



# **Proposed Upgrade of Two Existing Ash Dams and the Construction of Two Rehabilitation Dams at the Majuba Power Station's Ash Disposal Facility**

Draft EIA Report

10 June 2019

31 Allen Drive  
Loevenstein  
Cape Town 7530  
South Africa

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DEA Reference: 14/12/16/3/3/3/229

[www.advisian.com](http://www.advisian.com)



**Advisian**

WorleyParsons Group



## Synopsis

Advisian, a WorleyParsons (Pty) Ltd Group Company, was appointed by Eskom Holdings SOC Ltd as an independent Environmental Assessment Practitioner to undertake the Scoping and Environmental Impact Assessment (S&EIA) process, as per the requirements of the National Environmental Management Act (Act 107 of 1998, NEMA) and NEMWA for the Proposed Upgrade of Two Existing Ash Dams and the Construction of Two Rehabilitation Dams at the Majuba Power Station's Ash Disposal Facility (ADF). These dams will be used for the purposes of storm water management at, and rehabilitation of, the ADF area. The required integrated environmental authorisation (IEA) will assist in ensuring compliance to environmental legislation and protection of the environment. These authorisations include an Integrated Environmental Authorisation (IEA) in terms of the NEMA and National Environmental Management Waste Act (Act 59 of 2008, NEMWA). In terms of the 2014 Environmental Impact Assessment (EIA) Regulations, as amended in 2017 (EIA Regulations), the "One Environmental System" prescribes an integrated application process for the above-mentioned authorisations/permits, which will be undertaken in the form of a full Scoping and Environmental Impact Assessment process.

A specialist team was appointed to assess the potential impact of the proposed development on the natural, cultural and socio-economic environment of the affected project site and its surroundings. The findings of the specialist investigations are discussed in this report, including the baseline receiving environment it may impact upon.

A Plan of Study (PoS) was developed during the Scoping Phase to set out the approach of the EIA, and associated application processes in accordance with the 2014 EIA Regulations, as amended. The PoS was included in Section 9 of the Scoping Report and forms the basis of the Draft Environmental Impact Report\_(DEIR).

A 30-day public participation process (PPP) was completed during the Scoping Phase whereby the Draft Scoping Report was made available for public and authority review and comment from 30 January 2019 to 01 March 2019. The DEIR will also be subject to a 30-day PPP process. Thereafter, a Final Environmental Impact Assessment Report (FEIR) will be developed, through updating of the DEIR with the comments from the PPP, and the FEIR will be submitted to the Department of Environmental Affairs (DEA) for their consideration and decision-making whether or not an IEA should be granted for the proposed development.



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**Project No: C00800-ENV-DEIAR – Proposed Upgrade of Two Existing Ash Dams and the Construction of Two Rehabilitation Dams at the Majuba Power Station's Ash Disposal Facility: Draft EIA Report**

Rev	Description	Author	Review	Advisian Approval	Date
1	Draft EIA Report	 M Le Roux	 L Hattingh	 R Kuffner	11/06/2019



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## Terminology

The following abbreviations are pertinent in this report:

Abbreviations	Description
2014 EIA Regulations	2014 NEMA EIA Regulations, as amended in 2017
AEL	Atmospheric Emissions Licence
ADF	Ash Disposal Facility
BPEO	Best Practical Environmental Option
CBA	Critical Biodiversity Area
DEA	National Department of Environmental Affairs
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
IEA	Integrated Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EHS	Environmental Health and Safety
EMPr	Environmental Management Programme
FSR	Final Scoping Report
HIA	Heritage Impact Assessment
GNR	Government Notice Regulation
IEA	Integrated Environmental Authorisation
IAPs	Interested and Affected Parties
IEM	Integrated Environmental Management
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
NEMA	National Environmental Management Act, Act 107 of 1998, as amended
NEM: AQA	National Environmental Management: Air Quality Act, Act 39 of 2004
NEM: BA	National Environmental Management: Biodiversity Act, Act 10 of 2004
NEM: WA	National Environmental Management: Waste Act, Act 58 of 2008
NHRA	National Heritage Resources Act, Act 25 of 1999
NID	Notice of Intent to Develop
NWA	National Water Act, Act 36 of 1999
PAEL	Provisional Atmospheric Emissions Licence
PCD	Pollution Control Dam

Abbreviations	Description
PoS	Plan of Study
PPP	Public Participation Process
RD	Rehabilitation Dams
SAHRA	South African Heritage Resources Agency
SCC	Species of Conservation Concern
S&EIA	Scoping and Environmental Impact Assessment
SPLUMA	Spatial Planning and Land Use Management Act, Act 16 of 2013
VIA	Visual Impact Assessment
WML	Waste Management Licence
WUL	Water Use Licence

## Glossary

The following terms are used throughout this report, the meaning of which is presented below:

Terms	Description
Activity	An activity or operation carried out as part of the construction or operation of the ash dams.
Aquifer	A naturally occurring underground body of water.
Baseline	Information gathered at the beginning of the study which describes the receiving environment prior to the construction of the proposed development, against which predicted impacts are measured.
Biodiversity	Biodiversity includes the diversity or variety, of plants, animals including any other living organism, located in a particular area or region. It also includes diversity in respect of habitat, species and genetics.
Community	Those stakeholders who may be impacted upon by the proposed development. This may include neighbouring landowners, local communities and other occasional users of the area.
Consultation	The process of exchanging views, concerns and suggestions about the proposed development through meaningful discussions and transparent sharing of information.
Construction Phase	The stage within the life cycle of the proposed development which comprises of the site delineation, preparation as well as construction activities.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other or proposed developments in the area/region that affect the same resources and/or receptors.
Ecology	The study of the interrelationships of organisms with and within their environment.
Ecosystem	The interconnected collection of all species populations that occupy a given area and the physical environment with which they interact.
Endemic / Endemism	Found only within the study area / tendency of being found only in the study area.



Terms	Description
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These may include the biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	The authorisation granted by the competent authority in respect of a listed activity in terms of NEMA.
Environmental Impact Assessment (EIA)	The process of evaluating the environmental and socio-economic consequences of a proposed development.
Environmental Impact Assessment Report (DEIAR)	The report created to communicate the information gathered and assessments undertaken during the Environmental Impact Assessment.
Environmental Management Programme (EMPr)	A description of the environmental specifications or mitigation measures proposed for achieving the required environmental objectives and/ or targets as required by the relevant competent authorities, during all phases of a proposed development.
Fauna	The collective animals of a region.
Flora	The collective plants growing in a geographic area.
Heritage resource	Any place, act or object that forms part of a community's cultural legacy or tradition and is passed down from former generations.
Impact	A change to the existing environment, either positive or negative in nature, that is directly or indirectly due to the proposed development and its associated activities.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of the proposed development's lifecycle, i.e. planning/design, construction, operational and decommissioning phases.
Mitigation Measures	Design or management measures that are proposed to avoid and/or minimise or enhance an impact, depending on the desired effect.
Operations Phase	The stage in the life cycle of the proposed development following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Scoping	The consultation procedure with stakeholders to determine potential issues and concerns. Also for determining the approach to and extent of the EIA Phase of the proposed development, which results in the Plan of Study for the EIA and scope of works for the identified specialist studies.
Specialist Study	A study into a particular aspect of the environment, undertaken by an expert in that identified discipline.
Stakeholders	All parties or persons impacted or affected by the proposed development. Including those parties able to influence the proposed development, often those in a position of authority and/or representing others.
Sustainable Development	The integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that the proposed development serves present and future generations.



# 1 BACKGROUND INFORMATION

## 1.1 Majuba Power Station and its Ash Disposal Facility

Majuba is an Eskom coal-fired power station, situated approximately 30 km North-north-west from Volksrust, Mpumalanga. It has six (6) coal-fired power generating with a capacity to generate 4 110MW of electricity. Ash is produced from the coal combustion process and disposed of at the Ash Disposal Facility. The method of ash disposal is such that conditioned ash is transported via a conveyor system, to the ash disposal facility (ADF), where it is disposed of. Refer to **Appendix A** for the Majuba Power Station (MPS) regional **locality map**. Refer to **Figure 1** for the **existing layout** of the Majuba Power Station.

The ADF is operated and managed according to the station's authorisations and management plans. In order to provide water for dust suppression, pollution control and rehabilitation of the ADF, pollution control dams (PCD) are used on site. The water in the PCDs is collected via concrete perimeter drains as water runoff and is then diverted to one of the PCDs. The PCDs relevant to this project are divided into the following:

- Ash Dams (AD) - Contaminated runoff from active ash disposal areas.
- Rehabilitation Dams (RD) - Clean water runoff from rehabilitated areas.

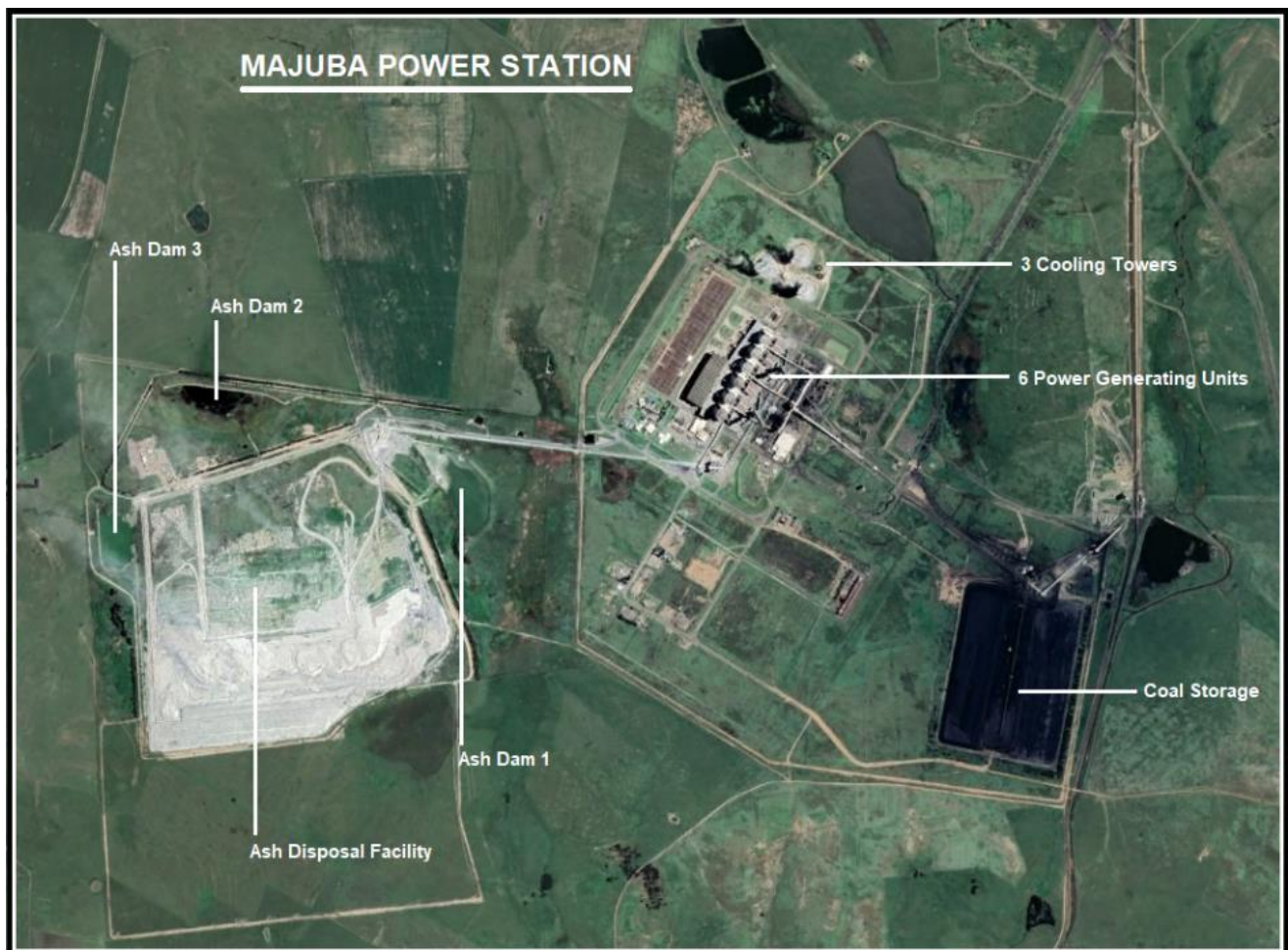


Figure 1: Majuba Power Station Layout

## 1.2 Existing Authorisations

An Environmental Impact Assessment (EIA) process was previously undertaken for the continued disposal of ash at the ADF and an Integrated Environmental Authorisation (IEA) (DEA reference number 14/12/16/3/3/3/53) was received from the National Department of Environmental Affairs (DEA). Additionally, due processes were followed to obtain a Water Use License from the DWS as well as a four (4) year exemption of lining requirements for the continued use of the ADF.

Details of the three authorisations mentioned above are provided in **Table 1** below.

*Table 1: Authorisations correlating to Properties*

Authorisation	Properties Applicable to the Authorisation
Integrated Environmental Authorisation (IEA) DEA Ref.: 14/12/16/3/3/3/53 Date: 19/08/2015	Portion 5, 8, 9, and 12 of the farm Witkoppies 81 HS. Portion 2, 4 and 10 of the farm Mezig 79 HS
Exemption from IEA ADF Lining Requirement for 4 years DEA Ref: 14/12/16/3/3/3/53 Date: 24/06/2016	Portion 5, 8, 9, and 12 of the farm Witkoppies 81 HS. Portion 2, 4 and 10 of the farm Mezig 79 HS.
Water Use License (WUL) DWS Ref: 08/C11J/BCGI/4253 Date: 01/02/2016	Portion 1, 4, 5, 8, 9, 11, 12, 13, 14, and the Remainder of Portion 0 of the farm Witkoppies 81 HS. Portion 1 of the farm Roodekopjes 67 HS.

## 1.3 Property Consolidation

In 2015 the various properties owned by Eskom with regard to the Majuba Power Station was consolidated into one farm "Majuba Power Station 263 HS" consisting of the following properties:

- Portion 7 of the farm Roodekopjes 67 HS
- Remainder of Portion 4 of the farm Witkoppies 81 HS
- Portion 6 of the farm Witkoppies 81 HS
- Remainder of Portion 8 of the farm Witkoppies 81 HS
- Portion 9 of the farm Witkoppies 81 HS
- Portion 12 of the farm Witkoppies 81 HS
- The Remainder of Portion 13 of the farm Witkoppies 81 HS
- Portion 14 of the farm Witkoppies 81 HS
- Portion 17 of the farm Witkoppies 81 HS
- Portion 18 of the farm Witkoppies 81 HS
- Portion 19 of the farm Witkoppies 81 HS
- Portion 20 of the farm Witkoppies 81 HS

Refer to **Appendix A** for the **Deeds Diagram** regarding the property consolidation.

**Figure 2** indicates the farm portions prior to the property consolidation as well as for which portions of the property the authorisations are linked to.

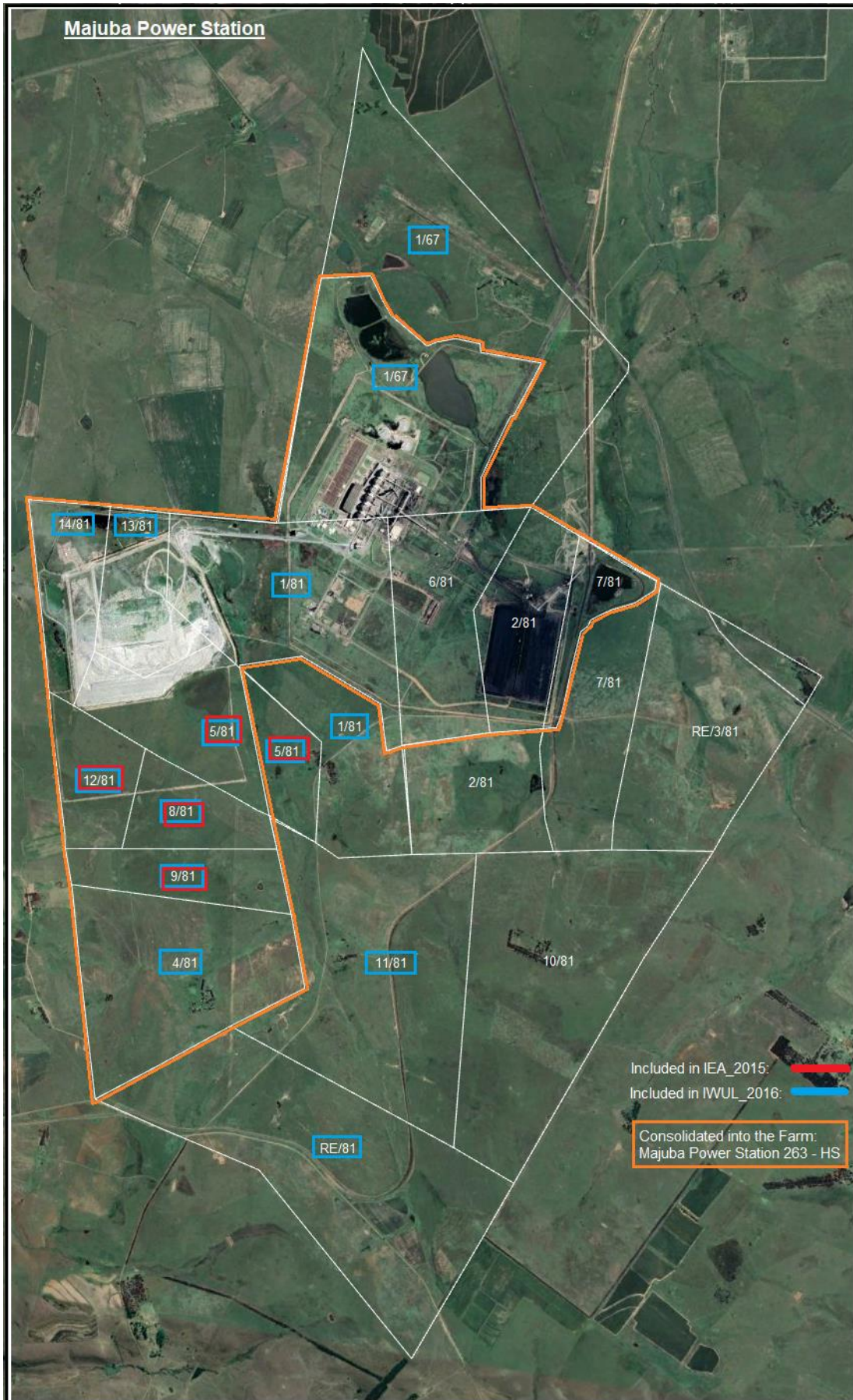


Figure 2: Farms Portions prior to Property Consolidation



## 1.4 Proposed Project

Eskom is proposing the upgrading and extension of two existing ash dams (AD) as well as the construction of two new rehabilitation dams (RD) at the ash disposal facility (ADF) of the Majuba Power Station.

Separate to this EIA, Eskom will be also be lining the existing Ash Dam 3 to further the environmental management of the site.

## 1.5 Appointment of Advisian

WorleyParsons RSA (Pty) Ltd, trading as Advisian ("Advisian"), was appointed by Eskom, as an independent environmental consultant to facilitate the required Environmental Authorisation Application process for the proposed development.

## 1.6 Project Team

### 1.6.1 Applicant Details

The details of the applicant are provided in **Tables 2 and 3**. This is the applicant/proponent who will be legally responsible for abiding by the integrated environmental authorisation.

*Table 2: Applicant Details - Majuba Power Station Senior Environmental Manager*

Project Proponent	Eskom Holdings SOC Limited
Contact Person:	Deidre Herbst
Postal Address:	PO Box 1091, Johannesburg, 2000
Telephone:	011 800 3501
Fax:	086 660 6092
Email:	<a href="mailto:herbstdl@eskom.co.za">herbstdl@eskom.co.za</a>

*Table 3: Majuba Power Station - Manager*

Project Site	Majuba Power Station
Contact Person:	Tebogo Lekalakala
Postal Address:	Private Bag 9001, Volksrust, 2470
Telephone:	017 799 2100
Fax:	017 799 2145
Email:	<a href="mailto:lekalaT@eskom.co.za">lekalaT@eskom.co.za</a>


### 1.6.2 Advisian Personnel Details


In terms of the NEMA EIA Regulations, the applicant must appoint an independent Environmental Assessment Practitioner (EAP) to undertake the environmental assessment of an activity regulated in terms of the aforementioned Act. In this regard, ESKOM has appointed Advisian to undertake the EIA for the proposed development in accordance with the 2014 NEMA EIA Regulations (as amended). The details of the Advisian Project Team are provided below in **Table 5**.



Curriculum Vitae's are attached as **Appendix B**.

Table 4: Project Team Members

Marinda le Roux		Environmental Assessment Practitioner
	<p>Marinda is a certified Environmental Assessment Practitioner (EAP) who holds a Master's degree in Town and Regional planning, and has 20+ years of experience of environmental management. Her fields of specialisation are environmental assessment and land use advice; project management and co-ordination of environmental aspects for engineering projects.</p> <p>Involvement included integration of specialist scientific studies and assessment of developments via feasibility studies, Basic Assessments and full EIAs. Marinda is experienced in project management and public participation of BAs and EIA's for electricity infrastructure, roads, landfills, dams and stormwater projects and private developments such as filling stations, Section 24G applications, biogas (air emissions), waste licensing, farm expansions and rezoning. Ms le Roux was the ECO responsible for compliance audits at Kusile Power Station, Red Farms Agripark, Pipeline construction at Lake Mzingazi at Richards Bay, the Eastern Cape Strategic Development Zone (IDZ) and Rainbow Chicken Farms.</p> <p>Projects are located in the Western Cape, Mpumalanga, Limpopo, Northern Cape, KZN, North West and Gauteng Provinces, and she has international experience of Impact Assessments and Strategic Planning in Uganda, Ethiopia and Mozambique.</p>	
<b>Relevant Years of Experience</b>	22 years	
<b>Highest Qualification</b>	MTRP (Town and Regional Planning), University of the Free State, 1992	
<b>Professional Registration</b>	Certified Environmental Practitioner, Registered Town and Regional Planner	
<b>Office Address:</b>	31 Allen Drive, Loevenstein, Bellville, 7530	
<b>Telephone:</b>	(010) 593 3936	
<b>Email:</b>	<a href="mailto:MarindaLeRoux.Advisian@outlook.com">MarindaLeRoux.Advisian@outlook.com</a>	

Liezal Hattingh		Reviewing EAP
	<p>Liezal is an Environmental Consultant with experience gained in performing and supporting Basic Assessments; Environmental Impact Assessments; Environmental Compliance Monitoring and Auditing; and Environmental Feasibility Studies. Her experience includes the compilation of Environmental Management Plans for various projects; as well as Water Use License Applications.</p> <p>Liezal has been an onsite Environmental Compliance Officer (ECO) for more than two years on the Construction of the Metolong Downstream Conveyance System – Primary pipeline to Maseru, as well as the secondary pipeline to Teyateyaneng, Lesotho.</p> <p>Her experience also includes public participation under the National Environmental Management Act (NEMA) 107 of 1998, as amended.</p>	
<b>Relevant Years of Experience</b>	10 years	
<b>Highest Qualification</b>	BSc in Environmental Science	
<b>Professional Registration</b>	Member: International Association for Impact Assessment South Africa	
<b>Office Address:</b>	31 Allen Drive, Loevenstein, Bellville, 7530	



Liesel Hattingh		Reviewing EAP
Telephone:	(010) 593 3937	
Email:	<a href="mailto:Liesel.Hattingh@advisian.com">Liesel.Hattingh@advisian.com</a>	

Rian Kuffner		GIS and Project Management
	<p>Rian is a GIS Professional with experience in the fields of Engineering and Environmental Services and Town and Regional Planning.</p> <p>He has extensive experience in various engineering and environmental related projects, where he has been responsible for data capturing, modelling, spatial analysis, remote sensing, map production, managing of spatial data and report writing.</p> <p>He has also gained experience in the town and regional planning sector, being responsible for the compilation of spatial and attribute data and preparation of plans for projects such as spatial development frameworks (SDF's), structure plans and zoning schemes</p> <p>For the past couple of years, he has also been involved in projects in the water services sector, assisting with the compilation of Audit and Development Reports for various municipalities in the Western Cape</p> <p>He has been involved with projects for private clients, government departments and municipalities and has often been the principle contact between clients, sub-consultants and his company.</p>	
<b>Relevant Years of Experience</b>	14 years	
<b>Highest Qualification</b>	BA (Hons) GIS (Analysis and Decision Making), University of Stellenbosch, 2003. BA (Sport Science), University of Stellenbosch, 2002	
<b>Office Address:</b>	31 Allen Drive, Loevenstein, Bellville, 7530	
<b>Telephone:</b>	(010) 593 3936	
<b>Email:</b>	<a href="mailto:Rian.Kuffner@advisian.com">Rian.Kuffner@advisian.com</a>	

### 1.6.3 Specialist Details

Table 5 gives the company names appointed to conduct the required specialist studies for this S&EIA process.

Table 5: Details of Specialists Appointed

Specialist Study	Company	Personnel
Fresh Water and wetland Assessment	Confluent Environmental	Dr. James Dabrowski
Heritage Impact Assessment	Heritage Contracts and Archaeological Consultants CC.	Jaco van der Walt
Ground Water Impact Assessment	Advisian	Karen Burgers
Ecological Assessment	Enviro-Insight CC.	Corné Niemandt Luke Verburgt

## 1.7 The Competent Authorities

### 1.7.1 The National Department of Environmental Affairs

In terms of the 2014 EIA Regulations, the relevant competent authority responsible for the review and decision on the environmental authorisation application is the National Department of Environmental Affairs (DEA). The details for the DEA Case Officer assigned to the application for the proposed development are given below.

*Table 6: Details of DEA Case Officer*

Department	DEA
Contact Person:	Bongeka Mtyana
Physical Address:	Environmental House, 473 Steve Biko Road, Arcadia, Pretoria
Telephone:	(012) 399 9376
Email:	<a href="mailto:bmtyana@environment.gov.za">bmtyana@environment.gov.za</a>

### 1.7.2 The South African Heritage Resources Agency

In terms of the National Heritage Resources Act (Act 25 of 1999) (NHRA), the relevant competent authority responsible for the review of the Heritage Impact Assessment conducted is the South African Heritage Resources Agency. A Heritage Impact Assessment was conducted regarding the proposed project site. Copies of the all reports are being submitted to the SAHRA for their information and review.

### 1.7.3 The National Department of Water and Sanitation

In terms of the National Water Act (Act 36 of 1998) (NWA) the Department of Water and Sanitation, whom issued the current Water Use License for the Majuba Power Station Site, will be informed regarding the current EIA. Copies of the all reports are being submitted to the DWS for their information and review.

*Table 7: Details of the DWS Water Use License Manager*

Department	DWS
Contact Person:	Khathushelo Muday
Physical Address:	285 Francis Baard Street, Bothongo Plaza East, Pretoria
Telephone:	(012) 366 7500 / (021) 392 1360
Email:	<a href="mailto:mudauk@dws.gov.za">mudauk@dws.gov.za</a>



## 2 LEGAL FRAMEWORK

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### 2.1 Introduction

This section provides an overview of the legislation applicable to the proposed development with regards to the authorisations to be obtained in order to proceed with the development – which also determines which EA process must be followed.

### 2.2 Applicable Legislation

#### 2.2.1 The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution of South Africa (Act No. 108 of 1996) was first adopted by the Constitutional Assembly on 8 May 1996. This Constitution represents the collective wisdom of the South African people and has been arrived at by general agreement, through an extensive public participation process. This is the supreme law in South Africa and no other law or government action can overrule the Constitution or be in conflict with it. The Constitution defines the provisions for environmental protection, the roles of the different spheres of government (national, provincial and local), the need for co-operative governance and the mechanisms for co-operative governance.

The following Constitutional rights as per the Bill of Rights have reference to this proposed development.

Section 24 of the Constitution States that:

*“Everyone has the right-*

- a) to an environment that is not harmful to their health or well-being; and*
- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislature and other measures that-*
  - (i) prevent pollution and ecological degradation;*
  - (ii) promote conservation; and*
  - (iii) secure ecological sustainable development and use of natural resources while promoting justifiable economic and social development.”*

Section 32 of the Constitution States that:

- 1) “Everyone has the right of access to*
  - (a) any information held by the State; and*
  - (b) any information that is held by another person and that is required for the exercise or protection of any rights.*

Section 33 of the Constitution States that:

- 1) “Everyone has the right to administrative action that is lawful, reasonable and procedurally fair.”*

In addition, the Constitution has placed an obligation on the legislature to enact and give effect to these rights, by providing for reasonable legislative and other measures. In response to this obligation various additional statutes have been promulgated in order to manage the various impacts within the realm and objective of the Constitution, these are briefly discussed below.





## 2.2.2 National Environmental Management Act, as amended (Act 107 of 1998) (NEMA)

The NEMA is the overarching framework Act for environmental management in South Africa. NEMA includes provisions which must be considered in order to give effect to the principles of integrated environmental management. These provisions are contained in Section 2 of the Act and will be considered during the EIA process.

Chapter 5 of the NEMA is related to Integrated Environmental Management (IEM), it sets out the general objectives (Section 23) and procedures for IEM and focuses on promoting the use of appropriate environmental tools, such as EIA's (Section 24).

Furthermore, in terms of Section 24(2) of the Act the Minister may identify activities which may have detrimental impact on the receiving environment and may not commence without prior authorisation. The Minister thus published Listing Notice 1, 2 and 3 (i.e. GNR 327, 324 and 325) under Sections 24(2), 24(5), 24D and 44 of the Act, these have been reviewed to assess its relevance in terms of the proposed development.

The following listed activities have been triggered for the proposed ash dam upgrade project in terms of the 2014 EIA Regulations (as amended):

Table 8: EIA Regulation Listed Activities

Activity No(s):	Relevant Activity as set out in Listing Notice 1 (GN No. 327)	Describe the portion of the proposed project to which the applicable listed activity relates
12	The development of (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square meters; or (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse.	From desktop studies, the RD 1 will be situated within 32m of a non-perennial watercourse.  The proposed ash dams will have a footprint of more than 100 m <sup>2</sup> : RD1 – 80 000 m <sup>2</sup> RD2 – 19 300 m <sup>2</sup>
63	The expansion of facilities or infrastructure for the transfer of water from and to or between any combination of the following— (i) water catchments; (ii) water treatment works; or (iii) impoundments; where the capacity will be increased by 50 000 cubic meters or more per day but excluding water treatment works where water is treated for drinking purposes.	Applicable to all ash and rehabilitation dams as there may be a need to transfer water from one dam to the other in some cases. A pump house will be used if one dam is full and pump the overflow to another dam. It may be required to upgrade pipe size and motor sizes due to the increase in volume in the dams.
66	The expansion of a dam where (i) the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, was originally 5 meters or higher and where the height of the wall is increased by 2,5 meters or more; or (ii) where the high-water mark of the dam will be increased with 10 hectares or more	AD 1 has a current maximum wall height of 5m, and the proposed compartment wall height will be <u>7.6m</u> , which separates the Ash Dam from the Rehabilitation Dam.



Activity No(s):	Relevant Activity as set out in Listing Notice 2 (GN No. 325)	Describe the portion of the proposed project to which the applicable listed activity relates
6	"The development of facilities or infrastructure for any process or activity which requires a permit or license or an amended permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent".	Development of two new Rehabilitation Dams and the upgrade of the two existing ash dams for the Majuba Power Station continuous ADF.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	The combined footprint size of the dams is more than 20 hectares AD 1 - 40 500 m <sup>2</sup> (4,05ha) AD 2 - 160 000 m <sup>2</sup> (16) RD 1 - 80 000 m <sup>2</sup> (8ha) RD 2 - 19 300 m <sup>2</sup> (1.9ha)
16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 meters or higher or where the high-water mark of the dam covers an area of 10 hectares or more.	RD 1 wall height will be a maximum of 7 m, whilst the compartment wall will be a maximum height of 7.6 m. AD 1 dam wall height will be increased from 5 to 7 m in height.

### 2.2.3 National Management: Waste Act No 59 of 2008 (NEM: WA)

Reasonable measures to avoid the generation of waste and the minimization of the toxicity and amounts of waste generated and also to reduce, recycle and recover waste. Waste must be disposed of in an environmentally sound manner. It must not cause a nuisance through noises, odour or visual impacts.

The following listed activities have been triggered for the proposed ash dam upgrade project in terms of the 2013 Listed Waste Management Activities (GNR 921):

Table 9: Listed Waste Management Activities

Category:	Activity	Proposed Project Related Activity
<b>A</b>	<b>Construction, Expansion or decommissioning of facilities and associated structures and infrastructure</b> No. 13: The expansion of a waste management activity listed in Category A or B of this Schedule which does not trigger an additional waste management activity in terms of this Schedule.	The existing ash dam capacity at Majuba Power Station will be expanded by construction of two Rehabilitation Dams and two ash dams. The proposed ash dams will have a capacity of: RD 1 – 240 000 m <sup>2</sup> RD 2 – 65 000 m <sup>2</sup> AD 1 – 150 000 m <sup>2</sup> AD 2 – 390 000 m <sup>2</sup>
<b>B</b>	<b>Disposal of waste onto land</b> No. 7: The disposal of any quantity of hazardous waste to land.	Hazardous waste from the ADF will be disposed of on the ash dump of general waste at any one time.

### 2.2.4 National Water Act (Act 36 of 1998) (NWA)

The proposed ash dam upgrade project may require Eskom to update the current Water Use Licence (License No: 08/C11J/BCGI/4253, File No: 27/2/2/C911/4/1) for the site.



The following water uses are licensed in terms of the existing license

Table 10: Existing Majuba Power Station WUL Water Uses

Section 21 Water Use	Description
<b>B</b>	Storage of water.
<b>C</b>	Impeding or diverting the flow of water in a watercourse.
<b>G</b>	Disposing of waste in a manner which may detrimentally impact on a water resource.
<b>I</b>	Altering the bed, banks, course or characteristics of a watercourse.

A Dam Safety Licensing process may be required in terms of the Regulations regarding the Safety of Dams in terms of Section 123(1) of the National Water Act, 1998.

### 2.2.5 National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA)

Sections 52(1)(a) and 56(1) of the NEM:BA state that the Minister may publish national lists of species and ecosystems, respectively, that are threatened or are in need of protection. A list of species that are threatened or are in need of protection was published in GNR 151 (dated, 23 February 2007), with GNR 152 (dated, 23 February 2007) detailing the regulations relating to such species. These regulations are imposed where restricted activities involve specimens of listed threatened or protected species. GNR 152 defines the requirements of permitting and the process related thereto.

An ecological assessment considering the presence of any floral and faunal species of concern on the site was conducted during the Scoping Phase of the project, and the report was updated for the EIA phase (report attached in **Appendix C**).

### 2.2.6 National Heritage Resources Act (Act 25 of 1999) (NHRA)

Section 34 and 38 of the NHRA detailed specific activities that may require that a **heritage impact assessment** be completed for the Ash and Rehabilitation Dams site. The heritage activities identified as potentially applicable for the proposed development are as follows:

- 1(c): "Any development or other activity which will change the character of a site:
- exceeding 5 000 m<sup>2</sup> in extent;
- 2: "Any development of the site where "development" means any physical intervention, excavation, or actions, other than those caused by natural forces, which results in a change to the nature, appearance or physical nature of a place, or influences its stability and future well-being, including:
  - Construction, alteration, demolition, removal or change of use of a place or a structure at a place; or
  - Carrying out any works on or over or under a place; or
  - Any change to the natural or existing condition or topography of land; or
  - Any removal or destruction of trees, or removal of vegetation or topsoil".

Section 48(2) requires a permit from the Gauteng NHRA to perform such actions at such time and subject to such terms, conditions and restrictions or directions as may be specified in the permit. A heritage impact assessment was undertaken (report attached in **Appendix C**).



## 2.3 Guidance Documents

The Department of Environmental Affairs (DEA) have drafted an Integrated Environmental Management Information Series (latest draft dated 2006), which comprised of 23 information documents. The documents were drafted as sources of information about concepts and approaches to Integrated Environmental Management (IEM). The IEM is a key instrument of NEMA and provides the overarching framework for the integration of environmental assessment and management principles into environmental decision-making. The aim of the information series is to provide general guidance on techniques, tools and processes for environmental assessment and management. The information documents which are of relevance to this proposed development are listed as follows:

- Information Series 1: Screening;
- Information Series 2: Scoping;
- Information Series 3: Stakeholder Engagement;
- Information Series 4: Specialist Studies;
- Information Series 5: Impact Significance;
- Information Series 7: Cumulative Effects Assessment;
- Information Series 11: Criteria for determining Alternatives in EIA;
- Information Series 12: Environmental Management Plans/Programmes; and
- Information Series 13: Review in Environmental Impact Assessment.

### 2.3.1 Mpumalanga Vision2030

The Mpumalanga Vision 2030 provides a provincial expression of the key priorities, objectives and targets enumerated in the National Development Plan (NDP) and expressed within the manifesto. It is a focused and strategic implementation framework that provides a direct implementation response to the NDP. The framework describes the Province's approach to realizing the objectives of the NDP in the provincial context. It builds on and informs past & existing sectoral and related planning interventions in Mpumalanga. In line with the principles of the NDP, Vision 2030 highlights the following socio-economic outcomes as priorities:

- Employment & Economic Growth
- Education and Training
- Health care for all
- Social Protection

These priorities aim to focus the activities and decisions of the Province on key areas leveraging high impact for improved and sustainable long term socio-economic development in Mpumalanga.

### 2.3.2 Local Municipal Integrated Development Plan

The Pixley ka Seme Municipal Integrated Development Plan (IDP) provides an overall framework for developments within municipal jurisdiction. The Majuba Power Station and Ash and Rehabilitation Dams are located in the jurisdiction of the Pixley ka Seme Local Municipality, and thus regulated by their IDP. In order to achieve the identified priorities for Pixley Ka seme Local Municipality, the following strategic development objectives have been identified in the IDP 2018/2019:

- To provide access to Basic Service Delivery to the community.
- To provide effective, efficient and transformed Human Resource.
- To create & promote a conducive environment for socio- economic development.



- To provide sound Financial Management & compliance with legislation.
- To deepen democracy through public participation and promote good governance.
- To ensure integrated rural and urban planning.

## 2.4 Summary

The general approach to this S&EIR process is guided by the principles contained in Section 2 of NEMA and those of Integrated Environmental Management (IEM). The compliance with the 2014 EIA Regulations, the associated guideline documents drafted by the relevant Competent Authority which sets out clear requirements for, *inter alia*, impact assessment and stakeholder engagement, further emphasises this.

Although this proposed development requires various authorisations or licences prior to construction, the 'One Environmental System' prescribes an integrated application process for the above-mentioned authorisations/permits, which will be undertaken in the form of a single S&EIR process to inform all applications. In addition, this integrated application process shall require all relevant authorities to commit to the principle of cooperative governance as enshrined in the Constitution and NEMA.

The Competent Authority in respect of this integrated application process will be the Department of Environmental Affairs (DEA). The supplementary applications have been made to the required authorities, namely the National Department of Water and Sanitation (DWS).

The required authorisations for the proposed development and their status are listed below.

*Table 11: Authorisations, permits and licences required for the proposed development*

<i>Application</i>	<i>Competent Authority</i>	<i>Status</i>
<i>Integrated Environmental Authorisation</i>	<i>DEA</i>	<i>Application submitted, DEIR in progress.</i>
<i>Water Use License</i>	<i>DWS</i>	<i>Water Use Licence to be updated.</i>
<i>Dam Safety Licensing (Possibly)</i>	<i>DWS</i>	<i>Enquiry in progress.</i>
<i>Authorisation i.t.o. NHRA (Possibly)</i>	<i>SAHRA</i>	<i>HIA study submitted to SAHRIS.</i>

The integrated S&EIR process consists of three phases, namely the Pre-Application / Initiation Phase; Scoping Phase; and the Impact Assessment Phase (*the current phase*). Refer to Figure 3 below for a flow diagram of the S&EIA Phase.

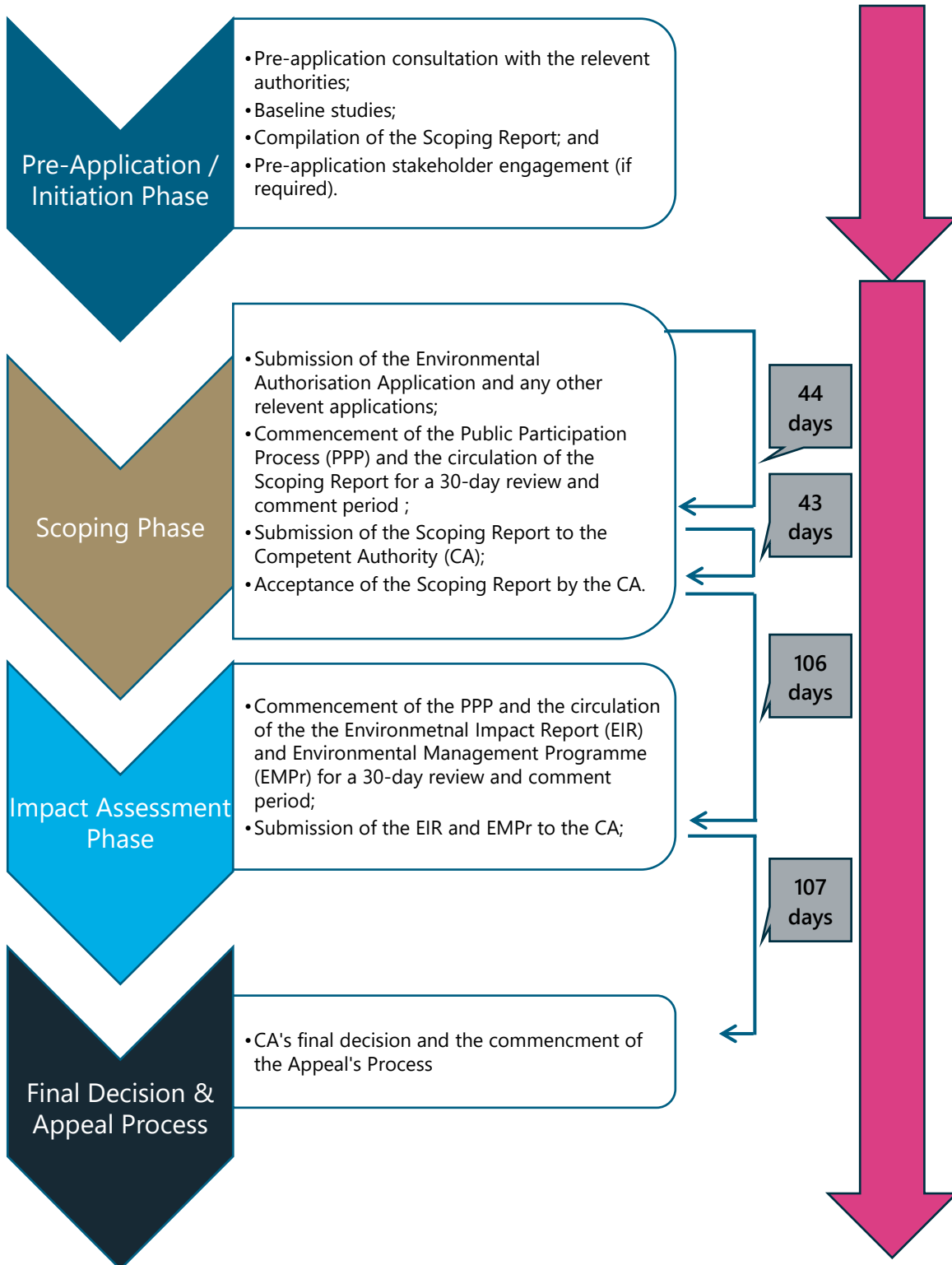


Figure 3: Scoping and Environmental Impact Assessment Flow Diagram

## 2.5 Purpose of this Report

The purpose of this Draft Environmental Impact Assessment Report (DEIAR) is to provide the Competent Authority (CA), Stakeholders, and Interested and/or Affected Parties (IAPs) with an overview of the proposed upgrade of two (2) existing Ash Dams as well as the construction of two (2) Rehabilitation Dams at the Majuba Power Station's ADF, hereafter referred to as the 'proposed development'.

Stakeholder and public engagement is an integral part to the EIA process as it contributes to the identification of issues and areas of concern by persons familiar with the Power Station and its surroundings.

This DEIAR has been compiled in line with the requirements of GN 326 of the NEMA. The EIA is described in detail in Section 7.

The DEIR furthermore provides information regarding the potential environmental and socio-economic impacts which the proposed development could have, as well as proposes mitigation measures to the various impacts. These mitigation measures are contained in the Environmental Management Programme (EMPr). The DEIR documents the activities undertaken during the EIA Phase to identify and assess the significance of potential impacts and determine measures to mitigate the negative impacts and enhance the benefits or positive impacts of the proposed development. This report presents the findings of the EIA Phase and its associated public participation, which forms part of the Scoping and Environmental Impact Reporting (S&EIR) process.

The DEIAR is supplemented by the Environmental Management Programme (EMPr), which documents the identified management and monitoring measures that need to be implemented during the various phases of the proposed development's lifecycle, to ensure that impacts are preferably avoided or appropriately mitigated, and the benefits enhanced.

The Environmental Impact Assessment Phase is divided into key phases:

- Consultation with relevant authorities;
- Specialist studies;
- Compilation of a DEIR and an EMPr;
- Stakeholder engagement / Public Participation for the DEIR and an EMPr; and
- Submission of the updated Final EIR and EMPr to the Competent Authority for their review and decision regarding the application for the proposed development.

The objectives of this DEIAR are to:

- Inform IAPs about the proposed development and the S&EIA process;
- Identification and assessment of all potential impacts and determine the significance of each impact;
- Address issues that have been raised during the EIA process;
- Assess alternatives to the proposed activity in a comparative manner;
- Formulate mitigation / optimisation measures Obtain contributions from IAPs on the proposed development; and
- Produce an EIAR that will inform the Competent Authority in its decision-making process, i.e. to decide whether to authorise the proposed development including the conditions associated with the authorisation, or to reject the application.

## 2.6 Deviations

It is to be noted that there have been no deviations from the approved Scoping Report in terms of the methodology used in determining the significance of potential environmental impacts and risk.

## 2.7 EIA Regulatory Required Information

The DEIAR has been compiled in accordance with the 2014 EIA regulatory requirements. The specific regulatory requirements have been listed in the table below as per Appendix 3 and 4 of GNR 326 and indicate the relevant corresponding sections within this report.

Table 12: NEMA (2014) Legislative Requirements as detailed in GNR 326, Appendix 3

GNR 326	Description of Requirement	Report Section
App 3: 3(a)	Details of the EAP, curriculum vitae and relevant expertise.	Section 1 and Appendix B
App 3: 3(b)	Location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report – i. 21-digit surveyor general (SG) code of each cadastral land parcel; ii. Physical address and farm name; iii. Where the above is not available, provide the coordinates of the boundary of the property/ies.	Section 1
App 3: 3 (c)	A plan of the proposed activity/ies applied for at an appropriate scale.	Section 1 and Appendix A
App 3: 3 (d)	Description of the scope of the proposed activity, including – i. all listed and specified activities triggered; ii. a description of the activities to be undertaken that includes associated structures and infrastructure.	Sections 3
App 3: 3 (e)	Description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.	Section 2
App 3: 3 (f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report.	Section 4
App 3: 3 (g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.	Section 3 and 4
App 3: 3 (h)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including-	Section 3
App 3: 3 (h)(i)	Details of the development footprint alternatives considered.	N/A – Expansion of current development
App 3: 3 (h)(ii)	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Section 6





GNR 326	Description of Requirement	Report Section
App 3: 3 (h)(iii)	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	PPP Report in Appendix D
App 3: 3 (h)(iv)	The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, socio, economic, heritage and cultural aspects.	Section 5 and Appendix C
App 3: 3 (h)(v)	List the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.	N/A - No Alternatives available
App 3: 3 (h)(vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	Section 7
App 3: 3 (h)(vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 7
App 3: 3 (h)(viii)	Possible mitigation measures that could be applied and level of residual risk.	Section 7
Appendix 3: 3 (h)(ix)	If no alternative development footprints for the activity (as a whole) were investigated, the motivation for not considering such; and	Section 3.6
App 3: 3 (h)(x)	A concluding statement indicating the location of the preferred alternative development footprint, within the approved site as contemplated in the accepted scoping report.	N/A – no alternatives. Expansion of current facility.
App 3: 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including-	Section 7
App 3: 3 (i)(i)	Description of all the environmental issues and risks that were identified during the EIA process	Section 7
App 3: 3 (i)(ii)	Assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.	Section 7
App 3: 3 (j)	An assessment of each identified potentially significant impact and risk, including – i. cumulative impacts; ii. the nature, significance and consequences of the impact and risk; iii. the extent and duration of the impact and risk; iv. the probability of the impact and risk occurring; v. the degree to which the impact and risk can be reversed; vi. the degree to which the impact and risk may cause irreplaceable loss of resources; and vii. the degree to which the impact and risk can be mitigated;	Section 7
App 3: 3 (k)	Summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Section 7



GNR 326	Description of Requirement	Report Section
App 3: 3 (l)	An environmental impact statement which contains – <ul style="list-style-type: none"> <li>i. summary of the key findings of the EIA;</li> <li>ii. map at appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and</li> <li>iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</li> </ul>	Section 8
App 3: 3 (m)	Based on the assessment, recommendations from specialist's reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisations.	Section 7 and 8
App 3: 3 (n)	Final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	Section 7 and 8
App 3: 3 (o)	Aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	Section 7 and 8
App 3: 3 (p)	Description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 10
App 3: 3 (q)	Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section 8
App 3: 3 (r)	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised.	N/A
App 3: 3 (s)	An undertaking under oath or affirmation by the EAP in relation to: <ul style="list-style-type: none"> <li>i. the correctness of the information provided in the reports;</li> <li>ii. the inclusion of comments and inputs from stakeholders and IAPs;</li> <li>iii. the inclusion of inputs and recommendations from the specialist reports where relevant; and</li> <li>iv. any information provided by the EAP to IAP and any responses by the EAP to comments or inputs made by IAPs.</li> </ul>	Section 9
App 3: 3 (t)	Details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	To be submitted by Eskom.
App 3: 3 (u)	Indication of any deviation from the approved scoping report, including the plan of study, including – <ul style="list-style-type: none"> <li>i. any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and</li> <li>ii. a motivation for the deviation.</li> </ul>	No deviations from Scoping Report
App 3: 3 (v)	Specific information that may be required by the competent authority.	Letter from DEA on the FSR. Appendix F.
App 3: 3 (w)	Any matters required in terms of section 24(4)(a) and (b) of the Act.	N/A



## 3 THE PROPOSED DEVELOPMENT

### 3.1 Description of the Proposed Development

Eskom is proposing the upgrading and extension of two existing ash dams (AD) as well as the construction of two new rehabilitation dams (RD) at the ash disposal facility (ADF) of the Majuba Power Station. The Rehabilitation and Ash Dams are utilised for containment of stormwater runoff and the water is used for rehabilitation of the larger ADF area.

### 3.2 Location of the Proposed Development

The Eskom Majuba Power Station (MPS) is located approximately 30 km from the town of Volksrust in Mpumalanga. The MPS falls within the jurisdiction of the Pixley Ka Seme Local Municipality. The Majuba ADF is situated approximately 1.5 km to the West-south-west of the Power Station. Refer to **Figure 4** for the regional location map of the amjuba Power Station and its ADF.

The proposed AD1 and RD1 are to be located to the NE corner of the existing ADF. Proposed AD2 is to be located just North of the ADF. Proposed RD2 is to be located just west of the ADF. Refer to **Figure 5** below for the proposed Ash and Rehabilitation dams at the ADF. Refer to **Appendix A** for the maps.

### 3.3 Property Affected by the Proposed Development

The MPS, ADF, as well as the proposed development at the ADF is situated on the Farm named "Majuba Power Station" owned by Eskom Holdings SOC Ltd. The Surveyor General (SG) Code for the property is given in the Table below.

Table 13: Property affected by the proposed development

Farm No.	Farm Name	21-digit SG Code	Landowner
Farm 263	Majuba Power Station	T0HS00000000026300000	Eskom Holdings SOC Ltd

### 3.4 Specifications of the Proposed Development

Table 14: Ash and Rehabilitation dams' specifications

Dam Description	Current Dam Wall Height	New / Increased Dam Height	Surface Footprint Size	Final Footprint Size	Final Volume/ Storage Capacity
Existing Ash Dam 1* (AD1)	Compartment Wall (Not existing dam wall) = 5m	Compartment Wall = 7.6m* (New)	Existing = 110 000m <sup>2</sup> Decrease by = 69 500m <sup>2</sup>	40 500m <sup>2</sup>	150 000m <sup>3</sup>
New Rehabilitation Dam 1* (RD1)		Dam Wall = 2m (Increase)	New Size = 80 000m <sup>2</sup>	80 000m <sup>2</sup>	240 000m <sup>3</sup>
Existing Ash Dam 2 (AD2)	3.1m	1.7m*	Existing = 95 000m <sup>2</sup> Increase by = 65 000m <sup>2</sup>	160 000m <sup>2</sup>	390 000m <sup>3</sup>
New Rehabilitation Dam 2	N/A	4.85m*	New Reduced Size = 19 300m <sup>2</sup>	19 300m <sup>2</sup>	65 000m <sup>3</sup>

\* Note this is the maximum embankment height to the downstream toe.



- As can be seen from Figure 3, AD1 and RD1 will be constructed from an existing dam on site, splitting it into two separate dams with separate functions. Hence AD1 will be smaller than the existing dam and the RD1 will be a new dam.
- AD2 is an existing dam on site which will be increased in size.
- RD2 will be a new dam on site.

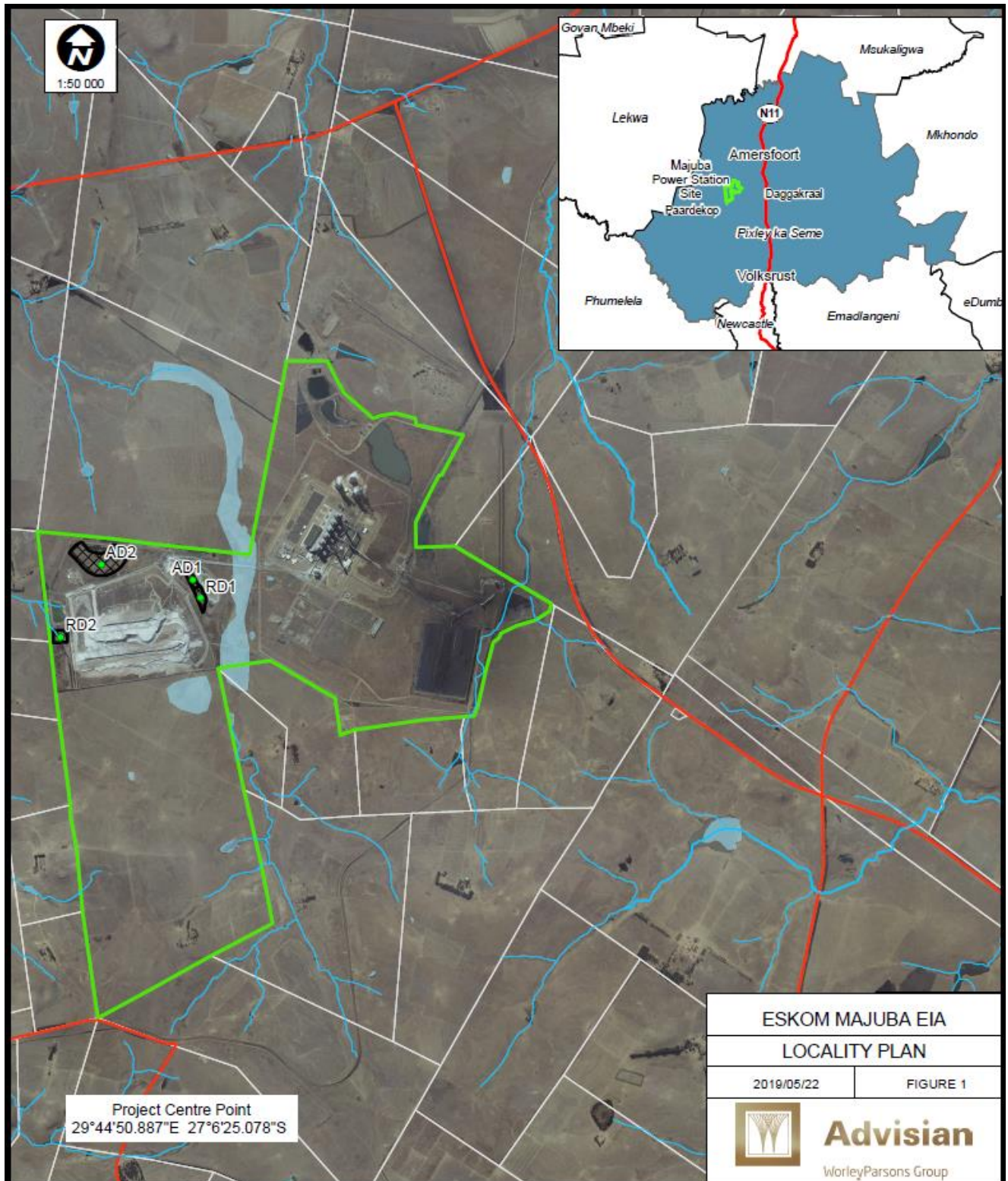


Figure 4: Regional Location of the MPS and its ADF

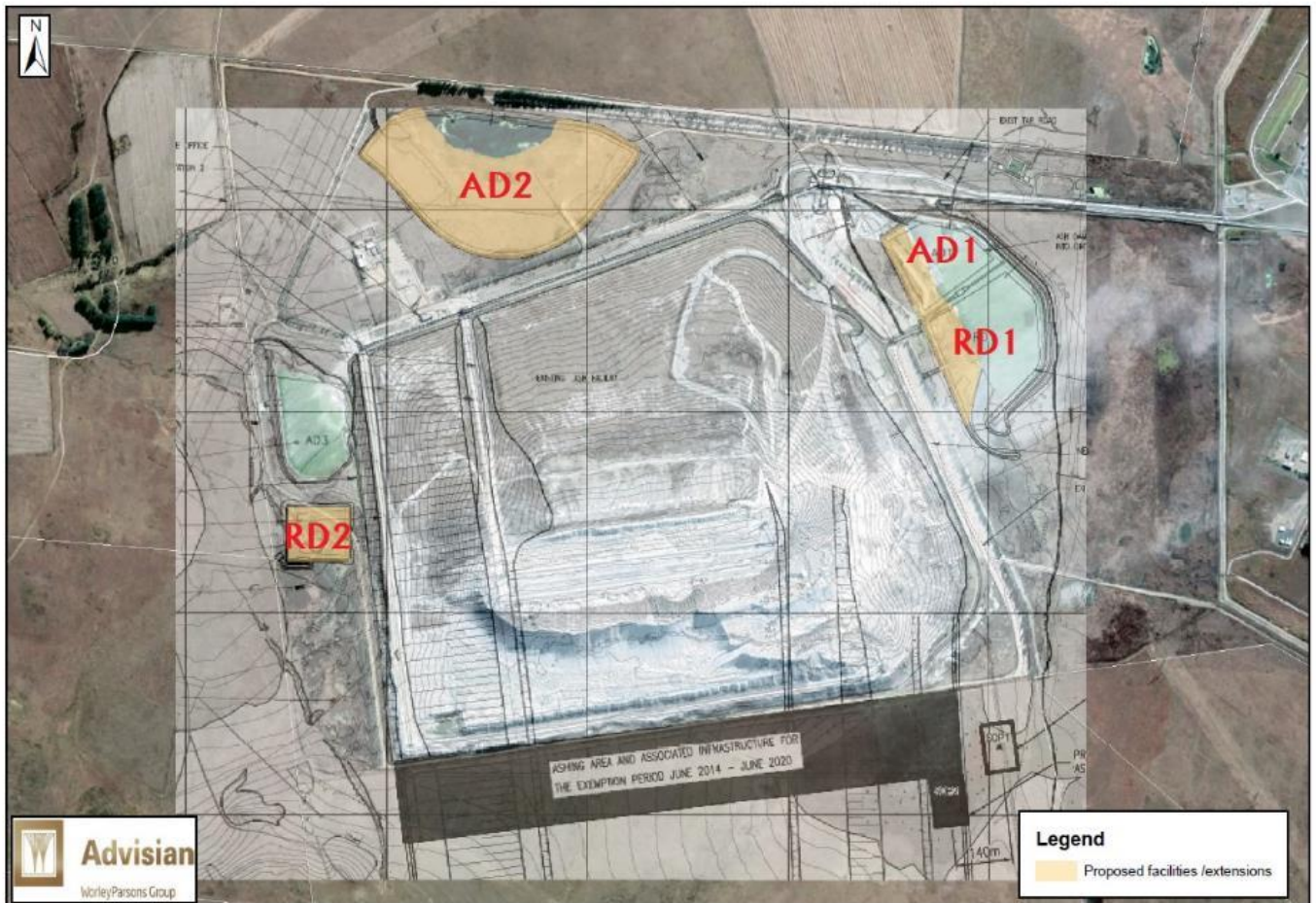


Figure 5: Ash Dam Upgrade Site

### 3.5 Phases of the Proposed Development

There are four phases regarding the proposed development lifecycle, namely:

- Planning & Design phase;
- Construction phase;
- Operational and Maintenance phase; and
- Rehabilitation phase.

Each of these phases is described below:

#### 3.5.1 Planning Phase

Prior to the undertaking of this EIA Process, possible alternatives were considered, and a preliminary engineering design was developed for the Ash and Rehabilitation Dams project, as per Figure 5 above. Final engineering report / design will be included as soon as it is available.

### **3.5.2 Construction Phase**

The Construction Phase will include the following:

- Activities to extend the 2 existing ash dams at the ADF.
- Activities to construct 2 new rehabilitation dams at the ADF.

The construction of ash dumps entails extensive disturbance of surface vegetation and soil material, as well as the underlying parent rock. The disturbance occurs primarily through the stripping of soils. Secondary and ancillary works include haul and access roads, camp sites storage areas and workshops.

#### **3.5.2.1 Water Supply**

The proposed development shall source water from the existing facility during the construction of the ash dams. The volume of water required for the construction phase has not yet been determined.

#### **3.5.2.2 Power Supply**

The construction phase will require power for site lighting and for driving equipment such as air compressors, cement batch plant, etc. It is anticipated that power will be generated on site by internal combustion generators running on liquid petroleum gas (LPG or propane) supplied by road tankers.

#### **3.5.2.3 Waste Management**

Waste produced during the construction phase will be typical construction rubble (rock, sand, soil, asphalt and concrete), general waste, dirty / used oil and grease, polluted material and soil and polluted water. Waste management during construction will be the responsibility of the contractor. All construction waste will be removed from work areas and disposed of at approved and licensed waste disposal facilities. Where possible, options for the reuse or recycling of waste materials will be favoured over disposal.

#### **3.5.2.4 Air Quality Management**

Sources of emissions during the construction phase will include dust generated by the movement of construction vehicles on cleared areas, bulk earthworks (where required) as well as exhaust emissions from construction vehicles and diesel generators (if used). Dust will be produced by wind face on existing ash dump and will impact during construction months. Dust emissions during the construction phase of the project will be limited as far as possible through keeping the exposed areas as small as possible, stabilisation of any exposed areas and watering of cleared areas where dust becomes problematic. Construction vehicles and generators will be maintained in good working order to minimise emissions, and speed limits will be regulated to minimise dust creation.

#### **3.5.2.5 Noise and Vibration Management**

Sources of noise and vibration during construction include construction vehicles and generators, as well as earthworks. Nuisance impacts of noise will be managed as far as reasonably possible. The location of the project away from residential areas, means that noise and vibration will not be a nuisance to people outside of the Power Station site.

The construction vehicles will use the existing road network. Construction traffic will include large vehicles / trucks for material delivery. The number of construction vehicle trips per day is unknown at this stage. The equipment expected to be used during the construction phase is unknown at this stage. The equipment would



be delivered to the site (via truck, where required) and will remain on the site for the duration of the construction phase.

### **3.5.2.6 Workforce**

It is estimated that the construction of the ash dams could create approximately (currently unknown) temporary jobs. Unskilled labour will be sourced from the surrounding communities and trained as required.

### **3.5.2.7 Construction Schedule**

It is anticipated that construction will most likely commence in 2020, Eskom is to confirm this. Construction activities are expected to occur during working hours of 6h00 and 18h00 and will largely be limited to Mondays to Saturdays. Construction activities will only be allowed outside these times where unavoidable, subject to the contractor successfully motivating for an extension.

### **3.5.3 Operational and Maintenance Phase**

During the Operational Phase of the Ash and Rehabilitation Dams, activities will be carried out by Eskom according to the Operational and Maintenance Plan of the Majuba ADF, as well as the station's Environmental Management Systems.

### **3.5.4 Decommissioning & Rehabilitation Phase**

The Ash and Rehabilitation Dams will be decommissioned according to the guidelines detailed in the Majuba Power Station Decommissioning Plan. It is anticipated that the decommissioning could include the following, but the exact scope will depend on the station's decommissioning scope:

- Replacement of soil is done with soil layers matching as far as possible the original pedological layers and re-vegetation with indigenous vegetation cover equivalent to that prior disturbance.
- Haul and access roads are maintained in a satisfactory manner such that air pollution and soil erosion are controlled. Haul roads that are not permanent roads are obliterated and their surfaces scarified, and all damaged fences and other structures are reinstated.
- A thick layer (50 mm) of topsoil will be placed on top of all completed cells in the ash disposal facility and re-vegetated in line with the Environmental Management Programme.

## **3.6 Project Alternatives Considered**

"Alternatives" are defined in the NEMA EIA Regulations, as "different means of meeting the general purpose and requirements of the activity". The consideration of alternatives is a key component of an EIA process. While an EIA process should investigate and comparatively consider all alternatives that have been identified, only those found to be "feasible" and "reasonable" must be comparatively assessed, in terms of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the community that may be affected by the activity (DEA&DP, 2011b).

The "feasibility" and "reasonability" of an alternative are measured by:

- The general purpose and requirements of the activity;
- The need and desirability of the activity;
- Opportunity costs;
- The need to avoid and/or minimise negative impacts;



- The need to maximise benefits; and
- How it impacts on the community that may be affected by the activity (DEA).

The different types of alternatives that can be considered as part of an EIA process include the following:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- "No-go option".

No process or operational alternatives were considered as the construction of the new rehabilitation dams and upgrade of the existing ash dams will result in a functional supporting structure for the already authorised ADF, which already functions in an accepted and prescribed manner. The ADF currently exists and will be extended to cater for the remaining life of the station and operated according to proven processes.

### **3.6.1 Site Alternatives**

Given the presence of aquatic habitat within the footprint of the RD2 dam a possible alternative could be to shift the location of the new rehabilitation dam due south, so as to avoid the loss of this habitat. Failure to choose this alternative should not however be considered a fatal flaw given the low EIS, moderate PES and minor to negligible impacts associated with the current design plans. For this reason, the alternative of shifting the location of the new rehabilitation dam due south was excluded from the assessment.

No other site alternatives were deemed viable as the construction of the new rehabilitation dams and upgrade of the existing ash dams are associated infrastructures supporting the already authorised ADF, and the landscape surrounding the ADF dictated the optimal location of this supporting infrastructure. The ADF currently exists and will be extended to cater for the remaining life of the station. The IEA for the ADF was issued on 19 August 2015 by DEA; WUL issued on 01 February 2016 by DWS; and the detailed designs were approved by DEA on 16 October 2017 for the ADF.

### **3.6.2 The No-Go Alternative**

If the ash and rehabilitation dams project were not to proceed, this would result in Majuba power station being unable to effectively contain the storm water from the ADF, which in turn will pose a significant environmental risk to the immediate and surrounding biophysical and social environment. The potential impacts resulting from the proposed development not being executed was assessed in the EIR phase, and specialists have not recommended this as an option.

## **3.7 Life of the Project**

The project ensures the continuous operation of the Majuba Power Station and will be functional for the duration of the Power Station's life or until this expansion of the ADF runs out of air space.





## 4 DEVELOPMENT NEED AND DESIRABILITY

According to the EIA Guidelines and Information Document Series, when considering the need and desirability of a project it is essential that cognisance is taken of strategic concerns (e.g. climate change and the sustainability in supply of natural resources, to name a few). To achieve the Constitutional goals of a better quality of life for all now and in the future, through equitable access to resources and shared prosperity, it is essential that society improves on the efficiency and responsibility with which we use resources, and improve on the level of integration of social, economic, ecological and governance systems.

NEMA and the EIA Regulations highlights specific considerations that must be taken into account for every application for environmental authorisation, including the principles set out in Section 2 of NEMA, the general objectives of Integrated Environmental Management set out in Section 23 of NEMA, the minimum requirements set out in Section 24(4) of NEMA, the criteria set out in Section 24O of NEMA and in regulation 8 of the EIA Regulations. Consistent with the above, need and desirability refers to the type of development proposed, divided into two components i.e. time and desirability to place– i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to wise use of land – i.e. the question of what is the most sustainable use of land.

### 4.1.1 Motivation for the Proposed Development

Eskom’s core business is the generation, transmission and distribution of electricity throughout South Africa. Electricity cannot always be successfully stored and must in most cases be used as it is generated. Therefore, electricity is generated according to supply-demand requirements. The reliable provision of electricity by Eskom is critical to industrial development and other poverty alleviation initiatives in the country.

The Majuba Power Station is a major stabilising link to South Africa’s network and produce  $\pm 9\%$  of South Africa’s electricity supply. Majuba is not linked to a specific mine and it receives its coal from various sources. The power station is running out of space for ash disposal and in order for the station to be able to continue with the generation of electricity it requires an upgrade to the existing ADF area for the continuous disposal of the ash for the remaining life of the station.

The following ash dam facilities at the Ash Disposal Facility (ADF) area will need to be constructed and extended to cater for the projected storm water required by Eskom to adequately sustain the storage of runoff ash water for the remaining life of the station.

Table 15: Ash and rehabilitation dams’ required specifications

Facility Description	Surface footprint change (m <sup>2</sup> )
Ash Dam 1	Existing = 110 000 m <sup>2</sup>
	Decrease = 69 500 m <sup>2</sup>
	<b>Final area required 40 500 m<sup>2</sup></b>
Ash Dam 2	Existing = 95 000 m <sup>2</sup>
	Increase = 65 000 m <sup>2</sup>
	<b>Final area required 160 000 m<sup>2</sup></b>
New Rehabilitation Dam 1	<b>Final area required 80 000 m<sup>2</sup></b>
New Rehabilitation Dam 2	<b>Final area required 19 300 m<sup>2</sup></b>
This Project	<b>TOTAL AREA 299 800 m<sup>2</sup></b>



## 4.1.2 Need and Desirability in the context of the Preferred Location

When considering this application and the need and desirability of the proposed development, the Competent Authority must take into consideration the answers to the following questions (summarised from the Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010 as updated in 2017, Gazette No 38108).

How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?

How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?

### **Terrestrial Biodiversity**

Fauna and flora specialists completed assessments for the terrestrial biodiversity (ecology) which may be potentially affected by the project related infrastructure. The specialists detailed the following findings and mitigation measures:

#### ***Terrestrial Flora Findings:***

No plants SCC were observed within the study area. All potential plant Species of Conservation Concern are indicated facilities are presented in the specialist report. However, no suitable habitat for these plant species is present within the proposed PCD expansion areas.

#### ***Mitigation Measures:***

The mitigation measures stipulated by the specialist have been listed in the EMPr for implementation during the project's construction and operational phases. Mitigation measures to prevent impacts are usually contained within Eskom's standard operation procedures and best practice guidelines for construction and therefore no specialized mitigation measures are anticipated.

#### ***Terrestrial Fauna Findings***

Seven faunal SCC were observed or could potentially occur within the study area with a high probability and are briefly discussed in the specialist report.

#### ***Mitigation Measures:***

The mitigation measures stipulated by the specialist have been listed in the EMPr for implementation during the project's construction and operational phases. Mitigation measures to prevent impacts are usually contained within Eskom's standard operation procedures and best practice guidelines for construction and therefore no specialized mitigation measures are anticipated.

Based on the habitat conditions and fauna and flora observations during the fieldwork, as well as the current impacts described above, each habitat type was evaluated in terms of its ecological sensitivity. This sensitivity is rated as either low, medium or high, where low sensitivity is considered ideal for development and high sensitivity areas are to be avoided by the development.



The vegetation and habitats of the proposed expansion areas for the PCD's are transformed or disturbed, with limited natural vegetation remaining, as per the MBCP "Least Concern" and "No Natural Habitat Remaining" areas. Almost no negative ecological impacts within these expansion areas are anticipated. However, the natural drainage areas and grassland surrounding the PCD's area considered to be sensitive habitats of importance and would need to be protected from impacts arising from the expansion of the PCD's such as flooding during construction etc.

How will this development pollute and/or degrade the biophysical environment? What waste will be generated by this development?

What measures have been explored to safely treat and/or dispose of unavoidable waste?

The development is expected to produce the following waste (during the construction phase):

- General (i.e. construction related solid waste and debris).
- Hazardous (i.e. chemical, hydrocarbon contaminated waste and cement powder).

**Mitigation Measures:**

Mitigation measures to effectively minimise, reuse, recycle and to correctly dispose of waste (whether hazardous or general) generated by the project will be listed in the EMPr and implemented on site during the construction and operational phases. Mitigation measures to prevent impacts are usually contained within Eskom's standard operation procedures and best practice guidelines for construction and therefore no specialized mitigation measures are anticipated.

How will the ecological impacts, resulting from this development, impact on people's environmental rights in terms of predicted bio-physical impacts?

The impact of this development is expected to have low biophysical impacts (and on people's environmental rights) as the majority of the routes planned for this infrastructure will be within Eskom's existing site of the Majuba Power Station which are already ecologically disturbed from previous development. No Mitigation is applicable.



What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:

- The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,
- Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),
- Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and
- Municipal Economic Development Strategy ("LED Strategy").

Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?

- Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?

The socio-economic context of the development area with regards to applicable national, regional and local framework strategies and plans and how the proposed development aligns with these is presented in table 13 below.

Table 16: Ash and rehabilitation dams' required specifications

Framework strategy/plan	Project alignment with Socio-economic context
The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area	The project is not in conflict with the strategic plans of the Pixley ka Seme Municipal Integrated Development Plan (IDP), as it is contained within the boundaries of the existing Majuba Power Station site.
Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.	The project is not in conflict with spatial priorities, as it is contained within the boundaries of the existing Majuba Power Station site.
Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.),	The project is not in conflict with existing or planned land use as it is associated with the existing Majuba Power Station site.
Municipal Economic Development Strategy ("LED Strategy").	The project has no impact on the LED strategy, however may contribute to localised skills development during construction

The potential socio-economic impacts (benefits) associated with the proposed development are listed as the following:

- Creation of temporary employment in the local communities.
- Skills development due to the creation of new employment opportunities.

In summary, the overall purpose of the proposed development is an expansion of the existing ash handling facilities at the Majuba Power Station and will be in the best interest of the environment.



### ***Mitigation Measures:***

The impacts are positive and can be enhanced by implementing measures to maximise appointment of local employees in as far as possible, taking into consideration the skills levels required, the urgency of the project (influencing the time to develop skills). The mitigation measures stipulated by the specialist have been listed in the EMPr for implementation during the project's construction and operational phases.

How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?

A heritage specialist completed a heritage impact assessment for the potential impacts the project may have on the loss or disturbance of archaeological resources. A summary of the specialist's findings and propose mitigation measures are detailed as follows:

### **Heritage specialist findings**

The heritage scoping study revealed that the following heritage sites, features and objects that can be expected within the study area.

- Palaeontological

The area has been historically transformed and SAHRA will most likely require not further studies prior to development.

- Archaeology

Almost no archaeological sites are on record close to the study area and no major landscape features like rocky outcrops or hills occur in the study area that would have been focal points in antiquity. Furthermore, the study area lacks raw material suitable for the manufacture of stone artefacts or for the construction of late Iron Age Stone walled settlements.

- Historical finds

Historical finds include middens, structural remains and cultural landscape. No homesteads/structures are visible on Google earth in the study area. No structures older than 60 years were noted during the site visit.

- Burials and Cemeteries

Graves and informal cemeteries can be expected anywhere on the landscape, but no graves were recorded in the study area during the field visit. Studies in the larger geographical area recorded informal cemeteries.

### ***Mitigation Measures:***

Given the above findings, mitigation is not applicable unless discoveries are made during site preparation and construction. The mitigation measures in such an instance have been stipulated by the specialist and listed in the EMPr.



## 5 RECEIVING ENVIRONMENT

### 5.1 Introduction

This section provides a general description of the receiving environment in which the proposed development will be located. The purpose of this section is to provide a description of the baseline environment in which the proposed infrastructure will exist and operate. Potential sensitive issues/areas are also identified, such as ecological aspects, which need to be considered when, conducting the Impact Assessment and designing the various components of the project.

The region has previously been studied to some extent and is recorded in various sources. Consequently, some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been generated and/or supplemented by specialists appointed to undertake baseline studies and impact assessments for the proposed development. Preliminary specialist baseline sensitivity studies were conducted during the Scoping Phase of this S&EIR process and a preliminary terrestrial vegetation sensitivity map of the project area compiled, to inform the alternatives. These studies were updated for the Impact Assessment Phase. The specialist baseline and impact studies that were undertaken for this S&EIR process and informed the description of the affected receiving environment presented in this chapter, are listed in the table below.

*Table 17: Specialist Studies*

Specialist Study	Company	Personnel
Fresh Water and wetland Assessment	Confluent Environmental	Dr. James Dabrowski
Heritage Impact Assessment	Heritage Contracts and Archaeological Consultants CC.	Jaco van der Walt
Ground Water Impact Assessment	Advisian	Karen Burgers
Ecological Assessment	Enviro-Insight CC.	Corné Niemandt Luke Verburgt

In addition to the specialist studies conducted as part of the S&EIR, and residual impact assessments was completed by Advisian to provide information for the Impact Assessment.

The specialist studies conducted are attached as **Appendix C**.

The description in this chapter aims to provide context for the affected regional receiving environment, with site-specific information where possible.

### 5.2 Climate

The Majuba Power Station area is characterised by moderate summer rainfall with an average rainfall of 658 mm per annum. Mean temperatures reach a maximum during December/January of 37.6 °C and a minimum in June/July of -1.6 °C.

The winds in the region are usually north-westerly and reach their maximum speed in the afternoon. During thunderstorms, strong and gusty south-westerly winds are common but short in duration. Local thunderstorms and showers are responsible for majority of the summer precipitation.



### 5.2.1 Rainfall

The study area falls within a summer rainfall region, with over 85% of the annual rainfall occurring during the October to March period. Between October 2011 and March 2012, monthly rainfall ranged between 21 and 128 mm. **Figure 6** shows the monthly rainfall for the Majuba Power Station experienced during the period August 2011 to July 2012.

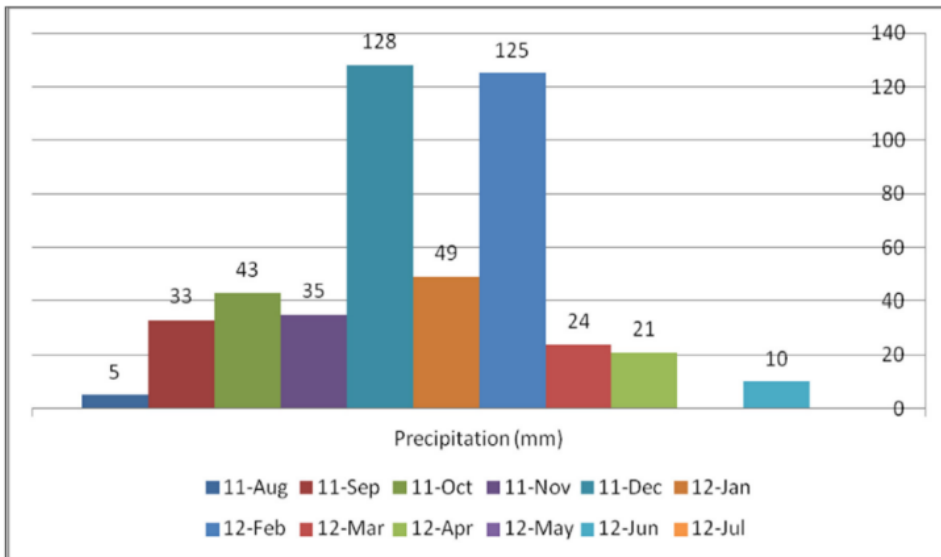


Figure 6: Monthly rainfall as measured at Majuba Power Station (mm/annum) for period August 2011 - July 2012

### 5.2.2 Temperature

Based on the measured data at Eskom's Majuba monitoring station for the period 2009- 2011. Average daily maximum temperatures range from 34.6°C in December to 22.8°C in July, with daily minimums ranging from 14.6°C in January to 2.6°C in June.

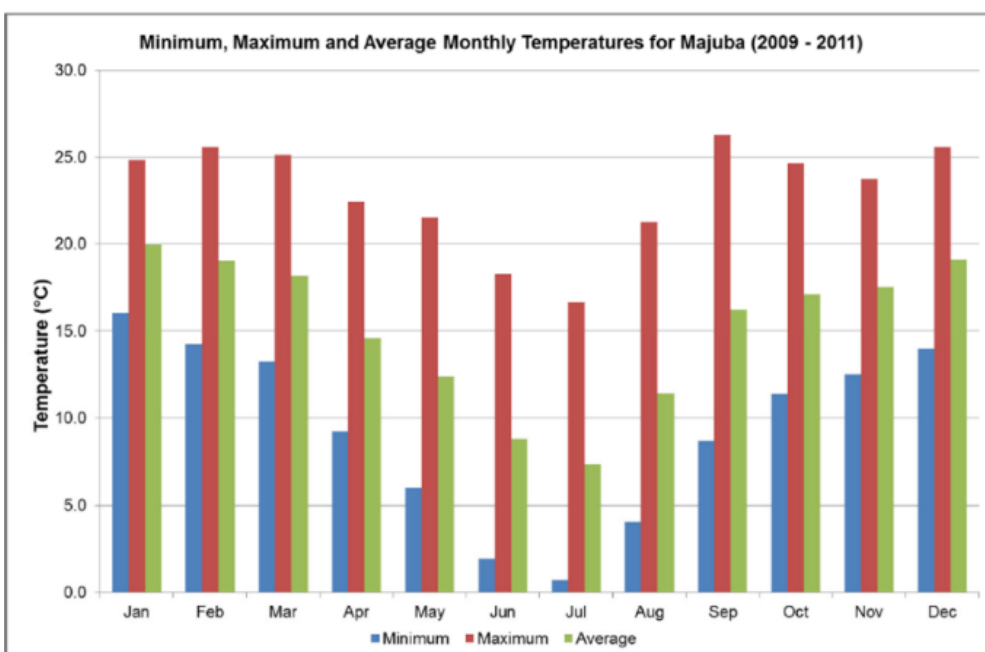


Figure 7: Average monthly maximum, minimum and mean temperatures for Majuba Power Station

### 5.2.3 Wind

The prevailing wind direction is recorded as being co-dominant, with both easterly and west north- westerly winds. Figure 8 shows the period, day-time and night-time wind roses for the Majuba Power Station.

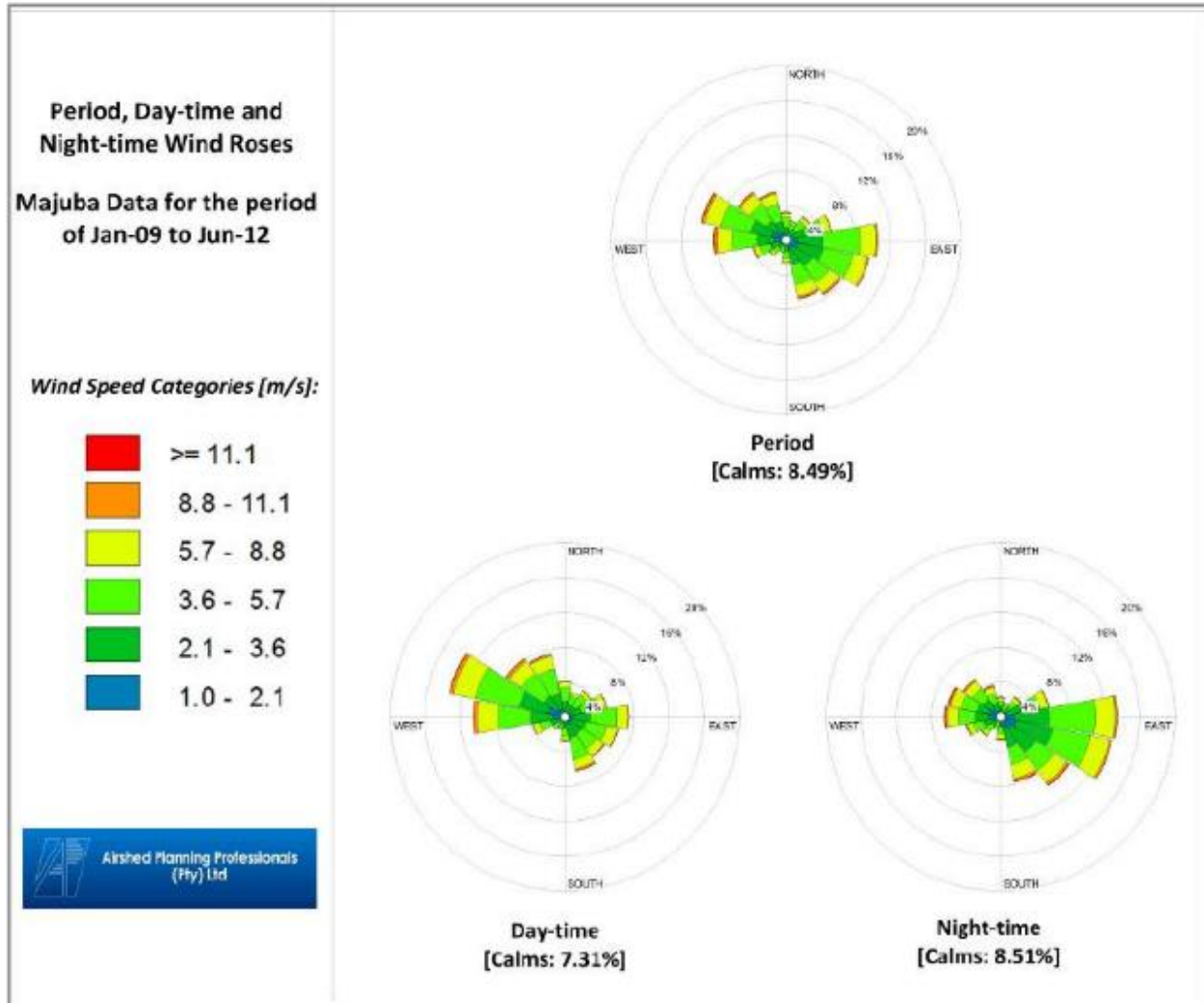


Figure 8: Average monthly maximum, minimum and mean temperatures for Majuba Power Station

### 5.3 Geology and Land use

Majuba Power Station lies on the north-eastern rim of the Great Karoo Basin which comprises predominantly sediments of the Karoo Supergroup. The Karoo dolerite has intruded these sediments along planes of weakness and form a large part of the Karoo rocks in the area.

The Karoo sediments that underlie the site belong to the Volksrust Formation (Ecca Group). The sediments consist of light to dark bluish grey *micaceous* mudrocks and shales with subordinate and intercalated siltstone/sandstone. Over much of the Karoo basin, the sedimentary rocks are horizontally bedded or have very gentle dips. Sandstones comprise a large portion of the Karoo sediments and are generally closely intercalated with the mudrocks and siltstones. The intruding dolerite dykes and still comprised dark-coloured, crystalline, igneous basaltic rocks weathering as prominent ridges or hills. The geology of the study area is shown in Figure 9.



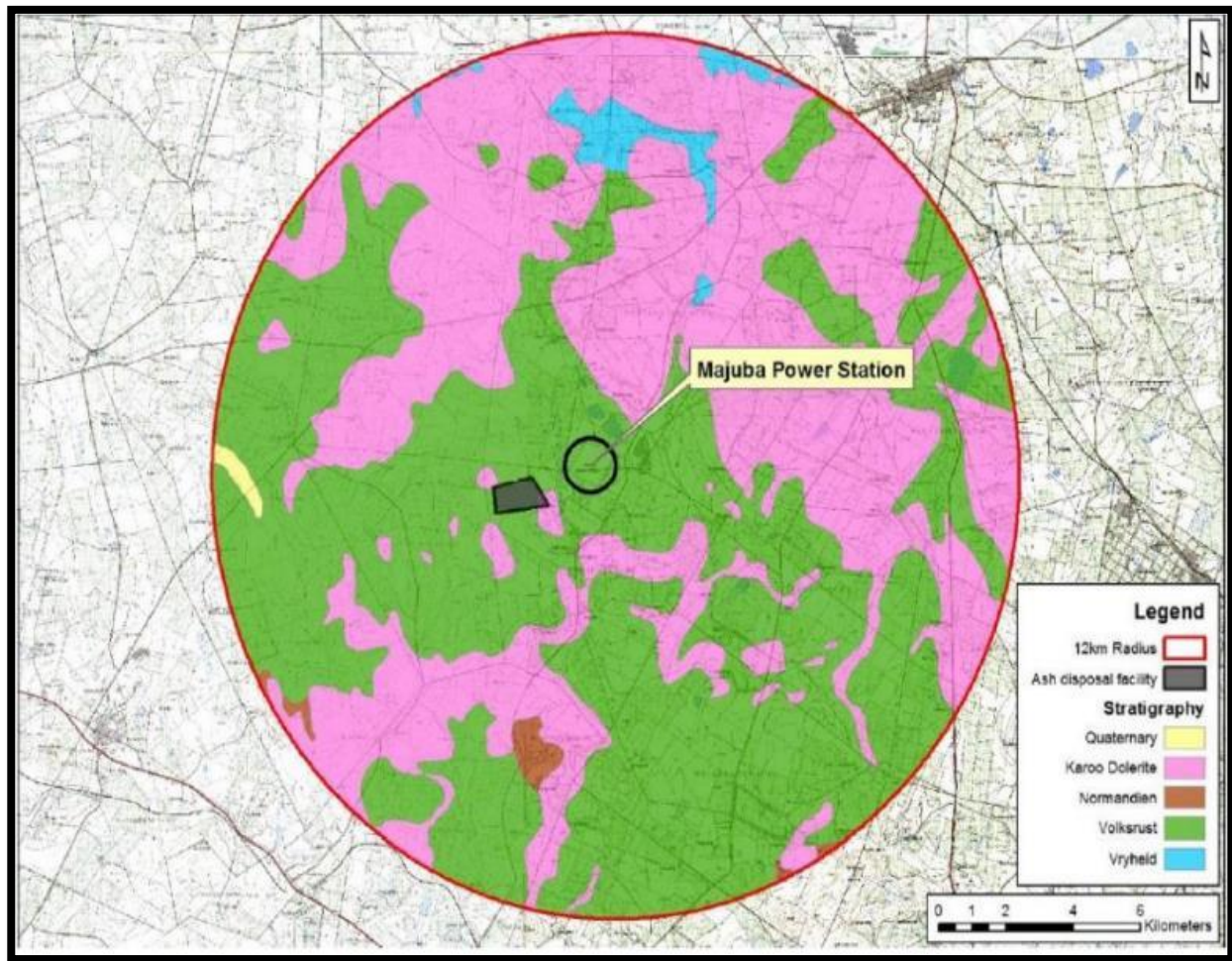


Figure 9: Geology of the study area

Land cover categories for the study area are presented in **Figure 10**. For the purpose of this assessment, land cover is loosely categorised into classes that represent natural habitat and categories that contribute to habitat degradation and transformation on a local or regional scale.

The study area is situated within the Pixley Ka Seme Municipality, which comprises a total of 522,723ha. The BGIS (2007) assessment indicates that approximately 88% of the municipal area is currently considered untransformed. This figure is however regarded an overestimation of the true extent of remaining natural (pristine) grassland habitat in the region.

The majority of the study area is characterised by high levels of habitat transformation, isolation and habitat fragmentation, resulting from persistent increases in mining and agricultural activities, urban developments, linear infrastructure and poor management practices.

The effects of commercial agriculture (maize production), infestation by alien invasive trees and recent increase in mining activities are evident from the *mosaic* appearance of land cover in the immediate region. Other noteworthy land transformation effects result from mining, industrial and urban development. Road and railway infrastructure in the region caused a moderate level of habitat fragmentation and isolation.

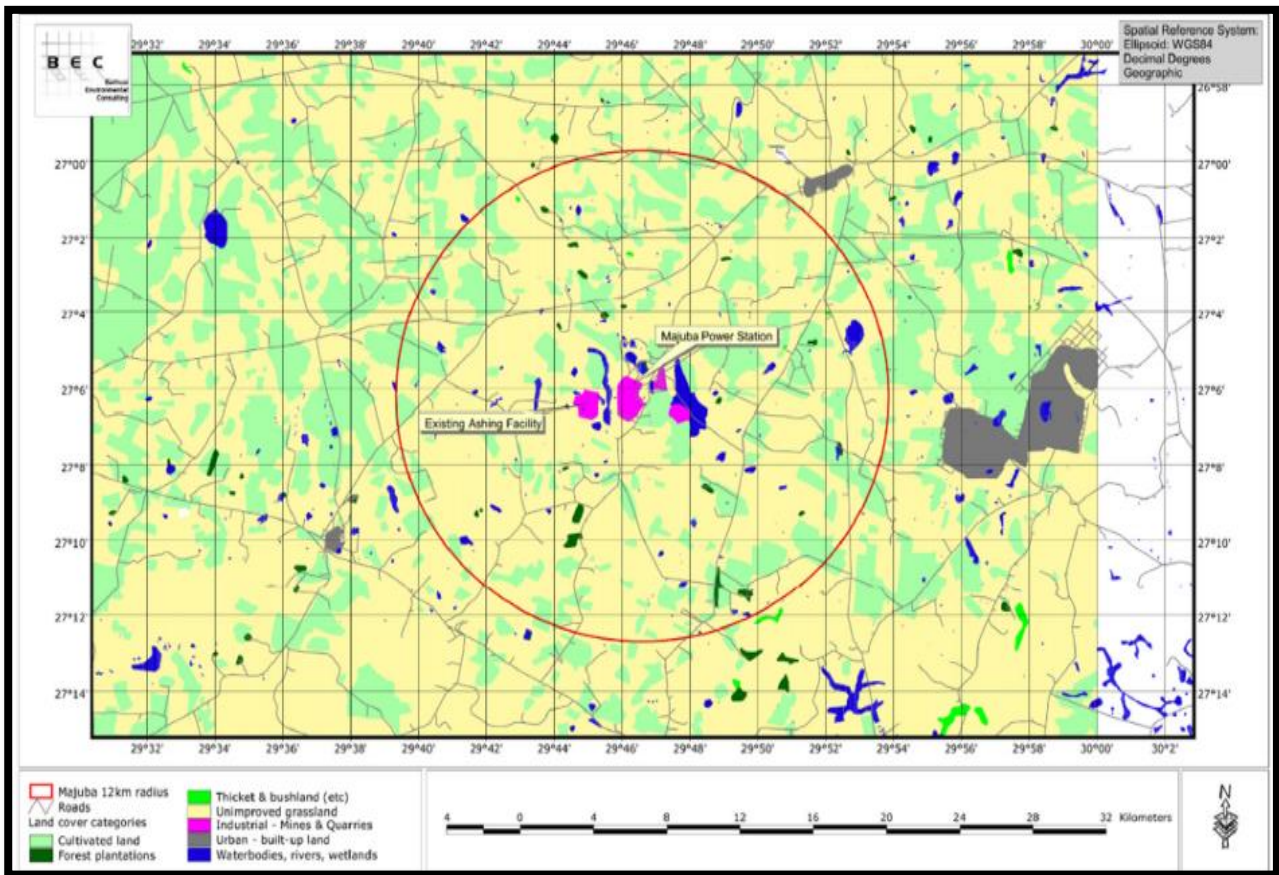


Figure 10: Land cover categories in the study area

## 5.4 Ecology

### 5.4.1 Flora

Enviro-Insight CC completed a terrestrial ecological (flora) assessment on the 7<sup>th</sup> of November 2018. The field survey focused on a classification of the observed fauna and flora, habitats as well as the actual and potential presence of species of conservation concern (SCC) either classified as Threatened by the IUCN (2018) or protected by the NEM: BA. An analysis of the diversity and ecological integrity of the habitats present on site was also performed. A literature review was also conducted as part of the desktop study to identify the potential habitats and flora SCC present within the study area.

The study area falls entirely within the Amersfoort Highveld Clay Grassland vegetation unit (represented in Figure 11).

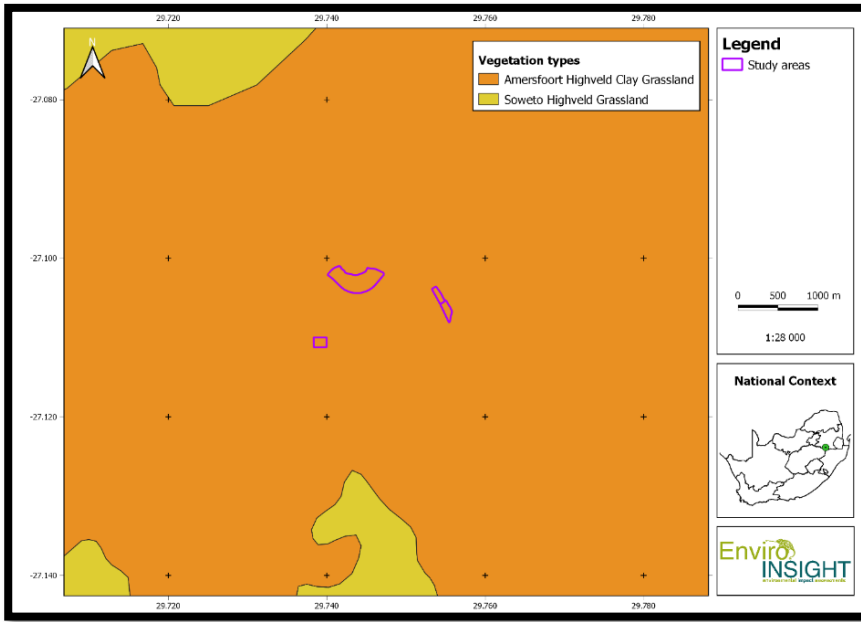


Figure 11: Regional vegetation types within the study area.

The vegetation is described as undulating grassland plains, with localised patches of dolerite outcrops in certain areas. The landscape is typically comprised of short closed grassland cover consisting mainly of *Themeda triandra*, which is often severely grazed to form a short lawn. This vegetation unit is considered Vulnerable with the conservation target set at 27 % of which none is currently protected. Approximately 25 % of the vegetation type is transformed of which 22 % is through cultivation, while exotic *Acacia* species (Silver and Black Wattle) and *Salix babylonica* invade drainage lines (Mucina & Rutherford, 2006). Overgrazing has led to the invasion of *Seriphium plumosum* (bankrupt bush).

According to the Mpumalanga Terrestrial Biodiversity Conservation Plan) map (refer to Figure 12), the study area intersects both "Least Concern" and "No Natural Habitat Remaining" areas. (Potential plant Species of Conservation Concern are indicated in Table 18.)

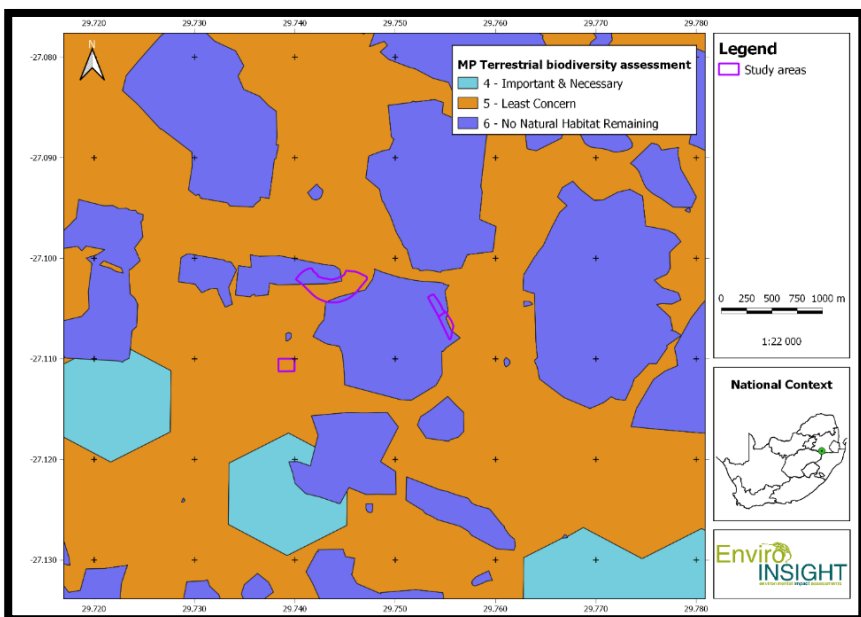


Figure 12: Study area in relation to Mpumalanga Terrestrial Biodiversity Conservation Plan.

Table 18: Potential Plant Species of Conservation Concern

Species	Conservation status	Habitat description	Present on site
<i>Aloe kniphofioides</i>	Vulnerable – species threatened by habitat loss through transformation and degradation, particularly from open cast coal mining in southern Mpumalanga. Populations declining from poor recruitment due to loss of pollinators and inappropriate fire management (species dependent on fire for flowering)	Occurs in high altitude montane grasslands (Flowering period: July – March)	No
<i>Aspidoglossum demissum</i>	Vulnerable – this species is known from only four localities all occurring within the Wakkerstroom district (Mpumalanga). Grasslands are susceptible to heavy grazing	Near edges of sheetrock on mountain summits, growing approximately 2000 m in Wakkerstroom Montane Grassland (Flowering period: November – December)	Unlikely
<i>Aspidoglossum xanthosphaerum</i>	Vulnerable – Habitat threatened by wetland drainage for crop cultivation and by trampling/grazing from livestock	Associated with marshy sites at around 1800 m (Flowering period: September – December)	Unlikely
<i>Cyphia bolusii</i>	Vulnerable – as a result of urban expansion, mining and alien plant invasion	Near rocky outcrops growing predominately on serpentine soils at altitudes 750 – 1700 m (Flowering period: September – March)	No
<i>Gladiolus robertsoniae</i>	Near threatened – predominately from agriculture, but recently through intensive coal mining. In addition, overgrazing and trampling by cattle particularly in the Amersfoort area. Populations in Gauteng have declined through urban expansion	Moist highveld grasslands, wedged in rock crevices, mostly dolerite outcrops. (Flowering period: October – February)	No
<i>Kniphofia typhoides</i>	Near threatened – reports suggest extensive declines in populations from habitat loss to coal mining, overgrazing by cattle and urban expansion. In Mpumalanga, habitat loss is primarily mediated through alien plant invasion	Associated with low lying wetlands and seasonally wet areas in <i>Themeda triandra</i> dominant grasslands on heavy black clay soils, tends to disappear from degraded grasslands. (Flowering period: February – March)	Unlikely
<i>Nerine platypetala</i>	Vulnerable – habitat loss through extensive harvesting and land degradation	Found predominately in perennial marshes (Flowering period: September – February)	No
<i>Stenostelma umbelluliferum</i>	Near threatened – the habitat is potentially threatened by urban expansion and industrial development has led to the establishment of highly fragmented populations. Loss of habitat through the removal of topsoil associated with open-cast mining. Agriculture is also a threat because of the highly fertile soils in which this species occurs	Occurs in deep black turf, mainly near drainage lines on vertical soils with high clay content in grassland. Plants grow either in full sun or light shade. (Flowering period: September – March)	Unlikely

During the field survey no plants SCC were observed within the study area as no suitable habitat for these plant species is present within the proposed Ash and Rehabilitation Dams area.

Four main habitats were identified:

- Ash Dump and associated infrastructure, including Pollution Control Dam;
- Natural Drainage;

- Natural Grassland; and
- Transformed Habitat.

The area in general has very limited natural vegetation remaining and therefore also has limited optimal habitat for fauna species. Nevertheless, the PCD's and the reeds surrounding them provide habitat for many waterbirds.

The Natural Drainage habitat has no obvious aquatic vegetation such as reeds or other marginal vegetation. One section of the drainage line leading northwards from PCD to the clean farm dam is dry. Cattle graze and trample within the drainage area, but it is still in a semi-natural condition.

The Natural Grassland habitat includes both natural and exotic plant species. Cattle graze within this habitat, and some sections are heavily impacted by both trampling and faeces from cattle, as well as ash fallout.

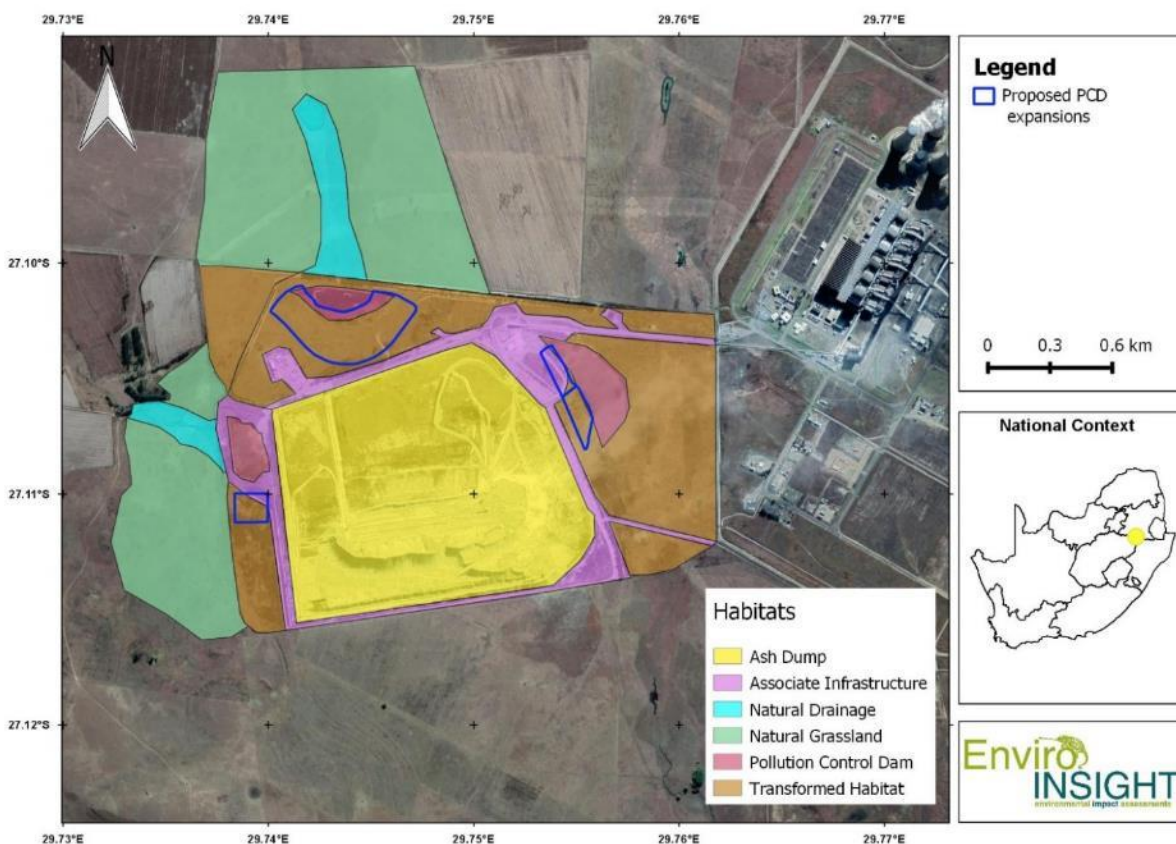


Figure 13: Habitat types identified within and surrounding the study area.

The Transformed habitat has virtually no ecological value due to old ash dumps which are vegetated by both pioneer and exotic plants. No plants SCC were observed within the study area. No suitable habitat for Species of Conservation Concern is present within the proposed PCD expansion areas.

## 5.4.2 Fauna

Enviro-Insight CC completed a terrestrial ecological (fauna) assessment on the 7<sup>th</sup> of November 2018. A rapid field survey was conducted within the regional vegetation type (Amersfoort Highveld Clay Grassland) from which a series of conclusions and subsequent recommendations were derived to inform the findings of the study. Faunal SCC (which were observed or could potentially occur within the study area) are presented in Table 19.

Table 19: Potential Faunal Species of Conservation Concern

Species	Conservation status	Present on site
African Clawless Otter ( <i>Aonyx capensis</i> )	Near-Threatened	Confirmed at two of the existing PCDs (scat). Unlikely to be negatively affected by proposed Ash and Rehabilitation Dams project in the long-term, only temporary disturbance during construction anticipated.
Serval ( <i>Leptailurus serval</i> )	Near-Threatened	Almost certainly occurs in the area and will forage around the PCDs but does not exclusively rely on them. Unlikely to be negatively affected by proposed expansion of PCDs in the long-term, only temporary disturbance during construction anticipated.
Southern African Vlei Rat ( <i>Otomys auratus</i> )	Near-Threatened	Almost certainly occurs in the areas surrounding the PCDs as well as the wetlands and drainage areas. Unlikely to be negatively affected by proposed Ash and Rehabilitation Dams project in long-term, only temporary disturbance during construction anticipated.
Giant Girdled Lizard ( <i>Smaug giganteus</i> )	Vulnerable	Although found within the study area, no suitable habitats exist for this species in the areas earmarked for the Ash and Rehabilitation Dams project.
Blue Korhaan ( <i>Eupodotis caerulescens</i> )	Vulnerable	Observed in the grasslands adjacent to the power station property. Will not be directly affected by the Ash and Rehabilitation Dams project. However, the structural failure and/or flooding of the PCDs could result in significant habitat loss for this species.
Red-footed Falcon ( <i>Falco vespertinus</i> )	Near-Threatened	Migratory species foraging in the area, will not be affected by the Ash and Rehabilitation Dams project.

Figure 14 shows the preliminary habitat sensitivity for the study area which indicates that the majority of the study area is regarded as low sensitivity as the areas are either disturbed or transformed. The Natural Drainage Areas are of medium-high ecological sensitivity, while the surrounding Natural Grasslands is considered to be of medium ecological sensitivity. Care should be taken to ensure that impacts to these habitats do not arise during the expansion of the PCD's.

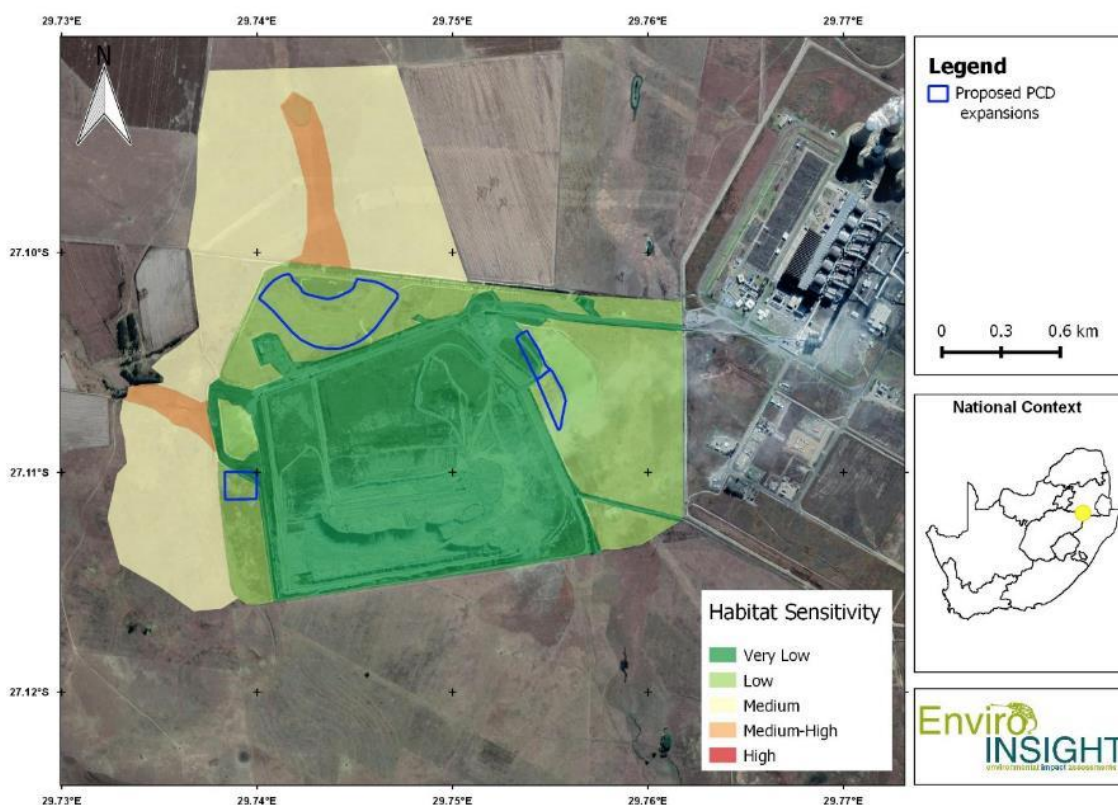










Figure 14: Preliminary habitat sensitivity of the study area

### 5.4.3 Site Specific Survey

Twelve survey sample sites surrounding the Majuba Power Station including the proposed extension areas were visited during the site visit. A short habitat description and visual representation of the 12 survey sites are presented in the table below.

Table 20 provides a short habitat description and visual representation of the 12 survey sites surrounding the PCD extension areas. \*PCD = Pollution Control Dam.

Table 20: Site Survey Findings

Survey sites	Habitat description	Photographs	
MJ1 -27.1052328° S 29.7545293° E	Existing PCD with surrounding ash. Small patch of reeds present.		
MJ2 -27.1013105° S 29.7452117° E	Existing with good reed beds and one rocky shore.		
MJ3 -27.1069981° S 29.7350124° E	Stream below PCD. No discernible flow, forming a series of small ponds. The area is heavily impacted by cattle (both trampling & faeces) and ash fallout (2 <sup>nd</sup> photo).		
MJ4 -27.109223° S 29.7382175° E	Cement walled PCD adjacent to ash dump. Marginal reed beds on one side. Heavily choked with ash (see 2 <sup>nd</sup> photo).		



Survey sites	Habitat description	Photographs	
MJ5 -27.1109452° S 29.7395529° E	Old ash dumps (from trucks) vegetated by both pioneer and exotic vegetation. Very low ecological value.		
MJ6 -27.1041327° S 29.7435633° E	Heavily disturbed grassland on edge of PCD.		
MJ7 -27.104132° S 29.74356° E	Seasonally inundated grassland on turf between PCD and dense disturbed grassland of MJ6.		
MJ8 -27.1033214° S 29.7452647° E	Excavated trench leading from ash dump to PCD. Densely reeded.		
MJ9 -27.099336 ° S 29.741842° E	Grassland drainage outside Eskom property. Grazed by cattle and trampled, but site is still in semi- natural condition		



Survey sites	Habitat description	Photographs	
MJ10 -27.0980493° S 29.7429462° E	Dry drainage line leading down from PCD to clean farm dam.		
MJ11 -27.0941572° S 29.7427244° E	Dammed drainage line frequented by cattle. No reeds or other marginal vegetation.		
MJ12 -27.106004° S 29.7545543° E	Transformed habitat adjacent to MJ1 (between PCD and ash dump).		

The vegetation and habitats of the proposed expansion areas for the PCD's are transformed or disturbed, with limited natural vegetation remaining, as per the MBCP "Least Concern" and "No Natural Habitat Remaining" areas. Almost no negative ecological impacts within these expansion areas are anticipated. However, the natural drainage areas and grassland surrounding the PCD's area considered to be sensitive habitats of importance and would need to be protected from impacts arising from the expansion of the PCD's such as flooding during construction etc. Mitigation measures to prevent these impacts are usually contained within standard operation procedures and best practice guidelines for construction and therefore no specialized mitigation measures are anticipated, although these will be addressed and described in the EIA report.

## 5.5 Ground Water

Advisian completed a desktop groundwater assessment for the study site on the 30<sup>th</sup> of November 2018. The findings of this survey are discussed in detail below.

The Majuba Power Station ash and rehabilitation dams fall within the C11J quaternary catchment. Within this catchment two aquifer systems are present underlying the site. These aquifers comprise an upper thin and lower / deeper and extensive aquifer systems.

Groundwater is predominantly topographically controlled. However, the geological structures, such as dolerite dykes, also have a very important influence on the flow directions and flow velocities of groundwater as groundwater in the area predominantly is contained in fractures, faults, joints and dykes or contacts between the sediments and the dolerite.

The upper aquifer is associated with a weathered zone. Water is often found within a few metres of the surface. Rainfall infiltrates into the weathered material and is constrained by impermeable shale or dolerite. Groundwater movement above this this shale or dolerite is lateral in the general direction of the surface slope. At surface, this water appears as either base flow in nearby non-perennial streams or as springs/seepage. Below the weathered zone, within the consolidated formations, the deeper aquifer is found occurs in fractures, joints and structural openings in the rock. Dolerite and sandstone show better development of these structures, therefore these formations show higher water-yielding properties. Yields from boreholes vary from 0.01 l/sec to 16 l/sec in the deeper aquifer from sandstone or dolerite. These aquifers together are classified as intergranular and fractured aquifers with average borehole yields between 0.1-0.5 L/s. No major groundwater use or abstraction occurs within the area surrounding the power station and dams (~12 km radius). The figure below indicates the types of aquifers surrounding the Majuba Power Station and GRA calculated yield for these aquifers.

Table 21: The GRA2 data summary for C11 J quaternary catchments

QUATERNARY CATCHMENT	C11J
Area of quaternary catchment (km <sup>2</sup> )	1000.6
Average groundwater level (meters below ground level)	9.3
Volume of water in aquifer storage (Mm <sup>3</sup> /km <sup>2</sup> )	703.93
Specific Yield	0.0031
Harvest Potential (Mm <sup>3</sup> /a)	20.90
Groundwater contribution to river base flow (Mm <sup>3</sup> /a)	6.76
Utilizable groundwater exploitation potential in a wet season (Mm <sup>3</sup> /a)	7.42
Utilizable groundwater exploitation potential in a dry season (Mm <sup>3</sup> /a)	4.83
Mean Annual Precipitation (MAP) (mm/year)	658
Mean groundwater recharge (mm/year)	30.53
Mean groundwater recharge (% of MAP)	4.64

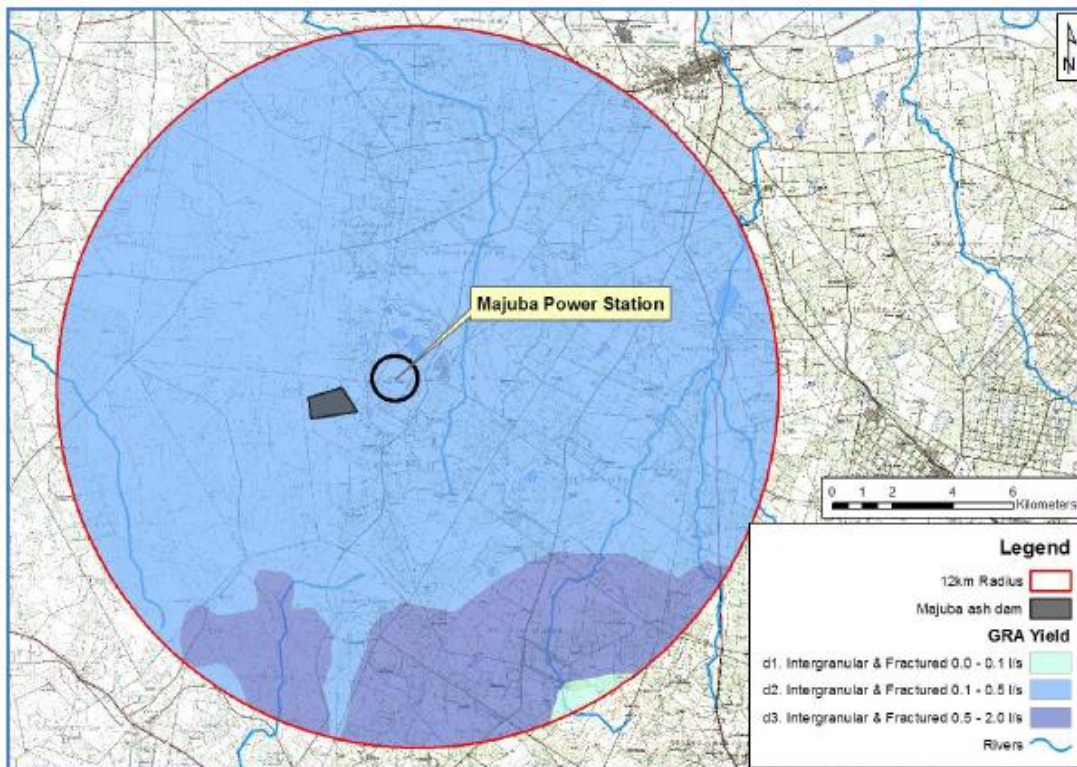


Figure 15: Study area and project areas.



### Groundwater Levels

Boreholes targeting groundwater in the Volksrust or Vryheid formations are generally drilled to between 35-40 m, or where groundwater in dolerite intrusions is to depths of 50-60 m. The groundwater in the underlying rock formation is of a potable quality with local occurrences of high salinity. In general, the aquifers underlying the project area are considered to constitute a minor aquifer, with some abstractions of local importance.

On average the water levels below the Majuba Power Station area occur at a depth of 3.06 mbgl with a minimum depth of 0.31 mbgl between ash disposal facility and Witbankspruit and maximum depth of 15 mbgl between the ash disposal facility and Palmietspruit. Artesian water and seepage does occur surrounding some of the ash dams.

Routine surface water and groundwater monitoring reports are available and contain groundwater levels and quality in the vicinity of Majuba Power Station. The surface water and groundwater monitoring network at Majuba is divided into specific areas according to their location relative to the infrastructure. Several different monitoring areas are identified at the power station:

- Palmiet Spruit Drainage System: drainage to the west of the power station, drainage to the east and north of the ash dump and clean and dirty water to the south of the ash dump.
- Mezig Spruit Drainage System: drainage to the west of the ash dump.
- Geel Klip Spruit Drainage System: drainage to the north of the coal stockyard, the sewage plant and power station and drainage to the west of the game camp.
- Witbank Spruit Drainage System: coal stockyard.

The monitoring sites are composed of 8 different types of monitoring:

- Groundwater
- Rivers or natural streams
- Canal or trenches
- Sewage effluent or discharge sites
- Pan or dams
- Seepage sites
- Other sites.

The monitoring points in various conditions are routinely monitored at the power station and ashing area. The Palmiet Spruit drainage area contains 61 monitoring points (surface and groundwater monitoring points combined), the Mezig Spruit drainage area contains 13 monitoring points, The Geel Klip Spruit Drainage System contains 28 monitoring points and the Witbank Spruit Drainage System contains 18 monitoring points. Therefore, a total of 110 monitoring points in various conditions and types are monitored on a quarterly basis, depending on access and condition. Some of the sampling points often do not contain water or the equipment is out of order and sampling cannot take place.

The variability in water level elevations across the site is estimated to be a function of the topography, with shallow groundwater observed in lower lying areas and deeper groundwater levels on the ridges. Groundwater levels close to the existing ash disposal facility are very close to the ground surface (and in some cases artesian). This is thought to be as a result of topography, but also due to seepage from the ash disposal facility and associated surface water infrastructure such as the toe drains, clean and dirty water dams. In general, groundwater in the study area flows from areas of higher topography to lower-lying areas. Groundwater discharge (e.g. springs, seeps, marshy areas) occurs in lower lying areas, pans and river courses. Water levels in the Ash Dump site and the majority of the boreholes vary between 1-7 mbgl. Some deeper water levels are observed to 15 mbgl here. The Metzlik drainage area water levels vary between 0-11 mbgl. The Geel Klip Spruit



drainage area shows water levels between 1-6 mbgl and the Witbank Spruit drainage area water levels between 0.3-4.3 mbgl.

**Ground Water Flow**

Recharge moving through the soil zone combines with leachate from the ash storage facility and migrates downwards through the unsaturated zone to the water table. The volume of leachate produced by each ash storage facility depends partly on the hydraulic properties of the compacted ash and the lining below the ash dams. Groundwater below the water table moves with the local groundwater gradient towards discharge zones (most likely surface water resources such as nearby streams, wetlands and dams). Groundwater gradients are determined by surface topography and the water table reflecting the topography (i.e. groundwater flows from higher areas to lower areas). Due to the shallow depth to groundwater in the immediate vicinity of the ash disposal facilities (existing and proposed) and associated infrastructure it is possible that some leakage from the base of the ash disposal facility reaches local groundwater (i.e. a groundwater mound has formed under the ash disposal facility). This is supported by the poor groundwater quality in some boreholes close to the existing ash disposal facility, which strengthens the case that the parameters are linked to ADF.

It is, however, difficult to separate the effects of leakage from the ash disposal facility from the effects of leakage from return water dams, toe drains and other surface water impoundments, and these have been combined for the purposes of impact identification. Any leachate from the current ash disposal area that is not intercepted by leachate control facilities, will flow through the aquifer and discharge at nearby surface water courses. Groundwater will flow via fractures, faults, fissures and other secondary discontinuities in the rock. Locally the groundwater gradients are expected to be modified because shallower groundwater depths ("mounding") are associated with the ash disposal facilities and other water sources. The figure below shows groundwater flow direction and elevation based on topography of the site. These water levels and flow directions are based on pre-operational data and therefore reflect information prior to construction of the ashing facility.

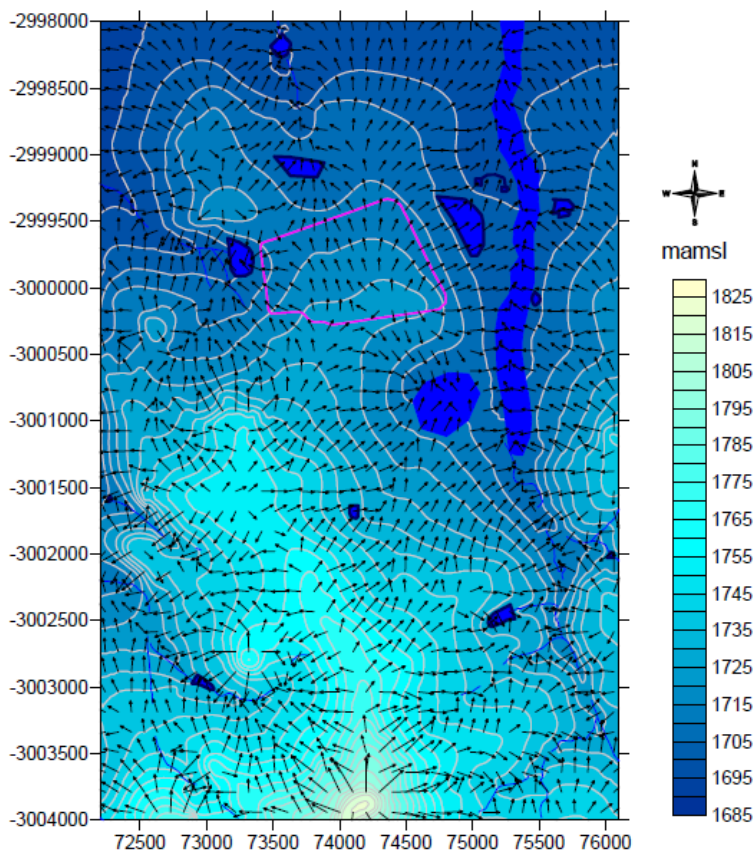


Figure 16: Groundwater flow through study area

**Ground Water Quality**

Two types of groundwater have been observed to occur in the Majuba Power Station area. These two types are:

- Calcium-bicarbonate (Ca-HCO<sub>3</sub>) water which originates as runoff (Ash moisture, dust suppression, etc.) and enters the groundwater system through Ash Dump area. This is typical of shallow, fresh groundwater's, implicating that it is freshly recharged water (rainwater or seepage); and
- Sodium-bicarbonate (Na-HCO<sub>3</sub>) water – this type of groundwater occurs in the deeper aquifer within the fracture rock aquifer in the groundwater found in sandstone and dolerite.
- Variable concentrations of SO<sub>4</sub>, Mg and Cl in the above water types.

The figure below shows the variations in groundwater type on a piper diagram, as analysed for from site boreholes. Groundwater monitoring has been occurring on the site since 1990.

The routine monitoring is conducted by Kimopax Pty Ltd in order to monitor the groundwater quality in the vicinity of Majuba power station. As previously discussed, the groundwater monitoring network at Majuba power station is divided into four areas according to their location relative to the infrastructure. The concentrations of more than 20 inorganic chemical parameters in the water samples are determined, however, six main parameters are evaluated as indicators of contamination in the monitoring of the pollution potential in this system. These six parameters are: electrical conductivity (EC) and the major ions, sodium (Na), calcium (Ca), chloride (Cl) and sulphate (SO<sub>4</sub>) and iron (Fe).

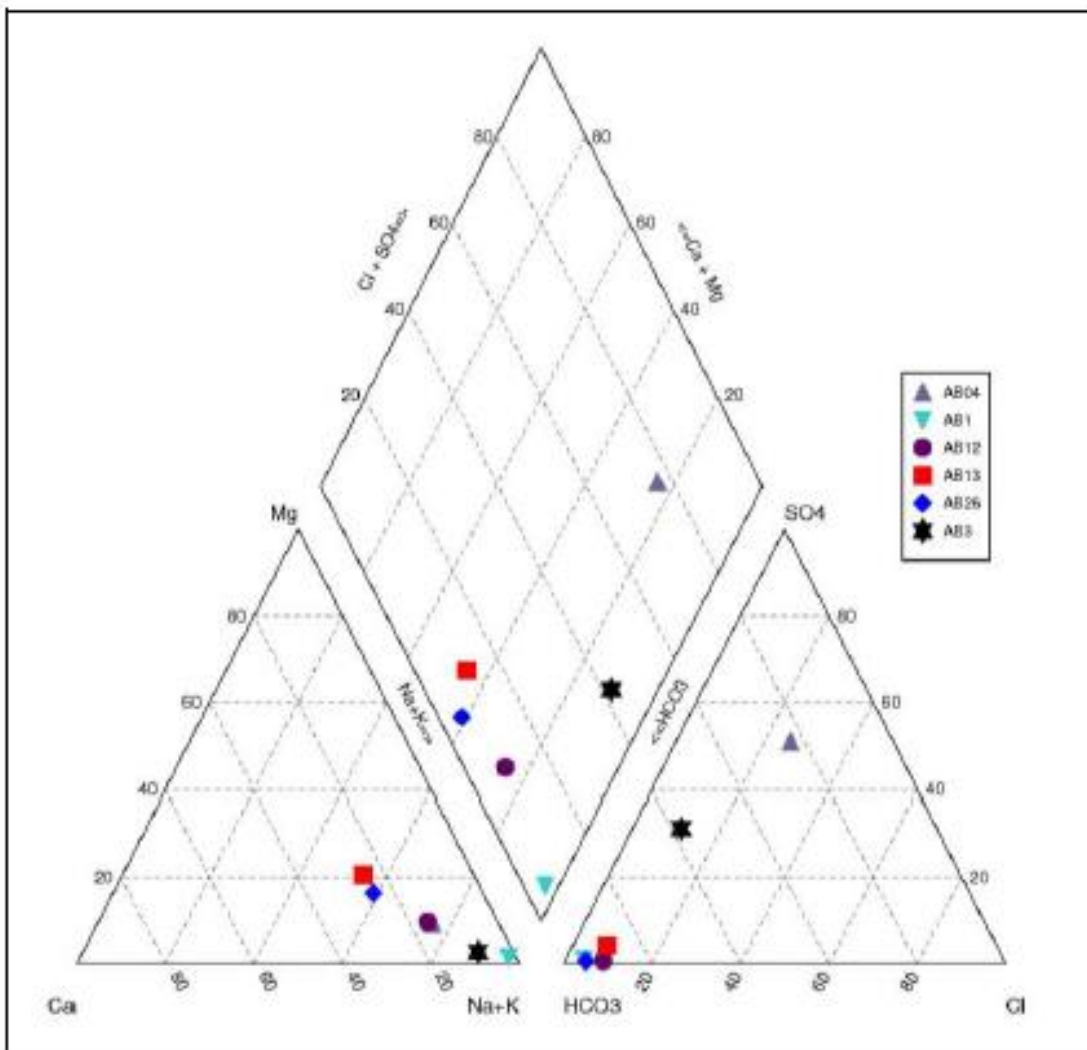


Figure 17: Groundwater quality

### Aquifer Properties

Slug tests were previously performed on all the boreholes to determine the hydraulic properties of the aquifer in the immediate vicinity around the borehole. Conductivities are relative low with values between 0.008 and 0.78 m/d.

### Aquifer Ash Properties and Source-Path-Receptor Information

A finite-difference groundwater flow and transport model was developed to simulate the potential movement of leachate from the ash disposal facilities to groundwater. Leachate plumes are likely to move with the ambient groundwater flow in a direction determined largely by the surface topography. However, the predictions depend on aquifer properties and on leachate seepage rates.

A detailed Source-Pathway-Receptor (SPR) study was conducted by SPR for the ash disposal facility (ADF) on the Majuba site. This study identifies and assesses potential liabilities associated with the operation of a lined and unlined 50-Year ADF. The study was conducted with hydrogeological data collected prior to construction of the ADF, during monitoring and using a calibrated numerical model.

### Source Characterisation

For the ash disposal facility (ADF), extension to the ash dams and the new rehabilitation dams, the ash source and source of contaminants is the Majuba Power Station. Water into these dams will come from natural rainwater, infiltration from dust suppression and irrigation. From geochemical perspective, the old fly ash material is classified as Type 3 based upon the leachable concentrations (B, Cr and Cr(VI)) and the fresh ash material as Type 4 as no concentrations exceeded the leachable or total thresholds. The older fly ash may contain elevated metals due to poorer quality coal use in the past or weathering which has exposed metals in the ash.

Pathway: Any contaminated leachate leaving the ADF, would seep through the underlying unsaturated zone before entering the shallow aquifer. The leachate would then be transported along with groundwater to nearby receptors. The upper aquifer (shallow) is associated with the weathered zone is often found within a few meters below the surface. The saturated zone movement occurs above the shale layers or dolerite and follows the surface slope. On the surface this water appears as either baseflow in nearby streams or as seeps. Groundwater flow and migration of potential contaminant from the ADF will be controlled by fractures with very low permeability.

Receptors: Abstraction boreholes, springs surface water streams and wetland, with their respective ecosystems, represent the main receptors of potential impacts from the ADF. The receptors fall within two catchments, a high risk and a low risk catchment. All downstream boreholes between the ADF, Witbank Spruit and Geelklip Spruit fall within the high-risk area and the Palmiet Spruit falls within low risk receptor catchment. A Geotechnical study would add value to receptor modelling and determining risks.

Model Results: Two scenarios were modelled using the numerical model: a high-risk scenario with no liner underlying the ADF and with a class C liner underlying the ADF. As the new RD and AD will be constructed using Class C liners the assessment, risk and mitigation with regards to the source, receptors and pathways is discussed here, only.

**Class C Liner in place:** The RD and AD with mitigation measures including cut-off trench, and the underlying clay is well compacted to ensure that the hydraulic conductivity is  $1 \times 10^{-9}$  m/d or above, with ash disposal the leakage rates are predicted to range between  $0.047 \text{ m}^3/\text{d}$  and  $0.4747 \text{ m}^3/\text{d}$  for the full operational duration.

The maximum Chromium (VI) and Boron (B) concentration that reaches groundwater system is predicted at  $0.003 \text{ mg}/\ell$  and  $0.045 \text{ mg}/\ell$ , respectively. The maximum Sulphate ( $\text{SO}_4$ ) and TDS concentration that reaches groundwater system are predicted at  $16 \text{ mg}/\ell$  and  $365 \text{ mg}/\ell$ , respectively. Therefore, Class C liner scenario where mitigation is in place, the following is anticipated. The plume is predicted to spread a maximum of 40 m around



the perimeter of the ash disposal facility (ADF) and migrate not further than 250m north-east and north-west of the in the underlying aquifer. Due to a well compacted clay liner, it is predicted to have different characteristics to the plume associated with class C liner and as such the impact is rated low to medium using significance of Impact in accordance with EIA ratings. The risk receptors in the area are:

- Witbankspruit
- Geelklipspruit
- Palmietspruit (lower risk)
- Wetlands /Pans along the Witbankspruit /Geelklipspruit and low risk along
- Palmietspruit
- Monitoring boreholes along and within Witbankspruit
- Pollution Control Dams (PCD's 1 and 2)

The assessment indicated and proves that all dams without mitigation (worst case scenario) and with mitigation (Class C liner) do leak but differ at the leakage rates. It is recommended that a well compacted clay liner, bentonite enriched soil with leachate collection and subsoil drain or a Class C liner be installed under the RD and AD dams to be constructed.

### **5.5.1 Surface Water / Wetlands**

Enviro-Insight CC completed an aquatic ecological (wetland) assessment on the 7<sup>th</sup> of November 2018. The findings of this survey are discussed in detail below.

The area of interest falls entirely within quaternary catchment C11J in the Vaal Water Management Area. All watercourses draining the project area and its immediate vicinity ultimately flow into the Geelklipspruit River which flows in a north-westerly direction and joins the Vaal River.

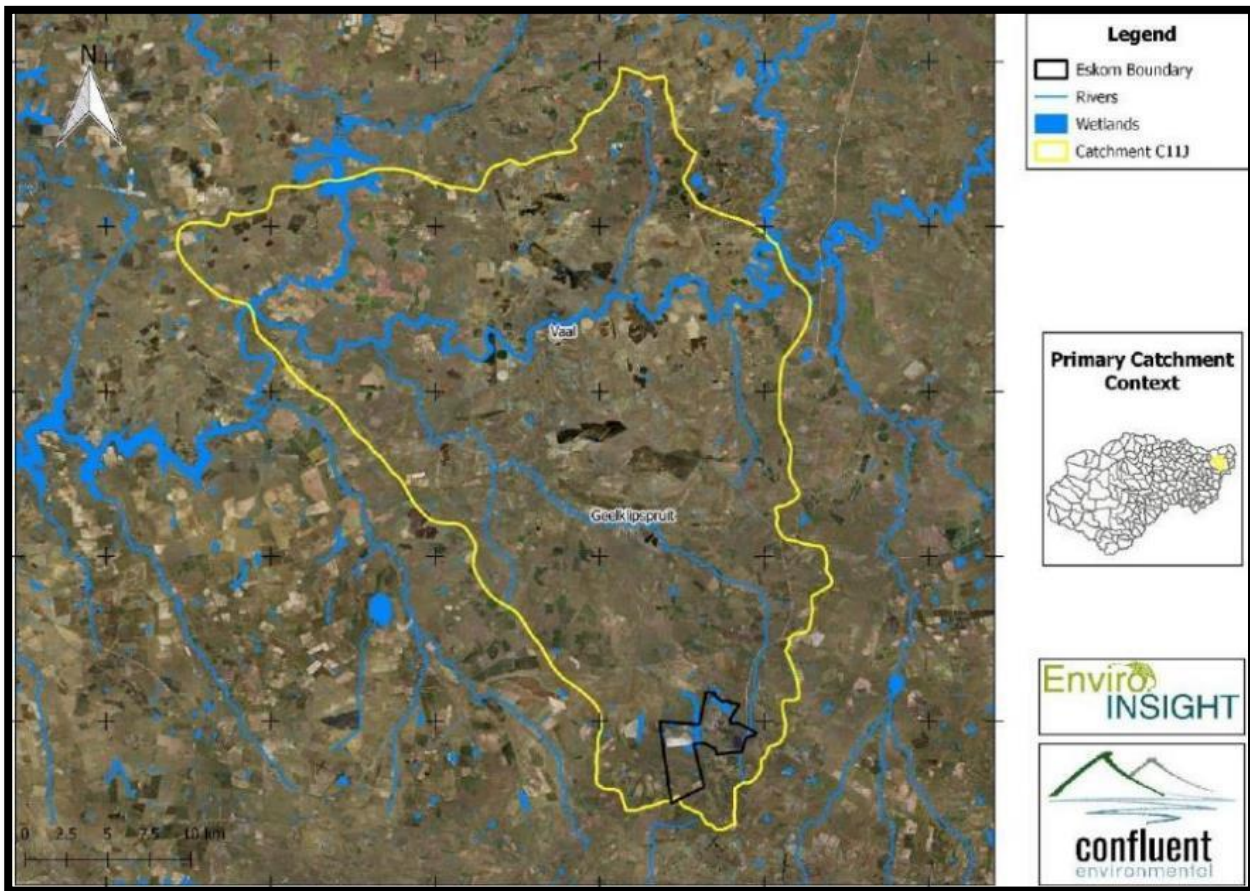


Figure 18: Location of Majuba power station property boundary within quaternary catchment C11J.

Surface water resources falling within the project area and potentially affected by the Ash and Rehabilitation Dams development are indicated in Figure 19 and include:

- Existing pollution control dams Ash Dam 1, Ash Dam 2 (both of which will be extended) and Ash Dam 3 (which is not affected by the development);
- A non-perennial river originating from the vicinity of Ash Dam 3, draining westwards outside of the boundary of the property;
- A non-perennial tributary located to the north of the property that falls outside of the property, draining in a northerly direction; and
- A series of wetland seeps located to the east of the Ash Dam Facility.



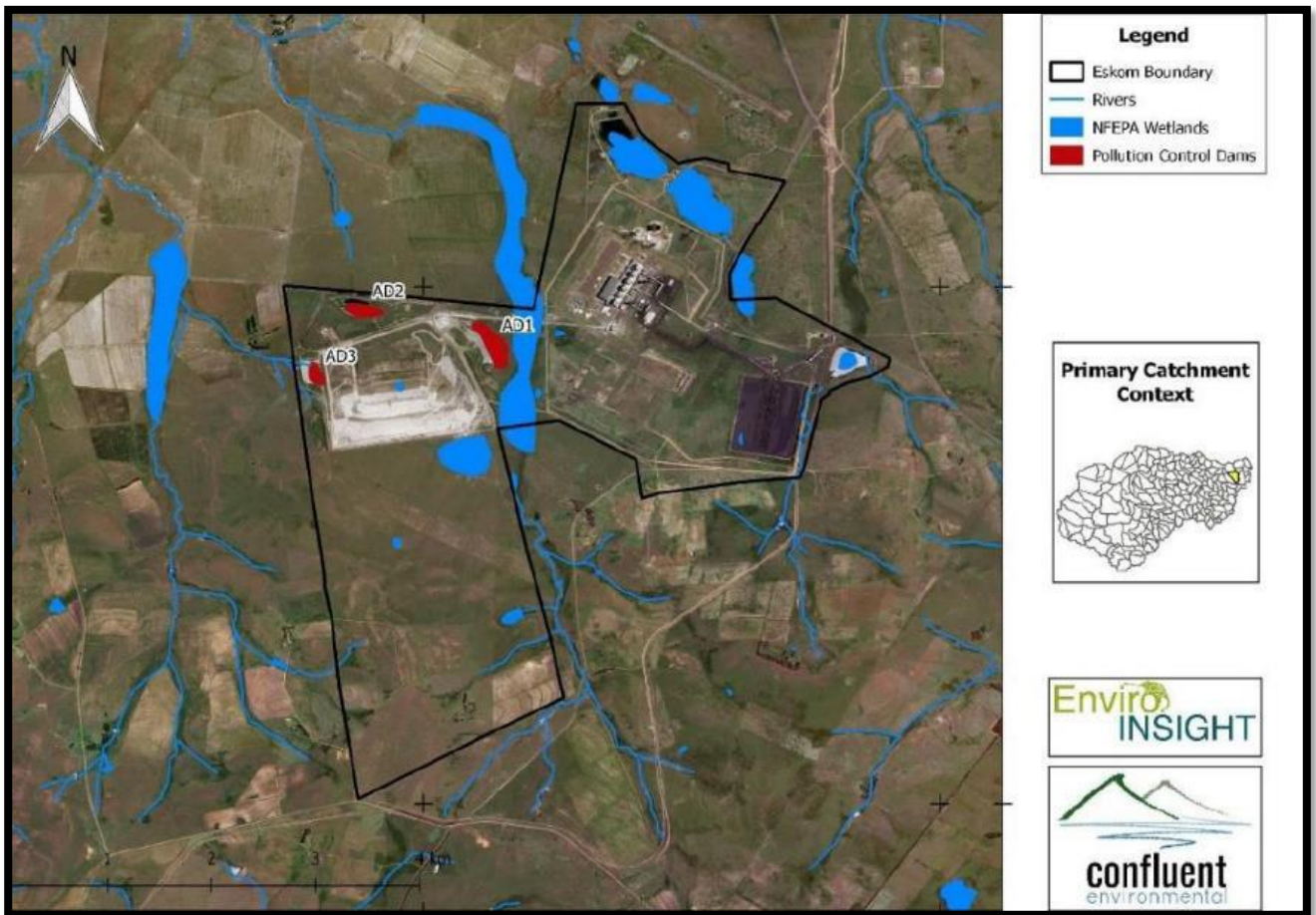


Figure 19: Freshwater resources potentially affected by the development

The majority of wetlands throughout the study area have been categorised as being in a near natural state (Present Ecological State of A/B) (Figure 20). The non-perennial watercourse draining to the west of the ADF (originating from the vicinity of AD3) is classified as a seep wetland, also with a PES of A/B.

The PES of the Geelklipspruit has however been assessed at a C (Moderately Modified). Modifications are largely due to moderate alterations in in-stream and riparian habitat and large modifications in water quality. The ecological importance of the Geelklipspruit is regarded as high mainly due to the high concentration of wetland and riparian habitats associated with the sub-quatarnary river reach.

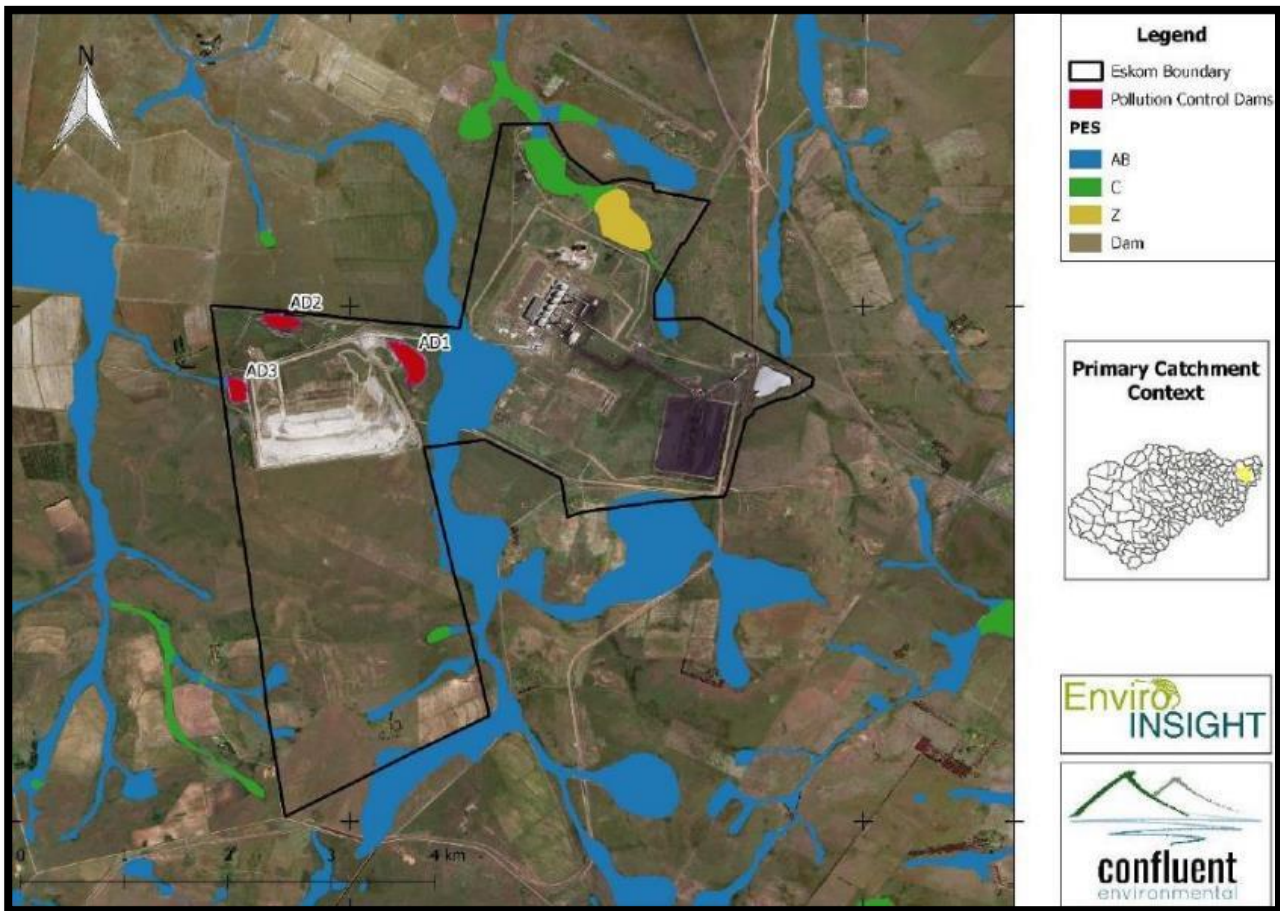


Figure 20: Present Ecological State (PES) of wetlands within the study area

The planned activities involve the extension of existing pollution control dams (AD1 and AD2), which are man-made dams designed specifically to capture seepage and runoff originating from the ADF. As no natural water resources are associated with these dams, their planned expansion is unlikely to result in any negative impacts from an aquatic perspective. Furthermore, construction activities will occur well outside the designated buffer areas of nearby water resources.

Both dams do however have a spillway which, if over-topped, could lead to water from the dams draining into these watercourses. Expansion of the dams will minimize the possibility of this happening.

The most significant impact is related to the construction of RD2 which is planned to occur in the upper reaches of the non-perennial drainage line draining to the west of the proposed dam. While this section of the drainage will provide some habitat to some aquatic biota and possibly birds, its very close proximity to the ash dump renders it as low value in terms of biodiversity importance and hydrological function. Given its ephemeral nature and position within the catchment, the loss of aquatic habitat that falls within the footprint of the dam can be regarded as a relatively minor impact.

A description of each identified impact as well measures that should be implemented to mitigate these impacts are described in the specialist report done by Confluent Environmental "Freshwater Assessment for the Proposed Expansion and Construction of Ash and Rehabilitation Dams at Majuba Power Station, Mpumalanga Province" 2019, attached as Appendix C.

## 5.6 Sites of paleontological, archaeological & cultural interest

Heritage Contracts and Archaeological Consulting (HCAC) completed a heritage impact assessment on the 7<sup>th</sup> of November 2018. The findings regarding the baseline survey conducted (as updated in the EIA phase) are discussed in the sections below.

### 5.6.1 Archaeology

No archaeological sites have been recorded on the national heritage database for the study area and no significant landscape features (i.e. rocky outcrops or hills) occur in close proximity to the site that may be historical focal points or contain heritage artefacts. Furthermore, the study area lacks raw materials suitable for the manufacture of stone artefacts or for the construction of late Iron Age Stone walled settlements.

### 5.6.2 Palaeontology

According to the specialist report, fossil remains have a *Medium probability*. As shown in the figure below, the area has an insignificant paleontological sensitivity. HARA Gauteng will most likely not require further detailed studies (i.e. Heritage Impact Assessment) prior to the development proceeding.



Figure 21: Palaeontology within the study area



Table 22: Potential palaeontological resources

Colour	Sensitivity	Required Action
<b>RED</b>	VERY HIGH	Field assessment and protocol for finds is required
<b>ORANGE/YELLOW</b>	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
<b>GREEN</b>	MODERATE	Desktop study is required
<b>BLUE</b>	LOW	No palaeontological studies are required however a protocol for finds is required
<b>GREY</b>	INSIGNIFICANT/ZERO	No palaeontological studies are required
<b>WHITE/CLEAR</b>	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

### 5.6.3 Farmsteads

No home or farmsteads are visible on Google Earth and no structures older than 60 years were noted during the site visit.

### 5.6.4 Cemeteries

Graves and informal cemeteries can be expected anywhere on the landscape, but no graves were recorded in the study area during the field visit in November 2018, or on the available maps. It is possible that indicators of such sites were concealed by vegetation, for which reason the Chance Find Procedure has been recommended.

## 5.7 Visual Aspects

A number of farms and homesteads occur throughout the study area, and in close proximity to the Majuba power station.

The visual character of the Majuba Power Station and its associated infrastructure is shaped by a combination of the following features:

- Grassland;
- An undulating topography with isolated koppies and ridges;
- Perennial and non-perennial streams and isolated dams;
- Cultivated land;
- Majuba Power Station and associated infrastructure (being a visually dominant feature in the area);
- Mining areas;
- Dispersed farmsteads, and
- Roads, including the N11 national road from Amersfoort to Volksrust, arterial routes (R23, R35) and a number of access roads to farms in the region.

The topography is an important form giving element of the visual landscape. It opens up vast panoramic views of the landscape, and on the other hand it creates visual barriers. The topography in the wider study area has a strong undulating character with hills and koppies south and east. This is significant in terms of the location of the ADF, since the topography will be the primary factor determining the visibility and level of exposure thereof.

In this regard, the screening effect of hills in the south must be noted. Also, this project will not entail structures with high visibility, due to the location on a site with an existing power station and other infrastructure that has already influenced the area in terms of visibility.

## 5.8 Air Quality

Eskom manages an ambient air quality monitoring station near Majuba power station which assesses impacts on air quality from Majuba Power Station and other pollution sources in the area. The monitoring station is located 3 km east-south-east of the power station and is equipped for continuous monitoring of ambient concentrations of sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and fine particulate matter of particulate size <10 μm in diameter (PM<sup>10</sup>). The average daily PM<sup>10</sup> concentrations for the period January 2009 to June 2012 are presented in Figure 22.

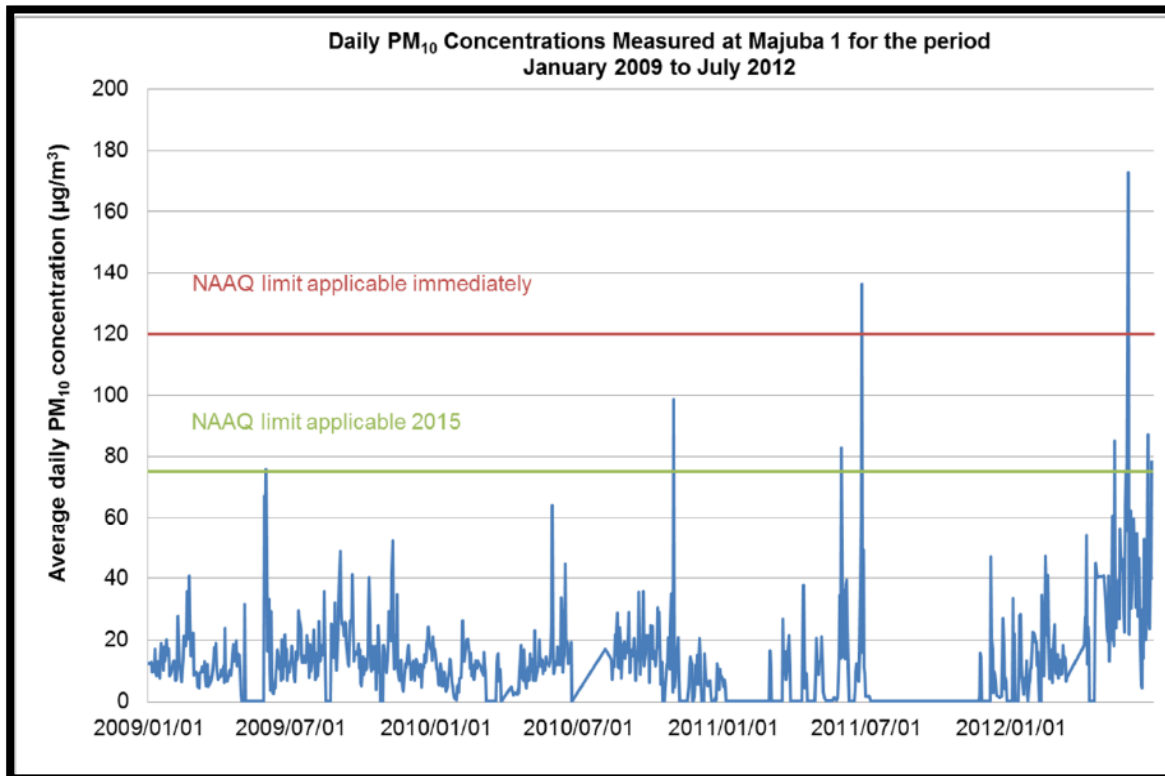


Figure 22: Daily measured PM10 ground level concentrations (µg/m<sup>3</sup>) at Eskom Majuba 1 monitoring station (January 2009 – June 2012)

## 5.9 Socio-Economic Environment

The town of Amersfoort was established in 1888 around a Dutch Reformed Church which was built in 1876. The area was first settled in 1876 when two farmers of the area donated land to the church, where Rev. Frans Lion Cachet proceeded to build a Dutch Reformed church. The new village was named after the hometown (in the Netherlands) of the Dutch farmers. When the area became too small for the growing village, more land was purchased from one of the original donors and the town was proclaimed in 1888. The bridge over the Vaal River was built in 1896 and is a national monument. The township of eZamokuhle lies adjacent to the town and contributes greatly to its economy.

### 5.9.1 Demographic Profile

The population for the entire Pixley Ka seme Local Municipality is estimated at 195 595 (IDP 2016/17 figures) and the population estimates (total number of people per household type) for Pixley ka Seme Local Municipality are presented below.



Table 23: Population per ward (2016/17)

WARD	NAME OF WARD	TOTAL POPULATION
Ward 1	Vukuzakhe	7554
Ward 2	Vukuzakhe	3412
Ward 3	Vukuzakhe	7867
Ward 4	Greater Volksrust	6763
Ward 5	Wakkerstroom	6852
Ward 6	Perdekop	9070
Ward 7	Amersfoort	6947
Ward 8	Ezamokuhle	7862
Ward 9	Daggakraal	5457
Ward 10	Daggakraal	12612
Ward 11	Daggakraal	8838

Table 24 below summarises the profile of the Pixley Ka Seme Local, using the Municipality's IDP document (2016/17) was used for the demographic information.

Table 24: Demographic Information

DEMOGRAPHIC PARAMETERS		2011	2016
Age Structure	Population under 15	31.6%	25.8%
	Population 15 to 64	62.4%	68.2%
	Population over 65	6.1%	6.0%
Dependency Ratio	Per 100 (15-64)	46.7	60.4
Sex Ratio	Males per 100 females	97.6	99.6
Population Growth	Per annum	—	1.10%
Household Dynamics	Households	49 193	56 309
	Average household size	3.7	3.5
	Female headed households	36.9%	36.8%
	Formal dwellings	86.3%	89.0%
	Housing owned	52.0%	61.1%
Household Services	Flush toilet connected to sewerage	65.7%	72.6%
	Weekly refuse removal	72.6%	74.2%
	Piped water inside dwelling	47.0%	45.1%
	Electricity for lighting	85.1%	89.8%

The Pixley Ka seme Local Municipality comprises of 11 Wards as per the municipal demarcation and 4 Admin Units of which are mostly rural. There are noticeable variations in the distribution of population within the Municipality.

Table 25: Ward areas and number of households

Demographic Area	Ward	Number of Households
Vukuzakhe	1-2	2600
Volksrust	3-4	3421
Wakkerstroom & eSizameleni	5	1832
Perdekop & Siyazenzela	6	2253
Amersfoort	7	1565
Ezamokuhle	8	1794
Daggakraal & Singobile	9-11	4946
<b>TOTAL</b>		<b>18 412</b>

## 5.9.2 Education Profile

The level of education for the population in the municipal area is reflected in the Table below.

Table 26: Education level in Pixley Ka Seme Local Municipality

Education Level	Pixley Ka Seme Local Municipality
None	11.97%
Grade 0-2	10.49%
Grade 3-6	9.87%
Grade 7-9	8.70%
Grade 10-11	7.21%
Grade 12 only	6.53%
Certificate/Diploma	7.19%
Bachelor's Degree	7.96%
Postgraduate Degree	8.31%

## 5.9.3 Employment Status

The employment status within the Pixley ka Seme Local Municipal area is presented in Table 27.

Table 27: Employment status within Pixley Ka Seme Local Municipality

Status	2005	2006	2007	2008
Economically active (% of population)	21 053 (23.7%)	21 314 (23.6%)	21 657 (23.7%)	22 455 (24.4%)
Inactive (% of population)	67 857 (76.3%)	68 835 (76.4%)	69 560 (76.3%)	69 755 (75.6%)
Unemployed (% of Inactive pop.)	5 053 (24%)	4 902 (23%)	4 981 (23%)	4 940 (22%)
People in poverty (% of population)	52 314 (58.8%)	49 805 (55.3%)	49 209 (53.9%)	47 811 (51.9%)
<b>Total population</b>	<b>88 910</b>	<b>90 149</b>	<b>91 216</b>	<b>92 210</b>



## **6 PUBLIC PARTICIPATION PROCESS**

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### **6.1 Introduction**

As per the principles enshrined in the Constitution including the NEMA, public participation is a right and understood to be a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views so that these can be considered and incorporated into the S&EIR decision-making process. Effective public participation requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed development.

This PPP will be undertaken in accordance to the principles of integrated environmental management as highlighted in the NEMA (Chapter 1), including Chapter 6 of the 2014 NEMA EIA Regulations (GNR 326), regulation 39 to 44.

The objectives of the PPP can be summarised as follows:

- Identify relevant individuals of the general public, communities, civic organisations and state departments or agencies who may be interested in or affected by the proposed development;
- Clearly outline the scope of the proposed development, including the scale and nature of the existing and proposed activities;
- Identify shortcomings and gaps in existing information;
- Identify viable project alternatives that will assist the relevant authorities in making an informed decision;
- Identify key concerns raised that should be addressed in the subsequent specialist studies;
- Highlight the potential for environmental and socio-economic impacts, whether positive or negative; and
- Inform stakeholders of the proposed solutions or mitigations measures which will be implemented to mitigate the potential impacts identified.

### **6.2 The Rights, Roles and Responsibilities of the Interested and Affected Parties**

#### **6.2.1 Rights of the Interested and Affected Parties**

Registered IAPs have the right to bring to the attention of the EAP and Competent Authority any issues that they believe may be of significance to the consideration of the application. The rights of registered IAP are qualified by certain obligations, namely:

- IAPs must ensure that their comments are submitted within the stipulated timeframes that have been approved by the DEA, or within any extension of the timeframe agreed by the Applicant, EAP or Competent Authorities. Such extensions must be communicated to potential stakeholders during the course of the application process;
- Serve a copy of the comments submitted directly to the EAP, Applicant or the Competent Authorities, and
- Disclose to the EAP any direct business, financial, personal or other interest that they might have in the granting or rejection of this application.

#### **6.2.2 Role of the Interested and Affected Parties**

The role of the IAP in the PPP usually includes one or more of the following:





- Assisting in the identification and prioritisation of issues that need to be investigated during the DEIAR Phase;
- Proposing potential project alternatives to be investigated and possible mitigation measures in a means of preventing, minimising and managing negative impacts and enhancing proposed projected benefits;
- Assisting in or commenting on the development of mutually acceptable criteria to be used during the evaluation of project alternatives;
- Highlighting information in terms of the needs, values and expectations of the public in relation to the proposed development;
- Contributing towards local and traditional knowledge; and
- Validating that the issues raised during the PPP have been considered.

### **6.2.3 Responsibility of the IAP**

The responsibility of the IAP in order to participate effectively during the S&EIR process, are as follows:

- Register as an IAP and become involved in the process as early as possible;
- Recommend other potential IAPs who should be consulted;
- Contribute towards the design of the public participation process (including timeframes) to ensure that it is acceptable to all stakeholders;
- Follow the process once it has been accepted;
- Read the documents and supporting information provided and actively seek to understand the issues involved;
- Provide timeous responses to correspondence;
- Be courteous and respectful towards the EAP, project team and other stakeholders;
- Refrain from making subjective, unfounded or ill-informed statements; and
- Recognise that the process is confined to issues that are directly relevant to the proposed development.

## **6.3 Approach to Public Participation Process**

The approach Advisian has adopted in terms of the PPP is based on the following principles:

- Undertake meaningful and timely participation with IAPs;
- Focus on significant issues during the S&EIR Process;
- Undertake due consideration of all alternatives tabled;
- Take accountability for the information provided and circulated;
- Encourage co-regulation, shared responsibility and a sense of ownership over the proposed project lifecycle;
- Apply "due process" particularly with regard to the PPP as provided for in the 2014 NEMA EIA Regulations; and
- Consider the needs, interests and values of all IAPs.

## **6.4 Public Participation Methodology**

Advisian has undertaken the following activities as part of the Impact Assessment Phase of the EIA process:

- Circulation of the DEIAR for IAP review and comment; and
- IAP notification of the Competent Authority's final decision and appeals procedure.



The activities undertaken thus far to canvass public opinion regarding the proposed project are summarised in Table 28 .

Table 28: Summary of activities undertaken and proposed during the PPP

Activity	Date
Submission of the Environmental Authorisation application in terms of NEMA and NEM: WA to the DEA	28 January 2019
Acknowledgement of receipt of the EA Application from DEA	21 February 2019 Ref 14/12/16/3/3/3/229
Media Notices advertising the commencement of the PPP and the availability of the DSR	01 February 2019
Circulation of the DSR for minimum of 30 days	01 February 2019 – 01 March 2019
Submission of the Final Scoping Report to DEA	01 April 2019
Receipt of Comments on FSR from DEA	20 May 2019

### 6.4.1 Identification and Registration of IAPs

The identification and registration of IAPs is an ongoing activity during the course of the S&EIR Process. It should be noted, that only a registered IAPs are entitled to comment (in writing), on all submissions made to the Competent Authority by the Applicant or the EAP managing the application. In addition, comments are to be submitted within the stipulated timeframes set by the competent authority or any extension of the timeframe agreed to by the Applicant or EAP.

IAPs were identified and will continue to be identified through several mechanisms, these include:

- Existing databases from previous projects in the study area;
- Engagement with local business owners, non-governmental agencies, civic organisations, and local municipal representatives and ward councillors;
- Canvassing in and around the project area, via press advertisements, community notices etc.; and
- Completed IAP registration and comment sheets.

All persons and organisations identified to date have been registered on the project IAP database. Refer to **Appendix D** for a copy of the project IAP database.

### 6.4.2 Authority Notification

National, provisional and local authorities relevant to the project have been notified of the proposed development via a notification letter at the commencement of the EIA process. The comments received from these authorities are included in the Comment and Response Table (refer to Public Participation Report in **Appendix D**). Communication lines will remain in place for the duration of the proposed development to ensure all authorities have the opportunity to comment on the proposed development and the EIA process undertaken.



### 6.4.3 IAP Notification

#### 6.4.3.1 Newspaper Advertisements

As per the EIA Regulation requirements, the proposed development was advertised in local and regional newspapers. The purpose of the advertisements is to notify the public about the proposed development and to invite IAPs to register as stakeholders (refer to Public Participation Report in **Appendix D** for a copy of the advertisements placed). The relevant advertisements which have been placed during the Scoping Phase as per Table 26 below for the Scoping Phase:

Table 29: Placement and Dates of Advertisements

Newspaper	Circulation	Language	Publication Date
Mpumalanga Mirror	Provincial	English, Afrikaans, Zulu	29 January 2019
Standerton Advertiser	Local	English, Afrikaans, Zulu	01 February 2019

#### 6.4.3.2 Site Notices

As per the EIA regulatory requirements, site notices/posters were placed at the following locations during the Scoping Phase:

- Majuba Power Station: Reception;
- Amersfoort Library, Amersfoort;
- Perdekop Public Library, Perdekop;
- Volksrust Library, Volksrust; and
- Vukuzakhe Library, Vukuzakhe.
- The purpose of the site notices is to notify the public of the proposed development; to invite the public to register as IAPs, where the DSR can be reviewed; and how to submit any comments.

Refer to Public Participation Report Notification letters

The purpose of the Notification Letter is to provide IAPs with introductory information on the application, the S&EIR process and the associated public participation process. The Notification Letter also provides an opportunity to register by way of completing the registration sheet distributed along with the Notification Letter. The registration sheet will be used to officially register IAPs on the project database so that they may stay informed via future communication. The registration sheet includes a section for comments and issues, which allows IAPs an opportunity to provide the EAP with written comments and feedback. Please note, this means of notification is considered suitable for IAP in this vicinity. E-mail notifications were sent out to all IAPs & Authorities on 31 January 2019. A copy of the Notification Letter and registration sheet is contained in **Appendix D**, including proof of notification.

### 6.4.4 Public Meeting / Public Events

A public meeting was held on 21 February 2019 in the Scoping phase, and another meeting is planned in July, during the review period for this DEIR.

### 6.4.5 Comment and Response Report

All concerns, comments, viewpoints and questions have been documented and responded to adequately in the Comment and Response Table contained within the Public Participation Report. The Comment and Response Table records the following:

- List of all issues raised;
- The phase of the project when the issues was raised;
- Record of IAPs who raised the issues and date when issues were raised; and
- Response to the issues.

### 6.4.6 IAP Engagement – Scoping Phase

The public viewing venues are listed below, and made available electronically for download from the Advisian website, <http://www.advisian.com/en-gb/stakeholder-engagement>. The DSR and Plan of Study for the EIA were made available for public review and comment for 30 days from 30 January – 01 March 2019 at the locations as indicated in Table below. The DEIR will be made available at the following locations.

Table 30: Public reviewing locations for the DSR and DEIR

Location	Address
Amersfoort Public Library	Corner Plein & Bree Street, Amersfoort (Mpumalanga province)
Perdekop Library	Durban street, Perdekop (Mpumalanga province)
Volkstrust Library	Volkstrust Library, Louis Trichardt Street, Volkstrust (Mpumalanga province)
Majuba Power Station	Majuba Power Station Reception Office
Advisian Webpage	<a href="https://www.advisian.com/en-gb/stakeholder-engagement">https://www.advisian.com/en-gb/stakeholder-engagement</a>

The first open day was arranged for 21 February 2019 at the Volkstrust Town Hall, Mpumalanga. Two sessions were held, one from 13:00 – 15:00 and the second from 18:00 – 20:00. E-mail notifications of the public meeting sessions were sent to all IAPs and Authorities on 13 February 2019, inviting them to the meetings. All registered IAPs and authorising/commenting authorities have been notified of the public review and commenting period.

### 6.4.7 Submission of the Final Scoping Report

All issues raised during the Scoping phase of the proposed project were incorporated into the Final Scoping Report (FSR) and submitted to the DEA. The FSR was accepted by the DEA on 20 May 2019.

### 6.4.8 IAP Engagement – Environmental Impact Assessment Phase

The PPP was initiated during the Scoping phase and has continued through the Impact Assessment phase to keep IAPs informed of project developments, and to maintain communication with authorities. The PPP activities during the Impact Assessment Phase are aimed at ensuring that the specialist studies and the assessment of potential impacts by the project team adequately address the issues and concerns raised during the Scoping Phase. During the Impact Assessment Phase public participation activities have included:



- The registration of any additional IAPs;
- The distribution of notification letters to registered IAPs informing them of the next project phase and the availability of the draft DEIAR for review and comment; and
- A public meeting, if required.

In addition to the circulation of project documents to IAPs, there will be ongoing communication between the Applicant, Advisian and IAPs throughout the S&EIR process until the Environmental Authorisation is issued.

*The draft DEIAR will be available for a 30-day review and comment period, before the Final DEIAR submission to the Competent Authority for approval.*

#### **6.4.9 Submission of the Final Environmental Impact Report**

Following the release of the revised draft DEIAR and completion of the registered I&AP comment period, all comments and concerns received from I&APs will be captured and responded to in the Comment and Response Table.

#### **6.4.10 IAP Notification of the Competent Authority's Final Decision**

Registered IAPs will be notified via post/electronic mail of the Competent Authority's final decision and the associated appeals procedure.



## 7 ENVIRONMENTAL IMPACT ASSESSMENT

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### 7.1 Introduction

#### 7.1.1 Potential Environmental and Social Impacts

Based on the professional experience of the project team, legal requirements, the nature of the proposed activity, the nature of the receiving environment and the issues and concerns raised during the PPP, the following environmental and social issues (potential negative impacts and potential benefits) were identified:

##### Terrestrial flora (vegetation)

- Loss, destruction and/or eradication of critically endangered/endangered plant species;
- Impact on plant communities of particular scientific, conservation or education value;
- Impact on sensitive plant ecological systems;
- Decrease in bio-diversity of natural plant communities;
- Possibility to enhance the spread of invasive and/or alien plants and declared weeds;
- Threat to the ecological functioning of natural plant communities due to:
  - Isolation of plant communities by destruction of habitat;
  - Reduction in the effective size of habitat/community; and
  - Physical destruction of the habitat.
- Degradation of plant habitat through:
  - Compaction of the topsoil through trampling, vehicles, machinery etc.;
  - Introduction and/or spread of invasive alien species - creation of dispersal sites; and
  - Potential for bush encroachment through disturbance of topsoil.

##### Terrestrial fauna

- Loss and/or displacement of critically endangered/endangered animal species;
- Impact on natural communities of particular scientific, conservation or education value;
- Impact on natural movement of species (flight pathways etc.);
- Disturbance of non-resident or migrant species (birds over-wintering, breeding);
- Decrease in bio-diversity of natural animal communities;
- Decrease in availability and reliability of food sources for animal communities;
- Possibility to introduce and/or enhance the spread of alien animal species;
- Threat to the ecological functioning of natural terrestrial communities due to:
  - Isolation of animal communities by destruction of habitat; and
  - Physical destruction of the habitat.
- Construction of barriers to animal movement or migration.

##### Heritage resources

- Discovery of previously unknown heritage sites or features during construction can halt work in the vicinity of the finds.



### Groundwater resources:

- Alteration to, modification, destruction of a wetland habitat.
- Alteration to, modification, destruction of a river bed and impediment of the natural flow.

### Socio-economic issues

- The project will potentially create opportunities for employment.
- Social benefits sometimes do extend the current employment of the team thus the benefit expands to the families/communities, even if no new jobs are created.

### Air quality impact

- Eskom manages an ambient air quality monitoring station near Majuba power station which assesses impacts on air quality from Majuba Power Station and other pollution sources in the area.

## 7.1.2 Specialist Studies Undertaken

A number of specialist studies were undertaken as part of the Impact Assessment Phase to inform the assessments of impacts (negative and positive) identified during the Scoping Phase. These specialist impact studies are as follows and included in **Appendix C**. Table 28 below presents the Specialists and their relevant areas of expertise.

*Table 31: Specialist Team Appointed*

Specialist Study	Company	Personnel
Fresh Water and wetland Assessment	Confluent Environmental	Dr. James Dabrowski
Heritage Impact Assessment	Heritage Contracts and Archaeological Consultants CC.	Jaco van der Walt
Ground Water Impact Assessment	Advisian	Karen Burgers
Ecological Assessment	Enviro-Insight CC.	Corné Niemandt Luke Verburgt

## 7.1.3 No Project Alternatives to Assess

No site alternatives were considered as the construction of the new rehabilitation dams and upgrade of the existing ash dams are associated infrastructures supporting the already authorised ADF. The ADF currently exists and will be extended to cater for the remaining life of the station. The IEA was issued on 19 August 2015 by DEA; WUL issued on 01 February 2016 by DWS; and the detailed designs approved by DEA on 16 October 2017 for the ADF.

If the ash and rehabilitation dams project were not to proceed (i.e. through implementation of the NO-GO alternative), this would result in Majuba station's being unable to effectively contain the storm water from the ADF, which in turn will pose a significant environmental risk to the immediate and surrounding biophysical and social environment. This option is not feasible as an alternative.

## 7.2 Environmental Impact Assessment Methodology

In accordance with the 2014 EIA Regulations, promulgated in terms of Section 24(J) of the National Environmental Management Act, 1998 (Act 107 of 1998) and Plan of Study for the EIA (as accepted by DEA on



20th of May 2019), specialists will be required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- The nature, significance and consequences of the impact and risk;
- The extent and duration of the impact and risk;
- The probability of the impact and risk occurring;
- The degree to which the impact and risk can be reversed;
- The degree to which the impact and risk may cause irreplaceable loss of resources; and
- The degree to which the impact and risk can be mitigated.

The potential environmental impacts will be evaluated according to their extent, duration, severity, frequency, probability and confidence of the impact. Furthermore, cumulative impacts will also be taken into consideration.

### **7.2.1 Identification of Environmental Impacts and Aspects**

Once a potential issue and/or possible impact has been identified during the Scoping process, it is necessary to identify which activity and specifically what aspect of the operations/activities result in the issue being raised or the possible impact being identified.

By considering the root cause of the issue in this way the probability that the activity undertaken does or may result in an impact can be determined. The associated impact can then be assessed in order to determine its significance and to define mitigation measures or management measures to address the impact.

The following definitions therefore apply:

- An activity is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation;
- An environmental aspect is an 'element of an organisations activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact;
- Environmental impacts are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality;
- Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. Impacts on the environment can lead to changes in existing conditions; the impacts can be direct, indirect or cumulative;
- Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. Indirect impacts result from cause-effect consequences of interactions between the environment and direct impacts; and
- Cumulative impacts refer to the accumulation of changes to the environment caused by human activities.

### **7.2.2 Description of Aspects and Impacts**

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. Once a potential impact has been determined it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal).

This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies. The aspects and impacts identified are therefore described according to the following:



### 7.2.2.1 Spatial Scope / Extent

The spatial scope for each aspect, receptor and impact is defined. The geographical coverage (spatial scope) description takes account of the following factors:

- The physical extent/distribution of the aspect, receptor and proposed impact; and
- The nature of the baseline environment within the area of impact.

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially. Many are significant only within the immediate vicinity of the site or within the surrounding community, whilst others may be significant at a local or regional level.

*Table 32: Spatial Scale of the impact will be rated according to the following scale:*

Spatial Scale	Rating
Activity specific	1
Area specific	2
Whole site/plant/mine	3
Regional/neighbouring areas	4
National	5

### 7.2.2.2 Duration

Duration refers to the length of time that the aspect may cause a change either positively or negatively on the environment. The environmental assessment will distinguish between different time periods by assigning a rating to duration based on the following scale:

*Table 33: Duration of the impact will be rated according to the following scale:*

Duration	Rating
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure	5

### 7.2.2.3 Severity

The severity of an environmental aspect is determined by the degree of change to the baseline environment, and includes consideration of the following factors:

- The reversibility of the impact;
- The sensitivity of the receptor to the stressor;
- The impact duration, its permanency and whether it increases or decreases with time;
- Whether the aspect is controversial or would set a precedent; and
- The threat to environmental and health standards and objectives.

The severity of each of the impacts will be rated on the following scale:

Table 34: Severity of each of the impacts will be rated according to the following scale:

Severity	Rating
Insignificant/non-harmful	1
Small/potentially harmful	2
Significant/slightly harmful	3
Great/harmful	4
Disastrous/extremely harmful	5

#### 7.2.2.4 Frequency of the Activity

The frequency of the activity refers to how regularly the activity takes place. The more frequent an activity, the more potential there is for a related impact to occur. The following frequency categories have been defined:

Table 35: Frequency of impacts will be rated according to the following scale:

Frequency	Rating
Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

#### 7.2.2.5 Probability of the Impact occurring

The probability of the impact refers to how often the aspect impacts or may impact either positively or negatively on the environment. After describing the frequency, the findings will be indicated on the following scale:

Table 36: Probability of impacts will be rated according to the following scale:

Probability	Rating
Almost never/almost impossible	1
Very seldom/highly unlikely	2
Infrequent/unlikely/seldom	3
Often/regularly/likely/possible	4
Daily/highly likely/definitely	5

### 7.2.3 Determination of Impact Significance

The information presented above in terms of identifying and describing the aspects and impacts is summarised in tabular form and significance is assigned with supporting rationale. A definition of a 'significant impact' for the purposes of the study is:



*“An impact which, either in isolation or in combination with others, could, in the opinion of the specialist, have a material influence on the decision-making process, including the specification of mitigating measures.”*

Significance will be classified according to the following:

- Very Low to Low - it will not have an influence on the decision;
- Medium to Medium-High - it should have an influence on the decision unless it is mitigated;
- High to Very High- it would influence the decision regardless of any possible mitigation.

The environmental significance rating is an attempt to evaluate the importance of a particular impact, the consequence and likelihood of which has already been assessed by the relevant specialist. The description and assessment of the aspects and impacts is presented in a consolidated table with the significance of the impact assigned using the process and matrix detailed below.

*Table 37: Consolidated Table of Aspects and Impacts Scoring*

Spatial Scope	Rating	Duration	Rating	Severity	Rating
Activity specific	1	One day to one month	1	Insignificant/non-harmful	1
Area specific	2	One month to one year	2	Small/potentially harmful	2
Whole site/plant/mine	3	One year to ten years	3	Significant/slightly harmful	3
Regional/neighbouring areas	4	Life of operation	4	Great/harmful	4
National	5	Post closure	5	Disastrous/extremely harmful	5
Frequency of Activity	Rating	Probability of Impact	Rating		
Annually or less	1	Almost never/almost impossible	1		
6 monthly	2	Very seldom/highly unlikely	2		
Monthly	3	Infrequent/unlikely/seldom	3		
Weekly	4	Often/regularly/likely/possible	4		
Daily	5	Daily/highly likely/definitely	5		
Significance Rating of Impacts			Timing		
Very Low (1-25) Low (26-50) Low – Medium (51-75) Medium – High (76-100) High (101-125) Very High (126-150)			Pre-construction Construction Operation Decommissioning		
<b>Adjusted Significance Rating</b>					

The sum of the first three criteria (spatial scope, duration and severity) provides a collective score for the consequence of each impact. The sum of the last two criteria (frequency of activity and frequency of impact)



determines the likelihood of the impact occurring. The product of consequence and likelihood leads to the assessment of the significance of the impact, shown in the significance matrix below in Table 38.

Table 38: Significance Assessment Matrix

		Consequence (Severity + Spatial Scope + Duration)														
Likelihood (Frequency of Activity + Frequency of Impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	

Table 39: Positive and Negative Impact Mitigation Ratings

Colour Code	Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Red	Very High	126-150	Improve Current Management	Maintain Current Management
Orange	High	101-125	Improve Current Management	Maintain Current Management
Yellow	Medium-High	76-100	Improve Current Management	Maintain Current Management
Green	Low-Medium	51-75	Maintain Current Management	Improve Current Management
Cyan	Low	26-50	Maintain Current Management	Improve Current Management
Light Blue	Very Low	1-25	Maintain Current Management	Improve Current Management

The model outcome is then assessed in terms of impact certainty and consideration of available information. Where a particular variable rationally requires weighting or an additional variable requires consideration the model outcome is adjusted accordingly.

### 7.2.4 Integration of Specialist Studies into the Environmental Impact Report

The findings of the various specialist studies undertaken have been integrated into this DEIAR. The key findings of each specialist study were evaluated in relation to each other to provide an overall and integrated assessment of the potential impacts of the proposed development.

Advisian has considered the suite of potential environmental and social impacts in a holistic manner and in certain instances, based on independent professional judgment and this integrated approach, may have altered impact significance ratings provided by the specialist. Where this has been done it has been indicated in the relevant section of the report.



Specialists have made recommendations for the management of impacts, and the project team have evaluated the recommendations. Key mitigation measures are presented below for each potential impact.

## **7.3 Potential Groundwater Impacts**

### **7.3.1 Introduction, Terms of Reference and Methodology**

This assessment is based on the Groundwater Impact Assessment undertaken by the **Advisian Geohydrologist**.

The Terms of Reference (in accordance to Appendix 6 of the EIA Regulations) for the study was the following:

- Attend a specialist site meeting;
- Undertake a site survey;
- Describe all relevant ecological resources that may be affected by the proposed project;
- Generate a sensitivity map indicating any sensitive/no-go areas;
- Identify and assess any impacts that may occur;
- Make recommendations for protection and management of ecologically sensitive sites;
- Make recommendations for any monitoring during development;
- Identify any mitigation measures that might reduce negative impacts or enhance positive impacts; and
- Attend a specialist integration workshop and finalise reports.

### **7.3.2 Assessment of Impacts**

The relatively low permeability of the rocks underlying the RD and AF dams and the dry ash disposal technique implies that additional recharge of potentially contaminated water will be limited, and that potential contaminant plumes will be limited to the immediate vicinity of the ash disposal areas. Use of liners, compaction, and cementation of the dry ash will most likely further reduce leachate infiltration.

#### **7.3.2.1 Construction Phase Impacts**

- **Water Migration:** The dry ash stacking system that is being used at Majuba implies that no slurry will be used in the construction of the new ash disposal facility. If ash-based or other slurry is used (for example to settle an underdrain system) then it is possible that increased downward migration of potentially contaminated water will occur.
- **Hydrocarbons:** The use of earth-moving plant also brings a risk of hydrocarbon spillages during the construction phase. This can be mitigated by careful storage and handling of hydrocarbons (e.g. diesel, lubricants, hydraulic fluids, etc), in bunded areas.
- **Top soil removal:** Top soil forms a filter of sorts to the downward migration of potential groundwater contaminants and can act as a physical, chemical and microbiological barrier. Removal of topsoil during the construction phase can increase contamination events from any spillages that may occur during this phase.
- **Local mounding of groundwater** due to increased recharge or the existing ADF could occur during the construction phase, with possible changes of local groundwater flow directions.

#### **7.3.2.2 Operational Phase Impacts**

Use of a dry ash stacking system would be unlikely to cause significant rise in the water table beneath the ash disposal facility will occur. The low permeability ash would also prevent leaching of contaminants and any water from the ash. The use of toe drains, stormwater dams and other surface water impoundments close to the proposed ash disposal facility is more likely to lead to local water table rise. Therefore during operation the following impacts are likely:

- Mounding of groundwater in the vicinity of the AD and RD could also change the groundwater flow direction.
- A portion of the water from various sources listed previously may percolate downwards and reach the groundwater. Therefore, the quality of groundwater beneath the RD and AF dams is likely to deteriorate, since natural groundwater will be mixing with the poorer quality ash leachate. Even if an under-drain system is used to convey any excess water away from the dams. It is important that infrastructure be designed to minimize and contain contaminated runoff and the dams are maintained in good condition.
- Diesel spills from equipment or plant carry a risk of hydrocarbon contamination of the soil and percolation to groundwater. Standard precautions, regular maintenance of equipment and prompt clean-up of any spills should be taken to minimize this risk.
- There is also a possible risk to local groundwater of contaminated water discharging from holding dams or toe drains to surface water courses in the vicinity of the ash disposal facility (rivers and streams), and later infiltrating into the subsurface some distance away from the ash disposal facility.

### 7.3.2.3 De-Commissioning Phase Impacts

Decommissioning of the ash disposal facility will involve halting ash disposal and removing ash disposal equipment, the AD1, AD2, RD1 and RD2 form part of the infrastructure associated with the ADF and thus will be closed and rehabilitated in line with the ADF methodology. It is important that infrastructure be designed to contain contaminated runoff from the ash disposal facility and this is maintained. Decommissioning of the ADF and associated infrastructure (including the ash dams and rehabilitation dams of this application) may also involve added diesel-powered plant on site, with attendant risks of hydrocarbon spills and prevention or mitigation of any spills be contained and cleaned up promptly.

### 7.3.2.4 Cumulative Impacts

The likely cumulative impacts of all three phases (RD and AD dam's construction, operation and decommissioning along with the ADF) are likely to be:

- A long-term rise in water table in the vicinity of the site, accompanied by deterioration in groundwater quality. These impacts will most likely gradually reverse once the ADF and associated infrastructure (including the ash dams and rehabilitation dams of this application) are fully decommissioned but are unlikely to completely disappear for many years.
- It is likely that other activities at Majuba power station (for example the coal storage yard) have more potential to pollute groundwater compared to the ash- and rehabilitation dams. Care should be taken to prevent the discharge of polluted water into local surface water courses, from where it could potentially pollute groundwater in the local area.

### 7.3.2.5 Potential Impact G1: Contamination of Groundwater Resources

Criteria	Rating before mitigation	Rating after mitigation
Status	Negative	Negative
Spatial Scope / Extent	Area Specific (2)	Area specific (2)
Duration	Post Closure (5)	Post Closure (5)
Severity	Significant/slightly Harmful (3)	Small/potentially harmful (2)
Frequency of Activity	Daily (5)	Monthly (3)
Probability of Impact	Likely (4)	Possible (4)



Criteria	Rating before mitigation	Rating after mitigation
Significance	Medium	Low
Cumulative impacts	The deterioration of groundwater quality with mitigation can be monitored and with proper management prevented and significantly reduced.	

### 7.3.2.6 Potential Impact G2: Groundwater Seepage and Doming

Criteria	Rating before mitigation	Rating after mitigation
Status	Negative	Negative
Spatial Scope / Extent	Area Specific (2)	Area specific (2)
Duration	Post Closure (5)	Post Closure (5)
Severity	Significant/slightly Harmful (3)	Small/potentially harmful (2)
Frequency of Activity	Daily (5)	Monthly (3)
Probability of Impact	Likely (4)	Possible (4)
Significance	Medium	Low
Cumulative impacts	Seepage or infiltration of rainfall/water/seepage from dams would lead to mounding of groundwater underlying the dams and a change in groundwater flow direction. With mitigation seepage or infiltration can be minimised.	

### 7.3.3 Mitigation Measures: Potential Groundwater Impacts

#### 7.3.3.1 Mitigation Measures during Construction

During the construction phase of the RD and AD dams, surface water runoff and leakage from surface water impoundments are expected to be limited due to the short duration of the construction phase. It is expected to consist of clearing part of the site, the installation of a barrier system, under-drain systems and related pipework, and construction of dam walls or bunds. The construction phase may also include the installation of piezometers for groundwater monitoring. There is likely to be a plant and equipment on the site at this time, with the possibility of spills and leaks of hydrocarbons and other polluting fluids.

Mitigation measures include:

- Preventing the disposal of any waste at the site (other than ash), particularly into any trenches / holes. Disturbing the surface layer / soil layer makes the aquifer more vulnerable to surface pollution.
- Taking steps to prevent any leaks or spills of fuels, solvents or other polluting liquids. This could include the provision of separate, bunded (concrete floors) refueling and fuel storage areas.
- Ensuring that any systems for the draining of leachates and / or supernatant water from the ash disposal facility are in good working order and are installed correctly (these would include an underdrain system if planned, as well as toe-drains and related pipe-work).
- Systems for removing or preventing blockages in drains or pipework must be installed correctly. Blocked under-drains can cause leaks, and lead to additional groundwater pollution.

#### 7.3.3.2 Mitigation Measures during Operation

The operational phase is likely to change both the quantity (water table level will gradually rise) and quality of local groundwater (deterioration underlying or surrounding the RD and AD dams). The local groundwater flow

direction may also be modified due to the local rise in the water table. Minimizing the volume of leachate percolating through the ash disposal facility and migrating downwards into the aquifer is the key to reducing all of these impacts. The aforementioned is considerably less likely when the dams are lined as proposed.

Mitigation measures therefore include:

- Ensuring that any under-drain, toe-drain and return water dam systems are in good working order;
- Preventing the disposal of any "foreign" waste material (e.g. hydrocarbons or solvents) to the ash disposal facility;
- Ensuring sufficient freeboard and other measures in holding ponds, toe drains and storm water dams, to prevent any spills of contaminated water onto adjacent land;
- Lining of surface impoundments of poor-quality water such as dirty water / return water dams and toe-drains;
- Continued operation of a groundwater monitoring network in the vicinity of the ADF complex, which includes these dams, as a whole to act as an early warning system for detection of contaminants.

### **7.3.3.3 Mitigation Measures during De-Commissioning**

Decommissioning of the ADF and the proposed infrastructure (AD1, AD2, RD1 and RD2), will mean that ash will no longer be disposed to the facility, and also that a degree of rehabilitation and re-vegetation can be conducted. Percolation of some leachate into local groundwater in the long term may not be totally obtainable, mitigation measures can reduce this, and the following are recommended:

- Maintenance of the under-drain, toe-drain and return water systems;
- Continuous groundwater monitoring in order to quantify ongoing impacts and provide early warning for any contamination;
- Re-vegetation of the ash disposal facility to reduce the volume of rainwater percolating down into the facility through natural evapotranspiration and to improve the quality of runoff from the ash disposal facility.

It is likely that minor changes to water table elevation and groundwater flow direction in the immediate vicinity of the site will persist after decommissioning, since the overlying ash disposal facility (even if vegetated and managed) will alter the flow / recharge characteristics of the local area. These issues are expected to be relatively minor.

The main impact on groundwater of the proposed ash disposal facility (or combination of facilities) is likely to be a reduction in water quality beneath the chosen site, and in the vicinity of the site.

## **7.4 Potential Heritage and Palaeontological Impacts**

### **7.4.1 Introduction, Terms of Reference and Methodology**

This assessment is based on the Heritage Impact Assessment undertaken by **Heritage Contracts and Archaeological Consultants CC**.

The Terms of Reference (in accordance to Appendix 6 of the EIA Regulations) for the study was the following:

- Attend a specialist site meeting;
- Undertake a site survey;
- Describe all relevant heritage resources that may be affected by the proposed project;
- Generate a sensitivity map indicating any sensitive/no-go areas;





- Identify and assess any impacts that may occur;
- Make recommendations for further studies that may be required during or after the Environmental Impact Assessment (EIA);
- Make recommendations for protection and management of heritage sites;
- Make recommendations for any monitoring during development;
- Identify any mitigation measures that might reduce negative impacts or enhance positive impacts; and
- Attend a specialist integration workshop and finalise reports.

The study methodology entailed survey of available literature to assess the general heritage context into which the development would be set, this included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS). The 1:50 000 map and historical aerial images were sourced from the Chief Directorate: National Geo-Spatial Information.

## 7.4.2 Assessment of Impacts

No sites of significance are on record for the study areas, no structures occur in the study areas and no graves were recorded in the study areas during the field visit. The following potential impacts on heritage and palaeontological resources would usually be possible:

- Loss or disturbance of archaeological resources; and
- Loss or disturbance of palaeontological resources.

### 7.4.2.1 Potential Impact H1: Loss or Disturbance of Archaeological Resources

No sites or objects of Heritage significance were identified during the site inspections. The chances of negatively impacting archaeological resources are relatively low, and no mitigation is required.

Table 40: Significance of loss of / disturbance to archaeological resources

Criteria	Rating before mitigation	Rating after mitigation
Status	Negative	Negative
Spatial Scope / Extent	Activity specific	Activity specific
Duration	One day to one Month	One day to one month
Severity	Insignificant/non-harmful	Insignificant/non-harmful
Frequency of Activity	Annually or less	Annually or less
Probability of Impact	Almost never/almost impossible	Almost never/almost impossible
Significance	Low	Low
Cumulative impacts	The loss of historical archaeological material could be seen as a cumulative impact of low-medium significance because it is likely that a number of sites have been lost the Majuba Power Station and associated infrastructure.	

### 7.4.2.2 Potential Impact H2: Loss or Disturbance of Palaeontological Resources

No sites or objects of Palaeontological significance were identified during the site inspections. The chances of negatively impacting palaeontological resources are relatively low, and no mitigation is required. Based on experience and the lack of any previously recorded fossils from the area, it is very unlikely that any fossils would be preserved in the Volksrust shales. The area is already highly disturbed from earlier agricultural and mining activities but If organic fragments are encountered then they should be given a cursory examination for fossils.

Table 41: Significance of loss of / or disturbance to palaeontological resources

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Spatial Scope / Extent	Area specific	Area specific
Duration	Post Closure	Post Closure
Severity	Small/potentially harmful	Insignificant/non-harmful
Frequency of Activity	Annually or less	Annually or less
Significance	Low	Very Low
Cumulative impacts	Impact highly unlikely to occur, no cumulative impact expected	

### 7.4.3 No-Go Alternative

The No-Go alternative implies that no disturbance of soils and potential heritage and palaeontological resources are experienced in the area. Similarly, the cultural landscape will not be altered. The current status quo of heritage and palaeontological resources will remain. As such, under the No-Go alternative it is expected that site conditions remain as per the current condition, taking into consideration that no such sites were identified for this project proposal.

### 7.4.4 Mitigation Measures: Potential Heritage and Palaeontological Impacts

No specific archaeological mitigation measures are suggested. Should findings be made during construction, procedures are prescribed on handling these "Chance findings". This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

## 7.4.5 Specialist Conclusion

The proposed projects are mostly located within areas entirely transformed by previous agricultural activities, existing dams with associated earthworks to the extent that from a heritage perspective, the impact areas have no heritage potential due to the extensive mechanical alteration of the topography. Similarly, very few known heritage sites occur in the vicinity of the study area and no surface indicators of heritage sites of significance were recorded. The area is however of high paleontological sensitivity according to the SAHRIS Paleontological Map and thus a further assessment was undertaken by a palaeontologist.

No burial sites were recorded during the survey, however, if any graves are located in future they should ideally be preserved in-situ or alternatively relocated according to existing legislation.

Due to the lack of significant heritage resources in the study area the impact of the proposed project on heritage resources is considered low and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMP and based on approval from SAHRA.

## 7.5 Potential Ecological Impacts

### 7.5.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Ecological Impact Assessment undertaken by **Enviro-Insight CC**.

The Terms of Reference (in accordance to Appendix 6 of the EIA Regulations) for the study was the following:

- Attend a specialist site meeting;
- Undertake a site survey;
- Describe all relevant ecological resources that may be affected by the proposed project;
- Generate a sensitivity map indicating any sensitive/no-go areas;
- Identify and assess any impacts that may occur;
- Make recommendations for protection and management of ecologically sensitive sites;
- Make recommendations for any monitoring during development;
- Identify any mitigation measures that might reduce negative impacts or enhance positive impacts; and
- Attend a specialist integration workshop and finalise reports.

The study methodology entailed a literature review to identify the potential habitats and flora species of conservation concern (SCC) present within the study area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA) (SANBI, 2017), to access distribution records on southern African plants. This is a new database which replaces the old Plants of Southern Africa (POSA) database. The POSA database provided distribution data of flora at the quarter degree grid cell (QDGC) resolution; however, the BODATSA database provides distribution data as point coordinates. The literature study therefore, focussed on querying the database to generate species lists for the xMin, yMin 29.50°, -26.9°: xMax, yMax 30.20°, -27.34° extent (WGS84 datum) in order to increase the likelihood of obtaining a representative species list for the proposed study area.

The Red List of South African Plants website (SANBI, 2018) was utilized to provide the most current account of the national status of flora. Relevant field guides and texts consulted for identification purposes in the field during the surveys included the following:

- Guide to grasses of Southern Africa (Van Oudtshoorn, 1999);
- Field Guide to the Wild Flowers of the Highveld (Van Wyk & Malan, 1998);



- Field guide to trees of southern Africa (Van Wyk & Van Wyk, 2013); and
- Problem plants and alien weeds of South Africa (Bromilow, 2010).

Additional information regarding ecosystems, vegetation types, and SCC included the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006); and
- Red List of South African Plants (Raimondo et al., 2009; SANBI, 2018).

The level of this study did not warrant intensive long-term field sampling. Rather, conditions on site were evaluated during a rapid field assessment and placed into context within the regional vegetation type (Mucina & Rutherford, 2006), from which a series of conclusions and subsequent recommendations were derived to inform the development process.

Relevant databases, field guides and texts were consulted for the desktop and literature study included the following:

- The online Virtual Museum (VM) facility of the Animal Demography Unit (ADU) of the University of Cape Town (<http://vmus.adu.org.za>) was queried for the presence of mammal (MammalMAP, 2018), reptile (ReptileMAP, 2018) and amphibian (FrogMAP, 2018) SCC within the QDGC in which the proposed development resides (2729BA and 2729BB);
- Information relating to avifauna species of conservation concern (SCC) was obtained from the Southern Africa Bird Atlas Project (SABAP 2), Hockey et al., (2005) and Taylor et al., (2015);
- Mammal SCC information was obtained from Child et al., (2017);
- Reptile SCC information was obtained from Bates et al., (2014); and
- Amphibian SCC information was obtained from Du Preez & Carruthers (2017).

The applicability of the information obtained from the literature sources was evaluated for the study area and the subsequent recommendations are to be used by the client in order to drive the development process in accordance with the relevant legislation.

Existing data layers were incorporated into a GIS to establish how the proposed the study area and associated activities interact with these important terrestrial entities. Emphasis was placed around the following spatial datasets:

- Vegetation Map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006);
- Mpumalanga Biodiversity Sector Plan (MBSP, 2014a)
- MBSP Terrestrial Assessment (MBSP, 2014b);
- Important Bird Areas (BirdLife South Africa, 2015); and
- National List of Threatened Ecosystems (SANBI, 2011).

All mapping was performed using open source GIS software (QGIS).

A site visit was performed on 7 November 2018 by an ecologist where the faunal and floral aspects of the survey area were evaluated. The timing of the study represented the start of wet season conditions which is sub-optimal for plant identification and good foraging quality for fauna species.

## **7.5.2 Assessment of Impacts**

The vegetation and habitats of the proposed expansion areas for the PCD's are transformed or disturbed, with limited natural vegetation remaining, as per the MBCP "Least Concern" and "No Natural Habitat Remaining" areas. Almost no negative ecological impacts within these expansion areas are anticipated.



However, the natural **drainage areas and grassland** surrounding the PCD's area considered to be sensitive habitats of importance and would need to be protected from impacts arising from the expansion of the PCD's such as flooding during construction etc. Mitigation measures to prevent these impacts are usually contained within standard operation procedures and best practice guidelines for construction and therefore no specialized mitigation measures are anticipated, although these will be addressed and described in the EIA report.

The following potential impacts on ecological resources were identified:

- E1. Loss of existing habitat due to loss of vegetation
- E2. Direct mortality of fauna
- E3. Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust and lighting [Construction & Operation]
- E4. Introduction of alien and/or invasive flora affecting native flora and faunal assemblages
- E5 Displacement of native species due to competition and/or unfavourable habitats due to alien establishment.

### 7.5.2.1 Potential Impact E1: Loss of existing habitat due to loss of vegetation

#### a. Physical removal of vegetation

- i. Construction camps & laydown areas [Construction] - these areas need to be progressively cleared of vegetation for safe operation and therefore available habitat for terrestrial fauna species will be reduced. Removal of all the vegetation would cause high silt loads in summer during rainfall. Eskom has alternatives in place like hay cover etc. to slow the speed of surface flow down.
- ii. Vegetation clearing and earthworks [Construction] – *Digging and laying foundations prior to construction will cause direct habitat loss as vegetation and soil is removed. Could lead to erosion caused by wind and rain. Such erosion undermines the stability of the habitat and reduces overall habitat quality for flora and fauna.*
- iii. Stochastic events such as fire (e.g. cooking fires or cigarettes of workers) [Construction & Operation] - *careless discarding of lit cigarette butts and/or glowing embers from cooking fires being blown into surrounding vegetation may cause runaway fires to remove habitat for terrestrial fauna species that would otherwise have been available.*

#### b. Secondary impacts associated with the loss of habitat and removal of vegetation

- i. Displacement/loss of flora & fauna - the removal of habitat (in this case unsuitable as the surrounding area is already disturbed), in particular vegetation, will directly result in the loss of flora species, and indirectly affect fauna reliant on this vegetation for foraging and/or refugia;
- ii. Establishment of alien and invasive vegetation – as alien and invasive flora establish and spread across the site it reduces available natural habitat and habitat quality for flora and fauna.

Table 42: Significance of impact of loss of vegetation

Criteria	Rating before mitigation	Rating after mitigation
Status	Negative	Negative
Spatial Scope / Extent	Whole site	Whole site
Duration	One year to ten years	One year to ten years
Severity	Great/harmful	Small/potentially harmful
Frequency of Activity	Annually or less	Annually or less



Criteria	Rating before mitigation	Rating after mitigation
Probability of Impact	Daily/highly likely/definitely	Often/regularly/likely/possible
Significance	Low	Very Low

### 7.5.2.2 Potential Impact E2: Direct mortality of fauna

#### a. Project components that can cause direct mortality of fauna

- i. Staff or construction workers poaching [Construction & Operation] - Several fauna species could be hunted by staff during the construction phase;
- ii. Direct mortality due to collisions with vehicles (roadkill) [Construction & Operational phase] - *Vehicles are defined as support vehicles (e.g. bakkies / pickups), staff vehicles (light passenger vehicles), large and slow-moving construction vehicles (such as earth moving equipment/trucks) that will be either self-propelled or towed (construction phase). Traffic volumes are considered to be high in the area and consequently it is unavoidable that collision related fauna mortality will occur. There will be increased traffic volumes during each phase of the project, and this will occur over multiple years. Reptiles, amphibians, small mammals and avifauna are particularly prone to collisions with fast moving vehicles as they do not move out of the way upon approach by a vehicle. Furthermore, vehicle drivers rarely see small fauna on the road surface or avifauna flying across, and cannot avoid collisions with these animals while travelling at high speed;*
- iii. Intentional killing of fauna [Construction & Operation] - *In general people are either superstitious or extremely fearful of snakes which usually results in the death of the snake when it is encountered. Despite the beneficial ecological functions of snakes such as rodent control, snakes are usually considered to be dangerous (despite the many non-venomous species) and are therefore killed;*
- iv. Direct mortality due to vegetation clearing and ground preparation for construction [Construction] - *The clearing of vegetation with machinery followed by the preparation of ground surfaces for construction is expected to result in the direct mortality of fauna by mechanical action (cutting, grinding and crushing), especially for burrowing fauna.*

#### b. Secondary impacts associated with direct mortality of fauna

- i. Changes in fauna population dynamics (e.g. rodent population explosion) – for example, prolonged mortality of predacious species such as snakes could significantly reduce the population density of these predators and allow prey species to undergo localised population explosions. This in turn can have major negative impacts on the surrounding ecology.

Table 43: Significance of impact of mortality of fauna

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Spatial Scope / Extent	Whole site	Whole site
Duration	Life of operation	Life of operation
Severity	Great/harmful	Small/potentially harmful
Frequency of Activity	Weekly	Monthly
Significance	Low-Medium	Very Low



### 7.5.2.3 Potential Impact E3. Disruption/alteration of ecological life cycles due to noise, dust and lighting (Construction & Operation)

Ecological lifecycles refer to feeding, behavioural, breeding, and migratory habits of animals.

#### a. Project components that can result in increased noise, dust and lighting

- i. Access roads and construction works [Construction & Operation] – Noise, dust and lighting generated from moving vehicles operating on access roads and from machinery on site can disrupt fauna populations by interfering with their movements and/or breeding activities. In particular, lighting at night is expected to attract insects which will attract geckos and amphibians which in turn can attract snakes (which might be venomous). Lighting at night may also disrupt flight paths of migrating birds and bats foraging at night which could cause collisions.

#### b. Secondary impacts associated with disruption/alteration of ecological lifecycles

- ii. Increased probability of interaction with reptiles – As described above, snakes may be attracted to potential prey due to lights and represent a potential health and safety threat. In addition, reptiles attracted to site such as snakes could be killed by staff on site.

Table 44: Significance of impact of disruption of ecological life cycles

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Spatial Scope / Extent	Whole site	Whole site
Duration	Post closure	Post closure
Severity	Significant/slightly harmful	Small/potentially harmful
Frequency of Activity	Daily	Monthly
Significance	Low-Medium	Very Low

### 7.5.2.4 Potential impact E4. Introduction of alien and/or invasive flora affecting native flora and faunal assemblages

#### a. Project components that can result in increased densities of alien flora

- i. Vehicles and machinery [Construction & Operation] – Vehicles and machinery can spread alien plant seeds throughout the study area which could potentially spread into the adjacent (natural) areas. Alien plants can cause alterations to the environment which could affect local flora and fauna;
- ii. Soil Disturbance [Construction & Operation] – Seeds of pioneer invasive species could germinate and rapidly establish when the soil is disturbed.

## b. Secondary impacts associated with increased alien flora and fauna species

Table 45: Significance of impact of introduction of alien/invasive species

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Spatial Scope / Extent	Area specific	Area specific
Duration	Post closure	Life of operation
Severity	Disastrous/extremely harmful	Small/potentially harmful
Frequency of Activity	Weekly	Monthly
Significance	Medium-High	Low

### 7.5.2.5 Potential impact E5. Displacement of native species due to competition and/or unfavourable habitats due to alien establishment

#### a. Project components that can cause increased pollution of watercourses.

- i. Ash disposal facility [Operation] – Ash dispersal caused by prevailing winds, especially close to the watercourse, can negatively affect the flora and fauna of the associated watercourses. Siltation could dramatically affect mortality rates of avifauna and herpetofauna species utilising the watercourse as breeding and foraging habitat. A particular threat is the catastrophic failure of retention walls that cause mass spillage of ash into the watercourse (this has occurred at least once previously);
- ii. Hydrocarbon spillage – spillage from trucks and vehicles close to the watercourse can severely contaminate the associated watercourses. Serious spills can dramatically affect mortality rates of avifauna, mammals and herpetofauna species utilising the watercourse as breeding and foraging habitat.

#### b. Secondary impacts associated with increased dust pollution.

- i. Pollution of water downstream.
- ii. Health issues for livestock and people.

Table 46: Significance of impact of displacement on species

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Spatial Scope / Extent	Area specific	Area specific
Duration	Post closure	Life of operation
Severity	Disastrous/extremely harmful	Small/potentially harmful
Frequency of Activity	Weekly	Monthly
Significance	Medium-High	Low

### 7.5.2.6 Watercourse contamination due to pollution

#### a. Project components that can cause increased pollution of watercourses.

- i. Ash disposal facility [Operation] – Ash dispersal caused by prevailing winds, especially close to the watercourse, can negatively affect the flora and fauna of the associated watercourses. Siltation





could dramatically affect mortality rates of avifauna and herpetofauna species utilising the watercourse as breeding and foraging habitat. A particular threat is the catastrophic failure of retention walls that cause mass spillage of ash into the watercourse (this has occurred at least once previously);

- ii. Hydrocarbon spillage – spillage from trucks and vehicles close to the watercourse can severely contaminate the associated watercourses. Serious spills can dramatically affect mortality rates of avifauna, mammals and herpetofauna species utilising the watercourse as breeding and foraging habitat.

**b. Secondary impacts associated with increased dust pollution.**

- i. Pollution of water downstream.
- ii. Health issues for livestock and people.

Table 47: Significance of impact on water course contamination

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Spatial Scope / Extent	Area specific	Area specific
Duration	Post closure	Post closure
Severity	Disastrous/extremely harmful	Significant/slightly harmful
Frequency of Activity	Daily	Monthly
Significance	Medium-High	Low

**7.5.3 No-Go Alternative**

The No-Go alternative implies that no additional disturbance of the proposed project site will occur. Similarly, the natural landscape will not be altered. The current status quo of ecological resources will remain. As such, under the No-Go alternative it is expected that site conditions remain as per the current condition (before mitigation), however without the proposed ash dam upgrading and construction of ash dams, the risk of negative impacts on the ecology will potentially increase.

**7.5.4 Mitigation Measures: Potential Ecological Impacts**

As appropriate, mitigation measures may need to be implemented. The requirement for monitoring of the excavations should be incorporated into the Environmental Management Program for the project. The specialist recommendations are listed below:

**7.5.4.1 Mitigation of potential loss of habitat**

- i. Clearings associated with construction to occur in as small a footprint as possible. Surrounding vegetation outside the development footprint may not be disturbed;
- ii. Construction camps & lay down areas should be erected on already disturbed surfaces where no vegetation clearing or soil disturbance is required;
- iii. Minimise all disturbances, especially regarding the construction phase, where possible;
- iv. Vegetation clearing close to the watercourse should be prevented and where necessary, appropriate storm water management should be put in place to limit erosion potential of exposed soil. Sedimentation trapping should be in place to prevent exposed soils from spilling into the watercourse;



- v. The watercourse and its buffer areas should be demarcated and fenced off prior to construction to exclude the watercourse from development activities;
- vi. Buffer zones are allocated to sensitive or important habitat features to alleviate the effect of habitat loss, habitat fragmentation, disturbances, increased isolation and edge effects. Suggested buffer zones for the watercourse/wetlands in the Aquatic Assessment report must be implemented where no construction or disturbances may take place. No vehicles or personal are allowed to enter these areas;
- vii. Earthworks and vegetation clearing should be left open for as short a time as possible. Temporary erosion control measures during the construction phase should be implemented to limit erosion;
- viii. Re-vegetation where required after clearance should commence immediately after the construction phase;
- ix. Re-vegetation as part of the rehabilitation phase including the promotion of natural ecosystem processes is critical;
- x. Alien vegetation control should take place during all phases of the proposed operation;
- xi. An environmental induction for all staff members must be mandatory in which specific issues related to the potential of fire are addressed e.g. only smoking in designated areas, no open cooking fires etc. Rules of the Majuba Power Station regarding safety should be adhered to at all times.

#### **7.5.4.2 Mitigation of mortality of fauna**

All vehicle speeds associated with the project should be monitored and should be limited to the lowest acceptable speed (maximum of 40 km/h) during the construction and operation phases, or as prescribed by the latest or previous Traffic Impact Assessment;

#### **7.5.4.3 Mitigation of Disruption/alteration of ecological life cycles due to noise, dust and lighting [Construction & Operation]**

- i. A dust monitoring system should be implemented during the construction phase;
- ii. Water or dust control agents should be used in working areas. Roads and areas with significant ash deposits should be sprayed for dust suppression on a regular basis in designated susceptible areas during heavy usage;
- iii. Reduce exterior lighting to that necessary for safe operation and implement operational strategies to reduce spill light. Use down-lighting from non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators;
- iv. Keep noise levels suppressed as per the local municipality or national standards. Do not unnecessarily disturb faunal species, especially during the breeding season and those with juveniles;
- v. Existing barriers should be in place that keep fauna species away from the existing facilities. These fences should be maintained in order to ensure fauna species do not gain access to the construction site unnecessarily where they can be hurt or killed;
- vi. All staff should be subjected to an induction training program where appropriate conservation principles, safety procedures, snake bite avoidance and first aid treatment are taught. Several staff members should complete a snake handling course in order to safely remove snakes from construction areas.

#### **7.5.4.4 Mitigation of Introduction of alien and/or invasive flora affecting native flora and faunal assemblages**

- i. Alien flora on site should be eradicated prior to construction including all Category 1 and 2 alien invasive species. Any remaining alien flora post-construction should be monitored and removed as part of the management plan.



- ii. Disturbance of natural areas should be avoided and the spread of alien flora into natural areas should be controlled.
- iii. Continuous monitoring of the growth and spread of alien flora coupled with an adaptive management approach to identify suitable control mechanisms, preferably mechanical for such a small area. No chemical control should take place due to the close proximity of wetlands;
- iv. No planting of alien invasive species as part of landscaping. Only trees indigenous to the vegetation unit and endemic to the area may be planted, even if for only visual purposes. This should be indicated prior to development and approved by the competent authority.

#### **7.5.4.5 Mitigation and Enhancement Measures for project components that can cause increased pollution of watercourses.**

- i. Zero tolerance for hydrocarbon spillage next to the watercourse.
- ii. Ash dispersal impacts on the watercourse must be reduced to the minimum possible.
- iii. No vehicles or machinery are allowed within the buffer areas or watercourse. Predetermined areas should be indicated where vehicles and machinery are to be stored, repaired and refuelled within a bunded area.
- iv. Use of drip trays positioned under stationary vehicles to collect hydrocarbons.
- v. Implementation of rapid response emergency spill procedures to deal with spills immediately, including training of staff to deal with such instances.
- vi. Comprehensive monitoring of water quality of the watercourses

#### **7.5.5 Specialist Conclusion**

The study area falls in the Vulnerable Amersfoort Highveld Clay Grassland vegetation unit, but from a provincial biodiversity management perspective the study area is located within "Least Concern" and "No Natural Habitat Remaining" areas. These areas are ideal for development as transformed areas make no contribution to meeting conservation targets within the province. The study area is, however, within the Grassland Important Bird Area, and accordingly suitable habitat including watercourses and wetlands need to be protected. No avifauna SCC may be disturbed or harmed during the construction or operational phase of the proposed expansion development.

The study area in question is already disturbed due to the existing ash disposal facilities including associated infrastructure such as internal roads and buildings. Accordingly, limited natural vegetation remains as the study area has been negatively impacted on by the existing facilities including choking by ash fallout that is being dispersed by wind.

The proposed impacts on fauna and flora are considered to be Very Low to Low, with the exception of operational activities that will have long-term Low to Medium impacts that can be mitigated to acceptable levels. Ash pollution from wind dispersal could negatively affect both flora and fauna within the surrounding area, which includes sensitive wetland habitats, and needs to be managed accordingly (it should be noted that this is currently not the case, and Majuba Power Station management needs to implement preventative measures to limit the dispersal of ash as this can have detrimental effects in the long-term on both the environment and human health).

The natural drainage areas (wetlands) and grassland surrounding the PCD's area considered to be sensitive habitats of importance and would need to be protected from impacts arising from the expansion of the PCD's. In particular, prevention of spillage events from PCD's must be of the highest priority to avoid impacts to the surrounding drainage areas and associated natural grasslands. Mitigation measures to prevent these impacts are usually contained within standard operation procedures and best practice guidelines for construction and operation. Please refer to the relevant section above for all mitigation measures proposed for each activity. In



order to ensure that the existing and proposed facilities cause only impacts of low significance on the environment, implementation of mitigation measures should take place and must be adhered to throughout the life of the project. This will require monitoring surveys to be conducted at regular intervals to ensure compliance and prescribe corrective measures in the case of non-compliance.

## 7.6 Fresh Water Impacts

### 7.6.1 Introduction, Terms of Reference and Methodology

This assessment is based on the Fresh Water Impact Assessment undertaken by **Confluent Environmental**.

The Terms of Reference (in accordance to Appendix 6 of the EIA Regulations) for the study was the following:

- Attend a specialist site meeting;
- Undertake a site survey;
- Describe all relevant surface water resources that may be affected by the proposed project;
- Generate a sensitivity map indicating any sensitive/no-go areas;
- Identify and assess any impacts that may occur;
- Make recommendations for further studies that may be required during or after the Environmental Impact Assessment (EIA);
- Make recommendations for protection and management of surface water;
- Make recommendations for any monitoring during development;
- Identify any mitigation measures that might reduce negative impacts or enhance positive impacts; and
- Attend a specialist integration workshop and finalise reports.

The study methodology entailed a site visit and survey of available literature to assess the water resources into which the development would be set, this included published material, unpublished commercial reports and online material.

### 7.6.2 Assessment of Impacts

The Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the non-perennial drainage lines are considered to be Moderately Modified (C) and Low (D), respectively. The PES of the unchanneled valley bottom wetland is Moderately Modified, yet the EIS is considered to be High due to its important biodiversity and hydro-functional attributes.

The extension of existing pollution control dams (AD1 and AD2) is unlikely to result in any negative impacts from an aquatic perspective. Furthermore, construction activities will occur well outside the designated buffer areas of nearby water resources. Both dams do however have a spillway which, if over-topped, could lead to water from the dams draining into these watercourses. Expansion of the dams will minimize the possibility of this happening.

The most significant impact is related to the construction of RD2 which is planned to occur in the upper reaches of the non-perennial drainage line draining to the west of the proposed dam. While this section of the drainage will provide some habitat to some aquatic biota and possibly birds, its very close proximity to the ash dump renders it as low value in terms of biodiversity importance and hydrological function. Given its ephemeral nature and position within the catchment, the loss of aquatic habitat that falls within the footprint of the dam can be regarded as a relatively minor impact.



### 7.6.2.1 Potential Impact FW1: Water Quality

#### Construction phase

- Impairment of water quality due to spillage of water contained in the existing dams as a result of construction activities;
- Spills, leakages or inadequate treatment and disposal of sewage effluent; and
- Hydrocarbon spillage from trucks and vehicles close to the watercourse can severely contaminate the associated watercourses. Serious spills can seriously affect mortality rates of aquatic and terrestrial fauna that utilize watercourses as breeding and foraging habitat.

#### Operational Phase

- Deterioration of water quality in downstream water resources due to seepage or accidental discharge of high salinity water from the dams

Table 48: Significance of impact on water quality during construction

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Extent	Local/site	Local/site only
Duration	Short term (One day to one Month)	Short term (One day to one Month)
Severity/Irreplaceability	Significant/slightly harmful	Insignificant/non-harmful
Probability/Confidence	Almost Certain	Unlikely
Significance	Medium	Low (Negligible)
Cumulative impacts	The unmitigated decline in water quality would during construction be a negative cumulative impact because it is likely that other sources also contribute to the pollution of fresh water.	



Table 49: Significance of impact on water quality during operation

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Extent	Local/site	Local/site only
Duration	Ongoing	Medium term
Severity/Irreplaceability	Very High	High
Probability/Confidence	Likely	unlikely
Significance	Medium	Low (Negligible)
Cumulative impacts	The unmitigated decline in water quality once operational would be a negative cumulative impact because it is likely that other sources also contribute to the pollution of fresh water.	

### 7.6.2.2 Potential Impact FW2: Aquatic habitats

- Loss of aquatic habitat that falls within the footprint of the RD2 dam;
- Deterioration of downstream aquatic habitat due to poor waste management, dumping of construction materials etc; and
- Destruction of habitat outside of the footprint of the expanded/new dams due to disturbance by construction vehicles.

Table 50: Significance of impact on aquatic habitats

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Extent	Local/site	Local/site only
Duration	Permanent	Permanent
Severity/Irreplaceability	High	High
Probability/Confidence	Certain	Certain
Significance	Medium	Low (Minor)
Cumulative impacts	The unmitigated destruction of aquatic habitats would be a negative cumulative impact because it is likely that other habitats are also impact upon by the operations associated with the existing ash dams.	

### 7.6.2.3 Potential Impact FW3: Erosion & Sedimentation

- Transport of sediment further downstream as result of disturbance and erosion of soil during the construction process; and
- Transport of sediment originating from stockpiled materials excavated from the footprint of the dams.

Table 51: Significance of impact of sedimentation and erosion

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Extent	Local/site	Local/site only
Duration	Short term	brief
Severity/Irreplaceability	Low	Low
Probability/Confidence	High	High
Significance	Low	Negligible
Cumulative impacts	The unmitigated sedimentation and erosion of the water resources would be a negative cumulative impact because surrounding areas are most likely also impact upon by the operations associated with the existing ash dams.	

#### 7.6.2.4 Potential Impact FW4: Reduction in Flows

Reduced flows into the downstream watercourse due to loss of surface runoff proportional to the footprint of new dam infrastructure (e.g. RD2).

Table 52: Significance of impact of reduction in flows

Criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Cannot be mitigated
Extent	Local/site	
Duration	Permanent	
Severity/Irreplaceability	Low	
Probability/Confidence	High	
Significance	Low	
Cumulative impacts	The reduction in flow would be a negative cumulative impact because other operations have most likely also impacted upon the flow of surface water.	

#### 7.6.3 No-Go Alternative

The No-Go alternative implies that no additional impact will take place on water resources, other than disturbances related to ongoing maintenance activities. Similarly, the aquatic landscape will not be altered by new construction, however without the proposed ash dams, a risk of pollution (seeping/spilling/discharging) from the surrounding area is created. This alternative is thus not recommended.

#### 7.6.4 Mitigation Measures: Potential Impacts on Fresh Water

##### FW1 Water Quality Mitigation during Construction

- Water contained in the AD1 and AD2 should be prevented from seeping, spilling or discharging into the receiving environment during construction activities. This could be achieved through pumping water out of



the dams during excavation of the expanded areas, or alternatively, planning construction appropriately (e.g. through use of coffer dams);

- No vehicles or machinery are allowed within the buffer areas or watercourse. Predetermined areas should be designated where vehicles and machinery are to be stored, repaired and refuelled within a bunded area;
- Road and geotechnical stability require analysis prior to construction of site roads
- Implementation of rapid response emergency spill procedures to deal with spills immediately, including the provision of a spill kit and training of staff to deal with such instances;
- Vegetation clearance should be minimised with surface *ameriolation* to prevent silt migration during high rainfall periods
- Vehicles and equipment must be regularly serviced and maintained;
- Any spillages must be cleaned up immediately to prevent further contamination;
- Routine water quality monitoring should be implemented in watercourses where regular sampling is possible. Results should be used to rapidly identify and remedy any potential sources of contamination;
- Chemical toilets to be provided on-site at 1 toilet per 10 persons;
- Chemical toilets to be located outside the designated buffer of nearby water resources

#### **FW1 Water Quality Mitigation during operation**

- The project plan for receiving dams should be more progressed than the ADF
- All dams should be equipped with sensors to monitor water levels and give an alarm in the event that there may be a risk of overflow;
- Dams should be appropriately lined/or not depending on the underlying soil and risk status to prevent seepage of poor quality water into the receiving environment;
- Watercourses located downstream of return and ash dams should be monitored on a routine basis to detect any changes in ecological state and water quality. Monitoring should include the collection and analysis of water quality samples, assessment of habitat quality and where possible, biomonitoring, using recognised indicators such as diatoms (e.g. in the drainage line below RD2).

#### **F2 Aquatic habitats - Mitigation measures during construction**

- The footprint of the new and expanded dams should be clearly demarcated and access controlled such that construction vehicles and heavy machinery do not enter aquatic habitats that fall outside of the footprint of the dam.

#### **F2 Aquatic habitats - Mitigation during Operational phase**

- No mitigation proposed (no impact)

#### **FW3 Erosion and Sedimentation**

- Earthworks and vegetation clearing should be left open for as short a time as possible during the construction phase;
- Erosion control berms should be installed on slopes draining in direction of drainage lines;
- Revegetation after clearance should commence directly after the construction phase; and
- Alterations to the storm water management should allow for the use of detention ponds,

#### **FW4: Reduction in flows**

This impact cannot be mitigated. However, considering the location (right at the top of the drainage line) and size of the proposed RD2 dam, the reduction of surface runoff to downstream habitats is minimal.



## 7.6.5 Specialist Conclusion

The extension of existing pollution control dams (AD1 and AD2) is unlikely to result in any negative impacts from an aquatic perspective. The most significant impact is related to the construction of RD2, but the loss of aquatic habitat that falls within the footprint of the dam can be regarded as a relatively minor impact.

## 7.7 Air Quality Impacts

### 7.7.1 Introduction, Terms of Reference and Methodology

Specialist studies were not conducted for this project, but information from the previous studies (Airshed Planning Professionals, 2014) was incorporated. The 2014 study has followed a quantitative approach, using available meteorological data and pollutants typically associated with the proposed activities to evaluate the potential for off-site impacts. A quantitative assessment was undertaken based on the evaluation of existing windblown dust from ash dump studies (Burger, 1994), together with the dispersion potential of the site and magnitude of expected impacts from the proposed activities. Construction activities particularly impacted days of no work on account of the windy season requires consideration.

### 7.7.2 Assessment of Impacts on Air Quality

#### 7.7.2.1 Potential Impact AQ1: Dust

The construction phase normally comprises a series of different operations including land clearing, topsoil removal, road grading, material loading and hauling, stockpiling and compaction. Each of these operations has their own duration and potential for **dust** generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. When is the worst period? Is it August to September?

Table 53: Significance of impact on air quality

criteria	Rating Before mitigation	Rating After mitigation
Status	Negative	Negative
Extent	Local/site	Local/site only
Duration	Brief	Brief
Severity/Irreplaceability	Low	Low
Probability/Confidence	High	High
Significance	Moderate	Negligible
Cumulative impacts	The creation of excessive dust would be a negative cumulative impact because surrounding areas are most likely also adding to the situation.	

#### 7.7.3 No-Go Alternative

Dust from current operations is a problem that has been identified. The No-Go alternative implies that no additional impact will take place on air quality at this site.



## **7.7.4 Mitigation Measures: Potential Impacts on Air Quality**

Mitigation measures during construction:

- Wet construction areas and access roads where practical.

Mitigation during Operational phase:

- No mitigation proposed (no impact)

## **7.7.5 Specialist conclusion**

New studies were not done for this project, dust from current operations is a problem that has been identified in the past. The construction of the proposed ash dams will potentially aggravate the situation, but this will be of short duration and can be mitigated by wetting surfaces of access roads. Employees must be provided with the required Personal Protection Equipment (PPE) such as dust masks and glasses.

## **7.8 Potential Socio-Economic Impacts**

### **7.8.1 Introduction, Terms of Reference and Methodology**

The assessment was done with the background of the project taken into consideration and based on prior knowledge of the typical impacts of this type of development. A dedicated specialist socio-economic impact assessment was not undertaken for this project.

The purpose of the assessment was to determine:

- Predict, assess and evaluate potentially significant direct, indirect and cumulative impacts, both with and without management actions. The evaluation of significance should be linked to thresholds of significance. Impacts identified included the impact on employment, and the potential impact on the lives of local communities.
- Mitigation and management recommendations.

### **7.8.2 Assessment of Impacts**

It is predictable that the upgrade of two new ash dams and the construction of two rehabilitation dams will not result in a significant direct or indirect increase employment during either the construction or operational phases. The nature and extent of the potential benefits of this impact will depend on the employment strategy of the contractor and owner of the development. In addition, this impact could be increased should local employment be maximised throughout the lifecycle of the project.

During the implementation (construction in particular) of the project, unskilled or semi-skilled workers would benefit in terms of skills transfer and increased experience and exposure, thereby increasing their chances of finding employment with other developments in the future. Therefore, the cumulative benefits on the socio-economic environment are considered to be higher than for the individual development alone.

Negative impacts may potentially arise, however due to the location of the Majuba Power Station from residential areas, and since the project is contained within the boundaries of the existing site, these issues are negligible.

The construction phase will require material and equipment to be supplied and transported to the construction site. Because the development is proposed on the existing Majuba Power Station site, vehicles will not place much additional pressure on the surrounding road network (apart from material that is sourced from outside the site boundaries). This is likely to overlap with current construction traffic movements, characterised mainly by trucks transporting coal to the power station, farming related activities and regular motorists passing through

the region. It is however not expected that traffic will increase significantly, or that there will be an increased risk in the potential for accidents and disruption to the road traffic network for local users. For this reason, no mitigation measures are proposed.

Based on the aforementioned, the cumulative impacts of the upgrade of two new ash dams and the construction of two rehabilitation dams on the socio-economic environment are expected to be mostly positive in nature. The following main potential socio-economic impacts were identified:

- Creation of temporary employment in the local communities and elsewhere in the country
- Skills development due to the creation of new employment opportunities (and improved standard of living of households directly or indirectly benefiting from created employment opportunities)

### 7.8.2.1 SE1: Creation of temporary employment in the local communities and elsewhere in the country

During the construction period, new opportunities for (temporary) employment will be created for local communities, mostly Amersfoort and Voksrust towns and surrounds. The establishment of the proposed development will also positively impact the standard of living of households directly or indirectly benefiting from the created employment opportunities during construction. The impact of such opportunities is assessed in the table below (the project is not expected to create new jobs during operational phase).

Table 54: Temporary jobs created during construction

Criteria	Rating Before mitigation	Rating After mitigation
Status	Positive	Positive
Extent	Local community	Local community
Duration	Construction period	Construction period
Severity/Irreplaceability	Low	Low
Probability/Confidence	Medium	High
Significance	Low	Low
Cumulative impacts	New opportunities for employment to alleviate poverty for a small number of workers.	

### 7.8.2.2 SE2: Skills development due to the creation of new employment opportunities

The increased skills development that will be created because of the new employment opportunities during construction is an additional induced impact on the local economy and been assessed in the table below.

Table 55: Temporary jobs created during construction

Criteria	Rating Before mitigation	Rating After mitigation
Status	Positive	Positive
Extent	Local (community)	Local (community)
Duration	Construction period	Construction period
Severity/Irreplaceability	Low	Low
Probability/Confidence	Medium	High



Criteria	Rating Before mitigation	Rating After mitigation
Significance	Low	Medium
Cumulative impacts	None	

### 7.8.3 No-Go Alternative

The No-Go alternative implies that the existing socio-economic environment i.e. *status quo* remains. Due to the current unemployment rate in this region, the socio-economic conditions within the region will remain the same, or even deteriorate with the No-Go alternative. The predicated rating for the No-Go alternative will be of a negative nature.

### 7.8.4 Mitigation Measures: SE1 & SE2 Socio-Economic Impacts

To assist in maximise the positive impact and minimise any potential negative cumulative impacts it is recommended that Eskom introduce training, employment and skills development via the local Labour Desk and community representatives. The proposed mitigation measures for the above listed potential positive impacts will be included in the EMP.

### 7.8.5 Specialist Conclusion

New socio-economic studies were not done for this project, the impacts of the project on the socio-economic component are expected to be mostly positive, through the creation of jobs and potential for skills training.

## 7.9 Cumulative Impacts

Activities can result in numerous and complex effects on the social-economic environment. Though many of these potential impacts may be direct and immediate, the environmental effects may cause incremental or cumulative effects. It is possible that the effects from unrelated activities may accumulate or interact to cause additional effects that may not be apparent when assessing the individual activities in isolation.

Cumulative effects can also be defined as *the total impact that a series of developments, either present, past or future, will have on the environment within a specific region over a particular period of time* (DEAT IEM Guideline 7, Cumulative effects assessment, 2004).

For the purposes of this report, cumulative impacts are defined as 'direct and indirect impacts that act together with existing or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors'. With respect to this project, factors to consider are as follows:

- The proposed development generates environmental impacts that are mostly of local extent (the site of the project within the boundaries of the Majuba Power Station).
- Cumulative impacts associated with the development can be described as unlikely. The most significant cumulative impact related to water resources would be the increased capacity of the dams to capture surface runoff thereby reducing natural flows into the receiving environment.
- Considering that stormwater and surface runoff originates from the ash dump and surrounds, the presence and enlargement of these dams, with minimal impacts to aquatic water resources should be viewed in a positive light. Increased capacity of dams will reduce the risk of dams overflowing and releasing contaminated water into the receiving environment.
- The loss of habitat could be seen as a cumulative impact of low-medium significance because it is likely that a number of sites have been lost to industrial development in the area and similar historical sites are relatively uncommon



- The unmitigated loss of grasslands from the area would be a negative cumulative impact because it is likely that other such sensitive grasslands have also been lost over the years.
- The unmitigated decline in water quality would be a negative cumulative impact because it is likely that other sources also contribute to the pollution of fresh water.
- The unmitigated destruction of aquatic habitats would be a negative cumulative impact because it is likely that other habitats are also impact upon by the operations associated with the existing ash dams
- The reduction in flow would be a negative cumulative impact because other operations have most likely also impacted upon the flow of surface water.
- The unmitigated sedimentation and erosion of the water resources would be a negative cumulative impact because surrounding areas are most likely also impact upon by the operations associated with the existing ash dams.
- New opportunities for employment to alleviate poverty for a small number of workers will be created, inclusive of skills training which will benefit the community in conjunction with other projects in the area.



## 8 CONCLUSIONS AND RECOMMENDATIONS

This chapter provides the conclusion of the impact of the proposed development in the Pixley Ka seme Local Municipality and Mpumalanga Province. The key findings are presented in this chapter, followed by a discussion of the factors DEA will have to consider in order to take a decision that is aligned with the principles of sustainable development.

As is to be expected, the proposed development has the potential to cause impacts, both negative and positive. However, since the development is of relatively low intensity and confined in extent, few project impacts are predicted to be of major concern.

The Impact Assessment has examined the available project information and drawn on both available (secondary) and specifically collected (primary) baseline data to identify and evaluate environmental and social impacts of the proposed development. The DEIAR aims to inform decision-makers of the key considerations by providing an objective and comprehensive analysis of the potential impacts and benefits of the proposed development and has created a platform for the formulation of mitigation measures to manage these impacts, presented in the EMPr provided in **Appendix E**.

This chapter presents the general conclusions drawn from the S&EIA process, which should be considered in evaluating the project. It should be viewed as a supplement to the detailed assessment of individual impacts presented in Section 7.

### 8.1 Environmental Impact Statement

The Appendix 3 of GNR 326, 2014 EIA Regulations, prescribes the required content of an DEIAR, including, inter alia, an Environmental Impact Statement (EIS), which is presented in the section below.

#### 8.1.1 Evaluation and Assessment

The evaluation is undertaken in the context of the:

- Project information provided by the applicant;
- Assumptions made for this DEIAR;
- Assessments provided by specialists.
- Assumption that the recommended mitigation measures will be effectively implemented.
- This evaluation aims to provide answers to a series of key questions posed as objectives at the outset of this report, which are repeated here:
- Assess in detail the environmental and socio-economic impacts that may result from the proposed development;
- Identify environmental and social mitigation measures to address the impacts assessed; and
- Produce an DEIAR that will assist DEA to decide whether (and under what conditions) to authorise the proposed development.

The observations with regard to the above impact assessment (assuming mitigation measures) are effectively implemented are:

- The predicted impact on **heritage and archaeological resources** was rated as Insignificant/non-harmful and of **low** significance. No specific archaeological mitigation measures are suggested.



- The predicted impact on the **ecology** in terms of the disturbance to natural drainage areas was rated as having **low** significance before mitigation and significant/non-harmful after successful mitigation. The potential loss or disturbance of grasslands is rated as Insignificant or non-harmful
- The expected impact on **water quality** during construction was rated as having medium significance before mitigation and **Low** (Negligible) after mitigation. The potential impact on water quality during operation has a similar rating.
- The predicted impact on aquatic habitats is rated as Low (Minor) after mitigation.
- The predicted impact of the project in terms of **sedimentation and erosion** was rated as having a **Low to Negligible** significance.
- The potential for **reduction in flows** cannot be mitigated, but has a **low significance**
- The predicted impact on **air quality** would be **moderately** significant, but after proper mitigation, it would be **negligible**
- In terms of **socio-economic** impact, the creation of temporary jobs (during construction) would have a positive impact of **high** significance (medium before mitigation)
- If ESKOM introduces skills training, via the local Labour Desk and community representatives as a mitigation measure, the **positive impact** would be enhanced, and the rating of medium significance would be given.

### 8.1.2 Principle Findings

The principal findings of the DEIAR are as follows:

- The proposed upgrade of two existing ash dams and the construction of two rehabilitation dams is expected to have a relatively low impact on the receiving environment.
- The reasons for the impact being significantly less than would have been at a green fields site, is because the development will take place in close vicinity of existing infrastructure that have been in operation, and because the entire project is contained within the boundaries of the Majuba Power Station's fenced off site.
- There are no residential areas close to the development that would be negatively impacted upon by the construction or operation of the proposed dams.
- The Public Participation Process has been followed according to the prescribed regulations and no serious issues or concerns were raised. I&APs are informed about the project and given the opportunity to take part in the assessment process.

### 8.1.3 Statement Motivation

The proposed construction and upgrading of ash dams is expected to have a minimal environmental impact.

Mitigation measures (as proposed in the Specialist Reports and EMPr) to lessen any environmental impacts must be implemented during the construction and operation phase of the project.

## 8.2 Conclusion and Recommendation

This draft DEIAR has identified and assessed the potential biophysical and socio-economic impacts associated with the proposed construction and upgrading of ash dams at the Majuba Power Station. In terms of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is presented, and in this regard Advisian believes that sufficient information is available for DEA to make a decision.

The proposed development will result in environmental of relatively limited intensity, given the already disturbed nature of the project area, which has largely been transformed through previous activities related to the power station. Consequently, none of these adverse impacts are considered to have an unacceptably high significance



and all can be managed to tolerable levels through the effective implementation of the recommended mitigation measures as listed in the specialist assessments and EMPr. In addition, the proposed development will provide socio-economic benefits due through job creation and skills development (during the construction phase).

Working on the assumption that Eskom is committed to ensuring that the proposed development is constructed in compliance with the environmental requirements, which shall be achieved through the implementation of the recommended environmental mitigation measures documented in this report and the EMPr, Advisian believes that adverse impacts can be reduced to levels compliant with national environmental standards.

In conclusion, Advisian is of the opinion that on purely 'environmental and social' grounds (i.e. the project's potential socio-economic and biophysical implications) the application **should be approved**, with regards to the proposed upgrade of two existing ash dams and the construction of two rehabilitation dams at the Majuba Power Station's ash disposal facility, provided the mitigation measures as proposed in specialist assessments and documented within the EMPr are implemented during the project's construction and operational phases.





## 9 LETTER OF UNDERTAKING

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The Environmental Assessment Practitioner (EAP) herewith confirms the following"

- A. The correctness of the information provided in this Report and all supporting studies;
- B. The inclusion of comments and issues received in writing from registered interested and affected parties (IAPs);
- C. The inclusion of inputs and recommendations from the specialist reports where relevant; and
- D. That the information provided by the EAP to IAPs and any responses by the EAP to comments and issues presented by IAPs are correctly reflected herein.

**Marinda le Roux**

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Name of the Environmental Assessment Practitioner

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Signature of the Environmental Assessment Practitioner

**WorleyParsons RSA (Pty) Ltd. trading as Advisian**

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Name of the Company

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Date



## 10 ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations provided below pertains to the S&EIA conducted for the proposed development, as well as the relative specialist studies, as described in **Section 2** of this DEIAR.

### 10.1 Advisian

The S&EIA Proses is being conducted as per the project proposal prepared by Advisian for the scope of work as provided by the client. In addition, the following assumptions and limitations apply to this report:

- Where data supplied by applicant/proponent or other specialist consultants, has been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Advisian for incomplete or inaccurate data supplied by external parties.
- At the time of this DEIAR Eskom is yet to provide Advisian with finalised designs of the proposed amendments to the Majuba Power Station Ash Disposal Facility, including a construction plan. The preliminary design, as per this report, was available.
- It is Advisian's professional opinion that the adopted predictive methods are sufficient and adequate for rating the significance of the impacts during the Impact Assessment phase.
- Advisian's assessment of the significance of impacts of the proposed development on the receiving environment has been based on the assumption that the activities will be confined to those described in this report. If there are any substantial changes to the description of proposed activity, impacts may need to be reassessed.
- Where detailed design information is not available, the precautionary principle, i.e. a conservative approach that overstates negative impacts and understates benefits, has been adopted.
- It is assumed that the public participation process undertaken during the EIA process has identified all relevant concerns of stakeholders.
- Eskom Holdings SOC Ltd will in good faith implement the agreed mitigation measures identified in this report. In this regard, it is assumed that Eskom Holdings SOC Ltd will commit sufficient resources and employ suitably qualified personnel.
- Notwithstanding the above, Advisian is confident that these assumptions and limitations do not compromise the overall findings of this report.

In terms of the respective specialist studies which inform this DEIAR the following assumptions and/or limitations also apply to the assessments completed:

### 10.2 Ecological Assessment Study

An ecological specialist study was undertaken by Enviro-Insight CC, and the following assumptions are given in the specialist report:

- It is assumed that all third-party information acquired is correct (e.g. GIS data and scope of work);
- A Site Development Plan (SDP) showing the exact location of the proposed infrastructure was provided prior to the site visit;
- The level of study did not warrant long-term trapping methods (i.e. small mammal trapping, herpetofauna trapping, camera trapping and night surveys) or a phytosociological delineation. The confidence in the assessment derived from the literature review and fieldwork data however is high due to the status quo of the study area, the location (disturbed area) and the size of the study area (relatively small);
- Due to the weather conditions on site during the survey, i.e. cold temperatures and high wind speeds, conditions were not optimal; and



- The site visit was conducted at the beginning of the wet season in November.

### 10.3 Groundwater Assessment Study

A Ground Water assessment was undertaken by Advisian, and the following assumptions were listed in the report:

- This assessment was based on conditions that were present at the time of the site visit. While groundwater assessments have taken seasonality into account it is possible that seasonal hydrological changes may influence the outcome of results presented.

### 10.4 Heritage Assessment Study

A Heritage Assessment was undertaken by Enviro-Insight CC, and the following assumptions were listed in the report:

- The authors acknowledge that the brief literature review is not exhaustive on the literature of the area.
- Due to the subsurface nature of archaeological artefacts, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Similarly, the depth of the deposit of heritage sites cannot be accurately determined due its subsurface nature.
- The report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys.
- The study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this report.

### 10.5 Freshwater Assessment Study

A Freshwater Assessment was undertaken by Confluent Environmental, and the following assumptions were listed in their report:

- The PES and EIS assessments undertaken are largely qualitative and results are open to professional opinion and interpretation. An effort has been made to substantiate scoring of important criteria where applicable.
- Given the lack of flowing water in the non-perennial drainage lines, the PES was determined by an assessment of in-stream and riparian habitat integrity only.
- The freshwater assessment was based on conditions that were present at the time of the site visit. While PES and EIS assessments have taken seasonality into account it is possible that seasonal hydrological changes may influence the outcome of results presented.

### 10.6 Air Quality Assessment Study

An Air Quality study was undertaken by Airshed Professionals in 2014, and the following assumptions are made:

- A composite ash sample was acquired from the Majuba ash disposal facility. It is assumed that the particle size distribution and elemental composition of ash disposal at the proposed new facility (AD1, AD2, RD1 and RD2) will be similar to that from Majuba at present.
- The assumption was made that the existing Majuba ash disposal facility would be completely rehabilitated when the proposed continuous ash disposal operations commence. Only impacts from the proposed facility site alternatives were therefore assessed.



## 11 REFERENCES

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- Enviro-Insight CC November, 2018 (updated 2019). Specialist Report terrestrial ecological (flora) assessment.
- Enviro-Insight CC, 2018 (updated 2019). Specialist Report ecological (wetland) assessment.
- Heritage Contracts and Archaeological Consulting, 2018 (updated 2019). Specialist Report Heritage (scoping) assessment.
- Advisian, 2018 (updated 2019). Specialist Groundwater Report.
- Majuba Power Station air quality monitoring station data (Eskom).
- Lidwala Consulting Engineers (SA) (Pty) Ltd, 2014. Final Environmental Impact Assessment for the proposed continuous disposal of ash at the Majuba Power Station, Mpumalanga Province.
- The Constitution of South Africa (Act No. 108 of 1996).
- Environmental Management Information Series (DEA, latest draft dated 2006).
- Ke seme Local Municipality KSLMM Integrated Development Plan (IDP) 2018/2019.
- Eskom's Majuba monitoring station – weather data.
- SANBI, 2018. The Red List of South African Plants website.
- Van Oudtshoorn, 1999. Guide to grasses of Southern Africa.
- Van Wyk & Malan, 1998. Field Guide to the Wild Flowers of the Highveld.
- Van Wyk & Van Wyk, 2013. Field guide to trees of southern Africa.
- Bromilow, 2010. Problem plants and alien weeds of South Africa.
- Mucina & Rutherford, 2006. The Vegetation of South Africa, Lesotho and Swaziland
- Red List of South African Plants, 2009. Raimondo et al.
- Mpumalanga Terrestrial Biodiversity Conservation Plan.
- Online virtual museum facility of the Animal Demography Unit of the University of Cape Town (<http://vmus.adu.org.za>).
- Southern Africa Bird Atlas.
- Child et al., 2017. Mammal SCC information.
- Bates et al., 2014. Reptile SCC information.
- Du Preez & Carruthers, 2017. Amphibian SCC information.

## **Appendix A**   **Locality Maps & Deed Diagram**

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## **Appendix B**   **Advisian Personnel Curriculum Vitae's**

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## **Appendix C Specialist Studies**



## **Appendix D Public Participation Report**





## **Appendix E Environmental Management Programme**



# **Appendix F      DEA Letter of Acceptance for the Final Scoping Report Submitted**

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