



# MYEZO ENVIRONMENTAL MANAGEMENT SERVICES

*Environmental Stewardship*

**ESKOM – INGULA – ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT**

**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE RELOCATION  
OF DWELLERS AT INGULA PUMPED STORAGE SCHEME LOCATED WITHIN FREE  
STATE PROVINCE**

**Document Name: EIB – EMPr**

**Date: 14 December 2020**

**Document Status: Ver 1**

**Volume 3 of 4**

**Myezo Ref: EIB 2020/01**

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**ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE RELOCATION OF**  
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**NATAL PROVINCE**

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**Document Status: Ver 1**

**Myezo Ref: EIB 2020/01**



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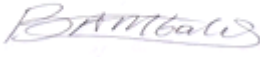
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**DOCUMENT CONTROL AND REVISION LIST**

Version	Nature of Amendment	Compiled by	Approved by	Date of Amendment
1	No amendments yet-Environmental Management Programme.	B. Fatyi		
2	Mitigation measures pertaining to rubble management following the comments that were received during the first public review period on 08 October 2020.		<i>Babalwa</i>	14 December 2020

**DOCUMENT REVIEW AND APPROVAL**

Author	No. of pages	Version No.	Date of Issue
Tatenda Hanyani and Babalwa Fatyi	116	1	14 December 2020
Author Signature:			

Reviewer	Prisca Thobejane		
Document Authorisation	Name Babalwa Fatyi	Signature 	Key words: Environmental Management Programme. Report

# ENVIRONMENTAL MANAGEMENT PROGRAMME

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## EXECUTIVE SUMMARY

This document is the Environmental Management Programme Report (EMPr) for the Ingula Relocation project which is being undertaken by Eskom Holdings Soc (Eskom). The EMPr outlines the roadmap which the construction and operational phase of the relocation project will adhere to, in order to minimise identified environmental impacts and uphold nature conservation principles, as per requirements of the National Environmental Management Act (No.107 of 1998 (NEMA)). In addition, this EMPr been designed with consideration of the Ingula Nature Reserve Management Plan of 2017, which was developed as part of the proclamation of the Ingula Nature Reserve, within which the relocation project will be undertaken. The relocation project is motivated by the need to limit uncontrolled activities within the nature reserve and as such the families which reside within this nature reserve are being relocated to the least sensitive part of the nature reserve.

The proposed relocation of dwellers will be undertaken at Wilge Farm, located within the Ingula Nature Reserve, under the jurisdiction of the Phumelela and Maluti A Phofung Local Municipalities, within Thabo Mofutsanyana District, Free State Province. The Wilge Farm is located about 10 km north of the Administrative offices of the Ingula Pumped Storage Scheme, about 42 km north-east-east of Harrismith, 26 km north-east of Van Reenen and 4.5 km from the Little Drakensberg escarpment.

Eskom Holdings SOC Limited (Eskom) constructed the Ingula Pumped Storage Scheme, (IPSS) a power generation plant, as part of its New Build Programme and the scheme was commissioned in 2016. As part of the conditions to the Environmental Authorisation, issued for the IPSS, Eskom was requested to purchase adjacent farms consisting of sensitive wetlands and grasslands to compensate for the residual impacts on wetlands and ecosystems that would be lost during the construction of the power station.

Subsequently, Eskom engaged all the landowners whose land comprised of the sensitive wetland ecosystems on which the project is situated and ultimately purchased these farms. Over 8000 hectares of land was purchased around the IPSS, and this was later proclaimed as a nature reserve, named Ingula Nature Reserve, to provide long-term protection to these ecosystems, which provide habitat to species of global importance.

Notably, part of the purchased land fell outside the required construction footprint and this land could be considered for the resettlement purposes for those dwellers who would require resettlement or relocation. Initially the land that was purchased was intended for the nature reserve proclamation and more land was later purchased to accommodate the for the resettlement needs.

Some of the dwellers chose to move to properties that were purchased off the nature reserve. However, some of the dwellers opted to stay on the property, within Ingula Nature Reserve, but on a less sensitive area. This EMPr addresses the relocation of the remaining families to a less sensitive areas of the nature reserve. During the latter half of 2016, studies were undertaken and the Wilge area was identified as the ideal area to relocate the remaining dwellers.

Initially, a total of seven (7) families were engaged, however in March 2019, only six (6) families decided to stay as one of the families had confirmed that they will be relocating outside the nature reserve, therefore the project is making provisions for six (6) remaining families. Negotiations with these last six households have been concluded and these will be relocated to the Wilge Farm.

The relocation site is on the northern boundary of Ingula Nature Reserve. The relocation site is located approximately 10 kilometres north of the Ingula Pumped Storage Scheme and on the north-north-western boundary of the Ingula Nature Reserve. The general coordinates of the project site are: latitude 28° 12' 9.999" S and longitude 29° 33' 5.744" E. The activities to be undertaken under this application trigger listed activities in terms of NEMA regulations of 2014, as amended in 2017, promulgated under Government Notice No (GN). R.983, Listing Notice No1), which include Activity Number 12 pertaining to development of buildings exceeding 100 m<sup>2</sup> in size and Activity No 27 concerning clearance of an area of 1 hectare or more but less than 20 ha of indigenous vegetation. In addition, GN.R.985 (listing Notice No.3) also applies specifically Activity Number 14, which addresses development of buildings exceeding 10 m<sup>2</sup> in size within protected areas or nature reserves.

Since this relocation of families will be undertaken within a nature reserve, the recommended and proposed mitigation measures are designed based on the guiding principles of adaptive management. According the Nature Reserve EMP, 2017-2021, adaptive management is a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance. In addition, the management and mitigation of the environmental impacts experienced during construction is governed by environmental legislation.

The area has erodible soils as evidenced by dongas and land degradation. As such, soil erosion is expected to be one of the major impacts which requires mitigation. Erosion control mechanisms will be installed. Sensitive ecosystems such as wetlands are at risk of being disturbed and must be avoided and hence there has been are-allocation of homesteads and grazing plots to consider the biodiversity studies that were undertaken and ensure that identified sensitive areas were avoided.

The integration of the families within the nature reserve we will be effective under the application training and awareness programmes pertaining to environmental conservation. In line with the ecosystem services principles, firewood can be availed to occupiers of this land, in a controlled structured manner, as part of the alien invasive control and management processes. The locals will be getting continual information pertaining to reserve management and aspects such as fire management, will be handled within the ambit of Eskom policies and procedures, as well as requirements of fire control committees as per the Veld and Forest Fire Act (No 101 of 1998). The adaptive management concept will be adopted for handling grazing matters within the nature reserve, along with ensuring that the number of cattle is reduced to combat overgrazing and potential degradation.

With the advertent implementation of this EMPr during the project's construction and operational phases, environmental and social risks will be minimised, mitigated and managed in a way that results in a net positive benefit to both humans and the environment. The success of the EMPr implementation is dependent on the allocation of resources for the execution of the development mitigation measures. The designated roles must be supported with necessary tools and equipment including information that will enable the assigned personnel to enforce the commitments presented in the EMPr. A dedicated environmental control officer is recommended to ensure that there is an assigned designated accountable officer who will be reporting to the competent authority on the effectiveness of the environmental control during the project implementation stages. A contractor has to appoint this person and should the ECO be appointed by Eskom; the accountability roles will be structured such that the ECO reports directly to the social officer.

## 1. INTRODUCTION

### 1.1 Details of The Environmental Assessment Practitioner

The compilation of this Environmental Management Programme (EMPr) was prepared by Ms. Babalwa Fatyi of Myezo Environmental Management Services (Pty) Ltd. For a detailed description of expertise and previous project experience of the author please refer to Annexure A for the curriculum vitae of the Environmental Assessment Practitioner (EAP). Ms. Babalwa Fatyi is an environmental consultant with over 20 years' experience carrying out Basic Assessments and Water Use Licence Applications for different clients including Eskom and working with government departments such as the Department for Environmental Affairs. She led, project managed and participated in over 25 environmental impact assessments and more than 20 Basic Assessment Reports (BARs) and compiled more than 25 Environmental Management Plans (EMPs) and programmes in the construction industry, power sector, mining and other industries.

As a qualified EAP, Babalwa has been instrumental in the coordination of the Public Participation Process either as a lead stakeholder engagement specialist and or as an overseer of the process. Partaking her duties as Public participation leader, her duties included engaging with Interested and Affected Parties (IAPs) so as to ensure that their issues and concerns regarding the proposed project activities are adequately captured, addressed, included in the Environmental Report. In addition, Babalwa has experience with working and engaging specialists since a number of environmental reports she compiled to date required that she engage with specialist. When engaging with specialists, her duties include designing of terms of references (ToRs) that are project specific and ensure that specialist studies reports findings and recommendations are included as part of the EIA report to be submitted to the Competent Authority for environmental authorisation.

Babalwa Fatyi has experience directing and managing environmental sustainability projects current across various industries and sectors, including environmental management programmes and associated stakeholder engagements and impact evaluation and development of environmental management plan in support of environmental authorisation applications. She has a broad range of experience in leading the implementation of environmental management plans on sites through development of implementation plans with clear set objectives and structures, roles and responsibilities, design of performance

monitoring plans and designing communication and risk management plans throughout the project implementation phases. She is also experienced in conducting Performance assessment audits as well as developing and maintaining integrated Safety, Health and Quality management systems.

Babalwa is a registered Environmental Assessment Practitioner (EAP) and Professional Natural Scientist (400123/01). Having graduated with BSc Degree Majoring in Zoology and Botany in 1997 at the University of Witwatersrand, she went on to pursue and complete her Master of Science at the same university, graduating cum laude.

## **1.2 Project Background**

This report outlines the Basic Environmental Assessment carried out by Myezo Environmental Management Services on behalf of Eskom Holdings for the relocation of the dwellers at Ingula in terms of the National Environmental Management Act No.107 of 1998. This relocation exercise was triggered by the Ingula Pumped Storage Scheme which began construction in 2005 which resulted in the local dwellers having to be relocated from the environmentally sensitive area to a less sensitive site.

In terms of the environmental conditions of authorisation from the EIA that as undertaken for the IPPS, Eskom had to purchase the land at Ingula and protect it from environmental damage. In 2018, the purchased land was declared a nature reserve in terms of the National Environmental Management: Protected Areas Act No. 57 of 2003. The relocation exercise will result in the dwellers having better infrastructure and improved standard of life as compared to where they are currently settled. The 131-hectare relocation site is on the northern boundary (inward side) of Ingula Nature Reserve. The relocation site is located approximately 10 km north of the Ingula Pumped Storage Scheme offices and on the north-north-western boundary of the Ingula Nature Reserve. The general coordinates of the project site are latitude 28°12'9.999" S and longitude 29°33'5.744" E

## **1.3 Need for the Project**

Eskom is the sponsor of the proposed project, and the management authority of the Ingula Nature Reserve (INR). The origins of the project can be traced back to 2002, when an EIA was conducted prior to the construction of the Ingula Pumped Storage Scheme (IPSS). One of the modules of that study recommended that Eskom engage all landowners whose land surrounding the IPSS and was comprised of the wetland ecosystem. The engagements ultimately resulted in Eskom purchasing the land, which was previously used for farming

purposes by landowners and had farm dwellers residing on them. The recommendations were incorporated as conditions of authorisation in the Record of Decision (RoD), Reference A24/16/3/124 of December 2002. In 2018, the IPSS and its associated land was declared as a nature reserve in terms of the National Environmental Management Protected Areas Act (2003), resulting in the birth of the INR. The decision to purchase the land was in accordance with the Environmental Impact Assessment as approved by the Department of Environmental and Tourism at the time. Originally purchased land was for the INR and additional land was later purchased for the relocation requirements.

Most of the landowners chose not to redeploy their farm workers elsewhere, when the farms were transferred to Eskom; and Eskom was obliged by agreement to engage on a resettlement programme for the farm tenants. Initially, the programme started with 22 families that were impacted; and 16 of whom have since opted to move to an area outside of the INR. The remaining six families, who are the subject of the project opted to remain within the INR but agreed to be moved from the highly environmental sensitive area they are currently located on, to a common low impact area. The affected six families have agreed and are in support of the pending move; There is no alternative that can be considered to avoid relocation for the following reasons:

- Currently, the tenant houses are situated throughout the INR in highly sensitive environmental areas; and this has high environmental impacts. Also, where their houses are currently situated, is remote to access roads.
- Due to the fact that the households are currently scattered throughout the nature reserve, makes it difficult and costly to provide basic services; as well as making it difficult to monitor whether their activities observe environmental good practices.
- The tenants will be able to develop sustainable farming practices, in the new common area where they will be relocated, which is critical for food security purposes.

It is obvious that the current location is subject to risks relating to environmental, lack of basic service infrastructure and safety challenges. The main objectives of the proposed project are to improve the families' living standards of life; and to reduce environmental impacts for them by providing a village, which will provide better quality dwellings, grazing land and social infrastructure. For the nature reserve, the benefit is that negative impacts will be reduced. The area on which these families are currently located is a paleontologically and ecologically

sensitive area. Relocation offers the families a chance to improve their lifestyles and livelihoods.

The Ingula Power Project, with capacity to generate 1,332 Megawatts of power, is the largest pumped storage scheme in Africa. It will contribute to meeting South Africa’s growing energy demand being expected to reach 40,000 Megawatts by 2025. Failure to meet the demand may cripple industries and eventually the economy and negatively affect livelihoods. The project is therefore a necessity. Hence relocation ensures both primary and secondary benefits for the six families.

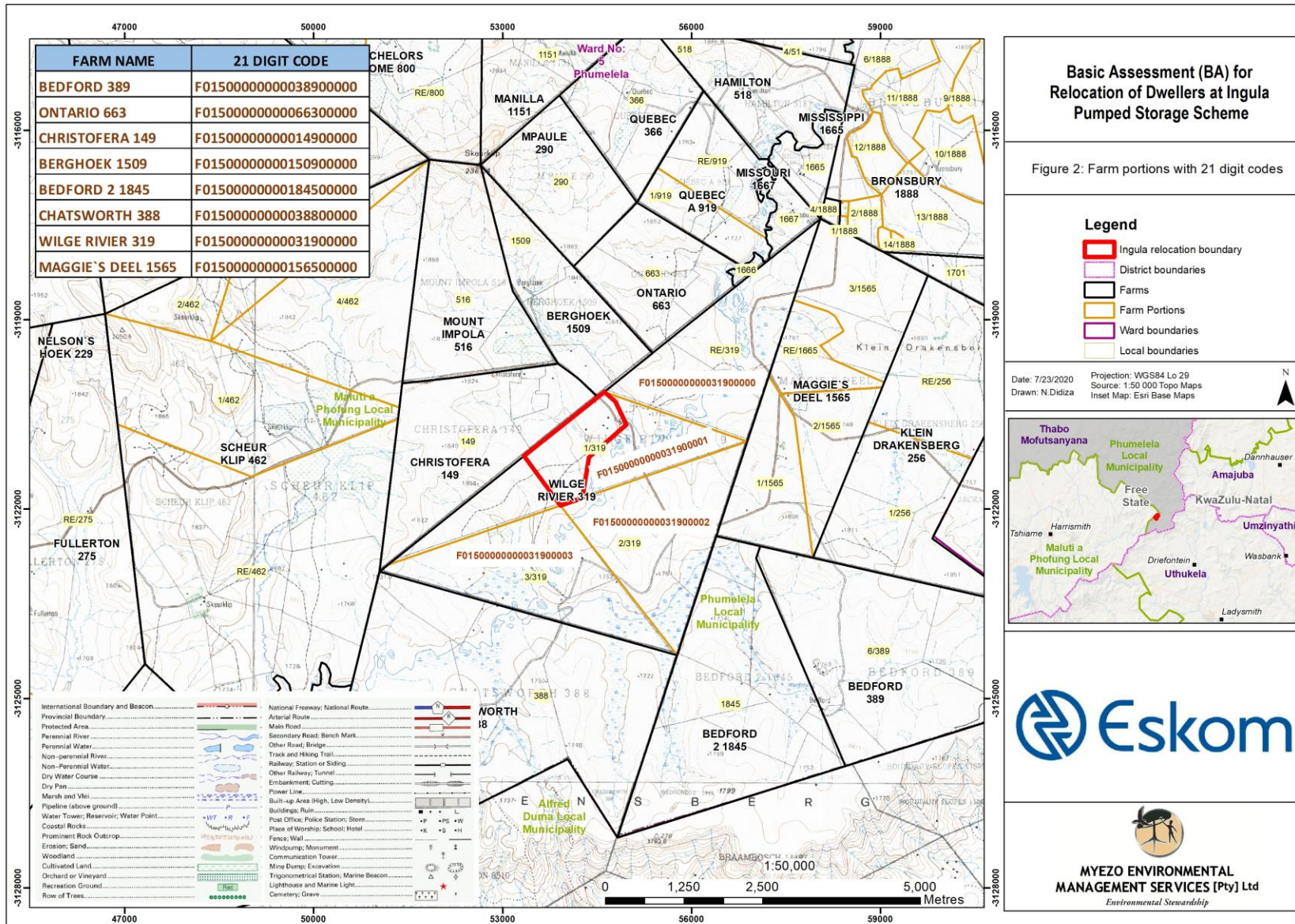
Additionally, involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social and environmental risks for unregistered right holders, legally or illegally occupying land at the time procured by Eskom. To mitigate these risks the resettlement plan is developed in line with South African legislation and the IFC Standards. As such, this developmental project is not just aimed at building their dwellings but to make them better and provide other amenities such as solar power, sewerage and piped potable water. Due to the fact that the village development will be implemented in a nature reserve, ownership of the land will remain vested in Eskom and the families will not be handed title deeds for the properties; but will be responsible for their maintenance.

**1.4 Project Location**

<b>Property description:</b>	Northern boundary of Ingula Nature Reserve. Portion 001 of Wilge Rivier Farm 319
	(Farm name, portion, number and registration division or Erf number etc.) Where a large number of properties are involved (e.g., linear activities), please attach a full list to this application.
<b>Current land-use zoning:</b>	The area is inside an area declared a Nature Reserve in terms of the National Environmental Management Protected Areas Act (2003)
	In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.
<b>Property size (m<sup>2</sup>) of all proposed sites:</b>	Total area for dwellers: 72 575.88 m <sup>2</sup> Total grazing areas: 1 182 276.57 m <sup>2</sup>



<b>Development footprint size (m<sup>2</sup>):</b>	The total development footprint area is 1 307 077,77 m <sup>2</sup>
<b>Project map:</b>	AA project map, site map, cadastral map and utilisation intensity map are attached as Appendix 3. In addition, Figure 1.4-1 provides the local setting.
<b>Site co-ordinates:</b>	Figure 1.4.-2 shows the site coordinates
<b>SG 21 Digit Code(s):</b>	The Surveyor-General 21-digit codes for the site are F 0 1 5 0 0 0 0 0 0 0 0 0 3 1 9 0 0 0 0 1 (Figure 1.4.1-1)



Ingula Relocation Project Farm Portions with 21 digit codes

Figure 1.4-1:

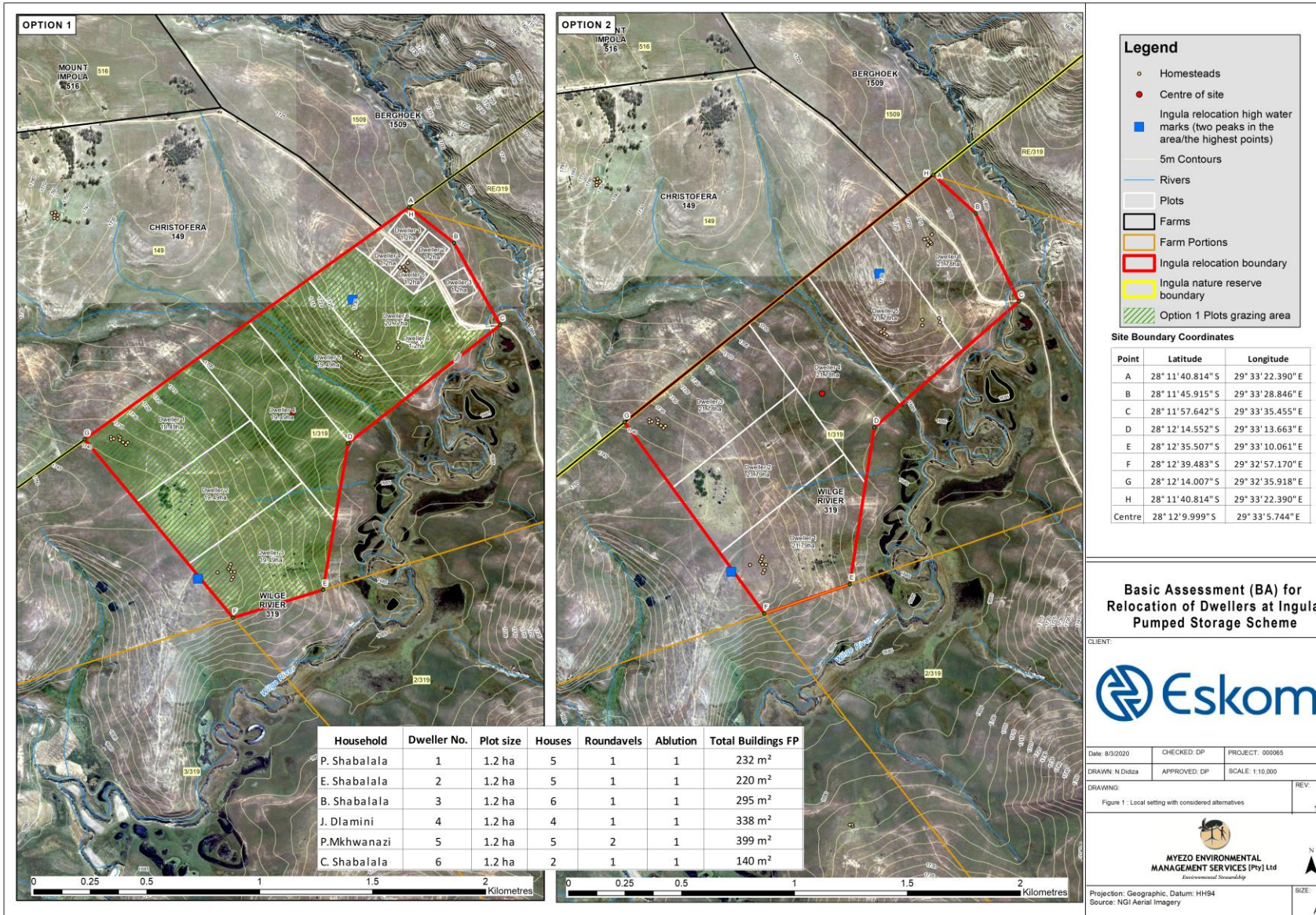


Figure 1.4-2 :

Relocation area with site co-ordinates

## 1.5 Scope and Purpose of the Document

This document is applicable to Eskom's Ingula Relocation Project. It is a management programme to be complied with by the developer and his contractor during the construction and rehabilitation phases of the Project and encompasses associated environmental aspects of the works.

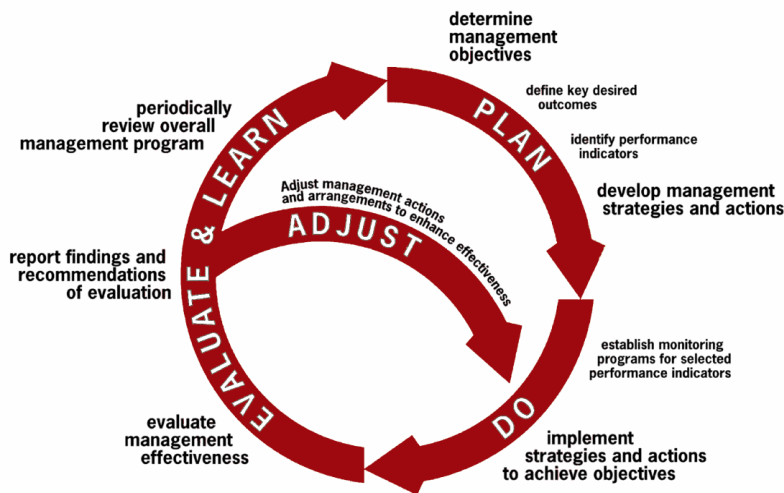
The purpose of this document is to provide guidelines for the application of environmental best practice to Eskom Holdings and its appointed Contractor commissioned to construct the proposed project.

This document shall be seen as part of the contract with the appointed contractor. The EMPr together with appropriate enabling clauses will thus be part of the enquiry document to make recommendations and constraints, as set out in this document, enforceable under the general conditions of the contract. It must be ensured that relevant environmental management specifications as contained in the EMPr are incorporated into the tender and contract documentation. Relevant payment items must be incorporated into the bill of quantities. During the tender evaluations, the ability of the potential contractors to adequately manage the environmental issues must be assessed.

The EMPr has a long-term objective to ensure that:

- Environmental management considerations are implemented from the start of the project.
- Precautions against damage and claims arising from damage are taken timeously; and
- The completion date of the contract is not delayed due to avoidable environmental issues arising that could be mitigated through a well-structured EMPr.

Since this relocation of families will be undertaken within a nature reserve, the recommended and proposed mitigation measures are designed based on the guiding principles of adaptive management. According the Nature Reserve EMP, 2017-2021, adaptive management is a structured, iterative process in which decisions are made using the best available information, with the aim of obtaining better information through monitoring of performance (Figure 1.5-1). In this way, decision making is aimed at achieving the best outcome based on current understanding, whilst accruing the information needed to improve future management. Adaptive management and learning can lead to revision of a part or if necessary, the whole management plan.



**Figure 1.5-1: The adaptive management cycle (Management Strategy Evaluation, 2009)**

Adaptive management enables landowners and managers to:

- i. Learn through experience.
- ii. Take account of, and respond to, changing factors that affect the area.
- iii. Develop or refine management processes.
- iv. Adopt best practices and new innovations in biodiversity conservation management.
- v. Demonstrate that management is appropriate and effective.

According to the Ingula Nature reserve management plan, in order for Ingula to operate appropriately, adequate infrastructure needs to be developed and maintained both for management and tourism purposes. In addressing the development of this relocation projects, which form part of the infrastructure needs at the site, the following guiding principles will be adhered to:

- Infrastructure will be maintained to avoid any damage to the environment and ensure the safety of staff and visitors to the site.
- Infrastructure is being provided to ensure the effective management and operation of the nature reserve since dwellers are now being relocated to the least sensitive part of the nature reserve
- Practical solutions to the provision of electricity are being sought at the nature reserve based on available renewable energy and energy efficiency technologies

## 2. LEGISLATIVE AND OTHER REQUIREMENTS

The management and mitigation of the environmental impacts experienced during construction is governed by environmental legislation. It is of utmost importance that this project is constructed in compliance with all relevant environmental legislation whether; National, Provincial and/or Local.

The environmental legislative framework and components for South Africa can best be unpacked and summarised as follows:

The Constitution provides the foundation for environmental regulation and policy. Section 24 of the Constitution makes provision for environmental protection for the benefit of present and future generations and the right to an environment that is not harmful to health and well-being. This can only be achieved through a reasonable legislative framework and other measures that prevent pollution and ecological degradation, promote conservation, secure ecologically sustainable development and the sustainable use of natural resources. The responsibility of ensuring a safe and healthy environment rests upon the State, reference can be made to the provisions of section 7(2) of the Constitution that reads "*The State must respect, protect and fulfil the bill of rights*". South Africa, specifically, the mandated Department of Environment, Forestry and Fisheries, fulfils these rights through the application of the NEMA and Specific Environmental Management Acts, among other tools.

The National Environmental Management Act, 107 of 1998 (NEMA) provides an overarching framework for the majority of issues relating to environmental management in South Africa. This framework includes the following key pieces of inter-related legislation:

- The National Environmental Management: Biodiversity Act (No. 10 of 2004)
- The National Environmental Management: Protected Areas Act (No. 57 of 2003)
- The National Environmental Management: Air Quality Act (No. 39 of 2004)
- The National Environmental Management: Waste Act (No. 59 of 2008)

The NEMA seeks to meet the Constitutional right to an environment that is not harmful to the health and well-being of South African citizens, the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (EMFs).

NEMA's primary objective is to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for matters connected therewith. Further to the above, the NEMA introduced a number of guiding principles into environmental legislation such as the life-cycle approach to waste management, producer responsibility, the precautionary principle, and the polluter pays principle, as well as 'duty of care' which places the onus on any person who causes significant pollution/degradation to the environment to institute measures to prevent pollution from occurring and to minimise and rectify the pollution or degradation where unavoidable. An additional principle, contained within the NEMA, is that of "Sustainable Development" which states that waste generation is to be avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner (the "Waste Hierarchy").

The NEMA introduced a number of guiding principles into the South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle. NEMA also places a duty of care on any person who causes significant pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided.

The NEMA enables the Minister to identify activities which may not commence without prior authorisation from the Minister or Member of Executive Council (MEC) and may also identify geographical areas in which specified activities may not commence without prior authorisation. The Minister thus published GNR 983, 984 and 985 (2014) which indicates listed activities that may not commence prior to receipt of authorisation. Should the intended activity trigger a listed activity, the prospector will need to undertake one of the following three processes:

- GNR 983 listed activity trigger – undertake a Basic Assessment (BA) process.
- GNR 984 listed activity trigger – undertake a Scoping and Environmental impact Reporting (S&EiR) process; and
- GNR 985 listed activity trigger – undertake a BA process.

The development of the norms and standards is the foundation of the regulatory system established in terms of Section 7(1) (c) of the NEM: WA.

Chapter 4 of the National Water Act (Sections 21 to 55) focuses on water use. Generally, a water use must be licensed. Water uses that need to be licensed (Section 21) include:

- a) Taking of water from a water resource
- b) Storing of water.
- c) Impeding or diverting the flow in a watercourse.
- d) Engaging in a stream flow reduction activity contemplated in section 36.
- e) Controlled activities (includes irrigation with wastewater and intentional recharging of aquifers with wastewater).
- f) Discharging of waste in a manner which may detrimentally impact on a water resource,
- g) Disposing of waste in a manner which may detrimentally impact on a water resource disposal of wastewater from industrial processes.
- h) Removing and/ or discharging of underground water if it is necessary for the efficient continuation of an activity or for the safety of people Licenses are not required (Section 22) where:
- i) Altering the bed, banks. course or characteristics of a watercourse:

The water use is an existing lawful use (a use which was authorised before the commencement of the Act) if:

- The use is permissible under a general authorisation this will be a measure to avoid a flood of licence applications and will be revoked with time)
- The water use is listed in Schedule 1 (includes: domestic use, non-commercial gardening and emergency water use such as firefighting).

A responsible authority has waived the need for a licence (because it is satisfied that the purpose of the Act will be served by an authorisation under any other law).

In water stressed areas, the responsible authority may override the provision for unlicensed use (Section 43).

Licensing procedures are outlined in Sections 40 to 48 and the review of licences is covered in Sections 49 to 52. Licences can only be granted once a preliminary estimation of the Reserve (water required for basic human and ecological needs) has taken place.

## **2.1 Pollution of water**

Section 19 of the National Water Act states that any person who owns, controls, occupies or uses land is deemed responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the responsible authority may do whatever is necessary to prevent the pollution or remedy its effects and to recover all reasonable costs from the responsible person.

Non-compliance with these provisions constitutes a criminal offence.



## 2.2 National Legislation pertaining to this Project:

- Constitution of the Republic of South Africa, Act (No 108 of 1996)
- National Environmental Management Act (No. 107 of 1998) (NEMA)
- NEMA: EIA Regulations of 2014 (GNR 326) and the 3 Listing Notices (GNR 324, 325 & 327) which were amended in 2017 and published as follows:
  - GNR 326 EIA Regulations (7 April 2017)
  - GNR 327 Listing Notice 1 (7 April 2017)
  - GNR 325 Listing Notice 2 (7 April 2017)
  - GNR 324 Listing Notice 3 (7 April 2017)
- National Environmental Management: Waste Act (No. 59 of 2008) (NEM: Waste Act)
  - National Norms and Standards for the Storage of Waste (Government Notice No. 926 of 2013)
  - List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment (Government Notice No. 921 of 2013)
  - National Environmental Management Waste Classification and Management Regulations (Government Notice No. 634 of 2013)
- National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM: Biodiversity Act)
  - Alien and Invasive Species Regulations (Government Notice No. 598 of 2014 National Environmental Management: Protected Areas Act (No. 57 of 2003)
- National Environmental Management: Air Quality Act. (No 39 of 2004 (NEM: Air Quality Act)
  - National Environment Management Air Quality Regulations regarding Phasing -out and Management of Ozone Depleting Substances (Government Notice 351 of 08 May 2014)
  - National Environment Management Air Quality Act, (No. 39, 2004) (Government Gazette No. 27318, Notice No.163 of 2005.)
  - SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication', Edition 6.
  - SANS 10357:2004 'The calculation of sound propagation by the Concawe method'. Edition 1.2.
  - National Dust Control Regulations (Government Notice No 827 of 2013)
- National Water Act (No. 36 of 1998).
  - General Authorisation in Terms of Section 39 of The National Water Act, 1998 (Act No. 36 of 1998) For Water Uses as Defined in Section 21(c) Or Section 21(i) (Government Notice 509 Of 2016)

- General Authorisation in Terms of Section 39 of The National Water Act, 1998 (Act No. 36 of 1998) For Water Uses as Defined in Section 21(a) or Section 21(b) (Government Notice 538 of 2016)
  - General Authorisation in Terms of Section 39 of The National Water Act, 1998 (Act No. 36 Of 1998) For Water Uses as Defined in Section 21(f) or Section 21(h) (Government Notice No.665 of 2013)
- 
- National Forests Act (No. 84 of 1998)
  - National Veld and Forest Fire (Act No. 101 of 1998)
  - Environment Conservation Act (No. 73 of 1989)
  - Conservation of Agricultural Resources Act (No. 43 of 1983)
  - Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947)
  - Hazardous Substances Act (No 15 of 1973)
  - National Heritage Resources Act (No 25 of 199)
  - Codes of best practices
  - Provincial and local by-laws
  - Explosives Act (No 26 of 1956)
  - Basic Conditions of Employment Act (No 75 of 1997)
  - Promotion of Administrative Justice Act (No 3 of 2000)
  - Extension of Tenure Act (No 62 Of 1997)
  - Prevention of Illegal Eviction and Unlawful Occupation of Land Act (No 19 of 1998)
  - Development Facilitation Act (No 67 of 1995)
  - Municipal Structures Act (No 117 of 1998)
  - Traditional Leadership and Governance Framework Amendment Act (No 23 of 2009)
  - Local Government: Municipal Systems Act (No 32 of 2000)

### 2.3 NEMA Regulations, 2014, as amended

The Environmental Impact Assessment (EIA) Regulations of 2014, as amended are also published under NEMA. Section 19 of these EIA regulations require the applicant to submit, within 90 days after receipt of the application by the competent authority, a basic assessment and EMPr.

Appendix 4 of the Regulations stipulates the required content of an EMPr. **Table 2-1** indicates these requirements and where it can be found within this EMPr.

**Table 2-1: Content of an EMPr as per the EIA Regulations**

No	Requirement	Reference in EMPr
1a	Details of <ul style="list-style-type: none"> <li>i) The EAP who prepared the EMPr; and</li> <li>ii) The expertise of the EAP to prepare an EMPr, including a curriculum vitae;</li> </ul>	Section 1.1 and Annexure A
1b	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 6
1c	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Annexures B, C, and D
1d	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development, including: <ul style="list-style-type: none"> <li>i) Planning and design.</li> <li>ii) Pre-construction activities.</li> <li>iii) Construction activities.</li> <li>iv) Rehabilitation of the environment after construction and where applicable post closure; and</li> <li>v) Where relevant, operation activities.</li> </ul>	Section 6 & 10
1e	A description and identification of impact management outcomes required for the aspects contemplated in 1d above.	Section 10
1f	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in 1d and 1e above will be achieved.	Section 10
1g	The method of monitoring the implementation of the impact management actions contemplated in 1f above.	Section 5
1h	The frequency of monitoring the implementation of the impact management actions contemplated in 1f.	Section 5 & 10

No	Requirement	Reference in EMPr
1i	An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 4
1j	The time periods within the impact management actions must be implemented.	Section 10
1k	The mechanism for monitoring compliance with the impact management actions.	Section 5
1l	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Section 5 & 10
1m	An environmental awareness plan describing the manner in which <ul style="list-style-type: none"> <li>i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and</li> <li>ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.</li> </ul>	Section 7
1n	Any specific information that may be required by the competent authority.	N/A

### 2.3.1 National Environmental Management: Biodiversity Act (No 10 of 2004)

Permit applications must be made to the relevant authority for the removal of any Red Data or Protected Species found in the proposed alignment and construction areas. These permit applications must be made in conjunction with requirements of the National Forests Act (No 84 of 1998). The identified protected species are listed later in the report.

The Biodiversity Act also holds Phumelela and Maluti-a-Phofung Local Municipalities responsible for the eradication of any alien or invasive species which establish on site as a result of the construction activities using methods which are appropriate to the species concerned and the environment in which it occurs.

### 2.3.2 National Environmental Management: Waste Act (No 59 of 2008)

All wastes, both general and hazardous, generated during the construction of the Project and associated infrastructure must be disposed of at an appropriately licensed waste disposal site. Copies of the permits or licences must be obtained and kept on site before the commencement of construction.

### 2.3.3 National Water Act (No 36 of 1998)

Eskom to complete a risk assessment in terms of the General Authorisations, Notice 509.

#### **2.3.4 National Heritage Resources Act (No 25 of 1999)**

According to the NHRA archaeological and destruction permits are required for the removal of a structure or element of cultural significance as well as for the relocation of graves on site.

#### **2.3.5 National Road Traffic Act (No 93 of 1996))**

Relevant provisions of the Road Traffic Act must be complied with pertaining to the correct licensing for all drivers on site as well as the ensuring that all vehicle and plant is road worthy.

#### **2.3.6 Hazardous Substances Act (No 15 of 1973)**

Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which may include the Hazardous Substances Act, the Occupation Health and Safety Act, relevant associated Regulations and applicable SANS and internal standards. The Implementer must ensure that all relevant Material Safety Data Sheets are present on site at all times.

#### **2.3.7 Occupational Health and Safety Act (No 85 of 1993)**

All provisions of the Occupational Health and Safety Act must be complied with. The Act must not only provide for the health and safety of the persons connected to the construction but also the persons in the surrounding areas which are affected by the construction.

#### **2.3.8 Explosives Act (No 26 of 1956)**

Blasting permits must be present on site before construction can commence. These permits must be acquired from the Department of Mineral Resources in accordance with the Explosives Act (Act No 26 of 1956).

#### **2.3.9 Basic Conditions of Employment Act (No 75 of 1997)**

The Basic Conditions of Employment Act details employment conditions applies to all workers and employers and must be obeyed even if other agreements are different. It includes specifications regarding working time, leave, job information and payment, and termination of employment. The proponent and all its contractors must adhere to the requirements of this Act in the recruitment and employment of labour for construction.

#### **2.3.10 World Bank's IFC Performance Standards**

The following IFC standards were applied to the project

IFC Standard	How it was (or will be) applied
1. Assessment and Management of Environmental and Social Risks and Impacts	<ul style="list-style-type: none"> <li>i. Effective community engagement through disclosure of project-related information</li> <li>ii. Proper management of environmental and social impacts through the EMPr</li> <li>iii. The proponent is capable of financing the costs of environmental and social risks. Proponent has already partnered with the Ingula Nature Reserve and Birdlife South Africa</li> </ul>
2. Labour and Working Conditions.	<ul style="list-style-type: none"> <li>i. The planning phase is being conducted with communication with relevant authorities to meet their requirements.</li> <li>ii. The construction phase will be done following the relevant labour laws and ethical practices.</li> <li>iii. For casual labour, preference shall be given to locals</li> </ul>
3. Resource Efficiency and Pollution Prevention	<ul style="list-style-type: none"> <li>i. Through the use of the EMPr, measures will be put in place to avoid and reduce pollution during the construction phase</li> <li>ii. The construction phase will be for homesteads and as such will not make use of heavy machinery over extended periods of time</li> <li>iii. Mention the consideration of dust regulations (cite what they are and also the Air quality Act)</li> </ul>
4. Community Health, Safety, and Security	<ul style="list-style-type: none"> <li>i. During the construction phase, the area will be fenced, and signs erected to protect the public from occupational risks</li> <li>ii. The planning and construction phases will be done with authorisations from competent authorities.</li> <li>iii. Recommendation of the biodiversity and social studies will be implements (Volume 4)</li> </ul>
5. Land Acquisition and Involuntary Resettlement	<ul style="list-style-type: none"> <li>i. Land acquired from the six affected families being relocated was done on a willing buyer and willing seller basis using free, prior and informed consent</li> <li>ii. The families will be relocated to the new site as they agreed to the alternative and were fully compensated.</li> <li>iii. A livelihoods restoration programme will be done.</li> </ul>
6. Biodiversity Conservation and Sustainable Management of Living Natural Resources	<ul style="list-style-type: none"> <li>i. Project activities will be done with the knowledge and recommendations of the Ingula Nature Reserve administration.</li> <li>ii. Recommendations have been done for the project to limit use of any non-renewable or scarce natural resources.</li> </ul>
7. Indigenous Peoples 8. Cultural Heritage	<ul style="list-style-type: none"> <li>i. Project activities might temporarily disrupt or interfere with local cultural practices</li> <li>ii. Recommendations have been made for the project to limit use of natural resources that support the locals' livelihoods, if there are any identified. What is needed will be purchased from locals.</li> </ul>

### 3. PROJECT DESCRIPTION

#### 3.1 A Detailed View of the Project Works

This section gives a description of the specific activities that will be taking place with the aim of establishing structures and infrastructure that form the dwellings and amenities for the families that will be relocated. Technological, site, operational and service provision alternatives are discussed in Section 8.

##### 3.1.1 Buildings

According to Eskom (2020), houses will be constructed for each family using brick and mortar to meet relevant standards and requirements. These will form some of the major components of the village. Each homestead will have a house, rondawel, internal access road, ablution block, sewer reticulation and kraal. The floor areas for each family’s household will be as follows.

**Table 3-1: Existing and new floor area for existing buildings per family (Eskom, 2020)**

Family	Philemon Shabalala	Ephraim Shabalala	Bheki Shabalala	Josiah Dhlamini	Paulosi Mkhwanazi	Christina Shabalala
Existing floor areas	144 m <sup>2</sup>	150 m <sup>2</sup>	241 m <sup>2</sup>	275 m <sup>2</sup>	300 m <sup>2</sup>	72 m <sup>2</sup>
New floor area	233.02 m <sup>2</sup>	220.67 m <sup>2</sup>	296.47 m <sup>2</sup>	333.12 m <sup>2</sup>	395.26 m <sup>2</sup>	141.47 m <sup>2</sup>

##### 3.1.2 Water supply

A borehole will be drilled to supply the dwellers with water. The pumped water will be kept in a storage tank before being send to individual houses. The estimated daily water requirement is 38 m<sup>3</sup> but a design of 43 m<sup>3</sup> is advised to cater for population growth. The water provisions for the village will be done following the requirements of SANS and Guideline for Human Settlement Planning and Design (Red Book). The following were considered as options for water supply for the village.

- Mechanical pumps (Hand, Wind, and Hydropower pumps)
- Petrol and Diesel pumps (Mechanical and Electrical)
- Electric Pumps (Wind electric pumps, PV)

### 3.1.3 Sewage/wastewater reticulation

According to Eskom (2020), there septic tanks are going to be constructed for holding and natural treatment of wastewater and sewage.

Minimum and Maximum Sewer Loads = 7980 and 14 250 m<sup>3</sup>. Design Assumptions:

- Maximum number of occupants per room in a dwelling = two people
- Minimum Design Load per Person = 70l/c/day
- Optimum Design per Dwelling Unit (2 bedroom) = 500l/day
- Optimum Design Load per Dwelling Unit (3 bedroom) = 750l/day i.e., equivalent to a Middle to Upper-Income Dwelling with 2 bedrooms

**Table 3-2: Sewer loads calculations to determine design requirements**

Dweller	No. of 2-bedroom dwellings	No. of 3-bedroom dwellings	Maximum No. of Occupants	Minimum Sewer Load (l/day)	Optimum Sewer Load (l/day)
Philemon Shabalala	5	0	20	1400	2500
Ephraim Shabalala	5	0	20	1400	250
Christinah Shabalala	2	0	8	560	1000
Bheki Shabalala	6	0	24	1680	3000
Paulos Mkhwanazi	4	1	22	1540	2750
Josiah Dlamini	2	2	20	1400	2500
<b>TOTAL</b>	<b>24</b>	<b>3</b>	<b>114</b>	<b>7980</b>	<b>14 250</b>

(Eskom, 2020)

**Power** –Solar will be provided to the relocation site and there are future plans of providing alternative electricity supply through connections to the national grid should the adequate infrastructure be available.

**Access roads** – there is a road that passes by the 131-hectare project site. Access roads will be constructed to connect to the houses to the main gravel road.

### 3.2 Description of the Affected Area

Below are the environmental attributes for the project location.



### **3.2.1 Geographical**

#### **3.2.1-1. Terrain**

The project site is mainly a relatively undulating savannah grassland of elevation gently rippling around between 1695 and 1730 m and with a small hill that reaches an elevation of 1749 mamsl. The surrounding areas have a rolling terrain and some hills dotted across the plains. Birdlife South Africa describes the areas surrounding the project site as high-altitude grasslands. Some of the surrounding areas have slopes composed of sandstone and shale. Due to dolerite dykes' junctures, the terrain has places where it forms terraces, ravines and benches.

#### **3.2.1-2 Settlements**

The project site is located inside the Ingula Nature Reserve on the northern boundary. The general area surrounding this northern boundary are farms that have few buildings each. As such, the area has few houses dispersed over a large area. Most of the farms practice subsistence farming and livestock rearing.

#### **3.2.1-3 Infrastructure**

The area has gravel roads that are used for access to the main tarred road (Figure 3.2-1). Ingula Pumped Storage Scheme resulted in the construction of some tarred roads in the local area. Most farms in the area do not have electricity.

#### **3.2.1-4 Administrative**

The project location is under Free State Province in the Thabo Mofutsanyana District and in the Phumelela Local Municipality (FS195).

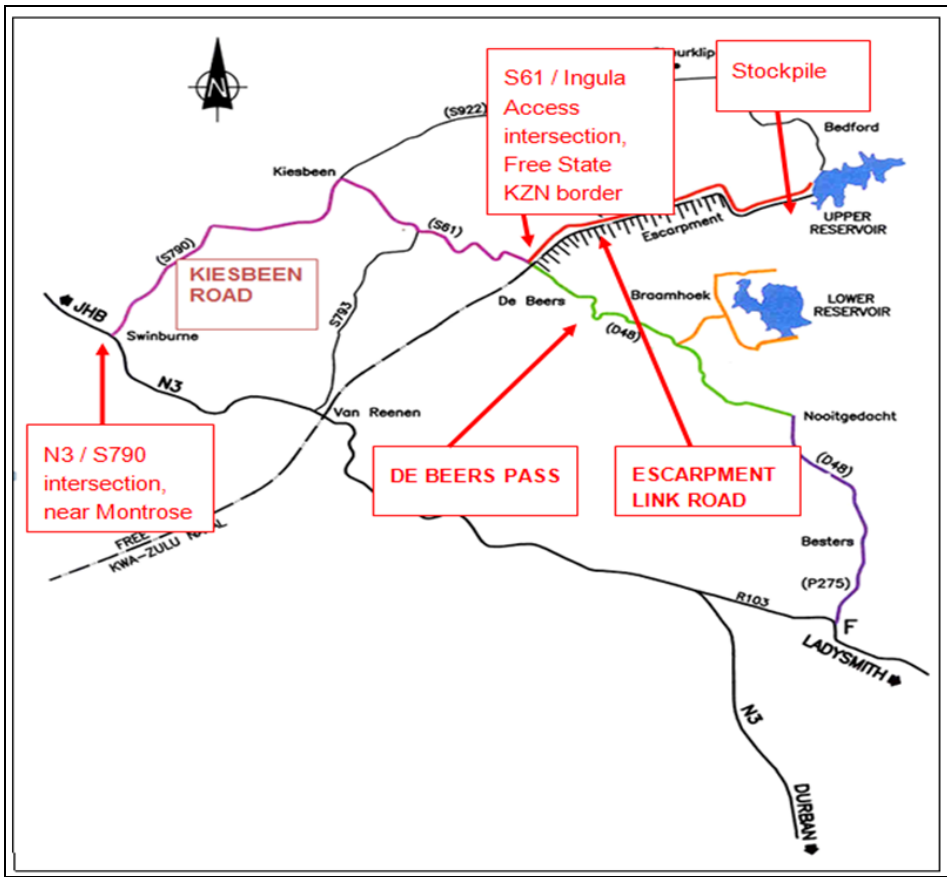


Figure 3.2-1: Existing access points

### 3.2-2. Physical

#### Climate

The climate in the region is generally mild with mild temperatures prevailing throughout the year except in winter which is cold. The winters are mostly dry, and rainfall falls mainly during the summer season. Annual average rainfall is 800 – 1000 mm with most of it falling between early November and early April. In winter, temperatures can go below zero but rarely beyond -4 °C. The average temperature in winter is 6° C. Summer average temperatures vary around 21°C, peaking at 24 °C. (Ingula Nature Reserve Management Plan, 2017)

According to the Ingula Nature Reserve Management Plan (2017) by Eskom Holdings, the area experiences summer rainfall, moderate summers and very cold winters. The cool summers can experience rainfall with possibility of thunderstorms whilst winters occasionally experience snowfall.

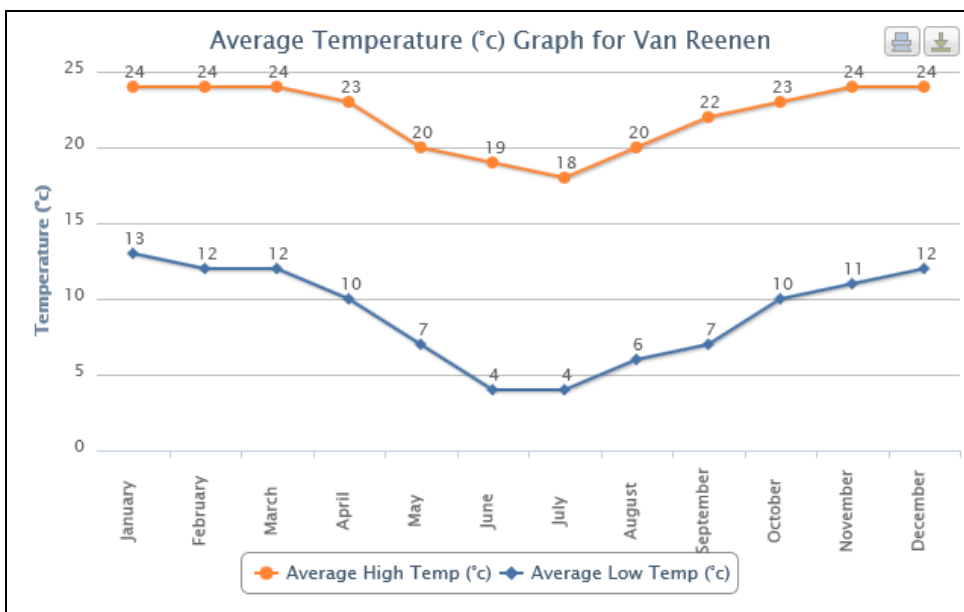
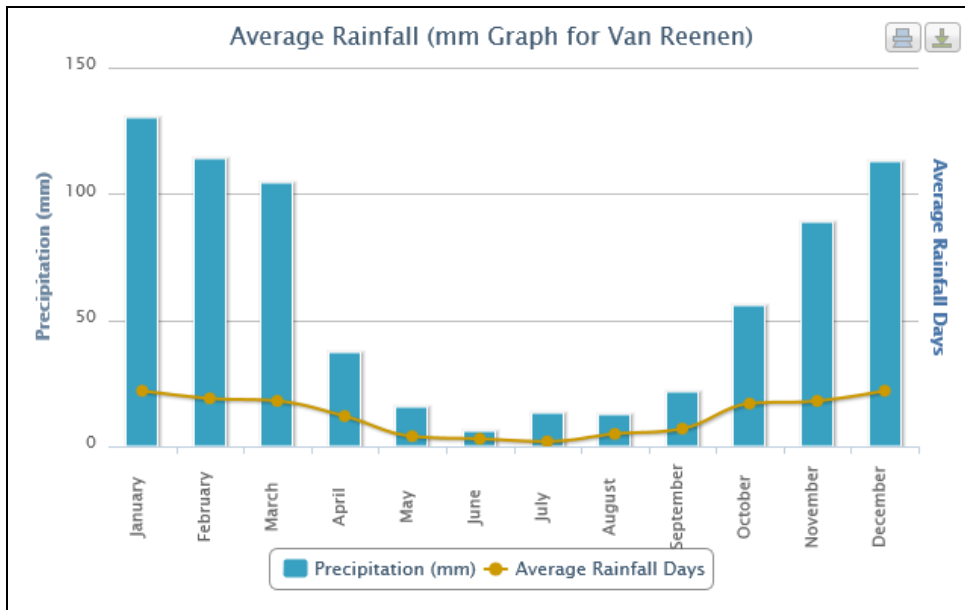


Figure 3.2-2: Average high and low temperatures at Van Reenen (Ingula Management Plan, 2017)



**Figure 3.2-3: Average precipitation and rainfall days for Van Reenen (Eskom Holdings' Ingula Nature Reserve Management Plan, 2017)**

### Soils and Geology

The Ingula Highveld is commonly characterised by grey-like Highveld pseudo-podzolic soils. The soils are primarily non-differentiated fersiallitic soils that transform into brown Mediterranean soils as altitude increases towards the little Drakensburg escapement. The geology is of the Normandien formation which is primarily sandstone of the Induan stratigraphic range. It is a Triassic-age rock formation. (geoscience.org.za, 2020)

Ingula Nature Reserve Management Plan (2017) describes the landscape as characterised by frequent dolerite koppies and relatively thin soil mantles. Streams seem to have chiseled into the highly erodible sandstone down to 50 metres resulting in the formation of small waterfalls and ravines along the Wilge River. The high erodibility of the soils is observed by Mentis and Partridge (2002), Mentis (2005) and by Vlok (2020) when a Biodiversity study was carried out.

### Hydrology

Ingula Nature Reserve sits on a continental watershed with most water paths draining seasonally or annually to the west. The Wilge River, a tributary to Vaal River and part of the Orange River system, passes close to the project site. In its upper sections, the Wilge River is

fed by vast and widespread wetlands (Eskom, 2017). A study done by Maud and Partridge in 2004 for the Ingula Pumped Storage Scheme also covered the relocation site as it is inside the nature reserve. The study identified that the area has floodplains, hillslope seepage wetlands, pans and wetland channels. The experts pointed out that even though channelization in areas with hillslopes was natural, it seemed to be accelerated by erosion which is common in the area. The above-average erodibility of the soils in some of the areas is supported by a study by Partridge, Crosswell and McCutcheon (2005), which indicated how erosion has an effect on the hydrology in the area such as how eroded soil result in siltation of wetlands. Erosion dongas have been formed by surface runoff erosion as water feeds into the wetlands.

In 2012, Terrell, Mahomed and Lorentz did a wetland study for Ingula Pumped Storage Scheme and noted that baseflow to wetlands in the area is maintained by perennial groundwater moving through finger tributaries. The area has several wetlands which have outflow or discharge that is seasonal. The study noted how water collects in the drainage features such as erosion gullies, streams and valley slopes. Most wetlands flow in a westerly direction feeding into the Wilge River that passes through the relocation site. To some extent, water levels in the local streams and wetlands is determined by local vertical recharge which replenishes ground water.

Mentis (2005) did a management objective for regulated rivers for IPSS noted how the Wilge River has a main tributary, Bedford spruit. It was noted that most wetlands also reduce flooding of surrounding rivers. Hydrology in the Ingula Nature Reserve contributes greatly to habitat biodiversity. In support, Vlok (2020) describes how wetlands and riparian ecosystems are the most sensitive habitats for bird species.

### **3.2-3. Biological**

According to Vlok (2020), open grassland habitat covers the greater part of the relocation site with a small portion being a ridge grassland habitat and a small stream (that feeds into Wilge River) passing through the middle of the site classified as a wetland habitat. The map is shown below. The stream passing through the relocation site is a sensitive ecosystem.

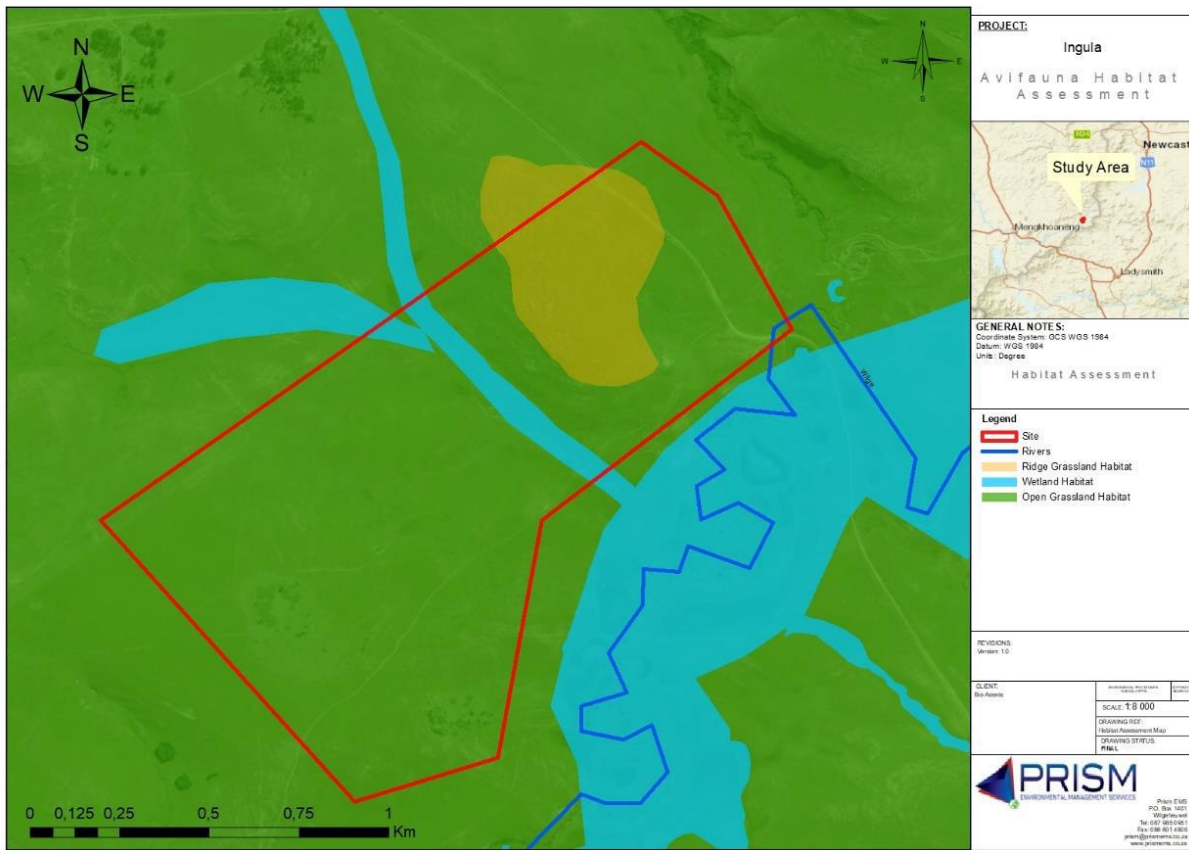


Figure 3.2-4: Map showing the stream that passes through the relocation site before feeding into Wilge River

In consideration of this impact, the design and allocation of the families was re-configured to avoid the sensitive areas. The post EA plan showing the amendment of the original plans in consideration of the results of the EIA biodiversity study is shown in Figure 3.3-4.

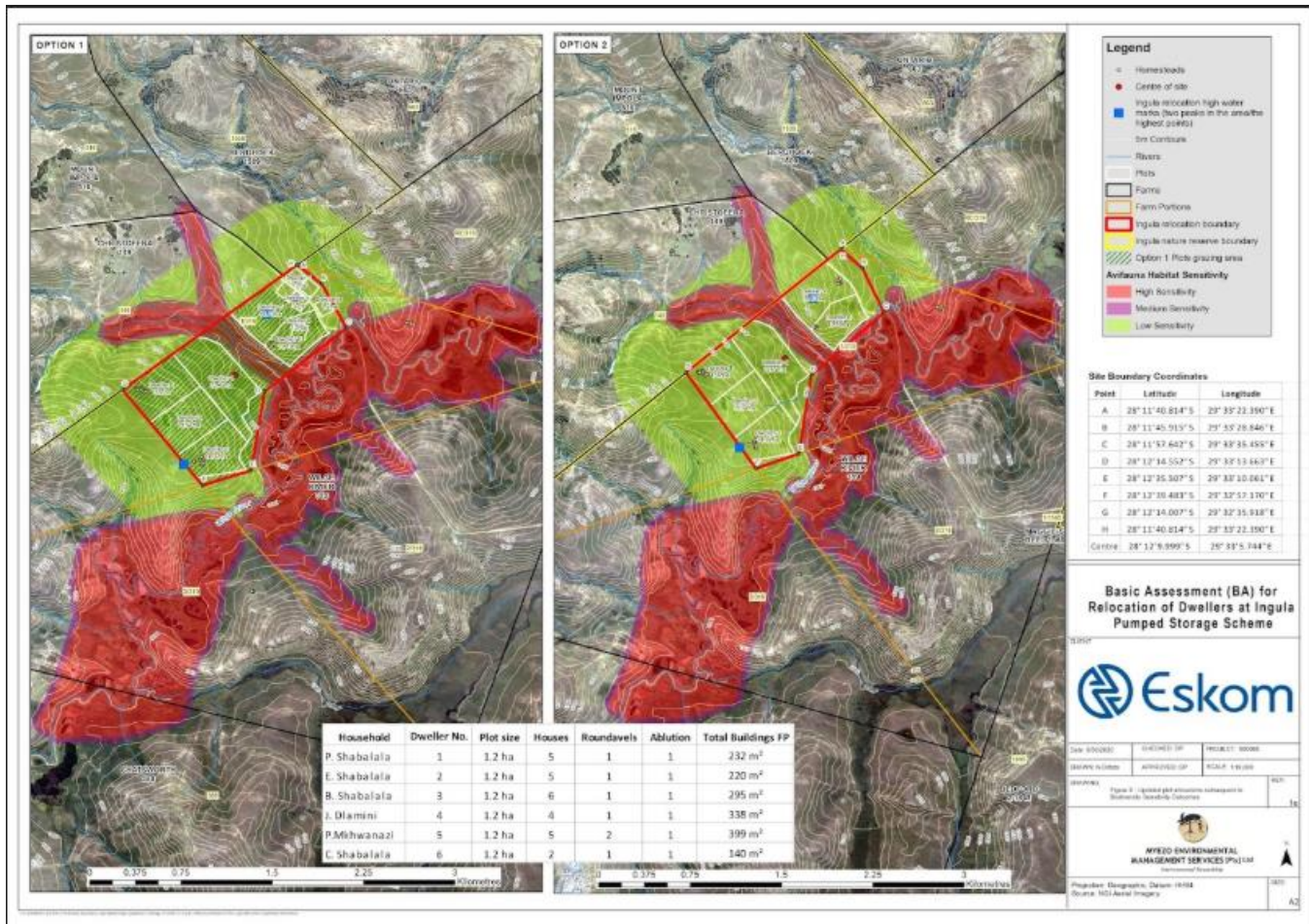


Figure 3.2-5: Post-EIA Relocation allocations taking cognisance of the sensitive areas

### Flora

The project site is in an African savannah ecosystem that is characterised by tropical grasslands dominated by grasses and with small trees that are meashly scattered. The vegetation is mainly grasses dominated by short to tall sour grasses constituting the bulk of species composition. Shrubs mainly occupy ravines, ground crevices and along rivers or streams. Examples of common grasses in the area include the *Themeda* and *Eragrostis* genus whilst *Leucosidea* is one of the common shrubs. The Ingula Nature Reserve Management Plan of 2017 also mentions numerous herb species such as *Helichrysum*, *Hypoxis*, *Ipomoea*, *Kohautia* *Vernonia* and *Berkheya*. Dominant grass species include different species of *Eragrostis*, *Aristida*, *Tristachya* and *Hyparrhenia*.

In 2004, a survey by Mentis mentioned how *Kniphofia ensifolia* subsp. *autumnalis* (classified as Vulnerable) and *Kniphofia typhoides* (classified as Near Threatened) were likely to be found in

the nature reserve. A study done by Vlok in 2020 included a site visit where the species were not observed. The study noted that the area had fair to good condition vegetation cover with erosion contributing to the reduction in chances of better cover. Vlok (2020) supports findings from Mentis (2004) that the nature reserve is abundant in floodplain grassland species such as *Harpochloa falx-Tristachya leucothrix* mixtures, *Tristachya leucothrix*, *Themeda triandra*, *Eragrostis capensis*, *Commelina africana*, *Helichrysum aureonitens* and *Helichrysum pilosellum*. Some of the species are common on floodplain grasslands only and not in the terrestrial grasslands. An example of these include *Helictotrichon turgidulum*. These grasslands form some of the habitat types for birds in the reserve which uses them as nesting grounds (Vlok, 2020).

## Fauna

The Nature Reserve has recorded 34 species of mammals with about a third being carnivorous animals and another third being antelope species such as the Oribi (*Ourebia ourebi*), Blesbok (*Damaliscus pygargus*), Grey Duiker (*Sylvicapra grimmia*), Common Reedbuck (*Redunca arundinum*) and Mountain Reedbuck (*Redunca fulvorufula*). Smaller mammals include the Aardvark (*Orycteropus afer*), Cape Springhare (*Pedetes capensis*), Serval (*Leptailurus serval*), porcupine (*Hystrix africaeaustralis*), striped polecat (*Ictonyx striatus*), otter (*Aonyx capensis*), vervet monkey (*Chlorocebus pygerythrus*), large grey mongoose (*Galerella pulverulenta*), yellow mongoose (*Cynictis penicillata*), black-backed jackal (*Canis mesomelas* or *Lupulella mesomelas*) and African wild cat (*Felis lybica cafra*) (Ingula Nature Reserve Management Plan: Eskom Holdings, 2017).

Due to the presence of wetlands in the Ingula Nature Reserve, the area has a large number of birds that go beyond 341 species and some of them endangered. Priority species of avifauna include Martial Eagle (*Polemaetus bellicosus*), Wattled Crane (*Bugeranus carunculatus*), White-winged Flufftail (*Sarothrura ayresii*), Secretary Bird (*Sagittarius serpentarius*) and the Bearded Vulture (*Gypaetus barbatus*). Farther into the Nature Reserve are wetlands that are recognised and protected by the Ingula Partnership Trust as important habitats for over 300 bird species. Ingula Nature Reserve has the Southern Bald Ibis (*Geronticus calvus*) which is a Vulnerable endemic grassland species.



The recent study by Vlok (2020) identifies bird species such as African Marsh Harrier (*Circus ranivorus*) and Flufftails (*Sarothrura* sp.) to be more common in sensitive ecosystems such as marshes, wetlands and riparian vegetation. Species such as the Eastern Long-billed Lark (*Certhilauda semitorquata*) prefer ridge-like grasslands for foraging purposes and nesting ground

Even though the SABAP (2020) provides evidence of how Ingula has 49% of bird species in the region, Vlok (2020) observed only 12% of the expected in the relocation site. Of the 16 red listed species expected in the area, only 3 were observed during the survey.

### 3.2-4. Social

The area, being a rural setting, have very low population density. Most families rely on horses for movement. Horses are also used for hunting and herding cattle.

According to Mfabana, the study area for the social study falls under Phumelela (PLM) and Maluti-a-Phofung (MAP) municipalities. The province has youths being 36% of the provincial population. The province has an HIV prevalence rate of 12.7% but the rate of AIDS related deaths has greatly declined due to the increase in government programmes such as prevention of Mother-to-Child Transmission, HIV Testing, rollout of antiretroviral therapy etc. Compared to other provinces of South Africa, the Free State has the lowest life expectancy at birth. The following information was extracted as is from the socio-economic study carried out by Mfabana (2020).

### Demographic and Household Data

Analysis of the demographic data focuses on population figures, gender breakdown and the age structure of the population; whilst analysis of HHs focuses on the total number and size of HHs, which is about the average number of people in a household. Information used is based on the 2016 Community Survey by Statistics South Africa.

**Table 3-3: Demographic and Household Data**

Key Indicator	Phumelela LM 8 209 km <sup>2</sup>	Maluti-a-Phofung LM 4 338km <sup>2</sup>
<b>Demographics:</b>		
(a) <b>Population</b>	50 054	353 452
(b) <b>Female</b>	51%	54%
(c) <b>Male</b>	49%	46%

Key Indicator	Phumelela LM 8 209 km <sup>2</sup>	Maluti-a-Phofung LM 4 338km <sup>2</sup>
<b>Age Structure:</b>		
(a) <b>0-14 years</b>	29%	31%
(b) <b>Youth 15-34 years</b>	39%	40%
(c) <b>Adult 35-64 years</b>	24%	21%
(d) <b>65+</b>	8%	8%
<b>Total Households:</b>	<b>14 586</b>	<b>110 725</b>
(a) <b>Formal Dwellings</b>	10 157	84 978
(b) <b>Informal Dwellings</b>	2 707	15 058
(c) <b>Traditional (Huts)</b>	642	9 294
(d) <b>Other</b>	1 081	1 395
<b>Household Size</b>	3,4	3,2

**Sources: Stats SA Community Survey 2016; 2018/2019 IDPs for PLM and MAP.**

In terms of geographical area, the PLM is the largest within the District Municipality; whilst the MAP has the highest population density within the District and the 3<sup>rd</sup> highest population density in the FS. Both municipalities have a youthful population and more females than males. The implication of both factors is that future planning and creation of economic opportunities by the respective role players should take this into consideration.

The PLM has no land area containing traditional authorities; whilst the MAP encompasses substantially the entire former homeland of Qwaqwa and has traditional systems of governance and applied within the municipal jurisdiction. 60% of HHs in the PLM are headed by males; whilst 50.4 % of HHs in the MAP are headed by females. In both municipalities, the average size of HHs is three people per household. The veracity of the HH size statistics as it applies to the MAP is questionable, because this municipality is regarded as one of the very poorer municipalities in the FS with high levels of unemployment.

Only the MAP has provided statistics on tenure status, which is 4.8% of the households, live in rented dwellings; 83.6% of households own the dwellings, whilst 9.1% live rent-free.

### Social Indicators

The focus here will be a brief analysis of poverty levels, education and the existence of health facilities. It is very uncommon to get statistics on the Human Development Index and Gini Co-efficient at the municipal level; however, these figures have been indicated in the provincial section.

**Table 3-4: Social Indicators**

Key Indicator	PLM	MAP
<b>Poverty:</b>		
(a) Poverty Headcount	8,7%	8,1%
(b) Intensity of Poverty	44,5%	40,8%
<b>Education:</b>		
Persons 20 years and have completed Grade 12	8 231	76 033
<b>Health Facilities:</b>		
(a) Clinics	6	34
(b) District Hospital	1	2
(c) Regional Hospital	0	1
<b>Access to Basic Services:</b>		
(a) Water (Piped)	94%	89%
(b) Sanitation (Flush)	70.4%	36.6%
(c) Electricity/Solar	79.8%	93.1%
(d) Weekly Refuse Removal	65,1%	22,1%

**Sources: Stats SA Community Survey 2016; FS Department of Health “TM District Health Plan 2018/19-2020/21; MAP IDP 2018/2019**

For the PLM, both poverty statistics have increased from the 2011 figures, which were 8,5% and 41, 2% for poverty headcount and intensity of poverty, respectively. This therefore means that levels of poverty in the PLM have not improved. On the other hand, there has been a slight improvement in the MAP, where the 2011 figures were 7, 9% for poverty headcount: and 41,4% for intensity of poverty.

It must be noted that both education (provincial mandate) and health (district and provincial mandate) are not municipal mandates and the statistics just point to the level of achievement with regards education, and the number and variety of health delivery platforms available. In the case of the PLM, it has been highlighted in the IDP, that according to the 2016 education statistics, more males (7 702) attended school than females (7 187); and, that this was the case is well in 2011.

### 3.2-5. Economic

Due to the very low population density in the area, economic growth has been very stunted. The region is classified as very impoverished and has been identified as a presidential poverty node. Livestock farming is the main economic activity with people rearing cattle. Most farmers grow maize. Farms that are in the vicinity of the project area mainly practice subsistence farming and

rarely for commercial purposes. However, the district is characterised by beautiful landscapes, plains, river valleys, ravines, wetlands, and Drakensberg Mountains which boost tourism in the district and province. Tourism provides locals with opportunities to find employment as bird guides and hosts. Fruit farming in the district contributes to employment creation and exports. The proposed project site is labelled as a “highly intensive utilization” zone because it will be easily accessible to district services compared to where they are currently situated (Global Africa Network, 2017).

The following information was extracted as is from the socio-economic study carried out by Mfabana (2020).

The average annual growth rate of the FS was 1.6% between 2011 and 2017; and the province’s economy is estimated to have declined by 1.4% in 2018. According to the 2019/2020 report on the Overview of Provincial Revenue and Expenditure, the 2015/16 drought was the most significant challenge to the economic growth rate of the province between 2011 and 2017. There was however a recovery in 2017 due to the recovery of the agriculture industry, the growth in the mining industry; as well as a rise in commodity prices (agriculture and mining). Sectors that are dominant in the economy are:

- **Primary Industries:** Agriculture; and Mining.
- **Secondary Industries:** Manufacturing; Electricity; and Construction.
- **Tertiary Industries:** Trade; Transport; Finance; and Community Services.
- All Industries.

The formal sector and the private household industry are the biggest employers of those employed. Between Q4: 2019 and Q1: 2020, the number of employed people decreased in five of the nine provinces, with the largest employment decrease recorded in the FS (down by 29 000). The table below provides a comparative picture of the official and expanded unemployment rates for both the country and the FS for 2020: Q1.

**Table 3-5: Official and Expanded Unemployment Rates**

	Official Unemployment Rate <sup>1</sup>	Expanded Unemployment Rate <sup>2</sup>
<b>FS</b>	38.4%	44.5%
<b>SA</b>	30.1%	39.7%

**Source: Statistics South Africa, QLFS, Quarter 1, 2020.**

During this period, the official unemployment rate in the Country increased in seven of the nine provinces: with the FS recording the second largest increase (3.4% after the North West at 4.4%). With regards expanded unemployment rate, all the provinces recorded increases, with the largest recorded in the FS (2.2%).

### 3.2-6. Heritage

The district has rock paintings believed to be from the Bushman also known as the San people (Hollman, 2002). The Free State province has got most of the best ancient rock paintings depicting the San’s hunting and gathering lifestyle. The area currently has Basotho people who are identified by their clan names such as Bafokeng, Makgolokoe and Bakuena. Some of this ethnic group are in Lesotho which is very close to the project area. An archaeological survey for the Ingula area done by Anderson and Anderson (2004) mentions fossils and rock art discovered in the area but the areas where these were found has since been inundated by the Bedford Dam.

### 3.2-7. Cultural Aspects

According to Mohale (2020), the majority of the people in the project area, who are of the Basotho origin speak Sesotho which is one of the official 11 languages of South Africa. They are believed to be an ethnic group started in the 19<sup>th</sup> century by King Moshoeshoe I. Their culture is depicted in the Basotho Cultural Village which is next to the Harrismith town. The Basotho people wear clothing that indicates the type of lifestyle they live. For example, herd men are synonymous with long gumboots and the Basotho cloth. These protect them from the mountain terrain and waterlogged areas as they tend to their livestock. The women normally wear bright coloured long dresses with a traditional wrap that can be used to carry children.

<sup>1</sup> Official Unemployment Rate measures the number of people actively looking for a job as a percentage of the labour force.  
<sup>2</sup> Expanded Unemployment Rate includes people who have stopped looking for work

They are also known for special clothing which include the young women's beaded waist wrap called a *thethana* and the young men's loincloth called a *tshea*, all worn during an initiation ceremony. The Basotho people who are in the project area are known for herding cattle and hunting on horseback (Mohale, 2020).

## 4. ROLES AND RESPONSIBILITY

Effective environmental management during the design and construction phases of the Ingula Relocation Project will be critically dependent on a number of project personnel. The purpose of this section is to define roles for personnel and to detail concomitant responsibilities in the execution of the EMP. Before doing so it is also necessary to define the various parties that bear environmental management responsibilities for the Ingula Relocation Project, during design and construction.

### 4.1 Project Owner – Eskom

Eskom Holdings is the owner of the Ingula Relocation Project and is the independent decision-making authority and ultimately accountable and responsible with respect to implementation of the contract and compliance with this EMP.

### 4.2 Contractor (Design and Construction)

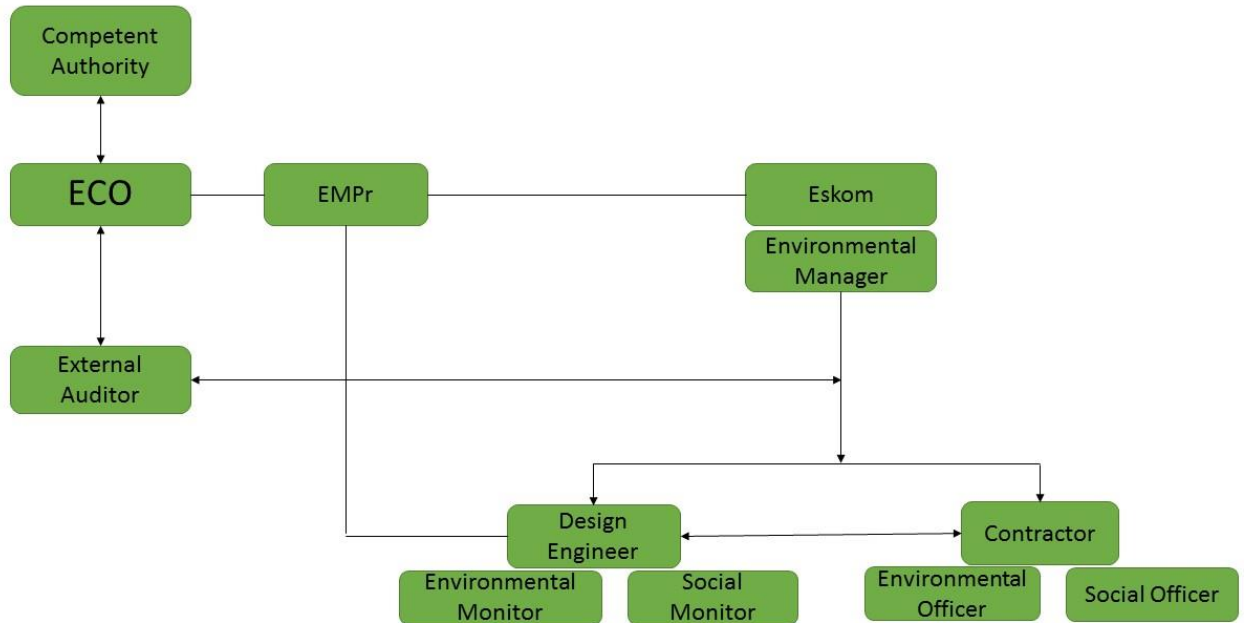
Eskom will appoint a turnkey contractor through its normal procurement processes. The requirements of this EMP will form part of the tender documents and Bill of Quantities to ensure that the turnkey contractor will price and fully comply with all environmental legislation and requirements.

The Environmental Manager will provide environmental management and oversight for all environmental issues that arise on a day-to-day basis. The Environmental Manager is the primary point of contact on environmental and social issues for the duration of the contract. The Environmental Manager will also assist the contractor in coordination with the Competent Authority.

### 4.3 Environmental Management Structure

Within the above structure there will be a number of functional posts that will either directly or indirectly have an environmental management function as shown in **Figure 4-1** below and described later. Important to note, that although the functions area shown and described

separately, these functions could be the responsibility of one post within the organisation, except for the Environmental Control Officer (ECO) post, which is an independent body reporting to the Competent Authority and the external auditor. The contractor will need to appoint the ECO, but the overall accountability will be upon Eskom.



**Figure 4.3-1: Environmental Management Structure**

**4.3.1 Project Owner**

As the Project Owner part of Eskom’s responsibilities is to oversee the overall implementation of the construction of the project as well as the compliance to the applicable legislation, the Environmental Authorisation and approved EMPr.

#### **4.3.1.1 Environmental Manager**

The Eskom Environmental Manager will focus on oversight and contractor compliance. The Environmental Manager reports to Eskom Holdings. The role of the Environmental Manager is to support the successful implementation of the EMPr through:

- Plan and direct the implementation of the EMPr.
- Ensure that the requirements of the EMPr are communicated, understood and enforced by personnel on site.
- Ensure that contractors on site develop, implement and monitor the required environmental management functions.
- Evaluate the applicability and accuracy of the EMPr and the Method Statements throughout the construction process.
- Ensure that all statutory requirements are met.
- Manage scheduled audits and inspections on contractor's performance on site.
- Manage all public and interested and affected party complaints, claims and recommendations.

#### **4.3.1.2 External Auditor**

Eskom will appoint an external auditor to undertake quarterly audits to ensure that the contractor is complying with the required construction phase management measures.

The main responsibility of the Environmental Auditor is to monitor and report on Eskom's compliance with the EMPr and other statutory obligations pertaining to environmental performance during construction of the project.

#### **4.3.2 Design Engineer**

The Design Engineer is responsible for the design of the chair lift and associated infrastructure. It will be the responsibility of the Engineer to ensure that the Contractor adheres to construction specifications, the Environmental Authorisation and EMPr. The Engineer has the authority to stop any construction activity which is in contravention of any of the specifications within the documents mentioned above after consultation with the ECO. All major decisions which may affect the programme or costs of the project with regards to the environmental procedure or protocols must be approved by the Employer via the Engineer.



#### **4.3.2.1 Environmental Monitor**

The Environmental Monitor (EM) is employed by the Engineer and is responsible for overseeing the daily implementation of the EMPr and relevant specifications for the duration of the project. The EM should have a clear understanding of the project as well as all the environmental matters pertaining to the project and should have a good knowledge on the applicable environmental legislation and processes.

Responsibilities of the EM include:

- To advise and provide recommendations to the Environmental Officer (EO) on all environmental and related issues based on the requirements of the EMPr.
- To record and forward complaints received from the public to the Engineer and Employer.
- Resolve conflicts.
- Keep detailed and accurate records of the EMPr related activities on site.
- Report to the ECO on the monitoring of environmental issues.

#### **4.3.2.2 Social Monitor**

The Social Monitor will act on behalf of the Engineer in all social matters pertaining to the project. The Environmental and Social Monitor roles could be the responsibility of one individual and can be an existing Eskom resource.

Responsibilities of the Social Monitor are:

- Resolve conflicts.
- Ensure the implementation of the Social Monitoring Plan as well as social-related requirements in the EMPr.
- Monitor the progress, impact and sustainability of the project.
- Ensure that all community and landowner complaints are reported to the Engineer, recorded and dealt with in a timeous manner.

#### **4.3.3 Contractor**

In order to carry out the requirements of this EMPr, the Contractor must make sure that he has a clear understanding of all environmental matters relating to the project.

The responsibilities of the Contractor will include:

- The implementation of and adherence to the applicable environmental contract specifications in accordance with the requirements of the EMPr.

- The compliance to all national, provincial and local legislation related to the management of environmental aspects, including ensuring all applicable and required site specific permits, authorisations and licenses which are triggered by the Contractor's activities are applied for and obtained timeously. Examples of such permits include the removal of protected plant species and the storage of flammables and hazardous material.
- To ensure all Sub-contractors under his supervision adhere to the applicable environmental contract specifications in accordance with the requirements of the EMPr.
- Report any incident to the Engineer immediately and follow the initial notification with a flash report within 12 hours of the event occurring. The flash report will include details of the incident, which includes the extent, reasons, preventative actions, and corrective actions taken.
- To ensure that all employees and Sub-contractors attend Environmental Awareness Training provided by the EM.
- To conduct any remedial work required in terms of this EMPr as a result of environmental negligence, mismanagement and/or non-compliance.

#### **4.3.3.1 Environmental Officer**

A suitably qualified senior employee of the Contractor shall be responsible for implementing the EMS, environmental monitoring, and control. This position shall be designated the Environmental Officer (EO). The EO shall be responsible for:

- Aiding the Contractor to comply with all the project environmental requirements, objectives, and targets.
- Facilitating environmental activities and environmental awareness training of all personnel on site, and
- Implementing an internal environmental management system.

#### **4.3.3.2 Social Officer**

The Social Officer functions could be included in the Environmental Officer roles and responsibilities.

The duties of the SO will include:

- Aiding of the Contractor with liaison with neighbours, land occupiers and other interested and affected parties,

- Facilitating the resolution of potential and actual challenges experienced during construction where these relate to land occupiers, staff, and guests and their special requirements, and
- Aiding the Contractor in keeping accurate records pertaining to issues, complaints and the associated corrective actions.

#### **4.3.4 Environmental Control Officer**

Eskom must appoint a suitably qualified and experienced independent Environmental Control Officer (ECO) who will be responsible for the monthly monitoring of the project compliance with the Environmental Authorisation, EMPr and applicable environmental legislation. The contract for the ECO will extend from the commencement of the Construction Phase to the handover of the site by the Contractor to Eskom.

The responsibilities of the ECO include but are not limited to:

- Undertaking a due diligence audit at least a month prior to the commencement of construction. The audit will include a site visit and a qualitative survey of the status of the area prior to construction.
- Review and analyse the monitoring data which will include but not be limited to water, dust and noise monitoring, complaints and pollution incidents and non-conformances against the limits that have been set in the environmental specifications and/or the Environmental Authorisation.
- Site inspections will be conducted in such a way that all the construction activities are covered in the month. The site inspection will include a physical visit to the construction sites. The ECO will inform Eskom of the visit and will commence the visit with an opening meeting on site to gather information regarding the level of operations and a closing meeting to provide feedback to the Design Engineer and Eskom. A report will be compiled to summarise the findings.
- Every month the ECO will also provide a monitoring report to the Competent Authority based on the data gathered by the Contractor and evaluate the information against the performance targets set out in the EMPr.

It is expected that the ECO will maintain open communications with Eskom to ensure that non-conformances are addressed as soon as possible on site and the entire environmental compliance monitoring must be incorporated into the existing certified 14001 EMS.

## **5. MONITORING, AUDITING, & REPORTING**

### **5.1 Introduction**

The purpose of monitoring, auditing and reporting is to ensure that implementation in the design, construction and operations and maintenance phases of the life cycle of the project is accomplished in such a manner that the organisations environmental policy, objectives and targets are met as outlined in this document. The entire compliance monitoring will be incorporated into the existing certified 14001 EMS.

Eskom has resolved to focus on environmental issues, with emphasis on attaining a high level of environmental conscience and as a responsible business take the lead in its field. It is recognised that every human being has the right to an environment that is not harmful to their health or wellbeing and that the nature of its activities could impact on the environment. The Eskom Environmental Policy is included in Appendix E.

The philosophy that will be followed is based on the Deming Cycle, namely, Plan, Do Check, Act, that allows for continual improvement of all activities on site. The objectives are:

- Identify possible impacts that may emanate from its activities.
- Implement mitigation measures to prevent, reduce and minimize the impacts.
- Create an awareness among all employees.
- Incorporate environmental issues into the company's business strategy.

#### **5.1.1 Plan**

The planning is intended to ensure that all activities of the project are carried out in a methodical fashion that allows for a concise intervention that is in concurrent with environmental management principles.

#### **5.1.2 Do**

The implementation will be through the development of Management and Mitigation Plans for each significant construction activity and its aspects that may have an impact on the environment.

### 5.1.3 Check

This EMPr can only be effectively implemented if it is accompanied by monitoring, auditing and reporting on compliance with the management and mitigation plans. The monitoring programme will be designed in a manner that ensures that all the components of the Project that have the potential to impact the environment are accurately monitored.

### 5.1.4 Act

Without acting on non-compliances and implementing corrective measures all actions on site will be fruitless. The Project will be subject to both internal monitoring, and external auditing to ensure compliance to relevant legislation and standards (including this EMPr).

The following basic elements will be included in establishing and maintaining procedures for investigating and correcting non-conformance:

- Identifying the cause of the non-conformance
- Identifying and implementing the necessary corrective action. Implementing or modifying controls necessary to avoid repetition of the non- conformance
- Recording any changes in written procedures resulting from the corrective action.

## 5.2 Environmental Control Documents

### 5.2.1 Health and safety incidents and/or near misses reporting

The following actions will be followed / addressed during incidents, accidents and near misses:

- All accidents, incidents and near misses will be reported to the Eskom Environmental Manager
- Accidents will be addressed in terms of the Health and Safety Plan. If injured, workers will be taken to an appropriate health care facility for treatment. The accident will be documented, including the nature and cause of the accident and the subsequent measures to prevent a similar accident from recurring.
- The corrective actions will be discussed during the next day's toolbox discussion.
- A weekly incident report will be forwarded to the Employer or his representative.

The incident report will be kept on file and will be available for review during audits.

### 5.2.2 Environmental Monitoring and Community Complaints Records

Records are evidence of the ongoing activities of the operation. Typical records that will be kept may include:

- Declaration of understanding of Environmental Management Programme
- Environmental Incidence Register
- Environmental Incident Report
- Hazardous Waste Disposal Register
- Method Statement Proforma
- Method Statement Register
- Hazardous Substances Register
- Community / Guests / Staff Complaints Register
- Environmental Audit Report
- Environmental File Index
- Relevant Letters of Appointment
- Quarterly Environmental Report
- Environmental Induction
- Visitors Induction and Indemnity

The environmental records will be legible, identifiable, and traceable to the activity involved. Records will be maintained to demonstrate conformance to all requirements.

### 5.3 Environmental Monitoring

The main objective of the monitoring programme with respect to project activities is as follows:

- To establish trends
- To ensure compliance with regulatory authorities' requirements
- To assess effectiveness of the proposed mitigation measures
- To detect environmental contamination as early as possible

In order to fulfil the above-mentioned objectives, the monitoring programme will cover issues related to the following environmental components:

- Public health – noise, dust and construction traffic
- Protected fauna and flora species – search and rescue and destruction
- Protection of paleontological resources

## **6. DESCRIPTION OF PROJECT RELATED ACTIVITIES AND ASPECTS**

In order to oversee the successful construction of the project and associated infrastructure, various construction activities as well as their associated aspects have been identified and listed. From the identified aspects it is possible to determine the associated environmental impacts and therefore set the base to formulate measures to manage and mitigate these environmental impacts on site.

### **6.1 Pre – Construction Activities**

Pre – Construction follows on from final project planning tender phase and leads up to the establishment of the appointed Contractor on site. Eskom will be responsible for overseeing the implementation of the project requirements.

The Pre-Construction activities that are going to be conducted involve, but are not limited to:

- Finalise Design Requirements
- Access to site.
- The surveying of the site
- Walk down of the alignment with the specialists and ECO, specifically to undertake search and rescue activities.
- Acquiring of all relevant permits and licences.
- Identified Cultural Heritage Resources and Graves fencing-off with a lockable gate.
- Rescue and relocation of identified red data flora.
- Social aspects related to the employment of local labour.
- Development of construction Method Statements where applicable.
- Environmental Awareness Training; and
- Photographic record of areas prior to site establishment and construction.

### **6.2 Construction Activities and Aspects**

Construction refers to the phase in the project during which the building and associated infrastructure will take place.

The Construction Phase will be divided into the following activities:

- Site Establishment and Infrastructure.
- Site Operations and Construction Works.

The activities and associated aspects which have been identified for Site Establishment and Infrastructure are listed in **Table 6-1**.

**Table 6-1: Site Establishment and Infrastructure activities and associated aspects**

No.	Activity	Aspect
1	Clearing and Grubbing	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility.</li> <li>• Increased level of noise generation</li> </ul>
2	Access to Site	<ul style="list-style-type: none"> <li>• Increased traffic volumes</li> </ul>
3	Construction and use of Temporary Access Paths / Roads	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility.</li> <li>• Increased potential for erosion.</li> <li>• Increase in vehicle movement in area.</li> <li>• Increased level of noise generation</li> </ul>
4	Installation of parking bays for construction plant and vehicles	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Increased level of noise generation</li> </ul>
5	Installation of temporary warning signage	<ul style="list-style-type: none"> <li>• Decrease in aesthetic quality of the environment</li> <li>• Lack of visibility of signage</li> </ul>
6	Topsoil stripping and stockpiling	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility.</li> <li>• Increased potential for erosion</li> <li>• Soil contamination</li> <li>• Encroachment and establishment of alien vegetation</li> <li>• Reduced productivity of subsistence farmland</li> </ul>
7	Provision of sanitation systems	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Ground water contamination</li> </ul>
8	Demarcation, fencing and gates	<ul style="list-style-type: none"> <li>• Loss of vegetation and habitat</li> <li>• Impede faunal movement</li> <li>• Impeded human movement and disrupted daily activities</li> </ul>
9	Provision of flammable material and other material stores	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Soil contamination</li> </ul>



The activities and associated aspects which have been identified for Site Operations and Construction Works are listed in **Table 6-2**.

**Table 6-2: Site Operations and Construction Work activities and associated aspects**

No.	Activity	Aspect
1	Excavation and digging of trenches	<ul style="list-style-type: none"> <li>• Increased level of noise generation</li> <li>• Vibration</li> <li>• Dust generation</li> <li>• Safety</li> </ul>
2	Refuelling of construction vehicles and plant	<ul style="list-style-type: none"> <li>• Soil contamination</li> <li>• Water contamination</li> </ul>
3	Spoil material generation and management	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Loss of vegetation, habitat and soil fertility</li> <li>• Decline in the aesthetic quality of the environment</li> </ul>
4	Relocation of existing services	<ul style="list-style-type: none"> <li>• Disruption in the provision of services</li> </ul>
5	Domestic and construction waste collection, storage, handling and disposal	<ul style="list-style-type: none"> <li>• Unpleasant odours</li> <li>• Increase in Waste generation</li> <li>• Decline in the aesthetic quality of the environment</li> </ul>
6	Handling, storage, disposal of hazardous waste	<ul style="list-style-type: none"> <li>• Unpleasant odours</li> <li>• Soil contamination</li> <li>• Water contamination</li> </ul>
7	Consultation with affected parties	<ul style="list-style-type: none"> <li>• Insufficient consultation</li> </ul>
8	Operation and movement of construction vehicles and plant	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Increase in level of noise generation</li> <li>• Soil contamination</li> <li>• Safety</li> <li>• Vibration</li> <li>• Greenhouse gas emissions</li> </ul>
9	Road upgrades	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Increased level of noise generation</li> <li>• Soil contamination</li> <li>• Safety</li> </ul>
10	Slopes and slope stabilisation	<ul style="list-style-type: none"> <li>• Dust generation</li> <li>• Increased potential for erosion</li> <li>• Water contamination</li> <li>• Decline in the aesthetic quality of the</li> </ul>

No.	Activity	Aspect
		environment • Safety
11	Maintenance of sanitation systems	• Unpleasant odours • Mismanagement of sewerage
12	Transportation of hazardous waste	• Potential spillages of hazardous waste • Safety • Greenhouse gas emission
13	Transportation and storage of equipment and associated materials at the laydown area	• Increase in vehicle movement in area • Impact on the existing road conditions • Safety • Increase in the level of noise generation
14	Use of generators	• Increase in level of noise generation • Soil contamination
15	Protection of archaeological findings	• Destruction of graves and other sites of archaeological value
16	Cooking of food	• Fire hazard • Illegal wood harvesting
17	Employment of local labour	• Insufficient employment of local labour • Presence of construction workforce • Influx of job – seekers • Loss of farm labour to construction work
18	Security	• Trespassing
19	Fire Control	• Loss of vegetation, habitat and soil fertility
20	Water Use and Management	• Water contamination • Misuse of available water
21	Concrete mixing	• Soil contamination • Water contamination • Misuse of available water

### 6.3 Rehabilitation

Rehabilitation will run con-currently with the actual construction. Rehabilitation will consist of, but is not limited to, the following rehabilitation measures: (Reference CEMP)

- Removal of temporary structures and infrastructures.
- Removal of inert waste and rubble.

- Hazardous waste and pollution control.
- Final shaping of disturbed areas.
- Topsoil replacement and soil amelioration.
- Ripping and scarifying.
- Planting.
- Grassing.
- Maintenance; and
- Management of alien vegetation.

Rehabilitation measures mentioned above are dealt with in more detail later.

## **7. COMMUNICATIONS, CONSULTATIONS, & TRAINING**

### **7.1 Communication Procedures on Site**

To ensure effective on-site communication and maintained environmental performance, copies of all documentation described in the EMPr must be maintained on site at all times and be available to both the Environmental Manager, Design Engineer, the EM and ECO, and will be provided on request to authorities or stakeholders for inspection.

#### **7.1.1 Site Instruction Entries**

The Site Instruction journal entries will be used for the recording of instructions as they relate to implementation of the EMPr. Entries could also include stoppage of work orders for the purposes of immediately halting any particular activities of the contractor.

#### **7.1.2 ECO Diary Entries**

The purpose of these entries will be to record the comments of the EM as they relate to activities on the site. Both the Site Instruction journal and EM Diary must be available on the site at all times. These documents will be made available to all relevant authorities for inspection if requested.

#### **7.1.3 Site Meetings**

Regular site meetings will be held between the Environmental Manager, Contractor and its EO, the Design Engineer and its EM, and the ECO (optional). The purposes of the meetings shall be:

- To establish the suitability of the Contractor's methods and machinery in an effort to lower the environmental, social and health risk involved.
- To discuss and resolve non-conformance to environmental legislation / policies or the EMPr.
- To assess the general state of the environment on site and discuss any environmental problems which may have arisen.
- To act as a forum for input into the nature and environmental performance of the construction works.
- To accommodate all stakeholders in the decision-making process regarding social and environmental issues on site.

#### **7.1.4 Non-Conformance Reports**

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the EO and EM. The EO and EM may also report non-conformances. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously as well as the effectiveness of the remediation measure in order for the non-conformance to be closed-out at the satisfaction of the EM and ECO.

#### **7.2 Community Consultation**

Key stakeholders and the representative community councillors should be informed on the progress with the implementation of the EMPr.

The stakeholders will be provided with an opportunity during construction to provide input into the project development process. The following consultation activities will be undertaken:

- Notify Local Community Councillors or their respective assigned representatives in the project area of the proposed construction start date and request them to notify their community members.
- The Community Councillors will be provided with the name of the appropriate project contact person that will deal with queries and complaints.
- Notify the community through the councillors of monitoring programmes and environmental audit results.
- Monthly meetings with the relevant councillors will be held to obtain feedback about the project from the communities.

#### **7.3 Complaints Management and Grievance Procedure**

A protocol to address complaints includes the following aspects:

- Name of complainant.
- Contact details of complainant.
- Date of complaint.
- Nature of complaint; health or environment or safety related.
- Details of complaint; location, severity, stakeholders involved, frequency; and

- Manner in which the complaint has been resolved and a description of how this was communicated back to the communities.

#### **7.4 Environmental Training**

All site staff of all levels, as well as visitors to the site, should be made aware of the environmental management requirements for the project. This should be achieved through training as part of their induction and regular refresher courses.

An Awareness Training Plan will be prepared by the Eskom environmental officer in conjunction with the appointed ECO, that provides for the various categories of persons on site and will cover at least:

- The role and responsibility of the ECO and of other key persons on site in relation to environmental management requirements
- The construction activities that will impact both the physical and social environments
- Mitigation measures that have been put in place to avoid or minimise the anticipated impacts
- The nature and appearance of cultural heritage resource sites that may be found during construction
- Fossil and archaeological chance find protocol as specified in the BAR, archaeological report and Appendix D-3 of Volume 4 of 4 of the BARS.
- Project activities and the mandatory procedures to be followed for their mitigation
- Prevention, management and control of waste including hazardous waste and building rubble handling measures, spillages and fire, and particularly veld fires
- An outline of specific environmental management measures, such as rehabilitation of disturbed areas, fire management, prevention of water pollution and dust management

Daily toolbox talks at the start of each day with all workers onsite should be held. At these sessions relevant environmental and communications requirements should be raised to alert workers to particular concerns associated with their tasks for that day or the area which they are working.

#### **7.5 Site Induction (SHE)**

The Contractor will provide all employees or other persons entering the site with health and safety induction training pertaining to the hazards prevalent on the site and with the necessary Personal Protective Equipment (PPE). All employees will also be informed of the relevant emergency procedures.

During the safety induction, the employees will be informed of all environmental, health and safety issues. All employees that undergo the environmental induction will sign an attendance register that will be kept on file (records).

## **8. EMERGENCY PLANNING AND RESPONSE PROCEDURES**

The Contractor shall develop plans for action to be taken in the cases of emergencies. These plans should specify the emergency procedures for fire, accidental leaks and spillages and medical emergencies and be in line with Eskom's existing Standard Operating Procedures which form part of the certified ISO 14001. An accident register should be compiled every month.

Emergency contact numbers should be displayed in prominent places which should include the Police, Fire Department and Ambulance Services.

A designated emergency meeting point should be established, and all employees should be informed of the locality and procedures.

### **8.1 Fire Control**

According to the IN-management plans (2017-2021), fire plays an important role in the ecological dynamics of grasslands and wetlands, and has important effects on vegetation composition, primary productivity and nutrient cycling.

Uncontrolled fire will be prevented and there is a need to maintain a system of firebreaks to enable the management of controlled burns and to effectively fight wildfires.

Burning will be undertaken with due consideration to the biodiversity conservation requirements of the nature reserve and the need to protect rare and endangered species.

Burning and fire management will be undertaken in a safe manner that is legally compliant with the National Veld and Forest Fire Act (No.101 of 1998).

In terms of Section 17 of the National Veld and Forest Fires Act, a landowner (in this case the nature reserve as managed by Eskom must have such equipment, protective clothing and trained personnel for extinguishing fires as may be prescribed or, if not prescribed, reasonably required in the circumstances. It is therefore necessary to consider the following in relation to firefighting:

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The equipment necessary to effectively fight wildfires will include:

- ✓ Water tankers and pressure pumps mounted on or pulled behind tractors.
- ✓ Fire-fighting equipment mounted on the backs of vehicles.
- ✓ Backpack sprayers.



- ✓ Beaters.
- ✓ Safety equipment for personnel involved in firefighting.
- ✓ Strategic water supply points.
- The Engineer and relevant authorities should be advised of a fire as soon as one starts.
- It should be ensured that all employees are aware of the procedure to be followed in the event of a fire.
- 'No smoking' areas should be marked, including the workshop and fuel storage areas.
- It should be ensured that there is basic and adequate fire-fighting equipment available on site and on all plant.

## **8.2 Accidental Leaks and Spillages**

The existing Eskom Service Provider should be used to undertake clean-up of accidental spills onsite.

The degree and nature of any spillage should be consulted and mutually agreed between the parties, to seek the best alternative clean-up method available. The safety data sheets (SDS) should also be consulted to determine the method of clean-up and to realise optimal utilization.

The following preventative measures should be undertaken:

- All sensitive sites should be identified such as rivers and wetlands and procedures developed to ensure proper handling of oil/fuel or chemical spillages in these areas.
- It should be ensured that all employees are aware of the procedure to be followed in case of accidental spills and leaks.
- It should be ensured that the necessary materials and equipment for dealing with spills and leaks is available on site at all times and at a minimum there must be spill kits
- All employees should be trained to handle all accidental leaks and spillages onsite appropriately.

## 9. REHABILITATION

The landscaping and rehabilitation of disturbed areas shall occur as soon as practically possible following the completion of the work in a specific area. Therefore, the rehabilitation process will immediately be executed, per phase, upon the completion of the work within a specific area, utilising specified methods and species.

### 9.1 Removal of Structures and Infrastructure

- The removal of all construction facilities and materials from the construction camp will be required and rehabilitation will have to be carried out, including the removal of the following:
  - Removal of construction site and/or camp.
  - Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, fixtures, concrete and compact earth platforms, fuel storage tanks and bund areas, chemical toilets and any other temporary works.
  - Materials that will not be used again must be removed by the Contractor.
  - Ensure that all access roads utilised during construction (which are not earmarked for closure and rehabilitation) are returned to a usable state and/or a state no worse than prior to construction.
  - Ensure that all access roads earmarked for closure and rehabilitation are ripped and that all imported material is removed. Rehabilitation should follow the first out; last in principle (i.e., rehabilitation should occur as follows subsoil, topsoil, hydro seeding).

### 9.2 Inert Waste and Rubble

- The site will be cleared site of all inert waste and rubble, including surplus rock, foundations, batching plant aggregate and soil crete. After the material has been removed, the site shall be re-instated and rehabilitated.
- Some rubble will be used as part of erosion control within the Ingula Nature Reserve. Another stream of rubble waste that is not adequate for use as erosion control, will be disposed at a licenced disposal site.
- Excess suitable spoil will be loaded and hauled in borrow pits / dongas as fill material for rehabilitation or erosion control and inert rubble will be taken to a licenced disposal site and designated spoil areas as indicated / approved by the Environmental Manager.

- Domestic waste will be removed and disposed of in the approved manner at a registered waste disposal site. Proof of this must be provided by the Contractor to the Engineer.

### 9.3 Hazardous Waste and Pollution Control

Pollution containment structures such as temporary sanitary infrastructure, wastewater disposal systems and oil separators will be removed. Eskom will take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner.

### 9.4 Shaping

Eskom will :

- Make sure all dangerous excavations are safe by backfilling and grading as required.
- In general, no slopes steeper than 1(V):3(H) is permitted, unless otherwise specified by the Environmental Manager, in consultation with the Engineer. Steeper slopes require protection.
- Programme the backfill of excavations so that subsoil is deposited first, followed by the topsoil. Compact in layers for best results.
- Additional fill may only be imported from approved borrow areas as indicated by the Environmental Manager.
- Monitor backfilled areas for subsidence (as the backfill settles) and fill depressions using available material.
- Shape all disturbed areas to blend in with the surrounding landscape.
- Ensure that no excavated material or stockpiles are left on site and that all material remaining after backfilling is removed to a dedicated spoil area.

### 9.5 Topsoil Replacement and Soil Amelioration

The Construction environmental management plan (CEMP) for the IPSS must be consulted for matter relating to topsoil replacement and such measure be implemented in conjunction and alignment with the overall CEMP requirements.

The *Contractor* shall remove and stockpile topsoil in accordance with the CEMP Section 3 - Clearing of site, or as directed by the *Supervisor*, in quantities sufficient for reinstatement, in accordance with the CEMP. Topsoil shall be removed from, inter alia, working areas (including quarry pits) and relevant areas of the Permanent Works, construction, haul and other access roads and such like, all as directed by the *Supervisor*.

- The principle of “progressive reinstatement” must be followed as determined by the EM and Contractor. This includes the reinstatement of disturbed areas on an on-going basis, immediately after the specified construction activities for that area are concluded.
- Eskom appointed contractor will as such:
- Execute top soiling activity prior to the rainy season or any expected wet weather conditions.
- Execute topsoil placement concurrently with construction where possible and as agreed by the Environmental Manager.
- Redistribute stockpiled topsoil. Replace herbaceous vegetation and reinstate grass in all areas cleared by the Contractor for the construction site, including temporary access routes and roads. Replace topsoil to the original depth.
- Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality. Ensure that the soil brought in undergoes both physical and chemical tests and is to the satisfaction of the Environmental Manager.
- Topsoil will be kept in good condition by controlling weeds when they emerge but avoiding use of herbicides which will kill vegetation and seed viability.
- Ensure that storm water run-off is not channelled parallel to the prevailing contours.
- After topsoil placement is complete, Eskom will spread available stripped vegetation randomly by hand over the top-soiled area.

## **9.6 Ripping and Scarifying**

The following principles will be adopted:

- Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary will be based on the site conditions immediately before these works begin.
- All soil to be rehabilitated shall be ripped with a mechanical ripper to a depth of 300mm or as agreed by the Environmental Manager. No section of ground shall remain undisturbed after ripping.
- Rip and/or scarify all disturbed (and other specified) areas of the construction site, including temporary access routes and roads, compacted during the execution of the Works.

- Rip and/or scarify along the contour to prevent the creation of down-slope channels.
- Do not rip and/or scarify areas under wet conditions, as the soil will not break up.

## **9.7 PLANTING**

### **9.7.1 Transplanted plants**

- All planting work is to be undertaken by suitably experienced personnel, making use of the appropriate equipment.
- Trees to be transplanted, (even though there are not expected to be any due to the openness of the selected relocation site), must be carefully removed from the soil so as to retain as large a root ball as practically possible. Use the tree's driplines as an indicator: the larger the tree the larger the root ball (and subsequently the planting hole).
- Minimise disturbance of the soil and the remaining roots in the root ball during the lifting, moving and or transportation of all species.
- Plant trees and shrubs so that their stems or trunks are at the same depth as in their original position.
- Orientate trees and shrubs in the same direction as in their original position.
- Plant aloes and bulbs in similar soil conditions and to the same depth as in their original position.
- The plant must be planted into the specified hole size with the approved soil, compost and fertiliser mix used to refill the plant hole and must cover all the roots and be well firmed down to a level equal to that of the surrounding in situ material, as per the rehabilitation specification.
- After planting, each plant must be well watered, adding more soil upon settlement if necessary.
- Place branches / brush packing on rehabilitated and seeded areas to protect new growth from grazing animals. This will also ensure the establishment of a seed bank.

### **9.8 Grassing**

- Suitably trained personnel must undertake grassing by making use of the appropriate equipment and using grass species as specified by the Environmental Manager pending availability.
- Trim areas to be grassed to the required level.

- Hydroseeding with a seed mixture that is proposed in the IPSS CEMP.
- Depending on soil texture and slope stability, it may be necessary to establish a temporary (annual) grass cover consisting of artificial composition to aid soil binding.

## 9.9 Maintenance

- The Environmental Manager will monitor the re-growth of invasive vegetative material for At least three years after last seeding occurs.
- Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers (or other approved method). If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.
- only locally occurring vegetation will be used for rehabilitation.
- Base the new carrying capacity of rehabilitated land on the status quo rather than the regional estimate.
- Control invasive plant species and weeds by means of extraction, cutting or other approved methods before the plants flower and form seeds.
- For planted areas that have failed to establish, replace plants with the same species as originally specified.
- A minimum grass cover of 80% of the planted area sown, hydro-seeded or planted shall be covered with live plants of the specified species measured as basal cover, and that there shall not be any bare patches larger than 500 mm maximum in diameter.
- Individual plants must be strong and healthy growers at the end of the Defects Notification Period.
- The entire process of rehabilitation shall be meticulously documented so that the methods used on a specific part of the alignment can be replicated on other parts or even other future projects.

## 9.10 Eradication of Weeds

All weeds spread over the entire disturbed construction footprint must be removed prior to the plants flowering and forming seeds, irrespective of its existence prior to construction. Chemical removal shall be used in accordance with manufacturer's specification for weeds. All chemicals used must be approved by the Eskom Environmental Manager. Once the weeds have perished, they shall be removed mechanically by use of an offset disk plough thereby digging up the vegetation including the root ball.

### **9.10.1 Control of weeds**

The remainder of the site including the re-vegetated areas shall be kept free of all weeds.

It is important that the entire process of rehabilitation shall be meticulously documented so that the methods used on a specific part of the alignment can be replicated (if necessary) on other parts or even other future projects.

**10. MANAGEMENT AND MITIGATION PLANS**

The management of environmental issues during the construction phase are dealt with through specific management and mitigation plans for each identified environmental component that requires management and mitigation.

The manner in which the development activities should be managed should be aligned with the nature reserve values since this development is going to be executed within a nature reserve.

The values of this protected area are those remarkable attributes that resulted into it being proclaimed as a nature reserve. The values are important in planning and management, as they are the aspects of the area that must be protected. The values of Ingula Nature Reserve include: (Nature reserve EMP, 2017-2021)

**Table 10-1: The values of Ingula Nature Reserve**

<p>Strategic</p>	<p>Integration of an industry with a conservation area – model for future conservation initiatives, i.e., allowing the PSS to operate and conserve the natural capital of the surrounding area (biodiversity and ecosystem services value).</p> <p>Formation of a core conservation area as a catalyst for encouraging conservation principles and management in the broader landscape / catchment (regional context).</p> <p>Educational and scientific research value of the site.</p> <p>Sound environmental management allowing the Pumped Storage Scheme to operate (strategic value of the PSS to electricity generation, national benefit).</p> <p>To use this initiative to catalyse social development within the local communities.</p>
<p>Social values</p>	<p>Contribution to sustainable livelihoods in the district for local communities, contributing to job creation and food security, with the long-term objective of poverty alleviation.</p>



<p>Natural values</p>	<p>Presence of threatened habitats – wetlands, scarp forests, grasslands.</p> <p>The value of these key habitats for threatened species.</p> <p>Protection of under-represented (in the current protected area network) high-altitude grasslands, and the relatively large size of the property in the grassland biome.</p> <p>Extensive grassland and wetland habitat (and its good condition) on the property, considering the poor protection status nationally.</p> <p>Presence of significant areas of Scarp Forest, being listed as a “threatened ecosystem” by SANBI and protected through this initiative.</p> <p>Maintenance of escarpment forest connectivity along the escarpment corridor.</p> <p>A diversity of habitats (habitat heterogeneity).</p> <p>The presence of key species that require protection -</p> <ul style="list-style-type: none"> <li>• White-winged Flufftail</li> <li>• Wattled Crane, Blue Crane, Grey Crowned Crane</li> <li>• Southern Bald Ibis</li> <li>• Yellow-breasted Pipit</li> <li>• Martial Eagle</li> <li>• African Marsh Harrier</li> <li>• Oribi antelope</li> <li>• Fairy Shrimp</li> </ul> <p>The property has a number of regional endemics, e.g., Rudd’s Lark, Yellow-breasted Pipit, <i>Kniphofia linearifolia</i>, Amatole Rocksitter, <i>Doratogonus septentrionalis</i> (Northern Black Millipede, KZN endemic), <i>Tetradactylus breyei</i> – (Breyer's Long-tailed Seps), <i>Smaug giganteus</i> (Sungazer), <i>Cordylus vittifer</i> (De Waal's Girdled Lizard)</p> <p>The site is registered as an Important Bird Area (IBA no.: SA043 - Bedford</p>
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	<p>/ Chatsworth).</p> <p>Potential for the site to become a Ramsar site.</p>
Ecosystem service values	<p>The position of the property along a continental watershed.</p> <p>Water catchment management value – ecological infrastructure to ensure water supply and regulation, water purification.</p> <p>The National Freshwater Ecosystem Priority Area status of the wetlands and rivers on the property – Wetlands and rivers are classed as ‘Largely Natural or Good’ and have FEPA status as priority areas for conservation.</p> <p>The extensive carbon storage in the grasslands and peat wetlands.</p> <p>Value in terms of climate change resilience (adaptation / mitigation) through the altitudinal gradient.</p> <p>Supply of sustainably harvested materials for community utilisation.</p>
Eco-cultural tourism values	<p>The scenic beauty of the site.</p> <p>Multiple use opportunities.</p> <p>Network of trails and paths for ecotourism opportunities.</p>
Cultural and historic values	<p>Paleontological, archaeological and historic value identified and present in a single property / reserve.</p> <p>Scientific value of archaeological and paleontological records (recorded in detail and stored in the National Museum in Bloemfontein).</p> <p>Continuum in a single place of cultural and archaeological history.</p> <p>Presence of recorded San history in the area, including extensive presence of San art and artefacts.</p>
Economic	<p>Job creation from the PSS and conservation and tourism activities.</p> <p>Ability of the site to sustain appropriate social development and utilisation.</p>

The specific and detailed management and mitigation plans for construction follow as separate chapters.

## **11. ESTABLISHMENT OF CONSTRUCTION LAY DOWN AREA**

### **11.1 Purpose**

This activity includes the establishment of the site camp which includes, but is not limited to the site offices, ablutions, dedicated eating areas, material storage areas, and waste collection areas for the period that construction is to be undertaken.

During the construction phase one construction site / lay down area will be established.

The purpose of this management and mitigation plan defines the establishment and management of the construction site during the construction phase to prevent or minimise environmental impacts these might cause.

### **11.2 Objective**

The objectives are to:

- Minimise impacts associated with the establishment and operation of construction site lay down area.
- Ensure access to the construction laydown area is properly controlled.
- Ensure that the handling and disposal of contaminated water is done within the framework of applicable legislation.
- Ensure that water washing, and toilet facilities are supplied complying to norms and standards.
- Ensure that the potential for communicable diseases to increase, as a result of the project, is managed and mitigated effectively.
- Ensure that hazardous materials storage is effective and compliant to norms and standards.
- Ensure that vehicle, plant and equipment refuelling is practiced in such a manner that no secondary pollution or emergency situation is created. Drip tray will be place under all stationery machinery that has a potential to leak.
- Ensure that lighting pollution is controlled at construction sites ensuring that neighbours are not negatively affected.

### 11.3 Objectives Targets

- No complaints regarding the construction camp from residents.
- No unauthorised access to the construction laydown area.
- No discharge of polluting elements to any stormwater drain, stream or river.
- Sufficient ablution facilities supplied at all construction sites.
- Percentage of medical examinations of all construction workers by the Contractor.
- No construction workers to stay on site.
- Hazardous substances storage shall comply with regulatory requirements at all times.
- Storage of flammable material shall be done according to prescribed standards at all times.
- Refuelling of vehicles, plant and equipment shall be done according to prescribed standards at all times.
- No complaints regarding lighting impacts on neighbours, residents, visitors and staff.
- No runoff shall be allowed from any wash facility.

### 11.4 General mitigation measures

#### Recruitment of casual and temporary labour

- Preference for casual labour must be given to locals or the affected families. This creates temporary employment, and they will have invested emotionally into their properties.
- Employees must undergo police clearance and certified to have no criminal records (Mfabana, 2020).
- Employee records must be kept
- Contractor must comply with labour legislation and standards (Mfabana, 2020).
- The contractor to ensure that all employees have undergone the police screening process mentioned in the Scope of Work.
- A code of conduct for project workers that establishes rules between the project, its workers and the local community.

#### Measures and devices to avoid environmental damage prior to construction

- Environmental management devices such as erosion control mechanically stabilised walls must be permanently installed using environmentally friendly materials such as stones, boulders and concrete.
- Erosion control mechanisms must be installed before construction begin (Vlok, 2020)

### **Preparation of access roads and contractor camps**

Prior to the construction of temporary site roads, the *Contractor* shall submit a Method Statement for acceptance by the *Project Manager* 14 days before such road is due to be constructed. A photographic record of the proposed route shall be prepared by the *Contractor* prior to the construction of the access roads.

- If possible, the contractor must be accommodated at Bedford office area. If not possible, the contractor camp must be established on an area with little vegetation to avoid or minimise vegetation clearing.
- The integrity of the roads must be protected by managing storm water and using energy dissipation mechanisms in areas that are prone to erosion.
- The contractor to establish a demarcated lay down or site camp area; provide electricity; sanitation facilities; and portable water for domestic consumption.
- Construction workers' movements must be monitored, and they must observe locals' norms and traditions.
- A local person can run a kiosk within the lay down or campsite.
- The kiosk can continue to run and serve the community.
- In line with Eskom's policy on BBBEE, the contractors and sub-contractors should be required to purchase an agreed to quota of materials, goods and services from local businesses.
- Set aside a safe space at the construction site to allow an agreed upon small number (2-3) of locals to operate food stalls, within agreed upon working hours.

### **Land clearing for establishing foundations and trenches**

- Houses must be established on natural clearings since the site has little tree vegetation. This reduces the ecological footprint and severity of the construction activities.
- Vlok (2020) mentions that the area does not have rare or endangered plant species.
- Unnecessary land clearing will be avoided due to the possibility of easily degrading the land which has erodible soils as mentioned by Mentis & Partridge (2002).
- Reforestation with fruit trees can be done after construction. This results in more residual benefits such as habitat creation for avifauna.

- If bird nests are discovered during construction, they must be moved with guidance from Bird Life South Africa.
- During the digging of foundations, the topsoil must be used to rehabilitate gulleys. According to a specialist study by Professor McCutcheon (2005), nearby areas are prone to gully erosion which can be controlled by using remnant vegetation and grazing control.
- This was supported by Vlok (2020) where use of control gabions is mentioned as effective.

### **Control of alien invasive species**

- If any alien invasive species are found, they must be disposed of with guidance from the nature reserve team. The Alien Invader Control recommendations by Mentis (2002) recommends cutting down the invasive plants, then destroy with a chipper before burning or applying appropriate herbicides.
- Invasive species can be cut and burnt.

### **Management of archaeological resources**

- If any artefacts are found during excavation or digging, an archaeologist must be notified and works temporarily ceased.
- The Contractor shall not deface, paint, damage or mark any national features (e.g., rock formations) situated in or around the Site for survey or other purposes unless accepted by the Project Manager. Any contravention of this Sub-Clause will require the item to be restored/ rehabilitated at the Contractor's cost. The Contractor shall ensure that should any archaeological finds be made during the construction excavations; the Contractor shall inform the Project Manager immediately in order to reach agreement regarding proper procedures to minimise damage and or effect salvage operations of the findings.
- All heritage resources to be affected by the Project shall be treated and managed in accordance with the National Heritage Resources Act 25 of 1999 and the National Monuments Act 28 Of 1969:
  - Remedial action in the event of non-compliance.
  - Implementation and management of environmental protection measures; and
  - Reporting of environmental incidents and routine reporting of environmental activities.

No measurement or payment will be made against any items for the rehabilitation of the *Contractor's* working and accommodation areas (including the areas designated for the *Supervisor's* use) or for rehabilitation of areas used for temporary roads.

No overhaul will be paid for work within the Site.

### **Movement and management of construction vehicles and machinery**

- Vehicle servicing and maintenance must not be done on the construction site. If that is not possible, refuelling or repairs must be done on an impervious surface and at least 30 metres away from rivers or wetlands. Drip trays must be used at all times under stationary machinery.
- Unnecessary vegetation clearing must be avoided since it acts as soil cover.
- Well serviced machinery and vehicles must be used in order to reduce noise and vibration levels.

### **Occupational health and community safety**

- All workers must use PPE and be made aware of construction safety.
- Daily and weekly safety briefings can be conducted to reduce incidences of injury.
- There must be a first aid kit on site and at least one worker with first aid knowledge.
- Cordon-off construction site and strictly control entry to authorised personnel only and they should be required to wear protective gear (Mfabana, 2020).
- the Contractor is required to set up medical facilities and fire-fighting facilities on site
- Local communities will be made aware of activities and dangers.
- The area does not have communities close by hence impact severity is low.
- The construction area must make use of warning signs.
- Pits must be fenced, and relevant warning signs erected.

### **Resource extraction by contractor**

- Water for construction activities must be extracted from sources indicated by the Ingula Nature Reserve management.
- Workers must not make use of resources such as firewood.
- The recommendation by the BAR specialists is to transport water from the nearby dam.

## Lighting

- Working hours should generally be restricted to daylight hours.
- Security lights are directed from the perimeter wall towards the centre of the camp with a down angle.

## Materials / Goods on site

- The store man should be responsible for stacking and storage of material.
- Bricks, sandstone blocks, building sand, plaster sand and stone will be stored “open” on site but with special care that materials are not contaminated i.e., that different types of sand are not mixed.
- Cement should be stored in a lockable and water- proof container and should be stacked not more than 13 bags high. Cement should be used, as far as possible, on a first-in first-out basis.
- Reinforcing bars should be stored in the open but should be placed on timber poles to avoid “contamination” by mud or soil.
- Paint will be stored in a ventilated lockable store.

## Noise Pollution

- Having due regard for local communities and dwellings, the *Contractor* shall restrict any of his operations which result in undue noise disturbance to those communities and dwellings to the hours of 06:00 to 18:00 on weekdays or otherwise as agreed with the *Project Manager*.
- The *Contractor* shall not use sound amplification equipment on Site unless in emergency situations.
- The *Contractor* shall ensure that environmental awareness and training for all employees includes the need to minimise noise. The *Contractor* shall provide suitable ear protectors to all of his staff and others entering areas with high noise levels. Zones of risk shall be clearly identified with warning signs.
- The *Contractor* shall provide and maintain equipment to measure noise levels in accordance with SANS 10083.
- The *Project Manager* may from time-to-time instruct the *Contractor* to carry out more frequent testing of noise levels. Furthermore, he may require the *Contractor* to carry out testing in other areas of the Site.



## 11.5 Monitoring & Reporting

Daily inspections should be carried out by the EO and record findings on a weekly checklist. Monthly audits will be undertaken by the ECO and a monthly audit report prepared.

## 12. EROSION CONTROL

### 12.1 Purpose

The purpose of this management and mitigation plan is to ensure that erosion is minimized that could occur as a result of construction activities. According to specialist studies carried out by Mentis (2005) and Vlok (2020), it is agreed and observed that the project location generally have soils that are very prone to erosion.

### 12.2 Objective

The objective is to avoid soil erosion of areas within and downstream of the construction activities.

Management measures to be done in accordance with the detailed Soil erosion strategy which meets the objectives and targets of the nature reserve management plan. The development strategy should focus on the following priority elements:

- To prevent new erosion occurring, by:
  - reducing the direct causes of current erosion.
  - Managing construction activities to prevent future erosion.
- Stabilise existing erosion features.
- To repair existing erosion to original ground level.
- Maximize job creation opportunities through this process.
- To update the map of identified existing erosion areas, and identify requirements for stabilization and rehabilitation
- Implement an erosion control plan to address areas identified above
- Undertake preventative measures in high-risk area for erosion (to prevent new erosion)
- Develop a rehabilitation plan for the reserve, identifying existing erosion areas and resources available
- For construction areas, rehabilitate degraded areas to original ground level and functional plant diversity

### 12.3 Targets

- No formation of small erosion channels and sheet erosion.
- No flooding as a result of stormwater control measures.
- No erosion as a result of stormwater control measures.
- No silt pollution as a result of flooding and/ or stormwater control measures.

### 12.4 Management and Mitigation Plan

Identified areas where erosion could occur should be appropriately protected by installing the necessary temporary and/or permanent drainage works as soon as possible and by taking other appropriate measures to prevent water from being concentrated in rivers/streams and from scouring slopes, banks or other areas.

Any erosion channels which develop during the construction period should be suitably backfilled, compacted and restored to a proper condition (i.e., vegetated etc.).

Where excavation takes place, the affected area should be properly stabilised and revegetated to minimise erosion risk.

Stormwater control measures should consider and provide for the following:

- Use of silt screens.
- Use of straw bales as filters, which are placed across the flow of overland stormwater flows.
- Channelling stormwater run-off through natural grassland buffer areas.
- Silting of stormwater pipes in adjoining developments as a result of run-off from the project area will not be allowed.
- Gabions or stormwater control structures should be used to disperse stormwater flows and/or prevent and control erosion where necessary.
- All erosion protection measures should be maintained on a continual basis
- Corrective actions should be taken as and when required to stop any signs of erosion.
- Regular inspections by competent personnel should be undertaken at especially:
  - o inlet and outlet points of drainage structures
  - o stormwater release points, and
  - o along sections where drainage structures are laid on steep slopes.
- Where possible, stormwater should be released in grassy areas which act as a natural filter and to reduce the erosion potential of the water.

- The stabilization of head cuts during the construction phase to prevent erosion and sedimentation should be undertaken through various methods to limit or eliminate erosion and sedimentation i.e., gabions, rock packing, vegetation establishment, bales and poles, and vegetation sausages.
- Make use of soil erosion control measures such as fibre rolls and mechanically stabilised walls
- Preventing overgrazing by implementing proper grazing management measures
- Preventing and minimising tillage or invasive work on steep slopes.
- Developing and installing gabions where required.
- Developing soil reconditioning techniques such as use of manure and artificial humus.
- Making use of riprap technology on slopes.

## **12.5 Monitoring & Reporting**

Weekly visual inspections of erosion sensitive areas and daily inspections after rainfall events will be undertaken. Recording and reporting will be through inspections notes and monthly monitoring report.

## **13. FLORA AND FAUNA MANAGEMENT**

### **13.1 Purpose**

The purpose of this management and mitigation plan is to ensure vegetation clearing is undertaken in such a manner that protected species as detailed in this report are rescued or protected.

### **13.2 Objective**

- To ensure that the existing roads will be used to access the project area.
- To ensure that the impact to habitat is restricted only to the footprint area and that protected plant and fauna species are not affected through construction and weed invasion does not take place as a result of development.
- To successfully rescue or protect species of conservation value.
- To revegetate disturbed areas after construction, inclusive of construction areas, temporary accesses, stockpile areas, and construction camps.
- The objective of management measures is to ensure that littering does not take place and faunal disturbance is kept to a minimum.
- To ensure that no bird collisions take place.

### **13.3 Targets**

- All protected plant species rescued.
- No evidence of erosion.
- No invasive species in areas that have been disturbed by construction activities.
- No bird collisions with pylons.

### **13.4 Management and Mitigation Plan**

- The footprint area should be kept as small as possible and therefore no additional areas will be cleared except for the immediate work areas.
- An Alien Invasive Plant Species (AIPs) Management Plan should be implemented, whereby the disturbed site is monitored quarterly for at least three years to ensure that AIPs does not take place.
- As seedlings emerge, they will be removed bi-annually as part of an AIPs Management Plan.

- Rehabilitation of the disturbed area should take place after construction, whereby a mixture of native grass species will be used as per prescription of the CEMP
- Signage should be erected to indicate any threatened plant and animal species, and that no disturbance of these are allowed.

### **13.5 Monitoring & Reporting**

Wherever rehabilitation is required, a detailed record will be kept of the land area that has been rehabilitated compared to the land area still to be rehabilitated. Photographic or video records should also be used to supplement this information.

The percentage rehabilitation completed will be recorded for the construction site and reported on a weekly basis.

After a slope has been vegetated it will be inspected daily for the first week. Thereafter visual inspections will be undertaken once per week until the slope is deemed to be well enough vegetated to ensure further slope stability. Specific reports on erosion or slumping and sliding will be investigated on a case-by-case basis, the condition of the slope recorded together with the remedial action implemented.

AIP monitoring and implementation of control/ eradication measures should take place. Monitoring, eradication and control should be initiated after constructed and should take place annually for two years to ensure that AIPs area completely removed.

Signage will be erected to indicate an expected plant and animal species, and that no disturbance of these will be allowed.

## 14. AIR QUALITY MANAGEMENT

### 14.1 Purpose

The earthworks proposed during the construction phase have the potential to create a short-term dust nuisance unless properly managed. This may impact surrounding communities, construction workers, nearby vegetation and rich fauna in the nature reserve. Dust may be generated from the following activities:

- earthworks associated with the development
- spillage or storage of soil and other materials
- vehicle movements along paved and unpaved roads

The impact of dust is likely to cause problems such as unpleasant visual amenity, dust on washing and dust entering houses. A potential exists for a public health impact if elevated levels persist in residential areas, however this is unlikely due to the stage nature of the project (very low probability). Potential impacts on workers' health and amenity will be addressed through induction and the issue of personal protective equipment.

### 14.2 Objective

To ensure that dust emissions from construction activities do not result in adverse health or other negative effects.

### 14.3 Targets

- Dust fallout values shall conform to the relevant values of levels of nuisance dust against the National Environmental Management: Air Quality Act (NEMAQA) National Dust Control Regulations (GNR 827) on the boundary of the residential areas adjacent to the construction site
- Dust from construction sites not to exceed 600mg/m<sup>2</sup>/day
- No complaints regarding dust.

### 14.4 Method Statement

Areas susceptible to dust generation include re-vegetated areas and areas in need of rehabilitation. Vegetation cover must preferably be maintained e.g., removal of vegetation should be avoided until such time as soil stripping is required. Excavation, handling and

transport of erodible materials should be avoided during periods of excessive wind. Location and management of stockpiles is of importance.

Dust control measures from traffic and other construction activities:

- Dust generation as a result of construction activities will be minimised through all reasonable measures.
- Removal of vegetation will be avoided until actual topsoil stripping is required.
- Excavation handling and transport of erodible materials will be avoided under high wind conditions or when a visible dust plume is present.
- Soil stockpiles will as far as possible be located in sheltered areas where they will not be exposed to erosive winds.
- Appropriate dust-suppression techniques will be implemented where dust generation is unavoidable through wet suppression.
- Strict measures will apply where materials in powder form, such as cement, concrete additives, etc. are stored, handled or used, and for the proper disposal of packaging of any such materials.
- In excessive windy conditions, the dust generating activities will be stopped until wind speed drops to an acceptable level.
- All exposed surfaces will be stabilised, resurfaced or re-vegetated as soon as is practically possible.

#### **14.5 Monitoring & Reporting**

Daily visual observations of dust and nuisance levels.

## 15. GENERAL SOLID AND HAZARDOUS WASTE MANAGEMENT

### 15.1 Purpose

Waste produced during the construction and operational phases can pose a risk to the environmental and biodiversity and must be managed. Sewage waste and faecal matter can result in endangerment of human health and eutrophication of aquatic bodies resulting in a threat to wetlands, rivers and dams.

The inappropriate handling and disposal of solid waste materials can impact on both human safety and risk contamination of the natural environment. Two waste stream categories will be generated during the construction phase. These are hazardous waste and general waste. The purpose of this method statement is to manage these waste streams such that all potential negative impacts are prevented.

General waste would typically include building rubble generated during site clearance, vegetation, waste steel, wire and electrical cable off-cuts, waste wood and waste concrete.

Hazardous wastes typically include sanitary waste and used oil, oil rags, empty oil and grease containers, paint containers, degreasers, bitumen, herbicides, resins and curing agents.

### 15.2 Objective

The objective is to avoid or minimize negative impacts on surrounding environment (soil, surface and groundwater) resulting from inappropriate waste disposal.

### 15.3 Targets

- Waste recycled and or reused
- Adequate containers are supplied and are easily accessible.
- Waste bins are removed and cleaned daily by the responsible Contractor.

### 15.4 General Method Statement

- Safety Data Sheets will be available for all chemicals of potential hazardous substances brought onto the site.
- Used oil and/or grease shall be removed from site to a nearest licenced oil recycling company.
- All hazardous waste shall be disposed of in a licenced hazardous waste landfill site and waste manifest supplied to the *Project Manager*.
- No maintenance of vehicles will take place onsite.



- Construction workers will be trained and informed about waste minimisation. The person dealing or who may potentially be exposed to hazardous chemical substances will be provided with a well-defined list of duties.
- Where feasible, waste materials will be recycled, and the following will apply:
  - Glass, papers and cardboard, metals (other than aluminium), aluminium, organic waste and plastic could be recycled and will be separated into different containers at the construction site.
  - These containers will be suitably marked and stored in a covered and enclosed area to protect it from the elements and scavengers.
  - Recycling will be done by staff wearing suitable PPE such as gloves and dust masks.
  - Clear signs and separation areas for waste material will be provided.
- Appropriate records will be kept of volumes of general and hazardous chemical substances generated and disposed. These will include safe disposal certificates.
- Littering will not be allowed on site or at the laydown camp.
- Adequate containers or bins for litter removal will be supplied on site.
- The containers or bins will be emptied on a regular basis as required.
- Bins or containers used at the construction areas will be waterproof.
- Waste collected from these bins and containers will then be stored on site in a larger, scavenger proof and waterproof container for later disposal - disposal will be done at least once a week at the closest appropriate waste disposal site - records of proper disposal will be kept.
- Care will be taken not to dispose of hazardous materials with the domestic waste - hazardous materials will be disposed of at a hazardous waste disposal site.
- Where waste is to be transported by truck, it will be covered and labelled appropriately
- 

## **Waste management**

The management of solid waste on Site shall be strictly controlled and monitored. Only licenced waste disposal landfill sites shall be used.

- The quantities of waste generated on Site shall be minimised.

- Labelled recycling bins shall be used, and waste separated where possible. In addition, a recycled-material collection schedule shall be established, and the bins shall be collected regularly.
  - Eating areas for the construction staff shall be designated and supplied with waste bins.
  - No on-site burying or dumping or unauthorised burning of any waste materials, vegetation, litter or refuse shall occur.
  - Bins provided must be sufficient to store the solid waste produced on a daily basis.
  - The bins should be emptied at least once a day.
  - Waste from bins may be temporarily stored on Site in a central waste area that is weatherproof and scavenger-proof and which the Project Manager has accepted.
  - All solid waste shall be disposed of off site, at a licenced landfill site. The *Contractor* shall supply the Project Manager with a certificate of disposal; and
  - Waste shall be separated into domestic waste, building/construction rubble, scrap metal, oil and grease and hazardous waste and dealt with in the following manner.
- 
- No discharge of pollutants such as cement, concrete, chemicals, fuels or oils should be allowed into any water resource.
  - The areas around storage of potential contaminants such as oil and fuel should make use of 110% bunding.
  - Concrete rubble must be used to fill in gullies or reused during construction of soakaways and septic tanks.
  - Most construction waste such as rubble, damaged bricks and stones pose little threat to the environment hence the low impact severity.
  - Animals that become a danger or excessive nuisance to persons and property due to either habituation or aberrant behaviour must be managed in accordance with relevant provincial conservation authority policies.
  - Organic solid waste will be composted.

#### Domestic Waste

- Metal refuse bins to BS 792 or equivalent plastic refuse bins, all with lids, shall be provided by the Contractor for all construction sites. Refuse shall be collected and removed from all

facilities on the Site at least twice per week. Domestic Waste shall be transported to the accepted refuse disposal site off site in covered containers or covered trucks.

#### Organic waste

- Refuse from food preparation and eating areas shall be collected and removed daily. Organic Waste shall be disposed of as per Domestic Waste and waste manifest supplied to the Project Manager.

#### Building/Construction waste

- Inert building/construction rubble shall be disposed at a nearest licenced landfill sites and waste manifest supplied to the Project Manager.

#### Scrap metal

Scrap metal shall be disposed off-site at a nearest licenced scrap metal recycling facilities. Paper trail to be supplied to the *Project Manager*.

#### Wastewater disposal and management

- Wastewater disposal by means of septic tank systems with soakaways, will be used and this is a well-established technology with technical information is available on design criteria.
- Maintenance personnel will be trained so that they gain technical knowledge and legislative requirements pertaining specifically to septic tank systems.  
Municipal by-laws and permit requirements will be followed for the installation and management of this wastewater disposal system
- The septic tanks will regularly be inspected (weekly visual inspections)
- Maintenance schedule will be developed for the septic tank
- Soakaway will be used to avoid frequent pumping of the septic tank and blockage will be avoided
- Adequate drainage field will be provided
- The septic tank lids will be closed and secured. ...
- Keep septic tank lids easily accessible

- A licence will be sourced from Department of Human Settlements, Water and Sanitation (DHWS) for the installation and operation of Septic tanks

### **15.5 Monitoring and Reporting**

A register will be kept of all quantities of non-aqueous waste that is generated and removed for disposal from all the construction sites. The waste will be characterized as follows:

- Domestic/general waste.
- Building rubble.
- Waste timber.
- Scrap metal.
- Hazardous chemical substances.

The disposal of these different waste types will also be recorded and tracked with waste disposal certificates.

Waste types must be documented and quantities per month identified.

## 16. TRAFFIC MANAGEMENT

### 16.1 Purpose

The management of traffic will be essential during the construction phase and will require specific mitigation measures as described below to ensure that the impact on road road users is kept to a minimum. There will be minimal traffic as there is not expected to be more than even two construction vehicles on the road per day. However, since this is a remote area, sensitivity to more than usual traffic flow might be a factor of concern. The safety aspect associated with any traffic flow should always be treating with utmost priority.

### 16.2 Objective

- To ensure that traffic impacts as a result of construction activities are minimised.
- To ensure that workers are not injured by vehicles or machinery
- To protect locals from injuries and noise

### 16.3 Targets

- Local communities must be made aware of activities and dangers.
- No construction vehicles exceeding defined speed limits.
- No complaints due to construction vehicles committing traffic offences.
- No construction vehicles on the roads during peak traffic times.
- Use of existing roads must be maximised.
- Well serviced machinery and vehicles must be used in order to reduce noise and vibration levels.

### 16.4 Method Statement

- A speed limit of 30 km/h for heavy vehicles; and 50 km/h for other construction vehicles will be strictly enforced. On public roads the specified speed limit would be applicable.
- Where possible, construction traffic should be scheduled in off-peak traffic times.
- Appropriate traffic safety signage should be provided to warn the public of construction traffic and flagmen will be on duty where traffic merges with normal road traffic.
- Construction vehicles shall be restricted to 6:00 to 18:00, Monday to Friday. Approvals from Eskom Manager must be obtained prior to any work that will be done over the weekends.
- Locals should not be allowed to cross construction areas.

- Construction of temporary access roads will be minimised. Roads used will be cleared regularly of any dust and mud resulting from the use by construction vehicles. Dust and noise will be minimised, and accident risk reduced by strict monitoring of speed limits.
- All gravel access roads will be watered regularly to control dust pollution.

### **16.5 Monitoring and Reporting**

Random checks will be done on the routes that construction vehicles follow to ensure that these vehicles only drive on the agreed roads. This should be done by following a vehicle from the construction site to its destination and vice-versa.

The routes followed must be checked at least once a month for all construction sites. The registration plate of truck, route followed, and time and day will be recorded.

## **17. NATURAL RESOURCE CONSERVATION**

### **17.1 Purpose**

The conservation of natural resources is important since the project is occurring within Ingula Nature Reserve. Construction activities such as the movement of traffic and humans and production of waste can threaten natural resource integrity. Mitigation and avoidance measures must be put in place since any negative impact on natural resources can have ripple effects on the entire ecosystem. The Ingula Nature Reserve has a number of important vegetation types and ecosystems, which require specific management interventions in order to maintain their ecological viability. The principles on which all ecosystems will be managed include:

- Maintain the ecological integrity of the ecosystems.
- Maintain all-natural processes within each ecosystem.
- Provide suitable habitat for threatened species characteristic of each ecosystem.

### **17.2 Objective**

- To prevent overexploitation or disturbance of natural resources and ecosystems.
- To ensure protection of aquatic resources.
- To prevent disturbance or destruction of bird habitats.
- To avoid spread of alien and invasive species.
- To prevent the destruction or disturbance of rare and endangered plant species.

- Maintain the ecological integrity of the grasslands through appropriate management
- To manage wetlands according to recognised best practice knowledge and guidelines
- Maintain the ecological integrity of the indigenous forests through appropriate management

### 17.3 Targets

- To minimise vegetation clearing.
- To preserve vegetation seedbanks.
- To prevent overexploitation and extraction of natural resources.
- Proper management and preservation of natural resources such as wetlands and priority species.

### 17.4 Method Statement

- Unnecessary vegetation clearing must be avoided.
- Cleared soil must be stockpiled to preserve seedbanks for rehabilitation.
- All resources required for construction e.g., river sand and water must be sourced elsewhere and away from the construction site.
- Workers must be prohibited from poaching or making use of nature reserve resources such as firewood.
- All works or storage of chemicals must be done at least 30 metres from the stream.
- Bird nests must be avoided and where avoidance is impossible, Bird Life SA must be notified so that they can move it to a suitable site.
- Any encountered alien and invasive species must be cut, chopped and burnt or sprayed with approved / registered herbicides.
- If any rare and endangered species are encountered and cannot be avoided, a qualified botanist must be engaged to transplant it to a new site.
- Wetlands and riverine vegetation must be avoided at all costs.
- Experts must be engaged to do reforestation of wetlands and riverine ecosystems using indigenous plant species.

## Protection of Flora

At the commencement of the contract, the *Project Manager* will identify to the *Contractor* indigenous flora or any rare or endangered flora that shall be preserved. The *Contractor* shall thereafter demarcate such and undertake all necessary measures to ensure the protection of such flora, including replanting and any special care required in accordance with the CEMP.

The use of herbicides is prohibited unless approved by the *Project Manager*.

## Protection of the Fauna

The *Contractor* shall protect fauna living within the Site and shall ensure that hunting, snaring, poisoning, shooting, nest raiding or egg-collecting and disturbance does not occur.

The *Contractor* is to ensure that his employees are instructed not to feed wild animals.

The use of pesticides is prohibited unless accepted by the *Project Manager*.

No domestic pets or livestock are permitted on Site.

## 17.5 Monitoring and Reporting

There should be a record of all alien plants, invasive species and rare / endangered species encountered and the avoidance or mitigation method applied. Ingula Nature Reserve Management must be allowed to also monitor construction activities' impact on natural resources. Whenever a contractor negligently and unreasonably violates conditions of this EMPr concerning natural resource management, they must bear the mitigation costs

## 18. ALIEN INVASIVE PLANT CONTROL

### 18.1 Purpose

Alien invasive plants pose a great threat to biodiversity and must be eliminated and kept below a certain level of abundance. A listed invasive species means any species, which is listed in terms of section 70 of the National Environmental Management: Biodiversity Act, whose establishment and spread occurs outside of its natural distribution range. Such plants are considered to be a serious threat to the ecological functioning of natural systems and to water production and must be strictly controlled.



## 18.2 Objective

- Develop and implement an ongoing programme to control alien invasive plant species especially along watercourses.
- To prevent introduction of alien invasive plants into the nature reserve.
- Avoid the deliberate or unintentional spread of alien invasive plant species.
- Eliminate existing alien invasive plants in the nature reserve.

## 18.3 Targets

- Identify alien invasive plant species.
- To have a permanent alien invasive plant control programme in place.
- Establish strategic partnerships towards the control of such plant species.

## 18.4 Method Statement

- A detailed inventory of the listed invasive species will be developed.
- Areas and extent of invasive species will be mapped.
- To prevent soil erosion, revegetation will be done where invasive plant species would have been cleared.
- Cleared alien invasive species can be given to locals for use as firewood.
- If any alien invasive species are found, they must be disposed of with guidance from the nature reserve team. The Alien Invader Control recommendations by Mentis (2002) recommends cutting down the invasive plants, then destroy with a chipper before burning or applying eco-friendly herbicides.

## 18.5 Monitoring & Reporting

Areas with invasive plant species must be mapped every 3-6 months with species abundance and distribution being documented to track the decrease or increase of such.

## 19. SOCIAL ASPECTS

### 19.1 Purpose

The land purchased in terms of the RoD was originally owned by commercial farmers and was home to a number of communities practicing subsistence farming. Eskom realises the rights of these

communities, and in accordance with the National imperatives of land reform and equity, is including the existing dwellers in the development and management of the Ingula Nature Reserve. People living in the area have few developmental opportunities, and it is intended to use the environmental programmes as a method of social upliftment in conjunction with appropriate national and provincial authorities.

A resettlement programme has been implemented, offering dwellers the opportunity to move to alternative areas on the property or off the property, allowing the provision of basic services and reducing current impacts. The zoning of the reserve takes existing and future requirements of dwellers into account. Programmes are being established to develop capacity amongst dwellers to allow them to contribute to the sustainable development of the Nature Reserve (Ingula Nature Reserve, 2017).

## 19.2 Objective

- To resettle dwellers to a central point where infrastructure can be provided.
- To incorporate the dwellers into the long-term sustainable operations of the reserve
- Improve the social life of the dwellers.
- To enable neighbouring landowners and communities to derive socio-economic benefits from Ingula Nature Reserve.

## 19.3 Targets

- All dwellers appropriately relocated
- To have all dwellers fully integrated into management activities
- Continually increase the number of people benefiting from the reserve
- Develop and implement community access plan
- To train and mentor communities to sustainably utilize their resources

## 19.4 Method Statement

- Dwellers will be allowed to continue certain farming practices (in accordance with this management plan), and will be encouraged to develop as sustainable rather than subsistence farmers
- Work opportunities will be created and where possible, labour intensive land management programmes implemented to address alien eradication and the rehabilitation of the area
- Dwellers will be encouraged to contribute to ecotourism development in the area and will also have incentives to contribute to the sustainable development of the project.
-

- Dwellers to be trained on sustainable use of natural resources in the nature reserve.

#### Relations with Local Communities

The *Contractor* shall liaise with the local Communities through the accepted channels or forums as indicated by the *Project Manager* on matters concerning the impact of his operations on local communities and other matters. Any problems which cannot be resolved by the *Contractor* shall be referred to the *Employer* through the *Project Manager*. A senior member of the *Contractor's* staff shall be required to attend the meetings of the Environmental Management Committee as and when requested.

### 19.5 Monitoring and Reporting

Resource thresholds and limits must be monitored continuously. Dwellers and surrounding communities must be involved in the monitoring and management of natural resources in the reserve.

## 20. ENVIRONMENTAL CONSTRAINTS AND MANAGEMENT

This section outlines the measures and areas of concern where various stakeholders in the construction phase of the project must take note of. These stakeholders include the contractor, supervisor and construction manager.

- (i) Special attention is drawn inter alia to the following aspects:
- Site demarcation: The *Contractor* shall demarcate his camp site, be restricted to that specific area and take full responsibility to restore the area to its original condition before the contract commenced.
  - Waste management: The *Contractor* shall dispose of all waste off-site at a licensed waste disposal facility and submit proof to Eskom.
  - Sanitation: The *Contractor* shall provide an appropriate enclosed temporary sanitation facility not a bucket system.
  - Dust control: The *Contractor* shall be responsible to apply effective dust control measures.

- Re-vegetation: The *Contractor* shall be responsible to re-vegetate the locations of trial pits, boreholes, roads and tracks through the veld, the camp site and any area of activity related to the works, as may be required.
  - Fire prevention: It shall be the responsibility of the *Contractor* to prevent veld fires at all times during the contract.
  - No work will be performed within a watercourse as a 30 will apply and
  - Storm water management: The *Contractor* shall be responsible to design and implement effective control measures to prevent siltation and erosion of the nearby streams.
- (ii) The *Contractor* shall take full responsibility for protecting the natural environment and eliminating or minimising the negative impacts of construction on the environment during construction. Nothing specified herein shall relieve the *Contractor* of any obligations or responsibilities in this regard.
- (iii) The *Contractor* shall implement an Environmental Policy, in line with various statutory regulations, the Construction Environmental Management Plan (CEMP), Ref: Annexures (3.4.2) and the Works Information. The Environmental management plan shall be submitted to the *Project Manager* within 14 days after the awarding of the contract. Upon the *Project Manager's* acceptance, the *Contractor* shall immediately implement the policy and any amendments and keep it in operation for the duration of the contract.
- (iv) The *Contractor* shall keep the Environmental management plan updated in accordance with his Quality Management Procedures and make amendments as required by the *Project Manager* and the circumstances prevailing at the time. The *Contractor* shall immediately supply the *Project Manager* with a copy of an updated Environmental management plan which shall clearly indicate the revisions undertaken.

## General

- (i) The *Contractor* shall conduct his activities so as to cause the least possible disturbance to the existing amenities, whether natural or man-made, in accordance with all the currently applicable statutory requirements. Special care shall be taken by the *Contractor* to prevent irreversible damage to the environment. Disturbance or disruption of the daily lives of local communities shall be avoided.

- (ii) The *Contractor's* responsibility in terms water use shall be as prescribed in the latest Ingula Water Use authorisation, ref: annexures C3.4.
- (iii) The *Contractor* shall take adequate steps to educate all members of his workforce as well as his *Supervisory* staff on the relevant environmental laws and regulations. The *Contractor* shall supplement these steps by prominently displayed notices and signs in strategic locations to remind personnel of environmental concerns.
- (iv) A suitably qualified individual shall be responsible for environmental management, in accordance with the Construction Environmental Management Plan. This position shall be designated the "Environmental Officer" (EO). The EO shall have as a minimum, a Diploma in Environmental Management (NQF level 4) or related qualification from a recognised institution to be accepted by the *Project Manager*.

#### Method Statements

The *Contractor* shall submit within 14 days before the starting date a Method Statement containing details of all site layouts and environmental protection measures proposed to the *Project Manager* for review and acceptance.

These shall include but not limited to:

- Site establishment layout.
- Site drainage management.
- Workshops' storage areas layout.
- Pollution prevention measures.
- Oil separator design.
- Fuel storage and dispensing area and bund design.
- Refuse dump design (where applicable).
- Temporary access roads.
- Waste Management plan.
- Chemical and Hydrocarbon Management
- Refuelling procedure or plan
- Environmental Incident Management plan

In addition, the *Contractor* shall provide detailed method statements on how he intends to carry out the *works*; this shall apply to all and any part of the *works* as provided in the *conditions of contract*

#### Temporary Services and Facilities

- Temporary pipelines, power lines, telephone lines and other temporary services and facilities shall be located in a manner which will cause the least disturbance and disfigurement to the environment.
- All fuel storage tanks shall be bunded to 110 % of the total storage capacity. Fuel dispensing areas and workshop areas shall be provided with concrete hard standing draining to oil separators. This will also apply to other areas with pollution potential.
- Vehicle / plants with Emergency breakdown fixed outside the workshop or designated area; oil spillage control measures shall be in place such as drip tray and spill kit, to catch oil and diesel which may leak from the vehicles.

#### Protection of Rivers, Streams and Watercourses

All rivers, streams and watercourses shall be protected from direct or indirect spills of pollutants such as garbage, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and wastewater or organic material resulting from the *Contractor's* activities. In the event of a spill prompt action shall be taken to clear polluted or affected areas.

The *Contractor* shall not work within 30 m of river floodlines, streams, watercourses and wetlands without the written acceptance of the Project Manager as required for the execution of the work.

The requirements for dealing with waste and polluted water are specified in Section 4 – Dealing with Water.

## **21. CONCLUSION**

The use of this Environmental Management Programme will ensure that the project complies with legislative requirements. This EMP, as an integrated environmental management plan tool, assists with the analysis, mitigation, monitoring and reporting of processes and impacts which will enable a proactive and holistic approach. Different stakeholders involved in the various aspects of this project are considered and empowered to work together in a synergistic way to fulfil the objectives of the relocation exercise. Various specialist studies supported and enabled the consolidation of this tool hence its value in project implementation is crucial.

## REFERENCES

1. Anderson, G & Anderson, L., *Archaeological Survey of Braamhoek Pumped Storage Scheme*, Umlando Archaeological Surveys & Heritage Management, Meerensee, 2004.
2. Anonymous, *Phumelela Local Municipality (FS195)*, Municipalities of South Africa Online, 2020. Accessed 23 May at: <http://www.municipalities.co.za/demographic/1053/Phumelela-local-municipality>
3. BLSA, Ingula Pumped Storage Scheme: Bird Life South Africa January to March 2013 Report, Bird Life South Africa, 2013.
4. Brand. F, et al, *A classification and description of the shrubland vegetation on Platberg, Eastern Free State*, South Africa, Online journal, University of Free State. 2009. Accessed on 04 May at: [http://www.scielo.org.za/scielo.php?script=sci\\_arttext&pid=S0075-64582009000100011](http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0075-64582009000100011)
5. Cauldwell, A., et al, *Ingula Pumped Storage Scheme: Veld Condition Assessment*, Natural Scientific Services, Johannesburg, 2012.
6. Chippe, R., Required Operational Capability Report for Relocation of Dwellers at Ingula, Eskom Holdings, Gauteng, 2019.
7. Durban Government, *Definitions: A – C*, The Official Website of eThekweni Municipality, Accessed 05 September at; [https://www.durban.gov.za/City\\_Services/development\\_planning\\_management/Land\\_Use\\_Management/Land\\_Use\\_Definitions/Part\\_B\\_General\\_Definitions/Pages/A\\_C.aspx](https://www.durban.gov.za/City_Services/development_planning_management/Land_Use_Management/Land_Use_Definitions/Part_B_General_Definitions/Pages/A_C.aspx)
8. Eskom Holdings, Ingula Agri-Village Project: Concept Phase, PowerPoint Presentation, Eskom Holdings, Johannesburg, 2020.
9. Eskom Holdings, *Ingula Nature Reserve Management Plan (2017-2021)*, Eskom Holdings, Johannesburg, 2017.



10. Esterhuizen, I, **Commissioning of first Ingula unit on schedule**, Creamer Media's Engineering News, Johannesburg, 2011. Accessed on 23 May 2020 at;  
[https://m.engineeringnews.co.za/article/ingula-on-schedule-2011-06-09/rep\\_id:4433](https://m.engineeringnews.co.za/article/ingula-on-schedule-2011-06-09/rep_id:4433)
11. Council for Geoscience, **CGS Geological Maps**, Accessed on 05 September at;  
<https://www.geoscience.org.za/index.php/publication/306-geological-maps>
12. Global Africa Network, What does the economic future of the Free State look like?: A brief look at the current and future economy of South Africa's most central province, 2017. Accessed 05 September at:  
<https://www.globalafricanetwork.com/company-news/what-does-the-economic-future-of-the-state-look-like/>
13. ICALM, Final Stage of Dweller Relocation Programme: An overview of the current status of the relocation programme developed to determine if further authorisations are required, Eskom Holdings, Johannesburg, 2019.
14. Madziwanzira, L., Eskom Ingula Basic Assessment Process: Public Participation Process Report for the proposed relocation of dwellers at Ingula Pumped Storage Scheme, Myezo Environmental Management Services, Pretoria, 2020.
15. Mentis, M., **Alien Invader Control**, Envirobiz Africa, KwaZulu-Natal, 2006.
16. Mentis, M., **Burning and Grazing Regimes**, Envirobiz Africa, KwaZulu-Natal, 2006.
17. Mentis, M., **Braamhoek Pumped Storage Scheme: Baseline study of the wetlands**, Wetland Consulting Services (Pty) Ltd, Pretoria, 2006.
18. Mentis, M., Construction Environmental Management Plan for Ingula Pumped Storage Scheme, Envirobiz Africa, KwaZulu-Natal, 2007.

19. Mfabana, N., Socio-Economic Impact Assessment On the Proposed Relocation of Dwellers at Ingula Pumped Storage Scheme, (sub-consultant for) Myezo Environmental Management Services, Pretoria, 2020.
  
20. Mohale, L., Vibrant Culture - The culture of the Basotho: history, people, clothing and food, Accessed on 05 September at;  
<https://www.southafrica.net/za/en/travel/article/the-culture-of-basotho-history-people-clothing-and-food>

## APPENDIX A: CURRICULUM VITAE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

<b>Name</b>	:	Babalwa Atalanta Fatyi
<b>Profession</b>	:	Professional Scientist
<b>Specific Function</b>	:	Project Leader/ EAP
<b>Experience</b>	:	20 years
<b>Nationality</b>	:	South African
<b>BI &amp; Male/Female Status</b>	:	Black Female
<b>Professional Qualifications</b>	:	MSc [Cum Laude] University of Witwatersrand 1999 BSc Honours (Botany) University of Witwatersrand 1997 Bachelor of Science University of Witwatersrand 1996
<b>Professional Membership</b>	:	SACNASP - Professional Scientist – 1993 (Registration No. 400123/01). Registered Environmental Auditor: (IEMA), Lincoln, UK (Registration No. 0025153). Associate Member: Land Rehabilitation Society of Southern Africa (LaRSSA) (Registration No. 91430). International Association for Impact Assessment South Africa (IAIAsa): Registered Member and Mentor Institute of Waste Management of Southern Africa (IWMSA): Member (Registration No.10105011)

LANGUAGE	SPEAK	READ	WRITE
English	Y	Y	Y
Xhosa	Y	Y	Y
Zulu	Y	Y	N

### SYNOPSIS

Babalwa is an elite environmental consultant with over 20 years' experience carrying out Basic Assessments and Water Use Licence Applications for different clients including Eskom and working with government departments such as the Department for Environmental Affairs. Her qualifications, experience with similar work and an impeccable professional record of working on Eskom projects and delivering exceptional results in time, her involvement in this project would be the project leader. In addition to that, she has led the Transhex Reuning Telecommunications Tower Project within the Richtersveld National Park.

#### ***Experience – Project Management, Basic Assessment, Water Use Licence Applications***

With over 20 years' experience conducting, coordinating and leading Environmental Impact Assessments and providing environmental solutions to corporates, NGOs, government departments and clients from other industry sectors such as construction and mining. She has extensive experience managing environmental issues and licence applications for large scale construction projects. She is a South African female business owner and entrepreneur who is determined to be a voice of consciousness, an instrument of change in the manner in which development and environmental matters are handled. Babalwa has worked for a consulting company, SRK Consulting from 1999 to 2002. She worked for a mining company Transhex (Pty) Ltd from 2002 to 2005 (and later as an independent consultant to-date), responsible for overseeing the company's compliance with its environmental obligations and was active in promoting environmental consciousness through all the different mining development phases. Her work experience gave her an insight with respect to sector specific environmental requirements ranging from authorizations, implementation and monitoring and auditing.

She led, project managed and participated in over 25 environmental impact assessments and more than 20 Basic Assessment Reports (BARs) and compiled more than 25 Environmental Management Plans (EMPs) and programmes in the construction industry, power sector, mining and other industries. Babalwa has developed site

specific construction Environmental Management Programmes (EMPrs) for various sites such as railway sidings, linear activities such as power lines, and roads within mining areas and pipelines. She has experience managing projects of all sizes for construction activities in nature reserves and protected areas. Also, she developed more than 40 Rehabilitation Plans, Closure plans and associated Performance Assessment Audits for several mining companies. During the compilation of environmental studies, Babalwa applied environmental laws and regulations such as National Environmental Management Act (Act No. 107 of 1998); National Environmental Management: Biodiversity Act (Act No. 10 of 2004); National Environmental Management: Waste Act (Act No. 59 of 2008); National Environmental Management: Protected Areas Act (Act No. 57 of 2003) as guidelines.

As a qualified EAP, Babalwa has been instrumental in the coordination of the Public Participation Process either as a lead stakeholder engagement specialist and or as an overseer of the process. Partaking her duties as Public participation leader, her duties included engaging with Interested and Affected Parties (IAPs) so as to ensure that their issues and concerns regarding the proposed project activities are adequately captured, addressed, included in the Environmental Report. In addition, Babalwa has experience with working and engaging specialists since a number of environmental reports she compiled to date required that she engage with specialist. When engaging with specialists, her duties include designing of terms of references (ToRs) that are project specific and ensure that specialist studies reports findings and recommendations are included as part of the EIA report to be submitted to the Competent Authority for environmental authorisation.

In addition, she has practical knowledge of water use licence application where she has been involved in conducting legal analysis, ensuring that the requirements of all legislations and applicable policies and standards are considered during the application of the Water Use Licence as well as the development of other relevant documents and reports. In addition, was responsible for the compilation of associated documents such as Integrated Water and Waste Management Plans (IWMMPs), Risk Assessment Reports, River Management Plans and submitting all the reports to the regulatory. During the process, was also involved in the arrangement of pre-consultation meetings with the relevant regulatory authorities, conducting follow up meetings and well as ensuring continual engagement until licence granting. Furthermore, stakeholder engagement was undertaken as part of the Water Use Licence application as set out within the regulations. In addition, was a project leader responsible for overseeing and managing actions by the team throughout the duration of the project as well as Management of the team outputs.

Babalwa Fatyi has experience directing and managing environmental sustainability projects current across various industries and sectors, including environmental management programmes and associated stakeholder engagements and impact evaluation and development of environmental management plan in support of environmental authorisation applications. She has a broad range of experience in leading the implementation of environmental management plans on sites through development of implementation plans with clear set objectives and structures, roles and responsibilities, design of performance monitoring plans and designing communication and risk management plans throughout the project implementation phases. She is also experienced in conducting Performance assessment audits as well as developing and maintaining integrated Safety, Health and Quality management systems.

Holding the position of Director since 2005, Babalwa has been executing managerial duties working with a team of employees whom she directs, manages, plans, oversees their activities and operations, motivate and provide management programs as part of team building. In executing her duties, Babalwa develops operational components and provide overall direction for each project, manages managers and all employees ensuring that the set targets, policies and goals are implemented and achieved, continually monitor operations and assessments so as to provide optimal environmental services. For the past 14years as a Director, Babalwa has managed to deliver strong operational performance meeting the standards required by industries as well as regulatory authorities.

In addition, Babalwa is a qualified and registered Lead Auditor, who has undertaken several Performance Assessment Audits as a lead auditor or as part of a team, and this has strengthened her capabilities to work and successfully yield positive results working as part of a team. Over the years, Babalwa has used legislations and regulations such as National Environmental Management: Air Quality Act (Act No. 39 of 2004); National Water Act (Act No. 36 of 1998) and many other applicable legislations and regulations as a measure for compliance. Babalwa has managed to develop operational control measures that aim at meeting all the regulatory measures and company policies ultimately achieving compliance. Furthermore, Babalwa has developed audit Terms of

References, Audit Plans and Schedule clearly setting the objectives of the audit, Audit checklist for all the audits she conducted, Also, she has been able to advise and ensure that corrective actions are taken whenever necessary as well as development of legal registers so as to ensure that the client complies with all the relevant statutes. This experience will enable Babalwa to ensure that all applicable permits will be applied for during the environmental authorisation application process.

To incorporate latest developments within the regulatory realm, Babalwa has attended several workshops so that she has knowledge regarding any statutory changes. For the period from 2010 to 2019 Babalwa has attended workshops that include Strategic Climate Change Legal Briefing: Legal and Business Implications of COP15 and the Copenhagen Accord; Legal Training Workshop: Water Law in South Africa; National Environmental Management: Integrated Coastal Management Act Legal Training Workshop; National Environmental Management: Air Quality Workshop; Contaminated Land Legal workshop; Environmental Law update workshop; Environmental Impact Assessment (EIA) 2014 Legal Regime workshop; Mine Closure and Recent Case Law Development Workshop; and the Carbon Tax Half Day Workshop among other workshops.

### ***Qualifications & Professional Registration – Masters, SACNASP, IAIAAsa***

Babalwa is a registered Environmental Assessment Practitioner (EAP) and Professional Natural Scientist (400123/01). Having graduated with BSc degree Majoring in Zoology and Botany in 1997 at the University of Witwatersrand, she went on to pursue and complete her Master of Science at the same university, graduating cum laude. She is a Registered Environmental Auditor with the Institute of Environmental Management in Lincoln, UK (Registration No. 0025153) and an Associate Member with the Land Rehabilitation Society of Southern Africa (LaRSSA) (Registration No. 91430). She is also a registered member and mentor with the International Association for Impact Assessment South Africa (IAIAAsa).

Over the years, she has pursued and completed several courses such as the Tyre Industry in the Republic of South Africa; Management Plans that was hosted by the Department of Environmental Affairs in 2018, Environmental Impact Assessment (EIA) 2014 Legal Regime Workshop hosted by Imbewu Sustainability Legal Specialists in 2014 and the IAIAAsa Annual Conference: 22nd Annual National Conference focusing on inspiring integrated environmental management; crafting innovative solutions to persistent environmental and social problems in 2017.

### ***Publications, Personal Work and Social Responsibility – journals, poetry, guest speeches***

Babalwa Fatyi's contribution to scientific journals demonstrate her leadership in the environmental sector as her publications are referenced across the world. Her co-authored journals appear the South African Journal of Botany and the Journal of Arid Environments. In 2001, a publication which she co-authored was presented at the Chamber of Mines Conference on Environmentally Responsible Mining. In 2014 she published *Greetings from my core*, a poetry book about acknowledging our role in the sustainability agenda through all the areas of our lives.

As a leader whose expertise is valued and beneficial to both society and business community, she is often engaged as keynote or guest speaker on different national occasions. In 2018 at the International Association for Impact Assessment South Africa and IAP2 Conference, she rendered a presentation themed: "Dynamic and Rapid Changing Nature of Public Consultation and Engagement by Civil Society within the Field of Environmental Management". At the same conference she also collaborated with Dim-Dep faces for environmental success doing a stage act and poetic narration of the "Value of protection of our natural resources" as part of welcome dinner for international delegates. At the IAIA18 Conference (2018a) she was a guest speaker on the topic of "Indigenous Knowledge: A Poetic Narrative". Where the highlight was on information and knowledge, through the opportunity of honouring our indigenous knowledge and incorporating it into the sustainability agenda.

In 2018, she was also a guest speaker at the South African Council for Natural Scientific Professions (SACNASP) where she educated, registered and dispatched “For such a times as these”, the natural Scientist Tale of heeding the Global trumpet call towards sustainable development/ green economy.

At International Association for Impact Assessment South Africa’s Full Day Conference, she performed a poetic narrative “Indigenous knowledge” where the highlight was on information and knowledge through the opportunity of honouring our indigenous knowledge and incorporating it into the sustainability agenda.

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## EXPERTISE

- Project management including monitoring
- Basic Assessments and Water Use Licence Application
- Environmental Authorisations applications
- Construction sector environmental management, legislation and international standards
- Environmental legislation
- Construction environmental and safety risk management
- Management of specialist investigations and outputs
- Development of roles and resources and goals and objectives for the developmental processes
- Good understanding of stakeholder dynamics and how to manage complicated situations between stakeholders
- Design of public/stakeholder participation frameworks and facilitation as well as ensuring that there is continual engagement with all stakeholders, including the regulatory authorities
- Design and development of companies’ environmental management system including input into the corporate charter and company environmental policy
- Development of operations’ risk and impact analysis framework and protocols
- Development of risk assessment criteria and leading the process of development of risk controls and continual risk rating
- Sustainability reporting for input into the companies’ sustainability report for legitimacy governance and stakeholder inclusivity

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## EXAMPLES OF PROJECTS CARRIED OUT

- **West Coast Resources (Pty) Ltd-** Amendment of an Environmental Management Programme, coupled with Environmental Impact Assessment and stakeholder engagement strategy development and facilitation, in support of a mining right held by West Coast Resources (WCR), over the Namaqualand Mines, in terms of the National Environmental Management Act (Act No. 107 of 1998) and Mineral and Petroleum Resources Development Act, (Act No. 28 of 2002), within the Administrative District of Namaqualand, Northern Cape (2013 – 2016).
- **Sound Mining Solution (Pty) Ltd:** EIA in support of the mining right for Coal prospecting proposed development in the Farm Vetleegte 304 LQ, situated in Lephalale municipality, District of Waterberg, Limpopo province (2018).
- **Aplorox (Pty) Ltd:** EIA for Forfar Railway Siding located at Portion 1 of the Farm Van Dyksput 214 IR, Bronkhorstspuit, Kungwini District Municipality, Gauteng Province (2018).
- **Eskom Holdings Soc Ltd:** Subcontracted by Nako Illiso (Pty) Ltd to undertake Public Involvement in respect to a proposed Eskom’s Donatello Gas Insulated Substation within Sandton, Gauteng Province (2018).

- **Translogix (Pty) Ltd:** Environmental Management Programme for a coal handling railway siding located on Portion 237R of the farm Rietkol within the Victor Khanye Local Municipality, Nkangala District Municipality, Mpumalanga (2018).
- **Transnet SOC Ltd:** Subcontracted by Hydroscience (Pty) Ltd to conduct Stakeholder Engagement Process regarding the decommissioning of a pipeline from Johannesburg to Durban (2018-2019).
- **Vuka Africa Consulting Engineers and Project Managers (Pty) Ltd-** Basic Assessment Process and associated stakeholder engagement for the construction of the proposed Bokamoso Sewage Outfall Pipeline (current), North West Province (2012-2013).
- **SALP Constructions (Pty) Ltd-** Application of Environmental Authorisation, Basic Assessment Report with associated stakeholder engagement and facilitation, for the proposed development at Masebe Nature Reserve with the Mogalakwane Local Municipality, Limpopo (2014 – 2015).
- **Athi River Mining South Africa (Pty) Ltd:** Environmental Management Programme and stakeholder engagement and facilitation is support of a mining right in terms of Section 39 and of Regulation 50 and 51 of Mineral and Petroleum Resource Development Act, 2002 (Act No.28 of 2002), Mahikeng, North West Province. (2012-2013).
- **Enermin Africa (Pty) Ltd:** Environmental Management Programme and associate environmental studies and stakeholder engagement and facilitation, is support of a mining right in terms of Section 39 and of Regulation 50 and 51 of Mineral and Petroleum Resource Development Act, 2002 (Act No.28 of 2002), Mahikeng, North West Province. (2012-2013).
- **Trans Hex Operation (Pty) Ltd:** Development of environmental management plans and environmental performance audits for marine and land operations (2005-2012 (on going). Projects include:
  - Environmental management programme updates, audit and closure plan for Brazil Farm.
  - Environmental management programme updates for Hondeklip Bay Operation.
  - Environmental management plans for more than 30 prospecting rights application in the Limpopo, Gauteng, Northwest and Northern Cape.
  - Closure plans for more than twenty prospecting rights.
- **Environmental Resource Management (SA):** Coordination and management of an environmental impact statement for a Burkina Faso Zinc Mine (2005).
- **Mineral Capital Assets:** Development of prospecting environmental management plans for farms on the Northwest Province. (2005).
- **Department of Environmental Affairs and Tourism:** Fourth Country Report for United Nations Convention to Combat Desertification, including stakeholder engagement and facilitation of regional workshops (2008).
- **Wesizwe:** Development of sustainability framework including policies, standards and guidelines (2008-2009).
- **Etruscan Resources Inc:** Environmental Management Programme and associated stakeholder engagement and facilitation of workshops and open days, in support of a mining right application (2007)
- **Trans Hex Operations (Pty) Ltd:** Closure plans and associated performances assessment audits and financial provision calculations for prospecting farms. (200-current).
- **Unimining Joint Venture:** Implementation of environmental measures during rehabilitation of an asbestos Mine – Heningvlei (2006-2007).
- **Department of Minerals and Energy-Council for Scientific and Industrial Research Project for abandoned Mines:** Myezo subcontracted by CSIR for development of Environmental Best Practice guidelines for Granite Mines in the North –West Province. (2005).

- **Alexkor SOC Ltd:** Alexkor's Five Year Implementation Land Rehabilitation Plan at its Alexander Bay Mine in Northern Cape (2014).
- **Trans Hex Operations (Pty) Ltd:** Application for Closure Certificates in terms of Section 43 (4) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), were prepared for various prospecting activities undertaken in the following farms in Northern Cape by Trans Hex. (10 Closure Plans were prepared) (2009).



APPENDIX 3

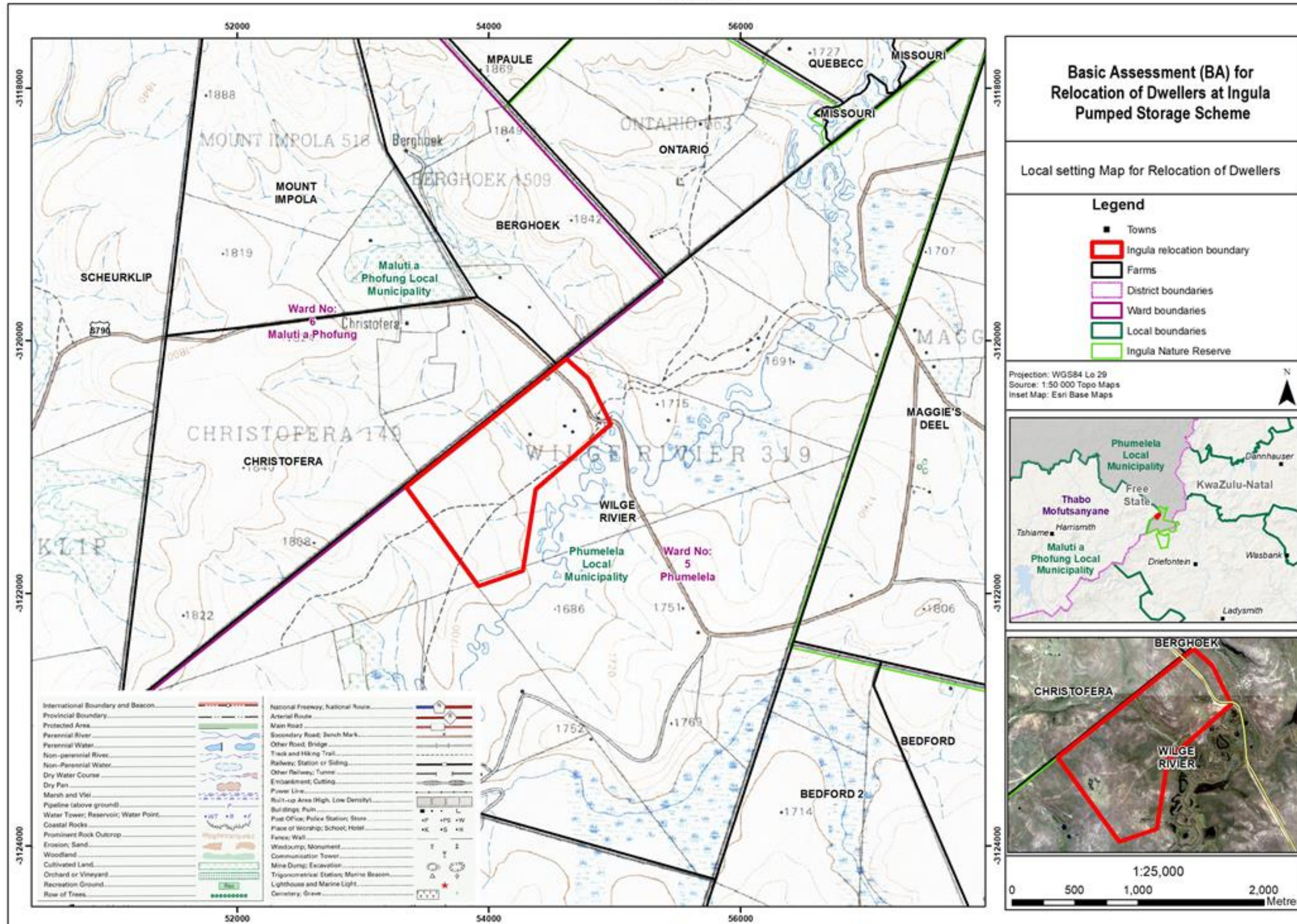


Figure 19.5-1: Ingula local setting map

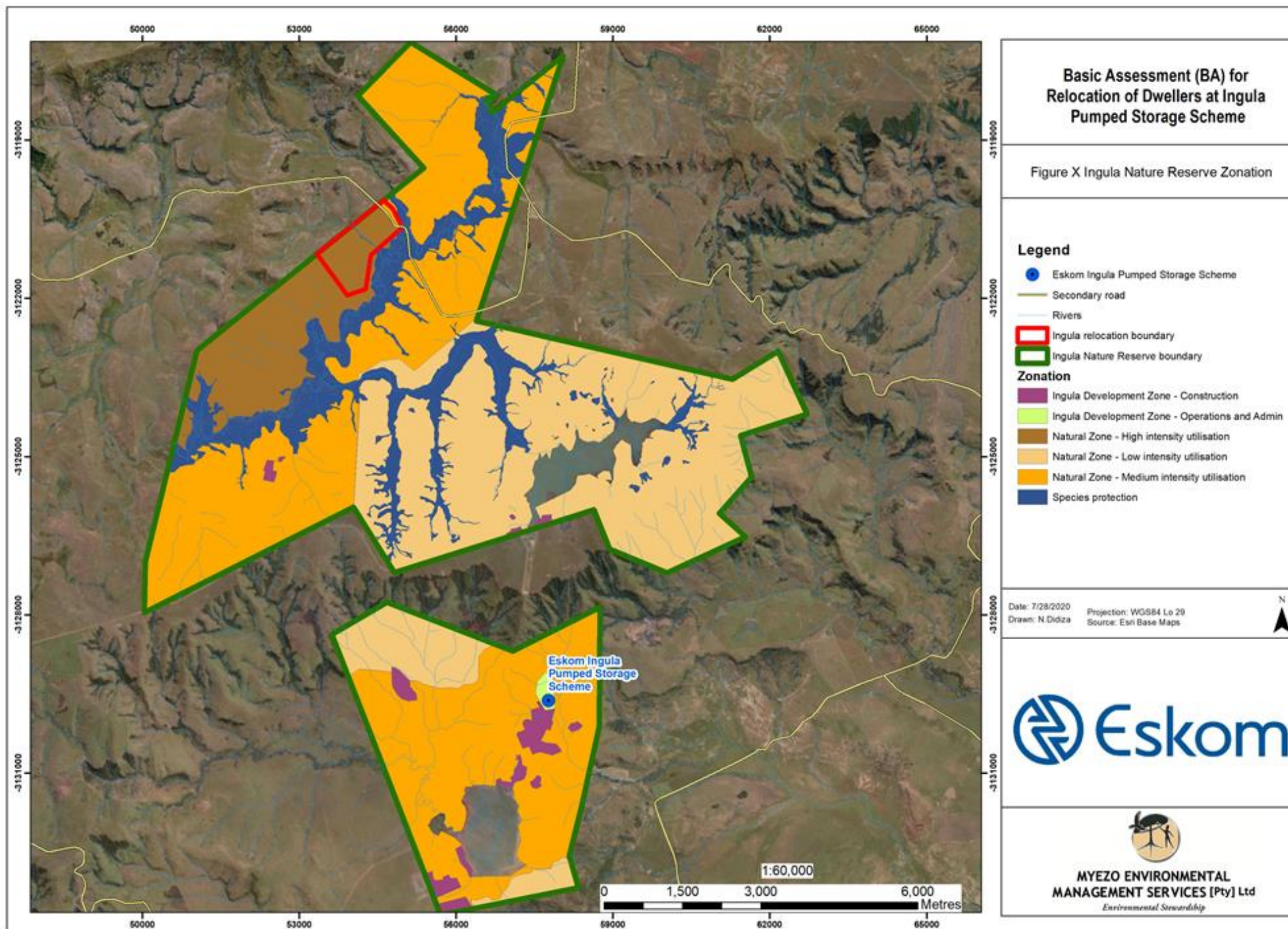
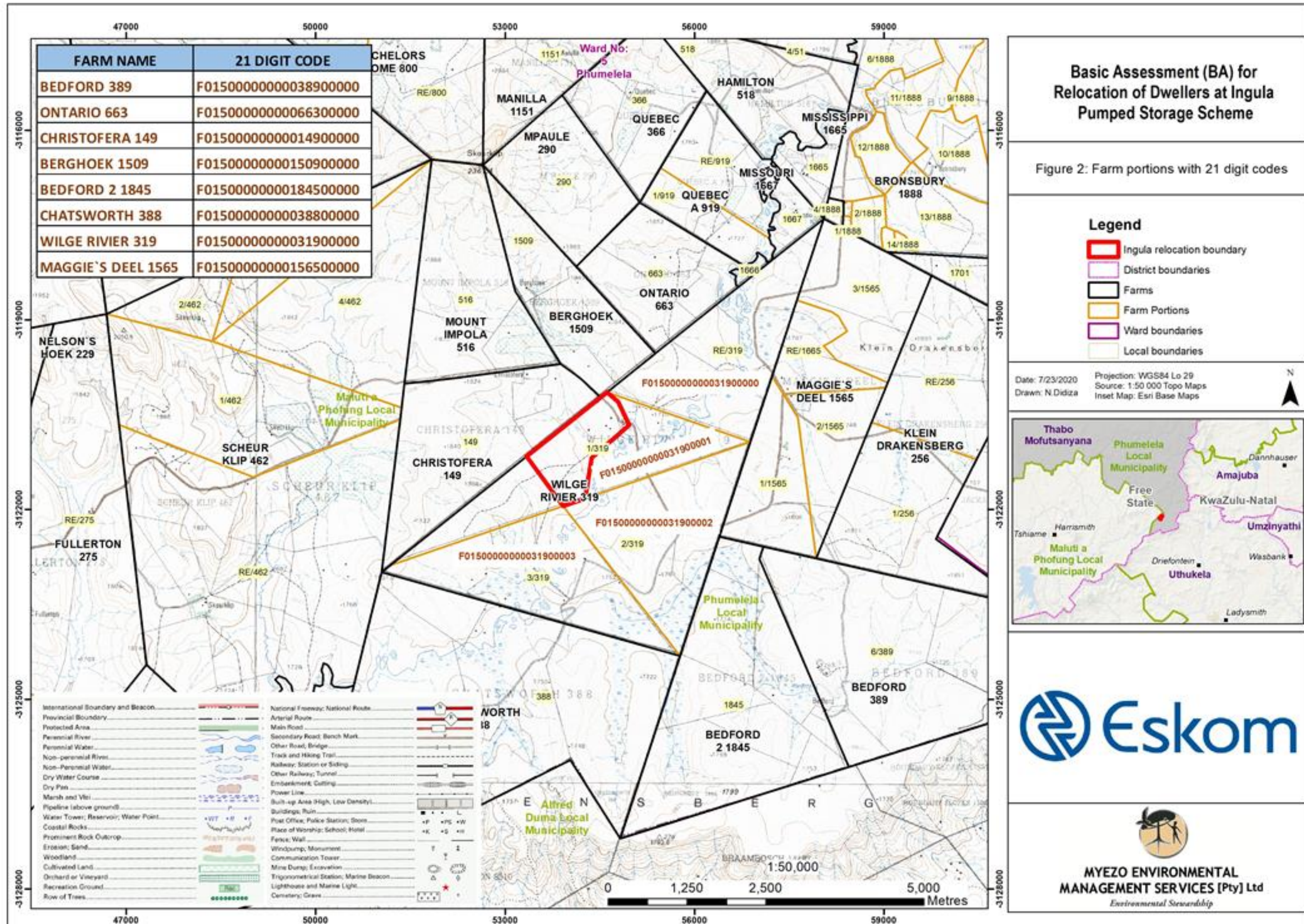


Figure 19.5-2: Ingula Zonation map



**Figure 19.5-3: Ingula environmental setting map**



**Figure 19.5-4: Ingula cadastral map**