                 |          |           |           |                              |             |     |      |  |
| <b>NATURE OF IMPACT</b>   |                 |          |           |           |                              |             |     |      |  |
| Constant provision of work<br>Contribution to regional economy  |                 |          |           |           |                              |             |     |      |  |
| <b>AFFECTED AREAS</b>   |                 |          |           |           |                              |             |     |      |  |
| Area: Noordgrens Boerdery<br>Municipal: Musina-and Blouberg<br>Province: Limpopo<br>National: Gauteng/Kwa-Zulu Natal  |                 |          |           |           |                              |             |     |      |  |
| <b>MITIGATION:</b>  |                 |          |           |           |                              |             |     |      |  |
| <p><u>What was found?</u><br/>                     The proposed expansion is to ensure the use of legal allocation of water for producing citrus. There is potential to extend the orchards.<br/>                     The type of farming activity is labour intensive with high skill development needs. Farming is a repeatable activity over time using renewable resources and will have a longer life-span than mining.<br/>                     Labour is sourced from communities at:</p> <ul style="list-style-type: none"> <li>• Blouberg</li> <li>• Dzanai/Makhado</li> <li>• Sibasa<br/>and from</li> <li>• Zimbabwe</li> </ul> <p><u>Recommendations:</u><br/>                     (i) No mitigating measures necessary. The proposed project will contribute to socio-economic welfare of an area and region and further.<br/>                     Expected outcome: Positive.<br/>                     Certainty: High degree</p> |                 |          |           |           |                              |             |     |      |  |

| SOCIO-ECONOMIC CHARACTERISTICS   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
|--|-----------------|----------|------------------------------|--------------|----------|--------|-----|------|--------|------|--------|-----------|-----|----|-----------|-----|-----|-------|-----|-----|--------------|--|--|---------|----|----|--------------|---|---|------------|-----|-----|-------|-----|-----|
| Aspect: Economic and employment status   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| <b>PHASE</b>   |                 |          | Construction and Operational |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| <b>CONFIDENCE</b>  |                 |          | Medium (15-49%)              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| EXTENT   |                 |          |                              | RISK         |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Site Specific  | Local           | Regional | National                     | Yes          |          |        | No  |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| PROBABILITY  |                 |          |                              | SIGNIFICANCE |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Definite   | Highly Probable | Probable | Unlikely                     | Low          | L-M      | Medium | M-H | High |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| STATUS & INTENSITY   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Major  |                 | Moderate |                              | Minor        |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| +5   | +4              | +3       | +2                           | +1           | Positive |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| -5   | -4              | -3       | -2                           | -1           | Negative |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| DURATION   |                 |          |                              |              |          | RISK   |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Transient  | Short-term      | Medium   | Long-term                    | Permanent    | Yes      |        | No  |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| ISSUE  |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Social-economic security   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| NATURE OF IMPACT   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Security for workers and their families supported by their spouses employment  |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| AFFECTED AREAS   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Area: Noordgrens Boerdery<br>Municipal: Vhembe District Municipality<br>Province: Limpopo<br>International: Zimbabwe   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| MITIGATION:  |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| <p>What was found?</p> <p>That citrus farming is labour intensive.</p> <p>That there is vertical-and horizontal management opportunities for workers to excel and grow in the farming structure.</p>   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| <table border="1"> <thead> <tr> <th>Number</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>Permanent</td> <td>160</td> <td>20</td> </tr> <tr> <td>Temporary</td> <td>400</td> <td>200</td> </tr> <tr> <td>Total</td> <td>560</td> <td>220</td> </tr> <tr> <th colspan="3">Skill levels</th> </tr> <tr> <td>Skilled</td> <td>19</td> <td>NA</td> </tr> <tr> <td>Semi-skilled</td> <td>5</td> <td>4</td> </tr> <tr> <td>Un-skilled</td> <td>536</td> <td>216</td> </tr> <tr> <td>Total</td> <td>560</td> <td>220</td> </tr> </tbody> </table> |                 |          |                              |              |          |        |     |      | Number | Male | Female | Permanent | 160 | 20 | Temporary | 400 | 200 | Total | 560 | 220 | Skill levels |  |  | Skilled | 19 | NA | Semi-skilled | 5 | 4 | Un-skilled | 536 | 216 | Total | 560 | 220 |
| Number   | Male            | Female   |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Permanent  | 160             | 20       |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Temporary  | 400             | 200      |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Total  | 560             | 220      |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Skill levels   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Skilled  | 19              | NA       |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Semi-skilled   | 5               | 4        |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Un-skilled   | 536             | 216      |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Total  | 560             | 220      |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Expected outcome: Positive.  |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Certainty: High degree   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| Recommendations:   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |
| (i) No mitigating measures can be made as Noordgrens Landgoed is compliant with national and international requirements.   |                 |          |                              |              |          |        |     |      |        |      |        |           |     |    |           |     |     |       |     |     |              |  |  |         |    |    |              |   |   |            |     |     |       |     |     |



## 6 INFRASTRUCTURE SERVICES

| INFRASTRUCTURE CHARACTERISTICS   |                 |                              |           |           |              |          |     |      |  |
|--|-----------------|------------------------------|-----------|-----------|--------------|----------|-----|------|--|
| Aspect: Adequacy of water resources  |                 |                              |           |           |              |          |     |      |  |
| <b>PHASE</b>   |                 | Construction and Operational |           |           |              |          |     |      |  |
| <b>CONFIDENCE</b>  |                 | Medium (15-49%)              |           |           |              |          |     |      |  |
| EXTENT   |                 |                              |           |           | RISK         |          |     |      |  |
| Site Specific  | Local           | Regional                     | National  | Yes       |              |          | No  |      |  |
| PROBABILITY  |                 |                              |           |           | SIGNIFICANCE |          |     |      |  |
| Definite   | Highly Probable | Probable                     | Unlikely  | Low       | L-M          | Medium   | M-H | High |  |
| STATUS & INTENSITY   |                 |                              |           |           |              |          |     |      |  |
| Major  |                 | Moderate                     |           | Minor     |              |          |     |      |  |
| +5   | +4              | +3                           | +2        | +1        |              | Positive |     |      |  |
| -5   | -4              | -3                           | -2        | -1        |              | Negative |     |      |  |
| DURATION   |                 |                              |           |           | RISK         |          |     |      |  |
| Transient  | Short-term      | Medium                       | Long-term | Permanent | Yes          |          |     | No   |  |
| ISSUE  |                 |                              |           |           |              |          |     |      |  |
| Expansion of storage capacity  |                 |                              |           |           |              |          |     |      |  |
| NATURE OF IMPACT   |                 |                              |           |           |              |          |     |      |  |
| Area that will be needed for storage will be transformed<br>Indirectly the riparian vegetation and stability of riverbank<br>More water will be available downstream in river for downstream water users.  |                 |                              |           |           |              |          |     |      |  |
| AFFECTED AREAS   |                 |                              |           |           |              |          |     |      |  |
| Approximately 70 hectares will be inundated by water.<br>The riparian zone downstream from the well-fields   |                 |                              |           |           |              |          |     |      |  |
| MITIGATION:  |                 |                              |           |           |              |          |     |      |  |
| <b>What do we know?</b>  |                 |                              |           |           |              |          |     |      |  |
| (i) The ecological reserve of the Limpopo River has not been determined by DWS.  |                 |                              |           |           |              |          |     |      |  |
| (ii) A total of 11 223 707 m <sup>3</sup> has been allocated to Noordgrens Boerdery.   |                 |                              |           |           |              |          |     |      |  |
| (iii) The stress period for water availability for users is in period from July to October.  |                 |                              |           |           |              |          |     |      |  |
| (iv) The supply of water is in sequence according to the season which differs for each season. The supply of water onto orchards is in phases and is briefly explained below:  |                 |                              |           |           |              |          |     |      |  |
| <ul style="list-style-type: none"> <li>• Phase 1 (Summer): Supply from boreholes and river. During this period water is also stored into dams.</li> <li>• Phase 2 (Late-summer to early-winter): Supply from boreholes</li> <li>• Phase 3 (Mid-winter to late-winter): Supply from boreholes and dams</li> <li>• Phase 4 (Early-summer to mid-summer): Supply from dams</li> </ul> |                 |                              |           |           |              |          |     |      |  |
| (v) Monitoring on water does take place for specific needs, which can be summarised as:  |                 |                              |           |           |              |          |     |      |  |
| a. Water volumes (quantity) from surface water from Limpopo River;   |                 |                              |           |           |              |          |     |      |  |
| b. Water volumes (quantity) from borehole well-field on Limpopo River bank;  |                 |                              |           |           |              |          |     |      |  |
| c. Water quality for both sources; especially the salt content which indicates that the aquifer has been depleted;   |                 |                              |           |           |              |          |     |      |  |

- d. Water monitoring in citrus orchards.
- (vi) Water is pumped from two extensive fields up-stream of Noordgrens Boerdery; the furthest at  $\pm 6.8$  km and the nearest at  $\pm 3$  km.
- (vii) For Venetia Mine a well-filed is situated further up-stream.
- (viii) Overvlakte Portion 4&5 farming is situated  $\pm 3.3$  km downstream.
- (ix) Karoi Boerdery is situated 24 km downstream.
- (x) Musina Municipal Water Facilities is situated  $\pm 50$  km downstream.
- (xi) Water is also taken from the Limpopo River and its aquifer by Zimbabwe farming activities.
- (xii) The confluence of the Limpopo-and Sashe Rivers is  $\pm 24$  km upstream.

### **What was found?**

Confirmation of Extent and Lawfulness of Wateruse (by DWS) is supplied in Table 1 below.

| PROPERTY                    | SOURCE    |           | TOTAL<br>m <sup>3</sup> /ANNUM |
|-----------------------------|-----------|-----------|--------------------------------|
|                             | SURFACE   | BOREHOLE  |                                |
| Overvlakte                  | 1 526 320 | 381 580   | 1 907 900                      |
| Semple                      | 1 031 710 | 6 554 397 | 7 586 107                      |
| Noordgrens                  | 847 553   | 882 147   | 1 729 700                      |
| TOTAL m <sup>3</sup> /ANNUM | 3 405 583 | 7 818 124 | 11 223 707                     |
| Percentage of water /source | 30.34%    | 69.66%    |                                |

The main source of water is from the boreholes.

In Table 2 the storage capacity of existing dams and with the expansion is supplied.

| DAM               | VOLUME IN m <sup>3</sup> |
|-------------------|--------------------------|
| Overvlakte        | 750 000                  |
| Semple            | 1 200 000                |
|                   | 1 950 000                |
| Semple: Extension | 3 800 000                |
| Total Storage*    | 5 750 000                |

\* After completion of extension

Even with the expansion of Semple dam a total of 5 473 707 m<sup>3</sup> will not be able to be stored. To use this water it has to be pumped either directly onto orchards or into impoundments.

The expansion of Semple dam is approximately 70 hectares which will be inundated by water. The expansion will make it possible to re-establish 30 ha of citrus and to establish 130 ha new citrus orchards.

Noordgrens Boerdery has developed a pro-active water management plan, and is still busy with further development, for sustainable farming.

### **Mitigation Recommendations:**

The mitigation recommendation is to provide an off-set programme for sustainable use of the water resource.

- (i) A *Water Monitoring Management Plan* has to be compiled and should include as a minimum the following monitoring aspects:



- a. High flow at main extraction point from Limpopo River.
- b. Water abstraction volumes for each borehole over calendar days per annum.
- c. Annual wateruse model integrated with the annual available water as experienced for the annual weather pattern.
- d. Water quality from each source.
- e. Monitoring of water stress in riparian vegetation
- f. Monitoring of riparian vegetation structure at:
  - location above extraction point;
  - extraction point; and
  - below extraction point.

This program should include species lists, structure and occurrence with listed impacts per monitor site other than water related impacts.

Rational:

The Water Monitoring Management Plan is critical to ensure that the primary source for water, e.g. the Limpopo River and its aquifer can supply sufficient water without inhibiting other water user's needs as well as being harmful to the ecological system of the Limpopo River.

The data collected has to be extended with the objective to collect data that can supply a better understanding of the seasonal distribution and subsequent ecological reserve as experienced along the Limpopo River bordering Noordgrens Landgoed.

Refer to *Hydrological Information and Techniques to Support the Determination of the Water Quantity Component of the Ecological Reserve for Rivers* (Hughes and Münster, 2000).

Expected Outcome: Positive

Certainty: Medium-High degree of certainty

| NATURE AND LEVEL OF PRESENT AND FUTURE ENVIRONMENTAL POLLUTION   |                 |                              |            |                     |                  |        |             |      |
|--|-----------------|------------------------------|------------|---------------------|------------------|--------|-------------|------|
| Pollution: Water   |                 |                              |            |                     |                  |        |             |      |
| <b>PHASE</b>   |                 | Construction and operational |            |                     |                  |        |             |      |
| <b>CONFIDENCE</b>  |                 | High (50-100%)               |            |                     |                  |        |             |      |
| <b>EXTENT</b>  |                 |                              |            | <b>RISK</b>         |                  |        |             |      |
| Site Specific  | Local           | Regional                     | National   | Yes                 |                  |        | No          |      |
| <b>PROBABILITY</b>   |                 |                              |            | <b>SIGNIFICANCE</b> |                  |        |             |      |
| Definite   | Highly probable | Probable                     | Improbable | Low                 | Low-Medium       | Medium | Medium-High | High |
| <b>STATUS &amp; INTENSITY</b>  |                 |                              |            |                     |                  |        |             |      |
| Major  |                 | Moderate                     |            | Minor               |                  |        |             |      |
| +5   | +4              | +3                           | +2         | +1                  |                  |        | Positive    |      |
| -5   | -4              | -3                           | -2         | -1                  |                  |        | Negative    |      |
| <b>DURATION</b>  |                 |                              |            |                     | <b>FREQUENCY</b> |        |             |      |
| Transient  | Short-term      | Medium                       | Long-term  | Permanent           | High             | Med    | Low         |      |
| <b>COMPLIANCE</b>  |                 |                              |            |                     |                  |        |             |      |
| <b>Operational:</b> Low-medium (Compliance)  |                 |                              |            |                     |                  |        |             |      |
| <b>ISSUE</b>   |                 |                              |            |                     |                  |        |             |      |
| How and what pollution can occur   |                 |                              |            |                     |                  |        |             |      |
| <b>NATURE OF IMPACT</b>  |                 |                              |            |                     |                  |        |             |      |
| Pollutants can end up in water sources   |                 |                              |            |                     |                  |        |             |      |
| <u>Definition:</u>   |                 |                              |            |                     |                  |        |             |      |
| National Water Act, 1998 (Act No 36 of 1998)   |                 |                              |            |                     |                  |        |             |      |
| <ul style="list-style-type: none"> <li>• <i>Pollution: means the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it-</i> <ul style="list-style-type: none"> <li>(a) <i>less fit for any beneficial purpose for which it may reasonably be expected to be used; or</i></li> <li>(b) <i>harmfull or potential harmful-</i> <ul style="list-style-type: none"> <li>(aa) <i>to the welfare, health or safety of human beings;</i></li> <li>(bb) <i>to any aquatic or non-aquatic organisms;</i></li> <li>(cc) <i>to the resource quality; or</i></li> <li>(dd) <i>to property.</i></li> </ul> </li> </ul> </li> <li>• <i>Waste: includes any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in which volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted.</i></li> </ul> |                 |                              |            |                     |                  |        |             |      |
| <b>AFFECTED AREAS</b>  |                 |                              |            |                     |                  |        |             |      |
| The following areas were considered:   |                 |                              |            |                     |                  |        |             |      |
| <ul style="list-style-type: none"> <li>• Areas surrounding project area.</li> <li>• Pollution of Limpopo River upstream</li> <li>• Pollution of groundwater</li> </ul>   |                 |                              |            |                     |                  |        |             |      |

## MITIGATION:

### **Background information:**

- (i) The water stored has two sources
  - From Limpopo River: the quality varies
  - From well-field: quality also deteriorates late in the winter and early summer.
- (ii) The water is monthly tested for pollutants by an accredited laboratory. It is within the prescribed legislation:
  - National Water Act (Act No 36 of 1998), Schedule to General Authorisation No 665 of 6 September 2013.

### **Questions and Answers which has to be answered:**

- (i) Q: Can the water be polluted?  
A: What was found is that the quality of the sources varies seasonally and is directly related to the seasonal rains and subsequent flow volume in the Limpopo River.
- (ii) Q: Are there suspended solid material in water (refer to definition above)?  
A: No. The water has suspended material from plants as per definition inserted in box below.

Definition as per National Environmental Waste Act:

“organic waste” means waste of non-anthropogenic origin that is readily biodegradable in the environment and does not contain any toxic substances that may accumulate in the environment

- (iii)Q: Does the water biological property pose a pollution risk?  
(iii)A: No pollution can take place as no activities that could be the source or cause of pollution is allowed.

Why not? :

The biological or chemical properties of the water pumped are not altered as it is pumped from the Limpopo River or well-field.

Rational:

The laboratory test results taken each month confirm the above.

- (iv)Q: Can the water that percolates into the aquifer have a negative effect on the water.  
A: The water cannot have any negative effect on the water-table quality.

### **What was found?**

- (i) The water quality is tested (by an accredited laboratory) to conform to minimum standards set by DWS and the proponent that produces an export product that has to meet Euro-Gap standards.

### **What is recommended for mitigation:**

- (i) No other measures are recommended as no form of pollution input could be discerned from the water.
- (ii) That the water monitoring program is continued.

## 8 GROUPING RISK AND HAZARD

| RISK AND HAZARD CHARACTERISTICS  |                 |                              |           |              |          |        |     |      |
|--|-----------------|------------------------------|-----------|--------------|----------|--------|-----|------|
| Aspect: Identity and level of hazard to public and property  |                 |                              |           |              |          |        |     |      |
| PHASE  |                 | Construction and Operational |           |              |          |        |     |      |
| CONFIDENCE   |                 | Medium (15-49%)              |           |              |          |        |     |      |
| EXTENT   |                 |                              |           | RISK         |          |        |     |      |
| Site Specific  | Local           | Regional                     | National  | Yes          |          |        | No  |      |
| PROBABILITY  |                 |                              |           | SIGNIFICANCE |          |        |     |      |
| Definite   | Highly Probable | Probable                     | Unlikely  | Low          | L-M      | Medium | M-H | High |
| STATUS & INTENSITY   |                 |                              |           |              |          |        |     |      |
| Major  |                 | Moderate                     |           | Minor        |          |        |     |      |
| +5   | +4              | +3                           | +2        | +1           | Positive |        |     |      |
| -5   | -4              | -3                           | -2        | -1           | Negative |        |     |      |
| DURATION   |                 |                              |           |              | RISK     |        |     |      |
| Transient  | Short-term      | Medium                       | Long-term | Permanent    | Yes      |        | No  |      |
| ISSUE  |                 |                              |           |              |          |        |     |      |
| Safety of people living/working below the dam-wall   |                 |                              |           |              |          |        |     |      |
| NATURE OF IMPACT   |                 |                              |           |              |          |        |     |      |
| In worst case scenario where dam-wall collapses/break  |                 |                              |           |              |          |        |     |      |
| AFFECTED AREAS   |                 |                              |           |              |          |        |     |      |
| Area below dam-wall between dam and Limpopo River as well as downstream  |                 |                              |           |              |          |        |     |      |
| MITIGATION:  |                 |                              |           |              |          |        |     |      |
| <p><b>What was found?</b></p> <p>Workers housing is situated between dam and Limpopo River.<br/>           The border security system consisting of fences and patrol road will also be affected.<br/>           The two identifiable issues for a possible dam-wall failure are:</p> <ul style="list-style-type: none"> <li>(i) Dam-wall design, which includes not only the dam-wall but also the overflow. This is controlled by:               <ul style="list-style-type: none"> <li>a. Design by an experienced Engineer approved and registered with DWS.</li> <li>b. Control on the design by a Safety Class application by DWS.</li> </ul>               Note:<br/>               The above issue is addressed in the <i>Preliminary Design Report</i> by PG Consulting Engineers (Pty) Ltd on:               <ul style="list-style-type: none"> <li>(i) Page 15 in sub-paragraph 5.2;</li> <li>(ii) Page 4 in sub-paragraph 6.5.</li> </ul> </li> <li>(ii) Natural events               <ul style="list-style-type: none"> <li>a. This is mostly extreme weather conditions where more-than normally expected and calculated water can impact on the dam-wall. The Limpopo River and two un-named epherical watercourses can have an influence on the integrity of the dam-wall. The first is the Limpopo River in a 1:100 year flood. This has been calculated and the wall is situated outside this flood zone. The second threat is epherical watercourses with the first a catchment area of approximate 54.4 km<sup>2</sup> and the second approximately 4.8 km<sup>2</sup>.<br/>                   Note: The design includes not only a main spill-way but also an emergency spillway. Refer to <i>Preliminary Design Report</i> by PG Consulting Engineers (Pty)</li> </ul> </li> </ul> |                 |                              |           |              |          |        |     |      |

Ltd on: Page 6 in sub-paragraph 6.5.

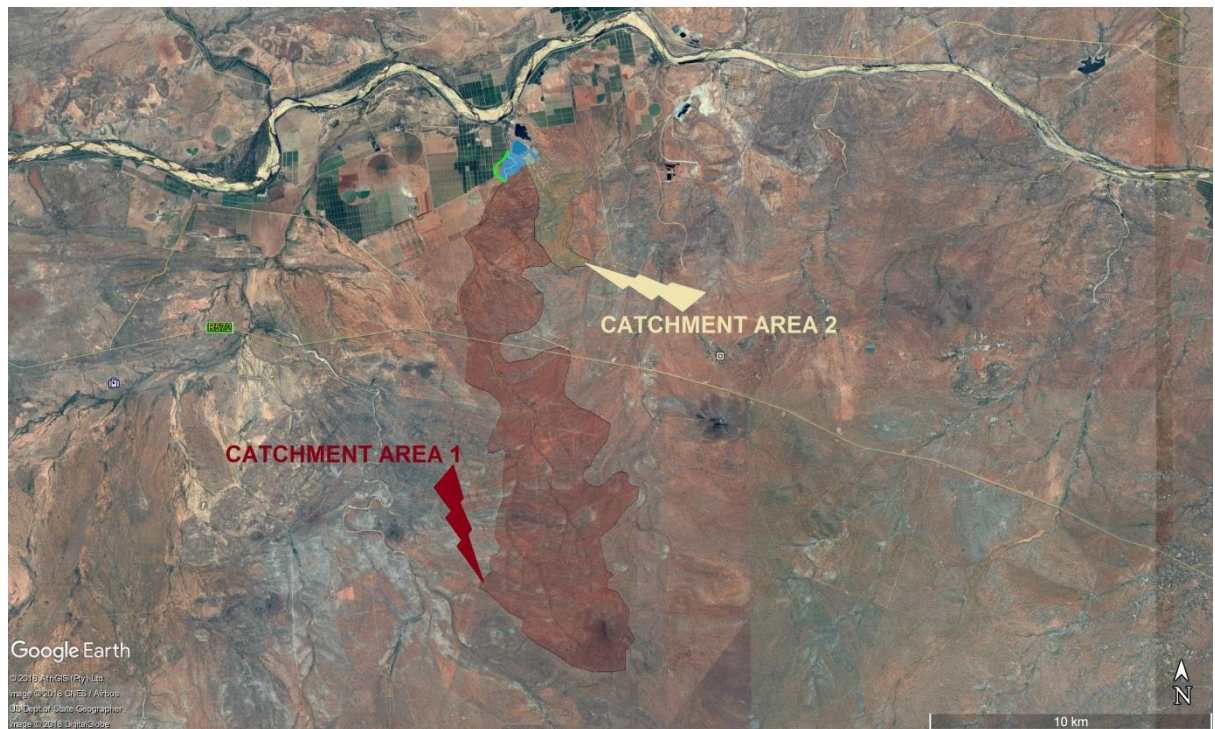


Image of catchment areas of two watercourses

**Recommendations:**

- (i) The applicant has to incorporate in the Farm Safety Plan a specific Action Plan for Flooding and weather impacts on the Dams.

**Expected Outcome:** Positive

**Certainty:** Medium degree of certainty

9 HEALTH AND SAFETY

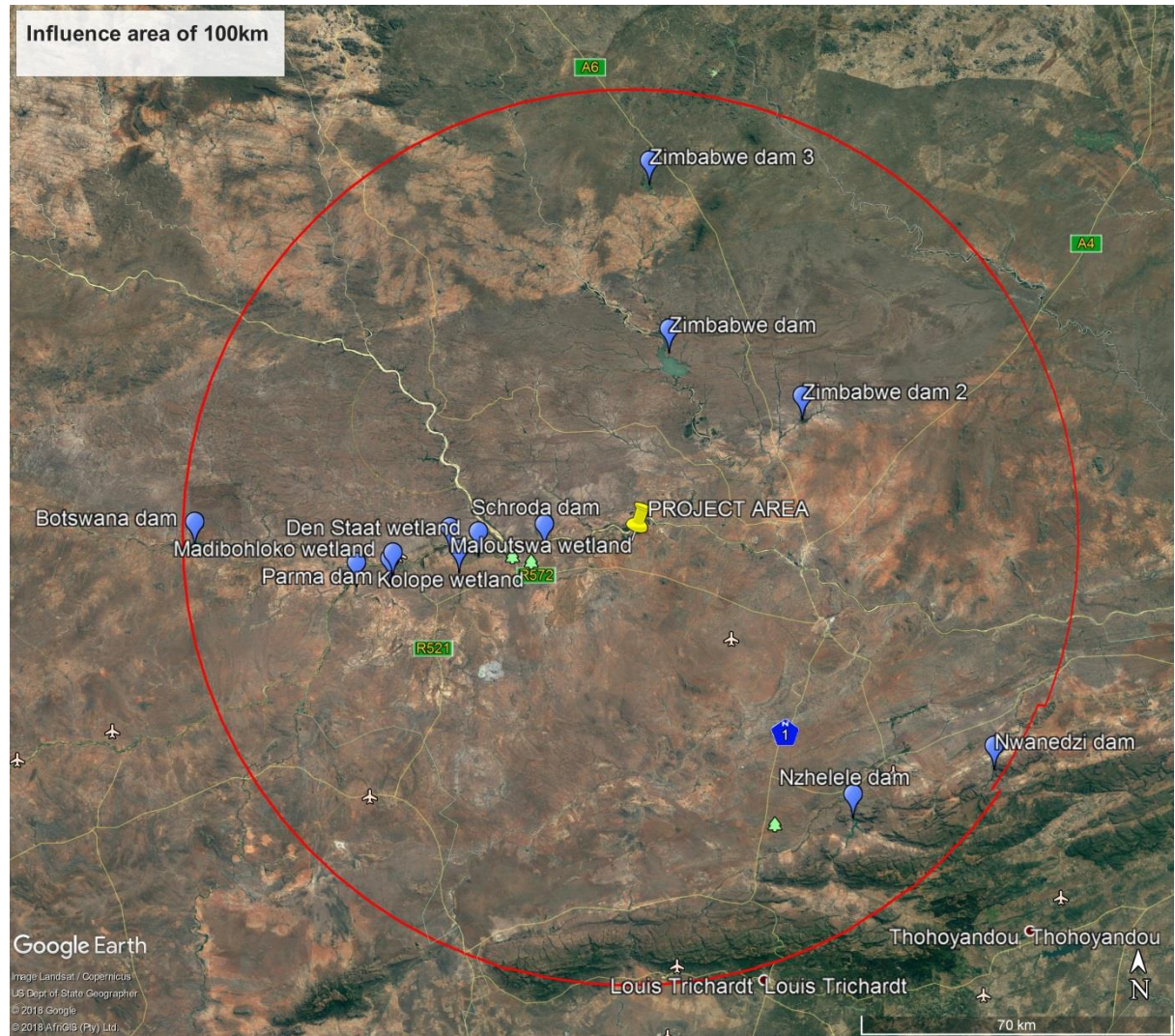
None

## 10 CUMULATIVE AND SYNERGISTIC EFFECTS

| CUMULATIVE AND SYNERGISTIC CHARACTERISTICS  |                 |                      |           |              |          |        |     |      |
|---|-----------------|----------------------|-----------|--------------|----------|--------|-----|------|
| Issue: Ability of natural and social environment to assimilate cumulative stress placed on them   |                 |                      |           |              |          |        |     |      |
| PHASE   |                 | Operational          |           |              |          |        |     |      |
| CONFIDENCE  |                 | Medium-High (50-75%) |           |              |          |        |     |      |
| EXTENT  |                 |                      |           | RISK         |          |        |     |      |
| Site Specific   | Local           | Regional             | National  | Yes          |          |        | No  |      |
| PROBABILITY   |                 |                      |           | SIGNIFICANCE |          |        |     |      |
| Definite  | Highly Probable | Probable             | Unlikely  | Low          | L-M      | Medium | M-H | High |
| STATUS & INTENSITY  |                 |                      |           |              |          |        |     |      |
| Major   |                 | Moderate             |           | Minor        |          |        |     |      |
| +5  | +4              | +3                   | +2        | +1           | Positive |        |     |      |
| -5  | -4              | -3                   | -2        | -1           | Negative |        |     |      |
| DURATION  |                 |                      |           |              | RISK     |        |     |      |
| Transient   | Short-term      | Medium               | Long-term | Permanent    | Yes      |        |     | No   |
| ASPECTS   |                 |                      |           |              |          |        |     |      |
| <ol style="list-style-type: none"> <li>1. Loss of habitat</li> <li>2. Loss of biodiversity</li> <li>3. Impact on mining rights of MCM</li> <li>4. Inundation of area</li> <li>5. Pumping of water in high-flow periods</li> </ol>   |                 |                      |           |              |          |        |     |      |
| NATURE OF IMPACT  |                 |                      |           |              |          |        |     |      |
| Species can be destroyed by continuous water abstraction from the primary source.   |                 |                      |           |              |          |        |     |      |
| AFFECTED AREAS  |                 |                      |           |              |          |        |     |      |
| Riparian zone at extraction point and river aquifer downstream  |                 |                      |           |              |          |        |     |      |
| MITIGATION:   |                 |                      |           |              |          |        |     |      |
| <b>What was found?</b>  |                 |                      |           |              |          |        |     |      |
| <p>To pump water during high-flow periods will result in adequate water for irrigation in winter and early summer (before the rainfall season starts).</p> <p>The rationale is that this will result in more water in the Limpopo River in this period that flows (sub-surface in the sand stratum) downstream. This flow will contribute to supporting the aquifer as well as the riparian vegetation. The biodiversity “driver” is the riparian zone but the supporting system for the riparian zone is the sub-surface water especially in the dry-period. Currently the applicant also pumps from boreholes along the Limpopo River bank, this being done in late-winter when the sub-surface flow in the Limpopo River is low; by not utilising this water from the aquifer the water table will be able to support the riparian vegetation, which in turn will contribute to riverbank stability.</p> <p>The downstream water needs of water users, and in specific, Musina municipality will also benefit.</p> <p>The findings in the specialist report <i>Water Resource Study</i> it was found that “...although the area is designated a Critical Biodiversity Area (CBA), it is not related to the water resource associated with the proposed site for the new impoundment.” The implication is that the new impoundment will not influence the CBA Area. This confirms the surveys conducted on the project location and its surroundings.</p> |                 |                      |           |              |          |        |     |      |



It was found that the current dams contribute to supplying a constant water habitat for birds species associated with open water bodies. This is significant in that when the Limpopo River “dries-up” (meaning no surface flow) in the mid-winter to early summer it is the “artificial open-water” of the dams that provide habitat for species. This is a simulation of the *Island Biographical Concept* where habitat “islands” is created for species whose survival is dependent on water. Thus the proposed larger open-water that will be created will contribute to biodiversity stability of certain species. The image below supplies an overview of similar supporting open-water habitats for birds associated with water habitats.



**Recommendations:**

- (i) Implementation of EMP.
- (ii) Water quantity monitoring instituted (if not already) from all sources of water for the applicant.
- (iii) Water quality monitoring instituted (if not already) at all sources as well as in the orchards.

**Expected Outcome:** Positive

**Certainty:** Medium-high degree of certainty

### 10.3 Potential significant impacts

Impacts with ratings of either *Medium-high* or *High* are impacts, which are regarded as potentially significant, rated without any mitigation measures. In this impact assessment out of a total of 26 impacts 1 were regarded as high and 11 as Medium-high potentially significant impacts, of the 11 impacts regarded as high-and medium potential significant impacts 6 are considered as positive. They are discussed below:

## 11. DESCRIPTION OF ASSUMPTIONS

In this report it is assumed that:

- i) The developer will act responsible with regards to the environment at all times.
- ii) That the recommendations made in this report and other specialist reports are implemented and followed.
- iii) That the development will abide by the ethical standards of development and will stay within the parameters and design specifications of the development and follow a best practise approach.

## 12. OPINION ON FACTS

- 12.1 The proposed expansion of Semple dam is a project that has its origin in the planning of Noordgrens Landgoed for sustainable farming by the wise use of water resources.
- 12.2 The location of the new dam footprint and the resultant inundated area was surveyed for biodiversity and ecological sensitivity. No critical issues were identified.
- 12.3 Archaeological site(s) was found and Phase 2 studie(s) will have to be conducted.
- 12.4 The proposed project will benefit the Limpopo River's ecological reserve as less water will be extracted during winter and early summer when the sub-surface flow of the river is at its lowest.
- 12.5 The applicant does monitor the water quality and is willing to extend and broaden the water quality and quantity monitoring as recommended.
- 12.6 The operational live expectancy of the project is for 30 years. This is determined by the High Order Mining permit of which MC Mining is the holder. The current landuse for agriculture activities can proceed and contribute to the local-and regional socio-economic communities.



- 12.7 Prior to this impact study MC Mining (previously known as Coal for Africa) conducted an environmental impact study which *included the Restant of Overvlakte 125 MS* (this project area location) and for which an environmental authorisation was issued. Mining is not based on renewable resources whereas farming is based on sustainable use of natural resources. In this EIR no issues were of such a nature that it could not be mitigated, an indication of the long-term sustainability of the project for socio-economic sphere and receiving environment in which this project will function.

### 13. ENVIRONMENTAL STATEMENT

#### 13.1 Summary of key findings

13.1.1 No specific evidence was found of any biota at individual or community level that will be threatened to such an extent that it will have a negative impact on the survival of species and/or communities.

13.1.2 Archaeological sites were found and Phase 2 investigations will have to be conducted. This has to be done before commencement of construction or incorporated in such a way in the planning that it can run concurrently with pre-construction activities. SAHRA approval has been received.

13.1.3 The dam will be registered with DWA and a safety certificate issued after construction.

#### 13.2 Positive and negative implications

##### 13.2.1 Positive

- i) The expansion of Semple dam will not have significant negative effect on the environment or for specific species or communities.
- ii) The dam will create new habitat for species associated with open water bodies.
- iii) The water in the dam will be used in the winter months and the sandpit boreholes in the Limpopo Riverbed as well as the borehole field on the Limpopo Riverbank which is currently used will be left to “rest” as reserve. This will lessen the impact on the aquifer dependant ecosystems and ecological reserve of the Limpopo River.
- iv) The water will also infiltrate and percolate through to the groundwater aquifers.

- v) The rainwater will contribute to the water that can be stored and used, currently it flows away.
- vi) The dam will also serve to prevent stormwater damage.

#### 13.2.2 Negative

- (i) Vegetation will be removed which includes protected species associated with terrestrial landscapes and watercourses.

### 13.3 Comparative assessment of advantages and disadvantages

The **advantages** can be summarized as follows:

- The development will address a critical issue of sustainable water use;
- It will contribute to preserving the ecological reserve of the Limpopo River and in specific the remaining riparian vegetation found along the river at the extraction point and downstream;
- Musina Municipality extracts its water from well-fields along the Limpopo River from water in the riverbed. This water will be less affected by the upstream extraction in wintertime, resulting in more water for extraction.
- It will positively contribute to the socio-economic profile of Musina town and community in general.
- An existing artificial water habitat will be enlarged. It will contribute to habitat for specific migrating birds associated with water habitats.

The **disadvantages** can be summarized as follows:

- Natural vegetation and habitat for terrestrial species will be destroyed and/or altered.

### 13.4 Final statement

No evidence was found or presented by any party that indicates that the dam should not be constructed. Issues could be sufficiently mitigated. The strategic gain collectively is for the good of firstly sustainable water use, secondly for socio-economic reasons and thirdly for extending conservation and cultural resource areas.

## 14. AUTHORISATION OF ACTIVITY AND CONDITIONS

The purpose of this report is to provide information in a compiled format regards the potential impacts of the proposed development so that the relevant authority can make

an informed decision regarding the approval/not approved of the Environmental Impact Assessment Report. Recommendations are supplied to be included.

14.1 Recommendations

- 14.1.1 That the mitigation measures mentioned under paragraph 10.2 for each discussed issue sheet has to be implemented.
- 14.1.2 That recommendations the listed in specialist reports under paragraph 8 is implemented.
- 14.1.3 The appointment of an environmental control officer (ECO) before the project commences.
- 14.1.4 That the ECO appointed has sufficient experience.
- 14.1.5 That the appointment is for the full duration of the project, starting with the pre-construction phase and ending with the rehabilitation phase.
- 14.1.6 That the EMP is updated with new information as the project progresses.
- 14.1.7 That the Standing Operation Plan for Archaeology is implemented on the project.
- 14.1.8 That the Phase 2 archaeological surveys are started before construction commences. The site has to be fenced before any activity commences.
- 14.1.9 The developer with the contractor should mark the roads that will be used for the construction phase. The delineation will then be surveyed by the ECO and approved before any clearing commences on the roads.
- 14.1.10 That audit reports are submitted to LEDET as stipulated by LEDET.

J. Claassens

Director: Tua Conserva

## REFERENCES

- Acocks, J.P.H. 1988. Veld Types of South Africa. Memoirs of the Botanical Survey of South Africa N. 57. Botanical Research Institute
- Barnes, K.N. (ed.) 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Bird Life South Africa, Johannesburg
- Branch, W.R. 1998. Field Guide to Snakes and other reptiles of Southern Africa. Struik Publishers, Cape Town
- Branch, W.R. 1988 (ed.) South African Red Data Book – Reptiles and Amphibians, S.A. National Scientific Programmes Report No 151
- Bromilow, C. 1995. Problem Plants of South Africa. Briza Publications, Pretoria
- Carruthers, V. 2001. Frogs and Frogging in Southern Africa. Struik Publishers. ISBN 1-86872-607-X.
- Colvin, C., D. le Maitre, I. Saayman, S. Hughes. July 2007. WRC Report No 301/07.
- Freeman N. M. and K. Rowntree. 2005. Our Changing Rivers. An introduction to the science and practice of Fluvial Geomorphology. Water Research Commission. Report No TT238/05.
- Friedman, Y. and Daly B. (editors), 2004. Red Data Book of the Mammals of South Africa: A conservation Assessment : CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust South Africa.
- Golding, J. Editor. 2002. Southern African Plant red Data List. Southern African Botanical Diversity Network Report No. 14. SABONET, Pretoria.
- Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (eds.) 1997. The Atlas of Southern African Birds, Vol. 1 & 2. Bird Life South Africa, Johannesburg
- Maclean, G.L. 1993. Roberts' Birds of Southern Africa. John Voelcker Bird Book Fund, Cape Town
- Mills, G. & Hes, L. 1997. The complete book of Southern African Mammals. Struik Winchester, Cape Town, RSA
- McLachlan, G. R. 1978. South African Red Data Book: Reptiles and Amphibians. SANC Programmes Report No. 23.
- Mucina, L. & Rutherford, M.C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland, *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- Onderstall, J. 1984. South African Wild Flower Guide: Transvaal, Lowveld and Escarpment including the Kruger National Park, Botanical Society of South Africa, Cape Town

- Passmore, N.I. & Carruthers, V.C. 1995. South African Frogs a Complete Guide. Southern Book Publishers, Witwatersand University Press, Johannesburg
- Raimondo, D., L. von Staden, W. Foden, J. E. Victor, N. A. Helme, R. C. Turner, D.A. Kamundi, P. A. Manyama. 2009. Red List of South African Plants, 2009. SANBI.
- Rutherford, M.C. and Westfall, R.H. 1994. Biomes of Southern Africa: an objective categorization. National Botanical Institute, Pretoria.
- Schmidt, E., Lotter, M. & McClelland, W. 2002. Trees and Shrubs of Mpumalanga and Kruger National Park, Jacana, Johannesburg
- SCHULZE, B.R. 1994 Climate of South Africa: General Survey. Department of Environmental Affairs, Pretoria.
- Skinner, J.D. & Smithers, R.H.N. 1990. The Mammals of the Southern African Subregion. University of Pretoria, Pretoria, RSA.
- Smithers, R.H.N. 1986. South African Red Data Book – Terrestrial Mammals. S.A. National Scientific Programmes Report no 125. Pretoria
- Snyman, D. D. 1991. Drakragnorme vir Wildplase in die Mopanieveld, Noord van die Soutpansberg. Navorsing Sentrum vir Weiding. Departement van Landbou-ontwikkeling.
- Transvaal Provincial Administration: Nature Conservation Division. 1985. Atlas of the Threatened Plant Species of the Transvaal.
- Transvaal Provincial Administration: Nature Conservation Division. 1993. A Herpetological Survey of the Transvaal Provincial Reserves.
- Van der Walt, R. 2009. Wild Flowers of the Limpopo Valley. Retha van der walt, Ludwiglust Game Farms. ISBN 978-0-620-43949-7.
- Van Oudtshoorn, F. 1999. Guide to Grasses of Southern Africa. Briza Publications, Pretoria
- Van Wyk, B., Van Oudtshoor, B. & Gericke, N. 1997. Medicinal Plants of South Africa. Briza. Pretoria
- Van Wyk, B. and Malan, S. 1988. Field Guide to the Wild Flowers of the Witwatersrand and Pretoria Region. Struik Publishers, Cape Town
- Van Wyk, B. and Van Wyk, P. 1998. Field Guide to the Trees of Southern Africa. Struik Publishers, Cape Town
- Vegter, J. R. 2001. Hydrology of Groundwater. Region 3: Limpopo Granulite-Gneiss Belt. WRC Report No TT 136/00.
- WATER RESEARCH COMMISSION 2001. Groundwater Development in South Africa. Report No. TT 134/00.