mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Scoping Report

for Listed Activities Associated with the Proposed Active Water Treatment Plant at the Klipspruit Colliery, Mpumalanga Province

DMR Reference Number: MP 30/5/1/2/2/125 MR

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

Name of Applicant:	South32 SA Coal Holdings (Pty) Ltd (SAEC)
Tel no:	013 643 3850
Fax no:	086 718 2070
Postal Address:	P.O Box 61820, Marshalltown, Johannesburg
Physical Address:	Portion 12,Farm Klipfontein 3 IS, Ogies, 2230
File Reference Number SAMRAD:	**MP 30/5/1/2/2/125 MR**

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This document has been prepared by Digby Wells Environmental.

Report Type:	**Draft Scoping Report**
Project Name:	**Environmental Impact Assessment for the Proposed Water Treatment Plant at the Klipspruit Colliery, Mpumalanga Province**
Project Code:	**SOU5014**

Name	Responsibility	Signature	Date
Anita Gutu	Report Compiler		May 2018
Xanthe Taylor	Project Manager Report Review		June 2018
Brett Coutts	Senior Review		June 2018

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE SCOPING PROCESS

The objective of the scoping process is, through a consultative process, to: -

- identify the relevant policies and legislation relevant to the activity;
- motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- identify the key issues to be addressed in the assessment phase;
- agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Introduction

South32 SA Coal Holdings (Pty) Ltd (hereafter SAEC) intends to construct a modular Water Treatment Plant (WTP) for treating mine affected water at its Klipspruit Colliery (KPS) located near Ogies in the Mpumalanga Province (the project). The purpose of the WTP is to treat mine affected water from the Balancing Dam to an acceptable standard and subsequently release this water into the Saalklapspruit.

This draft Scoping Report is submitted to Interested and Affected Parties (I&APs) and relevant Authorities for review and comment in terms of the application for Environmental Authorisation under the NEMA EIA Regulations, 2014 (as amended).

Project applicant

The details of the Project Applicant are included in the table below.

Name of Applicant:	South32 SA Coal Holdings (Pty) Ltd (SAEC)
Tel no:	013 643 3850
Fax no:	086 718 2070
Postal Address:	P.O Box 61820, Marshalltown, Johannesburg
Physical Address:	Portion 12,Farm Klipfontein 3 IS Ogies, 2230

Project overview

The affected mine water that is being generated at KPS exceeds the re-use capacity within the operations, whilst the storage capacity in mined out areas has reached its limits which increases the risk of spillages or discharges to the natural environment. As a result the treatment and release of affected mine water has been deemed the most feasible option to maintain the colliery's water balance.

A WTP capable of treating up to 10 Mega litres per day (Ml/day) of excess mine affected water from its Balancing Dam is proposed. The WTP is proposed to be constructed in three phases, starting at 3.3 Ml/day and then increasing in 3.3Ml/day increments thereafter. Therefore this application pertains to the full 10Ml/day capacity. Water from the WTP will be released directly into the tributary of the Saalklapspruit to the north of the KPS mine boundary where the tributary of the Saalklapspruit flows beneath the N12 highway. Treated water will comply with the Resource Water Quality Objectives (RWQOs) which are set by the Department of Water and Sanitation (DWS).

The proposed project will comprise of the following infrastructure:

- WTP located in the south-eastern corner of the Klipspruit Colliery (total footprint area 1.06 ha);
- Temporary laydown area of 0.4 ha for tools and equipment during the construction phase;
- 1.5 km HDPE feed water pipeline from the Balancing Dam to the WTP located in the Klipspruit Colliery;
- 3.8 km HDPE clean water pipeline from the WTP to the discharge point into the Saalklapspruit;
- A dissipation structure will be constructed at the discharge point into the Saalklapspruit to ensure that discharge is done in a manner that will not significantly impact or increase the natural velocity of the stream;
- A new powerline from the existing Ring Main Unit One at the sewage plant and new transformer (22kV/525V) at the WTP site; and
- Contractor change houses and ablution facilities (connected to the colliery's existing sewage line) at the WTP.

Purpose of this report

The Environmental Impact Assessment (EIA) process is a tool to identify and manage potential impacts on the environment as a result of a particular project. Environmental risks associated with such a project are also identified and mitigation measures proposed. The completion of an EIA is a regulatory requirement in terms of the provisions of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the EIA process which is regulated in accordance with the EIA Regulations, 2014[1] (the EIA 2014 Regulations, as amended). The overarching purpose of the EIA process is to determine, assess and evaluate the environmental and social consequences (positive and negative) of a proposed development, activity or project.

This Scoping Report forms part of the EIA process and aims to identify those biophysical and socio-economic issues or concerns that require investigation as well as determine feasible alternatives. This information is then used to determine the scope of work for the impact assessment phase of the EIA process. During the scoping phase, people interested or affected by the project are informed of the project as well as provided the opportunity to raise issues and concerns they may have.

The objectives of the scoping report are, therefore, to:

- Describe the Project and the associated activities;

[1] GN R982 published in Government Gazette 38282 of 4 December 2014 (as amended, 2017)

- Provide a summary of the Baseline Environment;
- Predict potential positive and negative impacts as a result of the Project and its activities, and identify potential measures to minimise negative impacts and enhance positive impacts;
- Provide a proposed Plan of Study for the EIA Phase; and
- Share the Project information with Interested and Affected Parties (I&APs) and to record the issues and comments raised by all stakeholders.

Environmental consultants

Digby Wells Environmental (Digby Wells) has been appointed by SAEC as the independent Environmental Assessment Practitioner (EAP) to conduct the EIA according to NEMA and Integrated Water Use Licence (IWUL) according to the National Water Act, 1998 (NWA) as well as the associated specialist studies and the required Public Participation Process (PPP) for the proposed project. The details of the Environmental Assessment Practitioner are contained in the table below.

Name of Practitioner:	Digby Wells Environmental Xanthe Taylor
Telephone:	011 789 9495
Fax:	011 069 6801
Email:	xanthe.taylor@digbywells.com

Approach and methodology for the Public Participation Process

A Public Participation Process has been initiated, which is central to the investigation of environmental and social impacts, as it is important that stakeholders who are affected by the Project are given an opportunity to identify concerns to ensure that local knowledge, needs and values are understood and taken into consideration as part of the EIA process.

This Draft Scoping Report is available for public comment for a period of 30 days and all comments or concerns raised will be recorded and responded to in the Comments and Responses Report (CRR). The 30 day comment period is from **13 July until 14 August 2018.**

The following activities were undertaken to announce the Project and initiate the Scoping Phase:

- A Background Information Document (BID) was distributed;
- Newspaper advertisement was placed in the Witbank News newspaper;
- An announcement letter including a registration form was distributed to identified Interested and Affected Parties (I&APs) via email;
- Site notices were placed around the site; and

- Hard copies of the Draft Scoping Reports have been made available at the Emalahleni Public Library, Ogies Public Library, and Phola Public Library. Furthermore, and an electronic copy can be accessed and downloaded from the Digby Wells website - www.digbywells.com (Public Documents).

Environmental Baseline

KPS is situated approximately 30 km west of Emalahleni near the town of Ogies within the Nkangala Magisterial District, Mpumalanga Province. The Mining Right Area is bordered by the N12 Road to the north; R545 Road to the east and R555 Road to the South. Mining activities commenced in October 2003 and comprise of open pit mining utilising strip mining and truck and shovel mining methods. The proposed WTP is located in the south-eastern corner of KPS with the proposed discharge point into the Saalklapspruit located to the north of the KPS mine boundary.

The WTP Project area is characterised as disturbed land/ rehabilitated areas which was previously mined as part of the KPS operation. Vegetation has re-established around the proposed discharge point, however extensive alien plant species can be observed. Two wetlands are present within the KPS boundary, namely a Channelled Valley Floor wetland situated on the northern portion of the WTP Project area and a Bench Depression situated west of the WTP.

Project alternatives

The Project alternatives considered for this project include the following:

- WTP location in terms of the environmental sensitivities associated with areas where developments are planned;
- WTP design with specific focus on waste generated by the plant;
- Pipeline routes which considered environmental sensitives and progressive mining and rehabilitation activities planned at KPS; and
- The No-go alternative.

Conclusions and recommendations

The installation of a WTP has been deemed the most feasible option to maintain the water balance at KPS. This will reduce the risk of spillages or discharges of mine affected water to the natural environment which would have a significant negative impact on the natural environment. The preferred location of the WTP is on disturbed land within KPS which was strategically selected to avoid further environmental disturbance within the Mining Right Area.

The preliminary potential impact identification considers impacts associated with both the construction of the proposed Project as well as the operation of the plant and associated pipelines once developed. Key impacts identified pertain to potential disturbance of wetland habitats as well as increased erosion resulting in potential siltation of watercourses and

wetlands. The proposed Project is also likely to result in positive impacts mainly pertaining to socio-economic improvements through increased job opportunity during the construction phase and improved public health and safety through reducing the risk of water pollution as a result of uncontrolled discharges or spillage of mine affected water.

This Scoping Report has been compiled to provide I&APs with information regarding the Project as well as identify issues and concerns that may arise from the execution of the Project. Various specialist studies are being undertaken as part of this EIA process to quantify impacts associated with the proposed developments. Mitigation and management measures will also be proposed to mitigate adverse impacts and enhance positive impacts as far as possible with the aim of ensuring that the installation of a WTP at KPS is constructed and operated in a sustainable manner.

Comments from I&APs are welcome throughout the process through the channels provided in this report.

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LIST OF ACRONYMS AND ABBREVIATIONS

%S	Total Sulphur Content
AATC	Anglo American Thermal Coal
ABA	Acid Base Accounting
AMD	Acid Mine Drainage
AP	Acid Generating Potential
ASTP	Average Score per Taxon
CARA	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
CR	Critical Endangered
CRR	Comments and Response Report
CSI	Corporate Social Investment
DD	Data Deficient
DEA	Department of Environmental Affairs
dBA	Decibels
DEM	Digital Elevation Model
Digby Wells	Digby Wells Environmental
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources (previously known as DME)
DRE	Design Rainfall Estimation
DWAF	Department of Water and Forestry
DWS	Department of Water and Sanitation (previously DWA)
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ELM	eMalahleni Local Municipality
EMPr	Environmental Management Programme
EN	Endangered
FRAI	Fish Response Assessment Index
GDP	Gross Domestic Product
GN	Government Notice
HGM	Hydro-geomorphic Unit
HIA	Heritage Impact Assessment

I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IHAS	Invertebrate Habitat Assessment System
IHI	Index of Habitat Integrity
IUCN	International Union for the Conservation of Nature
ISCW	Institute for Soil, Climate and Water
IWUL	Integrated Water Use Licence
IWULA	Integrated Water Use Licence Application
LC	Least Concern
KPS	Klipspruit Colliery
KSPX	Klipspruit Extension
LoM	Life of Mine
MAE	Mean Annual Evaporation
mamsl	Metres Above Mean Sea Level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
mbgl	Metres Below Ground Level
MDEDET	Mpumalanga Department of Economic Development, Environment and Tourism
MPHRA	Mpumalanga Provincial Heritage Resources Agency
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NDCR	National Dust Control Regulations
NDM	Nkangala District Municipality
NE	Not Evaluated
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM: AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
NEM: BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 od 1999)
NP	Neutralisation Potential
NNP	Nett Neutralisation Potential
NPR	Neutralisation Potential Radon
NT	Near Threatened

NWA	National Water Act, 1998 (Act No. 36 of 1998)
PCD	Pollution Control Dam
PCPP	Phola Coal Processing Plant
PES	Present Ecological Status
PPP	Public Participation Process
RHP	River Health Programme
ROI	Radius of Influence
ROM	Run of Mine
RWQO	Resource Water Quality Objectives
SAEC	South32 SA Coal Holdings (Pty) Limited
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SANAS	South African National Accreditation System
SASS5	South African Scoring System version 5
SAWS	South African Weather Service
SHE	Safety, Health and Environment
SMME	Small, Medium and Micro Enterprises
SSC	Species of Special Concern
STP	Sewage Treatment Plant
TDS	Total Dissolved Solids
ToR	Terms of Reference
VU	Vulnerable
WARMS	Water User Registration Management Systems
WMA4	Water Management Area 4
WMS	Water Management System

1 Introduction

South32 SA Coal Holdings (Pty) Ltd (hereafter SAEC) intends to construct a modular Water Treatment Plant (WTP) for treating mine affected water at its Klipspruit Colliery (KPS) located near Ogies in the Mpumalanga Province (the project). Feedwater for the WTP will originate from the Balancing Dam on KPS which currently accommodates mine affected water from the KPS operation. A new agreement between the SAEC and the neighbouring Anglo Zibulo Colliery will allow SAEC to utilise Zibulo Colliery's water for coal processing at the Phola Coal Processing Plant (PCPP). The PCPP is jointly owned and operated by SAEC and Anglo Zibulo Colliery, and Anglo currently uses the underground water from Zibulo at the PCPP. Currently, SAEC's mine affected water from the Balancing Dam is used for water make at the PCPP. Water quality produced at Zibulo Colliery is more suitable for PCPP and Zibulo pumps sufficient quantities of water from their underground operations to negate the use of KPS mine affected water for processing.

The enviro-legal process will include the application for Environmental Authorisation for Listed Activities triggered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and associated Regulations, namely the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended[2]). Concurrently, an application for an Integrated Water Use Licence (IWUL) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA) will be undertaken as part of the enviro-legal process for the WTP.

Digby Wells Environmental (Digby Wells) has been appointed by SAEC as the independent Environmental Assessment Practitioner (EAP) to conduct the EIA according to the NEMA and IWUL according to NWA as well as the associated specialist studies and the required Public Participation Process (PPP) for the proposed project.

This draft Scoping Report is submitted to Interested and Affected Parties (I&APs) and relevant Authorities for review and comment in terms of the application for Environmental Authorisation under the NEMA EIA Regulations, 2014 (as amended).

2 Project applicant

The details of the Project Applicant are included in the table below. The proposed duration of the authorisation is 10 years which is discussed in detail in section 8.

Table 2-1: Project applicant details

Project Applicant:	South32 SA Coal Holdings (Pty) Ltd
Registration number:	1963/000537/07
Responsible Person:	Klipspruit Colliery Operations Manager
Contact person:	Josua Bekker

[2] As amended by GN R 326 of 07 April 2017

Physical address:	Klipspruit Colliery: Portion 12,Farm Klipfontein 3 Registration Division IS Ogies, 2230 South Africa
Postal address:	Private Bag X15 Leraatsfontein, 1038 South Africa
Telephone:	013 643 3800
Email:	Josua.bekker@south32.net

2.1 Item 2(a)(i): Details of EAP

Digby Wells has been appointed by SAEC to facilitate and complete the enviro-legal applications for Authorisations required to develop and operate the proposed WTP. The details of the EAP are included in the table below.

Table 2-2: Contact details of the EAP

Name of Practitioner:	Digby Wells Environmental Xanthe Taylor
Telephone:	011 789 9495
Fax:	011 069 6801
Email:	xanthe.taylor@digbywells.com

2.2 Item 2(a)(ii): Expertise of the EAP

2.2.1 The qualifications of the EAP

Xanthe Taylor holds the following degrees:

- BA English and Psychology - University of South Africa (UNISA); and
- BA Honours Environmental Management – UNISA.

Please refer to Appendix 1 for the EAP's curriculum vitae and qualification certificates.

2.2.2 Summary of the EAP's past experience

Xanthe Taylor started her career in environmental consulting in 2012. She has an honours degree in Environmental Management from UNISA. Ms Taylor's experience is mostly related to the mining industry managing applications governed by the NEMA, and both the 2010 and

2014 EIA Regulations thereunder, as well as the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA).

Her experience comprises managing integrated mining applications: compiling application forms, Basic Assessment reports, Scoping reports, EIA reports, Environmental Management Programmes (EMPs), Section 29 and Section 31 Amendment applications, Section 102 Amendment reports, exemption applications, appeals processes, and auditing.

3 Item 2(b): Description of the property

The proposed project falls within the existing KPS Mining Right Area (MRA) which comprises various farm portions located near the town Ogies, Mpumalanga Province, adjacent to the N12 national road. The regional and local setting of the project area is depicted in Plan 1 and Plan 2, Appendix 2.

The KPS Mining Rights Area (MRA) comprises several farm portions on the Farms Smaldeel 1 IS, Klipfontein 3 IS, Oogiesfontein 4 IS, Prinshof 2 IS, Bankfontein 216 IR, and Phola Plant No. 830-IS.

The proposed Project subject to this application comprises several types of infrastructure including the WTP, temporary laydown area, feedwater pipeline and discharge pipeline which are discussed in detail in Section 5.3 below. This infrastructure spans over various properties within the KPS MRA with the centre coordinates for the WTP being 26° 3'5.05"S 29° 2'22.04"E. Table 3-1 below provides the property details specifically associated with the WTP.

Table 3-1: Property Details

Farm Name:	▪ RE of Portion 4 of the Farm Oogiesfontein 4 IS ▪ Portion 63 of the Farm Oogiesfontein 4 IS ▪ Portion 2 of the Farm Prinshof 2 IS ▪ Portion 14 of the Farm Prinshof 2 IS ▪ RE of Portion 14 of the Farm Klipfontein 3 IS ▪ RE of Portion 12 of the Farm Klipfontein 3 IS ▪ Phola Plant No. 830-IS on the Farm Klipfontein 3 IS
Application Area (Ha):	▪ WTP footprint area – 1.06 hectare (ha) ▪ Temporary laydown area (construction phase only) – 0.45 ha ▪ Feedwater pipeline – 1.5 km (7.5 ha) ▪ Clean water discharge line – Option 1 = 3.8 km (19 ha); Option 2 = 3.7 km (18.5 ha)

<table>
<tr><td>Magisterial District:</td><td>Nkangala Magisterial District, Mpumalanga Province</td></tr>
<tr><td>Distance and direction from nearest town:</td><td>Approximately 3 km east of the town Ogies</td></tr>
<tr><td>21 digit Surveyor General Code for each farm portion:</td><td>
<table>
<tr><th>Farm</th><th>Surveyor General Code</th><th>Infrastructure</th></tr>
<tr><td>Remaining Extent (RE) of Portion 4 of the Farm Oogiesfontein 4</td><td>T0IS00000000000400041</td><td>▪ Clean Water Option 1
▪ Clean Water Line Option 2</td></tr>
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<tr><td>Portion 2 of the Farm Prinshof 2</td><td>T0IS00000000000200002</td><td>▪ Clean Water Line Option 1
▪ Clean Water Line Option 2</td></tr>
<tr><td>Portion 14 of the Farm Prinshof 2</td><td>T0IS00000000000200014</td><td>▪ Clean Water Line Option 1
▪ Clean Water Line Option 2</td></tr>
<tr><td>RE of Portion 14 of the Farm Klipfontein 3</td><td>T0IS00000000000300014</td><td>▪ Feed Water Line to WTP</td></tr>
<tr><td>RE of Portion 12 of the Farm Klipfontein 3</td><td>T0IS00000000000300012</td><td>▪ WTP
▪ Temporary Laydown Area
▪ Clean Water Line Option 1
▪ Clean Water Line Option 2</td></tr>
<tr><td>Phola Plant No. 830-IS on the Farm Klipfontein 3 IS</td><td>T0IS00000000083000000</td><td>▪ Abstraction Pump
▪ Feed Water Line to WTP</td></tr>
</table>
</td></tr>
</table>

4 Item 2(c): Locality map

An A3 Locality Map is included as Plan 2, Appendix 2, and below as Figure 4-1.

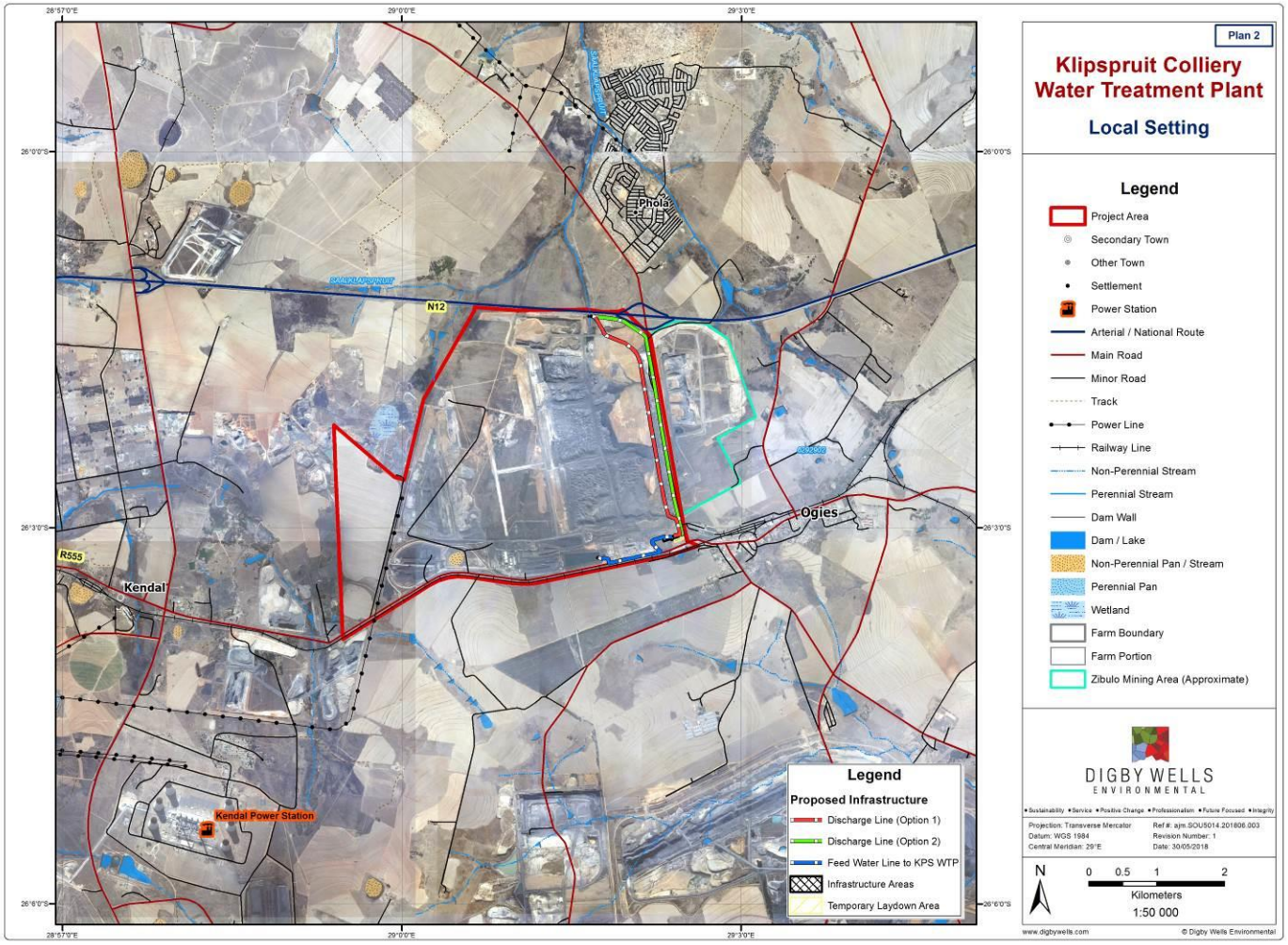


Figure 4-1: Local Setting

5 Item 2(d): Description of the scope of the proposed overall activity

The main objective of the WTP is to ultimately treat water from several sources related to the KPS operation. KPS is currently treating water which has gathered in Bankfontein Void which needs to be dewatered in preparation for rehabilitation activities to commence in that area at KPS. Further to the Bankfontein Void, other voids have established around the KPS operational area leading to further accumulation of mine-affected water, and placing further pressure on the Balancing Dam's capacity.

5.1 Project Activities

The proposed project Infrastructure Layout Plan is provided in Figure 5-1 below as well as an A3 map included as Plan 3, Appendix 2. The project comprises of the construction and operation of a modular WTP which will treat mine affected water from the KPS Balancing Dam. The key infrastructure includes:

- WTP located in the south-eastern corner of the Klipspruit Colliery with a dedicated entrance from the R555 road;
- Temporary construction laydown area for tools and equipment during the construction phase;
- An HDPE feed water pipeline and return water pipeline between the Balancing Dam and the WTP;
- An HDPE clean water pipeline from the WTP to the discharge point into the Saalklapspruit;
- A dissipation structure at the discharge point into the Saalklapspruit; and
- Associated supporting infrastructure such as change houses and power line.

Further detail pertaining to this infrastructure at its operation is provided in Section 5.3 below.

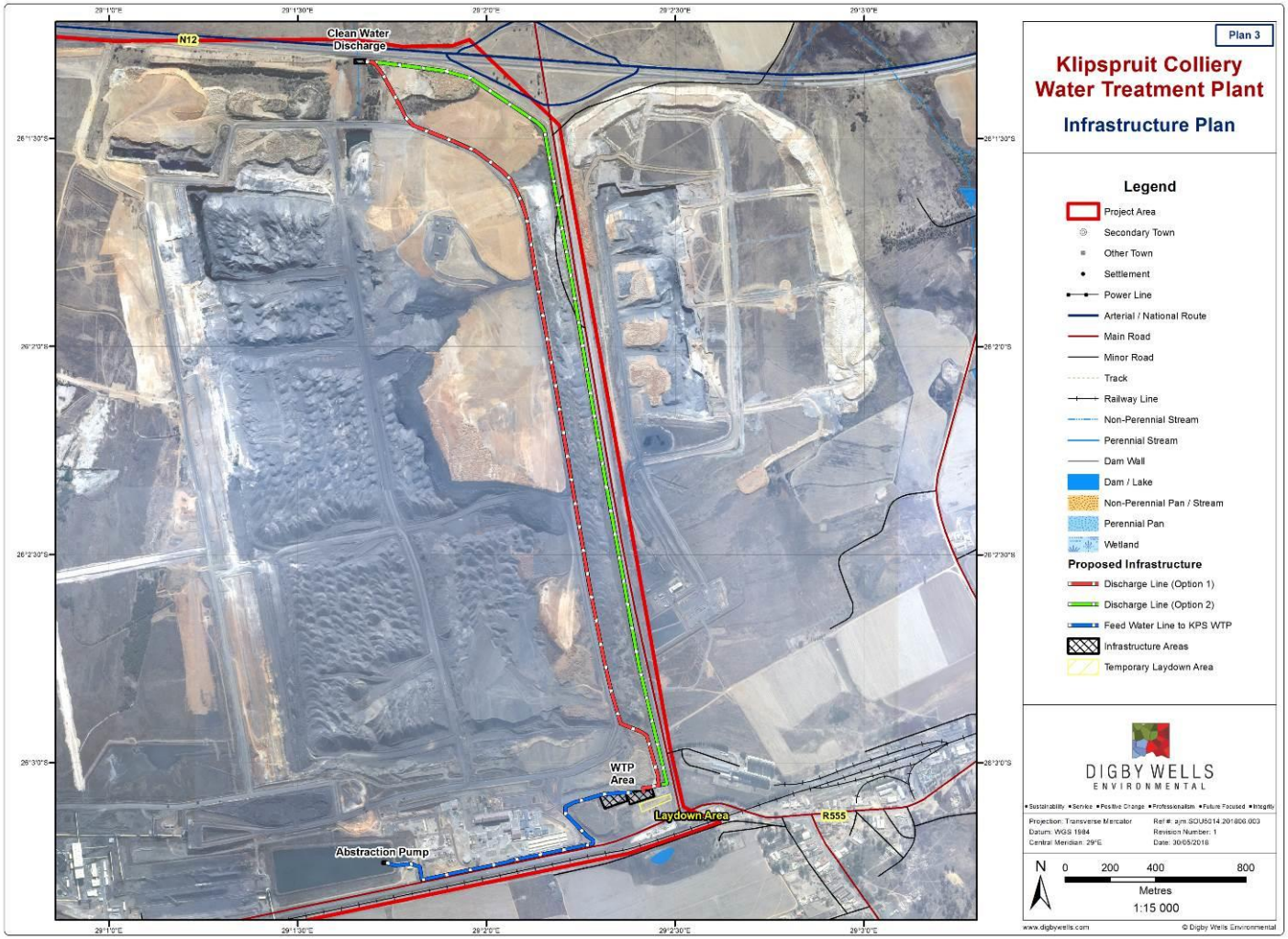


Figure 5-1: Infrastructure Layout Plan

5.2 Listed and specified activities

Table 5-1 provides the Listed Activities in terms of NEMA associated with the proposed project requiring authorisation.

Table 5-1: Listed Activities associated with the project

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Clean water pipeline *The development of infrastructure exceeding 1000 metres in length for the bulk* *transportation of water or storm water-* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where-* *(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or* *(b) where such development will occur within an urban area.*	3.8 km (19 ha)	X – 9 (i) and /or (ii)	GN R 983 (as amended by GN R 327) – Listing Notice 1
Feedwater and sewage pipelines *The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where-* *(a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or* *(b) where such development will occur within an urban area.*	1.5 km (7.5 ha)	X – 10 (i) or (ii)	GN R 983 (as amended by GN R 327) – Listing Notice 1.

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Dissipation structure *The development of-* (i) *dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or* *infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs-* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;-* *excluding-* *(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;* *(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;* *(dd) where such development occurs within an urban area;* *(ee) where such development occurs within existing roads, road reserves or railway line reserves; or* *(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.*	To be confirmed – designs not yet available	X – 12	GN R 983 (as amended by GN R 327) – Listing Notice 1.

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Dissipation structure and activities taking place within a watercourse *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;* *but excluding where such infilling, depositing, dredging, excavation, removal or moving-* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or* *(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.*	To be confirmed – designs not yet available	X – 19	GN R 983 (as amended by GN R 327) – Listing Notice 1.
Construction and operation of the WTP *The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.*	WTP - 1.06 ha Laydown area – 0.4 ha	X – 25	GN R 983 (as amended by GN R 327) – Listing Notice 1.

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Water Use Licence (for discharge of treated water into the Saalklapspruit) *The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding-* *(i) activities which are identified and included in Listing Notice 1 of 2014;* *(ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;* *(iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or* *(iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.*	10,000m^3 per day at full capacity	X – 6	GN R 984 (as amended by GN R 325) – Listing Notice 2

5.3 Description of the activities to be undertaken

KPS is situated approximately 30 km west of Emalahleni near the town of Ogies within the Nkangala Magisterial District, Mpumalanga Province. The MRA is bordered by the N12 Road to the north; R545 Road to the east and R555 Road to the south (refer to Plan 1, Appendix 2 for the Local Setting). Mining activities commenced in October 2003 and comprise of open pit mining utilising strip mining and truck and shovel mining methods.

Water collected from the mining area, which is sourced mainly from pit dewatering and runoff from designated dirty areas such as workshops, haul roads and the coal washing plant, is stored in the KPS Balancing Dam which is located west of the plant area. To manage the colliery's water balance, SAEC intends treat and release excess mine affected water from the Balancing Dam to the release standard of the river catchment.

To do this, the installation of a modular WTP capable of treating up to 10 Mega litres per day (Ml/day) is proposed. The associated infrastructure, as listed in Section 5.1 above, is discussed in the subsequent subsections.

5.3.1 WTP and temporary laydown area

The WTP will occupy a total footprint of 1.06 ha on disturbed land located in the south-eastern corner of KPS (WTP centre coordinates: 26° 3'5.05"S 29° 2'22.04"E). During the Construction Phase, a laydown area will be located adjacent to the WTP for the storage of tools and equipment. This temporary laydown area will occupy a total footprint of 0.4 ha.

The WTP is proposed to be constructed in three 3.3 Ml/day phases, which will result in a total of 10 Ml/day at full capacity.

The WTP system will comprise of the following treatment stages:

- Stage 1 Pre-Treatment;
- Stage 1 Ultra-Filtration (UF);
- Stage 1 Reserve Osmosis (RO);
- Stage 2 Pre-Treatment;
- Stage 2 UF; and
- Stage 2 RO.

In terms of waste product, liquid waste in the form of brine which will be stored in tanks and trucked off-site for disposal as well as dry sludge will be produced. The dry sludge will be disposed of at an approved hazardous waste disposal facility through an appropriately licenced subcontractor. Three dewatering sumps will be in place at the WTP to receive the sludge cake waste material. Each sump holds approximately one days' capacity of material. Once the solids have settled and the clarified water has overflowed into the reactor sump (approximately one day) one day, the dewatered sludge is emptied using a Bobcat loader or similar. A 15 x 15 m Storage Bunker will be provided for each waste product. Once every two days, a dewatering sump for each product is emptied. This material is placed in the Storage Bunker. Each Storage Pad can hold about four truckloads of material, giving a maximum of three weeks' holding capacity to allow for final drying and drainage within the constraints of the removal logistics.

5.3.2 Feedwater pipeline

Feedwater for the WTP will be abstracted from the Balancing Dam (abstraction point coordinates: 26° 3'15.15"S; 29° 1'43.35"E) and pumped via a HPDE pipe to the WTP. The pipeline is 1.5 km in length and run along the R555 road servitude before passing underneath the KPS mine entrance to the WTP area. A return water line will also be in place between the Balancing Dam and WTP which will allow water which does not meet the Resource Water Quality Objectives (RWQOs) for the Saalklapspruit.

5.3.3 Return Water Pipeline

A calibration period is required during which time treated water will be analysed to ensure it meets the RWQO. Water which does not meet the requirements of the RWQO will be pumped back to the Balancing Dam via a return water pipeline for further processing.

5.3.4 Clean water pipeline and discharge

Once treated to a suitable standard, water from the WTP will be released directly into the tributary of the Saalklapspruit via a HPDE clean water pipeline. Two options for the pipeline are proposed to accommodate current mining and rehabilitation activities at KPS along the pipeline route. To this end, both pipeline routes will be utilised at some point during the operation of the project (refer to Plan 3, Appendix 2). Due to current mine dumps over the area proposed for Option 2, which is the preferred route, this area is currently unavailable for use. As such, Option 1 will be utilised until such a time as the preferred route is accessible. Option 1 of the clean water pipeline is 3.8 km in length while Option 2 is 3.7 km in length.

The discharge point (discharge point coordinates: 26° 1'18.83"S; 29° 1'39.57"E) is located within the KPS MRA adjacent to the N12 Road. A dissipation structure will be constructed at the discharge point to ensure that discharge is done in a manner that will not significantly impact or increase the natural velocity of the stream.

As indicated above, water will be treated to the release standard of the river catchment. The RWQOs, as prescribed by the Department of Water and Sanitation (DWS), for the Wilge River Catchment Region which forms part of the Upper and Middle Olifants Catchment will be adhered to. Table 5-2 provides the RQWOs to be adhered to.

Table 5-2: RWQOs for the Wilge River Catchment

Water Quality Variable		Value	Value
Physical	pH	pH Units	6.5-8.4
	Conductivity	mS/m	70
	Dissolved Oxygen	% SAT	70
Chemical	Total Alkalinity	mg CaCO3/l	85
	Calcium	mg Ca/l	80
	SAR	meql0.5	1
	Dissolved organic carbon	mg/l	10
	Chloride	mg Cl/l	20
	Fluoride	mg F/l	0.5
	Magnesium	mg Mg/l	20
	Potassium	mg K/l	10
	Sodium	mg Na/l	20

Water Quality Variable		Value	Value
	Sulphate	mg SO4/l	120
	Total Dissolved Solids	mg/l	450
Metals (Soluble)	Iron	mg Fe/l	1
	Manganese	mg Mn/l	0.18
	Aluminium	mg A/l	0.02
	Chromium (VI)	mg/l	0.05
Plant Nutrients	Ammonia	mg/l as N	0.007
	Nitrate / Nitrite	mg as NO3-N/l	6
	Total Nitrogen	mg/l as N	2.5
	Phosphate	mg/l as P	0.05
	Total Phosphorus	mg/l as P	0.25
Microbiological	E Coli	#per 100ml	130

5.3.5 Supporting Infrastructure

The operation of a WTP will require the following supporting infrastructure:

- A new powerline from the existing Ring Main Unit One at the sewage plant and new transformer (22kV/525V) at the WTP site; and
- Change houses and ablution facilities at the WTP.

KPS has a licensed sewage treatment plant, therefore sewage works associated with the ablution facility to be constructed at the WTP will tie in with the existing infrastructure.

6 Item 2(e): Policy and legislative context

An application in terms of NEMA to obtain Environmental Authorisation will be submitted to the Department of Mineral Resources (DMR). Various policy and legislative requirements are applicable to the EA application and assessment process as detailed in Table 6-1 below.

Table 6-1: Policy and Legislative Context

Applicable legislation and guidelines used to compile the report	Reference where applied
The Constitution of the Republic of South Africa, 1996 (the Constitution) Under Section 24 of the Constitution it is clearly stated that: *Everyone has the right to* *(a) 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 legislative and other measures that -* *(i) Prevent pollution and ecological degradation;* *(ii) Promote conservation; and* *(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*	SAEC is undertaking an EIA process to identify and determine the potential impacts associated with the proposed WTP installation. Mitigation measures recommended will aim to ensure that the potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.
National Environmental Management Act, 1998 (Act No 107 of 1998) and EIA Regulations (December 2014) NEMA, as amended, was set in place in accordance with Section 24 of the Constitution. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that: *The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.* The EIA Regulations, Government Notice (GN) Regulation (R) 982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations,	Activities associated with the proposed WTP installation are identified as Listed Activities in the Listing Notices (as amended) and therefore require environmental authorisation prior to being undertaken. This Scoping Report and proceeding EIA Report will be informed by the requirements of the NEMA and Regulations thereunder.

Applicable legislation and guidelines used to compile the report	Reference where applied
the Minister also published GN R 983 (Listing Notice No. 1), GN 984 (Listing Notice No. 2) and GN R 985 (Listing Notice No. 3). The NEMA EIA Regulations, 2014 and Listing Notices have recently been amended by GN R326, (EIA Regulations) GN R 327 (Listing Notice 1); GN R325 (Listing Notice 2) and GN R324 (Listing Notice 3) of 7 April 2017.	
Mineral and Petroleum Resource Development Act. 2002 (Act No. 28 of 2002)(MPRDA) The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. The MPRDA ensures that environmental management principles as set out in the NEMA are applied to all mining operations. The MPRDA serves as a guideline for interpretation, administration and implementation of environmental requirements and ensures that mineral resources are exploited in a sustainable manner to serve both present and future generations.	The proposed WTP is associated with mining-related activities and a MRA; therefore, the provisions set under the MPRDA will be duly observed.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)(NEMWA) On 29 November 2013, the list of waste management activities published under GN R718 of 3 July 2009 (GN R718) was repealed and replaced with a new list of waste management activities under GN R921 of 29 November 2013. Included in the new list are activities listed under Category A, B and C for which a Waste Management Licence (WML) may be required.	The activity thresholds associated with the proposed WTP do not trigger activities listed under NEMWA and therefore a WML is not applicable. However, the Act does make provision for the treatment of effluent which will be duly observed and the norms and standards will be compiled with.
National Water Act, 1998 (Act No. 36 of 1998) (NWA) The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. GN R 704 was published in June 1999 and aims to regulate the use of water for mining and	A Water Use Licence Application (WULA) and an associated Integrated Water and Waste Management Plan (IWWMP) are required in terms of Section 21 of the NWA for the project. The WULA and IWWMP will be compiled and submitted to the DWS as the decision-making authority. The water uses under Section 21 of the NWA which is relevant to this project is Section 21(f) associated with the discharge of effluent into the natural environment, which

Applicable legislation and guidelines used to compile the report	Reference where applied
related activities for the protection of water resources and states the following: ▪ Regulation 4: No residue deposit, reservoir or dam may be located within the 1:100 year flood line, or less than a horizontal distance of 100 m from the nearest watercourse. Furthermore, person(s) may not dispose of any substance that may cause water pollution; ▪ Regulation 5: No person(s) may use substances for the construction of a dam or impoundment if that substance will cause water pollution; ▪ Regulation 6 is concerned with the capacity requirements of clean and dirty water systems, and ▪ Regulation 7 details the requirements necessary for the protection of water resources.	triggers the EIA process. Section 21 (c) and (i) will also apply.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) The NEMBA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance: ▪ Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014); ▪ National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and ▪ National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011).	A Fauna and Flora Impact Assessment will be conducted as part of the EIA Phase which will include the characterisation of the natural habitat and provide mitigation measures that must be applied to sensitive habitats (if any are identified). Infrastructure associated with the project has been placed on already disturbed land as far as possible to reduce disturbance of natural vegetation.
National Noise Control Regulations, R.154 of 1992 (the Noise Regulations) promulgated in terms of Section 25 of the Environmental Conservation Act, 1989 (Act 73 of 1989) The National Noise-Control Regulations (GN R154 in Government Gazette No. 13717 dated	A Noise Impact Assessment, including modelling, impacts and proposed mitigation measures will be undertaken for

Applicable legislation and guidelines used to compile the report	Reference where applied
10 January 1992) (NCRs) form part of the Environmental Conservation Act and these Regulations apply to external noise. The NCRs differentiates between Disturbing Noise levels (which is objective and scientifically measurable which are generally compared to existing ambient noise level) and Noise Nuisance (which is a subjective measure and is defined as noise that "*disturbs or impairs or may disturb or impair the convenience or peace of any person*"). Local Authorities use Controlled Areas to identify areas with high noise levels. Restrictions have been set out for development that occurs in these Controlled Areas. These regulations make provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication. As such, a Noise Impact Assessment in accordance with the NCRs must be undertaken for submission to determine the potential disturbing and nuisance noise levels associated with a particular development.	the EIA Phase.
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority of Gauteng (PHRA-G), be notified as early as possible of any developments that may exceed certain minimum thresholds. This act is enforced through the National Heritage Regulations GN R 548 (2000).	The Heritage Impact Assessment will be undertaken during the EIA Phase with the specific aim of identifying heritage resource and providing mitigation measures that must be applied to these resources.
GN R 1147 (Financial Provisioning Regulations), 2015 The Financial Provisioning Regulations prescribe methods for determining the quantum of financial provision for rehabilitation and mechanisms for providing for it. Section 41 (1) of the	A rehabilitation plan and closure costing which is aligned with the GN R 1147 will be compiled for the proposed WTP Project and related disturbed area within the project

Applicable legislation and guidelines used to compile the report	Reference where applied
MPRDA has been repealed and Section 24P of the NEMA, as amended, which provides that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision must guarantee the availability of sufficient funds.	boundaries and submitted as part of the EIA Report. This will be tied in with the existing rehabilitation plan for KPS.

7 Item 2(f): Need and desirability of the proposed activities

SAEC intends to continue and expand its KPS mining operation until the end of the Life of Mine (LOM). The Balancing Dam was designed and constructed to store water accumulating from the mining areas and this water is reused throughout the operation as far as possible. With the progression and expansion of mining at KPS however, the affected water that is being generated exceeds the reuse capacity within the operation whilst the storage capacity in mined out areas has reached its limits.

As discussed, SAEC intend to utilise underground mine affected water from the neighbouring Zibulo Colliery in the coal processing at the PCPP. The water quality from Zibulo is better suited to the PCPP process and the quantity produced is sufficient to sustain processing at the plant for both SAEC and Anglo. To this end, an alternative measure for water management is required to reduce the risks associated with excessive mine affected water storage at the KPS Balancing Dam to manage the risk of spillages or discharges to the natural environment. KPS has a positive water balance due to concurrent rehabilitation on site thereby reducing the areas on site where dirty water can be utilised. Therefore, treating excess water for release into the natural environment is preferable. Effective management of these risks is essential to the bottom-line performance at KPS ensuring access to coal resources and securing and maintaining the licence to operate and grow. This approach to co-operative and integrated water management between neighbouring mines is desirable due to the sensible use of water impacted by mining.

The treatment and release of affected mine water has been deemed the most feasible option to maintain KPS Colliery's water balance. As previously indicated, SAEC intends to treat the water to the RWQOs for the Wilge River Catchment Region. The control measures in place to test water prior to be released will also ensure an overall improved water quality to the receiving stream. This will alleviate current and future pressures on the Balancing Dam as well as reintroduce the valuable resource to the natural environment. Furthermore, measures will be put in place at the discharge point to ensure that discharge is done in a manner that will not significantly impact or increase the natural velocity of the stream.

Through the EIA Process, the potential impacts associated with the installation and operation of the WTP will be identified and mitigation measures will be established to avoid adverse environmental impacts. Where impacts are unavoidable, measures to reduce the significance of such impacts will be determined.

8 Item 2(g): Period for which the environmental authorisation is required

The preferred WTP technology opted for by SAEC is that of a modular plant as opposed to a fixed installation, (refer to Section 9.1.3 below for further detail). Modular installations have a shorter operational life than that of a fixed installation; typically 10 years subject to correct maintenance and management. It is therefore recommended that the Environmental Authorisation be valid for 10 years, to accommodate the increase in the WTP's capacity over

the additional two phases (refer to Section 5.3.1 for detail pertaining to the phased capacity ramp up).

9 Item 2(h): Description of the process followed to reach the proposed preferred site

The location of the project has been determined based on the intended use of the WTP. The primary qualifying criteria for the WTP location focused on identifying sites within the KPS operational area that are able to accommodate the plant infrastructure as well as their proximity to the Balancing Dam and the tributary to the Saalklapspruit discharge point.

Furthermore, an important consideration was the state of the site options. Several areas within the KPS MRA have been rehabilitated following the completion of mining-related activities or have not been disturbed as part of the operations. These areas were eliminated from consideration to prevent unnecessary disturbance rehabilitated and natural areas.

9.1 Item 2(h)(i): Details of all alternatives considered

Alternatives were considered for the WTP as discussed in the subsections below.

9.1.1 Water Treatment Options

Active-, passive- and *in-situ* treatment options were considered to treat the excessive mine affected water.

Passive treatment processes were disregarded as there is no configuration that can satisfy the treatment requirements to render the waste water stream fit for release off site due to the stringent discharge water quality requirements set by the DWS. An *in-situ* treatment was also disregarded as an alternative as it too does not address the treatment requirements. Therefore, the water treatment solution will fall in the active treatment category where the water quality objectives can be met.

9.1.2 WTP Location

The site selection for the WTP infrastructure considered size requirements, proximities to the water abstraction and discharge point as well as the current environmental state of the footprint. Furthermore, the position of the WTP site determines the lengths of the dirty water collection, treated water delivery and final effluent pipelines. Four site options were considered based on a 0.5 ha footprint as follows (refer to Figure 9-1 below):

- WTP Site 1 – Adjacent to the Balancing Dam;
- WTP Site 2 – Across from Sub-Zero substation;
- WTP Site 3 – Across from Ramp 1 Void; and
- WTP Site 4 – At Phola Plant.

Figure 9-1: WTP Site Options

The table below provides a summary of the WTP site options considered.

Table 9-1: WTP Site Comparisons

Parameter	Option 1 (Preferred)	Option 2	Option 3	Option 4
Advantages	▪ Close to the Balancing Dam; ▪ Secure power supply close by; and ▪ Close to existing amenities	▪ Close to the Bankfontein Void ▪ Power supply close by	▪ Close to discharge point	▪ Close to the Balancing Dam; ▪ Secure Power supply close by; and ▪ Close to existing amenities.
Disadvantages	▪ Space constraints	▪ Security concerns(far from existing amenities); and ▪ Blasting activities in close proximity.	▪ Security concerns(far from existing amenities); ▪ No power supply close; and ▪ Site requires levelling	▪ Space constraints

Based on the comparison above, Option 1 is the preferred WTP location as its in close proximity to the Balancing Dam and existing amenities required to support the WTP. Although the site size is a constraint, the WTP can be accommodated on the footprint. The site is characterised as disturbed, cleared land.

9.1.3 WTP Design

The WTP configuration considered a fixed installation and modular installation. The characteristics of each are provided in Table 9-2 below.

Table 9-2: WTP Design Options

Fixed Installation	Modular Installation
▪ Suitable for long term (> 10 years) water treatment requirements; ▪ Economy of scale benefits with regional plants; ▪ >20-year life subject to renewal and maintenance programs; ▪ Typically, 18 to 24-month construction period; and ▪ Engineering and process design optimisation possible for large volume (>10Ml/day) facilities.	▪ Suitable for medium term (2 – 10 years) water treatment requirements; ▪ 10-year life subject to renewal and maintenance programs; ▪ Typically, 9 to 18-month construction period ▪ Components designed for road transport to site – Off site fabrication and construction; ▪ Site layout and maintenance requirements increase in complexity with larger (>10Ml/day) capacity installations – no economy of scale benefit; ▪ Allows for the increasing/decreasing of the capacity of the facility by the addition/removal of modules; ▪ Alternative processes (should the feed water quality change) can be added.

The proposed first phase of the WTP (3.3Ml/day) is required for a period of between two to five years. Based on these characteristics, a modular installation is preferred as it will satisfy the operational period requirement and can be constructed in a shorter timeframe. Modular installation will also allow for adjustments to the treatment process if required. The ultimate total capacity required is 10 Ml/day which will be constructed in three phases of 3.3 Ml/day increments.

9.1.4 WTP Technology

A variety of different treatment options are available for investigation. The qualifying criteria focused on the most effective treatment option based on the specific water quality characteristics at KPS. Based on the treatment requirements, the treatment process must cater for removal of dissolved metals, sulphates and soluble salts mainly. Although neutralisation of the feed water is not required, pH adjustment will likely be required to assist with the removal of the dissolved metals and for correction of the pH prior to discharge of the product water.

Various options based on the membrane processes for the removal of sulphates and soluble salt were explored and it has been deemed that the removal of sodium and chloride from the dirty water is best done using evaporation based processes.

9.1.5 Pipeline Routes

The pipeline route determination considered shortest and most direct distances along existing infrastructure corridors. Longer pipeline routes are associated with increased impacts on the environment as more soil and vegetation is disturbed, and efforts to monitor for pipe breaks or leakages are increased.

One option for the feedwater pipeline was considered. The pipeline will run along the R555 road servitude before crossing over to the WTP area at the KPS mine entrance. This route is associated with one crossing of a clean water drain at the KPS main entrance.

Two options for the clean water pipeline have been considered. These routes take into account current and future mining and rehabilitation activities along the route the pipelines traverse. Both pipeline routes will be utilised during the operation of the project. Ultimately Option 2 is the most desirable, however is inaccessible currently due to mine dumps. Option 1 therefore will initially be utilised and runs along a haul road route, while Option 2 runs along the eastern edge of the MRA which will be subsequently utilised once mining/rehabilitation activities commence in the area.

9.1.6 Waste Disposal

The WTP will produce a sludge cake and brine that requires disposal. Two options were explored; namely on-site and offsite disposal. On-site disposal would require a dedicated waste facility in line with minimum requirements for the waste type produced which would be determined through a waste classification process. Important considerations associated with the on-site alternative include the required surface area, leachability and possible groundwater pollution.

The off-site disposal would entail dewatered sludge being trucked to an existing authorised waste disposal facility such as Holfontein. Based on the potential environmental impacts and cost of establishing an on-site facility, off-site disposal is preferred.

9.1.7 No-Go Alternative

The no-go alternative entails maintaining the status quo and as such the excessive water management challenge being experienced at KPS will persist. Furthermore, the agreement between Zibulo Colliery and SAEC will not be realised, thereby limiting both operations' ability to effectively manage water.

9.2 Item 2(h)(ii): Details of the public participation process followed

During the Scoping Phase, the following core stakeholder engagement activities were undertaken:

- Stakeholders (including Government Departments, landowners, land occupiers, communities, Non-Governmental Organisations, agricultural organisations, Parastatals and businesses) have and will continue to be identified and captured in a stakeholder database;
- A Background Information Document (BID) and letter was distributed to the identified I&APs together with the placement of adverts and site notices around the Project area;
- The environmental Scoping Report and associated documentation is available for public comment for a period of 30 days;
- Consultation with I&APs will be undertaken; and
- Suggestions and concerns will be obtained from I&APs.

Table 9-3 provides more detail regarding the Stakeholder Engagement activities undertaken thus far, together with referencing materials included as Appendices in the Stakeholder Engagement Report. The Stakeholder Engagement Report is attached hereto in Appendix 3.

Table 9-3 Public Participation Scoping Phase Activities

Activity	Details
Identification of stakeholders	A stakeholder database was developed which includes I&APs from various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.
Distribution of announcement letter and Background Information Document (BID)	A BID, announcement letter with Registration and Comment Form was emailed to stakeholders on **13 July 2018**.
Placing of newspaper advertisement	An English advert was placed in the Witbank News
Putting up of site notices	English site notices were put up at boundary of KPS as well as public places including local libraries and municipal offices.
Announcement of Scoping Report	Announcement of availability of the Draft Scoping Report was emailed and posted to stakeholders together with the formal project

Activity	Details
	announcement on **13 July 2018**. Copies of the Scoping Report are available at: ▪ Emalahleni Publuc Library; ▪ Ogies Public Library; and ▪ Kriel Public Library. A SMS was also sent to stakeholders on **13 July 2018** announcing availability of the Scoping Report. The Scoping Report is also available on www.digbywells.com (Public Documents) and will be made available the Public Meeting. ***(30-day comment period for the Scoping Report: 13 July until 14 August 2018)***
Stakeholder Meeting	A Public Meeting will be undertaken during the Scoping Phase public comment period. Further details will be provided to I&APs once the time and venue have been confirmed.
Obtained comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders will be captured in the CRR.

9.3 Item 2(h)(iii): Summary of issues raised by I&APs

This section will be populated in the Final Scoping Report, once comments and responses have been received from the public. All comments and responses which are received during the 30-day public comment period, as well as comments received prior to the Final Scoping Report being printed, will be included herein.

10 Item 2(h)(iv): The environmental attributes associated with the sites (Baseline Environment)

This section provides a description of the baseline environment associated with the project area and region (where relevant). The purpose of understanding the environmental baseline conditions relates to the potential of the project to impact on the existing environment, and the potential for existing environmental aspects to influence a proposed development in terms of design, location, technology and layout.

The information presented in this section was obtained from preliminary specialist investigations undertaken for various environmental aspects as well as previous studies undertaken for KPS. During the EIA phase, the specialist impact assessment reports will be completed and appended to the Draft EIA report. These reports will be made available for public review accordingly.

This baseline provides an overview of the regional characteristics of the area. The EIA Phase will include site-specific detail based on the specialist investigations undertaken.

10.1 Climate

Climate data for the project area was obtained from previous studies undertaken for the KPS (Digby Wells, 2016). The data presents a three-year study period (2011-2013). More recent climate data will be researched during the EIA Phase.

10.1.1 Temperature and Precipitation

The three-year average maximum, mean and minimum temperatures for the local area are displayed in Table 10-1. The average daily maximum temperatures range from 8.1°C in June to 21°C in February. Annual mean temperature is given as 14.8°C. The highest temperature recorded for the project site was 30.2°C, with the lowest recorded temperature of -1°C.

Table 10-1: Average Monthly Minimum, Maximum and Mean Temperature Values (Modelled Data, 01 January 2011 to 31 December 2013)

Temp (°C)	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Monthly Maximum	20.4	21.0	19.7	14.6	12.2	8.1	9.2	11.9	14.4	17.7	19.6	20.1	15.74
Monthly Minimum	20.0	19.1	18.7	14.2	11.9	8.1	7.4	10.4	14.0	17.2	19.3	19.9	15.02
Monthly Mean	20.2	20.0	11.9	14.4	12.1	8.1	8.3	11.2	14.2	17.4	19.5	20.0	14.78

The three-year (2011 to 2013) annual total and mean precipitation for the area are 1 064.9 mm and 795.3 mm respectively, as displayed in Table 10-2. The highest monthly maximum precipitation was recorded at 228 mm for December and decreases to 4.1 mm in June. The monthly minimum precipitation ranges between 0 mm in May and July to 192 mm recorded in December.

Table 10-2: Average Monthly Precipitation (Modelled Data, 01 January 2011 to 31 December 2013)

Precipitation (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Monthly Maximum	153.7	115.1	70.9	70.6	20.8	4.1	13.0	17.3	53.1	178.3	140.2	228.1	88.75
Monthly Minimum	149.1	45.7	32.8	19.3	0.0	1.3	0.0	8.6	6.6	33.0	98.8	192.0	48.94
Monthly Mean	151.4	80.4	20.8	45.0	10.4	2.7	6.5	13.0	29.8	105.7	119.5	210.1	66.26

10.1.2 Wind

The predominant wind direction for the project area occurs from the north-northeast and from the north. Wind speeds greater than 5.4 m per second (which represent winds capable of generating dust) occurred 9% of the time. Over a three year period, winds greater than 5.4 m per second occurred for 99 days, with calm conditions (wind speeds less than 0.5 m per second) occurring for 3.2% of the time. Strong winds greater than 8.8 m per second occurred for approximately 1% of the data period, equating to 11 days throughout the three year period. The most frequent wind speeds for the period were between 3.6 m per second and 5.4 m per second, occurring for 36% of the time.

10.2 Geology

The project area occurs within the Witbank Coalfield. The sequence of the Karoo Supergroup in the project area comprises of the Ecca Group and underlying Dwyka Group. The sediments typically found in the Ecca Group comprise coarse to fine grained sandstones, siltstone, shale and coal which often occur as interbedded units.

10.3 Topography and Visual Environment

The topography of the project area and its surrounds is characterised as undulating with numerous small ridges and valleys with a maximum elevation of 1 612 m above mean sea level (mamsl) in the south and decreases to 1 482 mamsl in the north. The majority of the project area has gentle slopes of less than 4 degrees, with isolated slopes of between 4 degrees and 11.3 degrees occurring along the sides of the ridges and river valleys.

The sensitive receptors to the project could include, but are not limited to, the following:

- Residents of Minnaar; Phola; Ogies; and surrounding farms within the viewshed area;
- Kendal Power Station; and
- Users of roads including N12 National Road; R545 Regional Road; R547 Regional Road; R555 Regional Road; and Secondary and farm roads within the viewshed area.

It must be noted that the treatment plant is within a mining setting and therefore the construction of the WTP is unlikely to have a drastic impact to the receiving environment.

10.4 Soil, Land Use and Land Capability

10.4.1 Land Type and Soil Forms

The land type for the project area was determined based existing Land Type data, namely Land Type Survey Staff, 1972 - 2006. The dominant land type covering the proposed WTP area, laydown area and pipeline routes is classified as a Ba4 Land Type which is identified with Hutton, Avalon and Glencoe Soil Forms, and the underlying geology consists of shale

and sandstone of the Ecca Group of the Karoo Sequence, depicted in Plan 4, Appendix 2. Table 10-3 provides further detail regarding the identified Soil Form characteristics associated with the Ba4 Land Type.

Table 10-3: Dominant soil type and soil forms

Soil Forms	Characteristics
Hutton	Well drained, usually slightly acidic and have a low cation capacity due to their clay mineral composition
Avalon	Free-draining and chemically active soils with manganese and iron oxides accumulating under conditions of fluctuating water table resulting in the formation of localised mottles or soft iron concretions
Glencoe	Moderately suitable for crop production depending on the depth of the soil. The impermeable plinthic material of shallow Glencoe soils can hinder rooting depth and cause periodic waterlogging which is unsuitable for crop production

10.4.2 Land Capability (Agricultural Potential)

Land capability is determined by assessing a combination of soil, terrain and climate features utilising the approach adopted by Schoeman *et al* (2000). The dominant land capability class in the Project area is Class III (Moderate cultivation), as depicted in Plan 5, Appendix 2.

Land in Class III is characterised by relatively severe limitations that reduce the choice of plants capable of growing or require special conservation practices. When used for cultivated crops, the conservation practices are usually more difficult to apply and to maintain. Limitations for the project area includes effects such as low permeability of the subsoil, wetness or some continuing waterlogging after drainage and potentially relatively higher susceptibility to water or wind erosion or severe adverse effects of past erosion.

It is noted however that the land associated with the WTP Project area is disturbed/ rehabilitated mining area as part of the KPS operation.

10.4.3 Current land use

The project area falls entirely within the KPS mining areas, therefore, the current land use, as depicted in Plan 6 Appendix 2, is mining.

10.5 Fauna and Flora

10.5.1 Flora Characteristics

The project area is situated within an area vegetated by Eastern Highveld Grassland (Mucina & Rutherford 2012). The vegetation type is considered to be endangered nationally with none conserved and 55% altered, primarily by cultivation. The conservation status of this vegetation type is very poor, with large parts either being currently cultivated or have

been previously ploughed, and the remaining untransformed vegetation that occurs as patchy remnants are often heavily grazed.

The KPS MRA is situated in an endangered ecosystem (Figure 10-1). This means that the ecosystem has undergone degradation of ecological structure, function or composition as a result of human intervention, although it is not critically endangered.

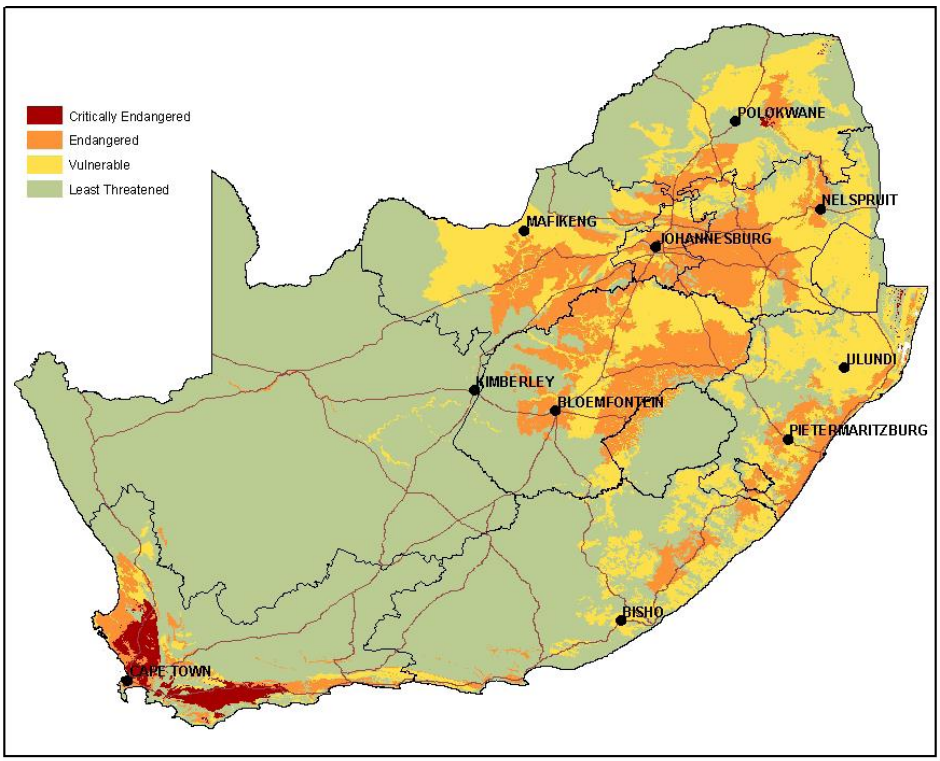


Figure 10-1: Status of terrestrial ecosystems (Driver *et al*, 2004)

10.5.1.1 Plants of Conservation significance that could occur in the area

The New Plants of South Africa (NEWPOSA) website list was obtained from the South African National Biodiversity Institute (SANBI) website. This list provides all the Red Data plant species officially recorded by SANBI for Quarter degree square grid (2628 BB and 2629 AA). For a plant species to be included in this list, a specimen collected in this grid must be supplied to SANBI.

The plant species list obtained from the SANBI website show eleven species (classified as vulnerable or near threatened), and two species (classified as rare) that might occur within in the area of the site that have been recorded in the grid reference. These species are listed in Table 10-4.

Table 10-4: Protected plant species

Species	Threat status[3]	SA Endemic
Aloe cooperi Baker subsp. cooperi	LC	No
Aloe reitzii Reynolds var. reitzii	NT	Yes
Brachystelma minor E.A.Bruce	VU	Yes
Brachystelma stellatum E.A.Bruce & R.A.Dyer	Rare	Yes
Crassula setulosa Harv. var. deminuta (Diels) Toelken	NE	Yes
Crassula setulosa Harv. var. setulosa forma setulosa	NE	Yes
Cryptocarya transvaalensis Burtt Davy	LC	No
Dactylis glomerata L.	NE	No
Dianthus zeyheri Sond. subsp. natalensis S.S.Hooper	NE	Yes
Disa alticola H.P.Linder	VU	Yes
Disa zuluensis Rolfe	EN	Yes
Eucomis autumnalis (Mill.) Chitt. subsp. clavata (Baker) Reyneke	NE	No
Eucomis vandermerwei I.Verd.	VU	Yes
Graderia linearifolia Codd	VU	Yes
Habenaria barbertoni Kraenzl. & Schltr.	NT	Yes
Helichrysum aureum (Houtt.) Merr. var. argenteum Hilliard	NE	Yes
Jamesbrittenia macrantha (Codd) Hilliard	NT	Yes
Khadia alticola Chess. & H.E.K.Hartmann	Rare	Yes
Lydenburgia cassinoides N.Robson	NT	Yes
Protea parvula Beard	NT	No
Zantedeschia pentlandii (R.Whyte ex W.Watson) Wittm.	VU	Yes

10.5.2 Faunal Characteristics

Fauna expected to occur around KPS include assemblages within terrestrial ecosystems, categorised by mammals, birds, reptiles and amphibians. Each of these species occurs within unique habitats and the ecological state of these habitats directly relates to the number of species found in each. According to Carruthers (2007), the main habitats occurring in the region are grassland plains, rivers and dams, with little altitudinal variation.

[3] Threat Status Key: LC – Least Concern, NT – Near Threatened; VU – Vulnerable; and NE – Near Endangered.

10.5.2.1 Mammals

Mammal species expected to occur in the Quarter Degree Square (QDS), includes fifteen antelope species (Artiodactyla), 23 species of the Carvivora order, 14 species of the order Chiroptera (Bats), 12 species of Insectivora (Insect feeders), 24 Rodentia (Rats and mice), three Lagomorpha (Hares and Rabbits), three species of Primata (Monkeys and Baboons), one species of Hyracoidea (Rock Hyrax), one species of Macroscelidea (Elephant shrew) and one species of Tubulidentata (Antbear).

Of the mammal species expected to occur in the QDS, species which have been assigned a Red Data status, either as per the South African Red Data list or the International Union for Conservation of Nature (IUCN) are provided in Table 10-5.

Table 10-5: Listed mammal species

Species Name	Common Name	SA Red List[4] (2016)	IUCN 2017
Georychus capensis	Cape Mole Rat	LC	LC
Chlorotalpa sclateri montana	Sclater's Golden Mole	LC	LC
Amblysomus septentrionalis	Highveld Golden Mole	NT	NT
Chrysospalax villosus	Rough-haired Golden Mole	VU	VU
Neamblysomus julianae	Juliana's Golden Mole	EN	EN
Amblysomus robustus	Robust Golden Mole	VU	VU
Amblysomus hottentotus meesteri	Hottetnot Golden Mole	LC	LC
Otomys laminatus	Laminate Vlei Rat	NT	LC
Rhinolophus blasii empusa	Peak-Saddle Horseshoe Bat	NT	LC
Miniopterus fraterculus	Lesser Long-Fingered Bat	LC	LC
Myotis welwitschii	Welwitsch's Hairy Bat	LC	LC
Cleotis percivali australis	Short-Eared Trident Bat	EN	LC
Orycteropus afer	Antbear	LE	LE
Ourebia ourebi	Oribi	EN	LE
Poecilogale albinucha	African Striped Weasel	NT	LC
Lycaon pictus	Wild Dog	EN	EN
Manis temminckii	Pangolin	VU	VU

[4] Threat Status Key: LC – Least Concern, NT – Near Threatened; VU – Vulnerable; LE – Least Endangered; and EN – Endangered.

Species Name	Common Name	SA Red List[4] (2016)	IUCN 2017
Proteles cristatus	Aardwolf	LC	LC
Panthera pardus	African Leopard	VU	VU
Pronolagus crassicaudatus ruddi	Natal Red Rock Rabbit	LC	LC
Atelerixs frontalis	South African Hedgehog	NT	LC
Dasymys incomtus	African Marsh Rat	NT	LC
Hyaena brunnea	Brown Hyaena	NT	NT
Leptailurus serval	Serval	NT	LC
Hydrictis maculicollis	Spotted-Necked Otter	NT	NT
Miniopterus schreibersii	Schreiber's Long-fingered Bat	NT	NT
Rhinolophus clivosus	Geoffroy's Horseshoe Bat	LC	LC
Rhinolophus darlingi	Darling's Horseshoe Bat	LC	LC
Dendrohyrax arboreus arboreus	Tree Hyrax	EN	LC

10.5.2.2 Birds (Avifauna)

Birds have been viewed as good ecological indicators, since their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological condition are linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). According to Roberts (2006), 353 species of birds have been identified in the area. Of these species, 30 have been assigned a Red Data status. These species are listed in Table 10-6. In addition to these, a further 41 species are endemic and are listed in Table 10-7.

Table 10-6: Red Data Birds species that could be present in the area.

Scientific	English Name (Rob 7)	NEMBA Status[5]
Botaurus stellaris	Eurasian Bittern	LC
Spizocorys fringillaris	Botha's Lark	EN
Alcedo semitorquata	Half-collared Kingfisher	NT
Charadrius pallidus	Chestnut-banded Plover	NT
Ciconia nigra	Black Stork	VU
Circus maurus	Black Harrier	EN

[5] Threat Status Key: LC – Least Concern, NT – Near Threatened; VU – Vulnerable; LE – Least Endangered; and EN – Endangered.

Scientific	English Name (Rob 7)	NEMBA Status[5]
Circus pygargus	Montagu's Harrier	LC
Eupodotis caerulescens	Blue Korhaan	LC
Falco biarmicus	Lanner Falcon	VU
Falco peregrinus	Peregrine Falcon	LC
Glareola nordmanni	Black-winged Pratincole	NT
Hieraaetus ayresii	Ayres's Hawk-Eagle	LC
Leptoptilos crumeniferus	Marabou Stork	NT
Mirafra cheniana	Melodious Lark	LC
Mycteria ibis	Yellow-billed Stork	EN
Phoenicopterus minor	Lesser Flamingo	NT
Phoenicopterus ruber	Greater Flamingo	NT
Rostratula benghalensis	Greater Painted-snipe	NT
Sagittarius serpentarius	Secretarybird	VU
Sterna caspia	Caspian Tern	VU
Anthropoides paradisea	Blue Crane	NT
Circus ranivorus	African Marsh-Harrier	EN
Crex crex	Corn Crake	LC
Falco naumanni	Lesser Kestrel	LC
Geronticus calvus	Southern Bald Ibis	VU
Gyps coprotheres	Cape Vulture	EN
Neotis denhami	Denham's Bustard	VU
Podica senegalensis	African Finfoot	VU
Polemaetus bellicosus	Martial Eagle	EN
Tyto capensis	African Grass-Owl	VU

Table 10-7: South African Endemic species that could be present in the area.

Scientific	English Name (Rob 7)	General Status
Amadina erythrocephala	Red-headed Finch	Endemic
Anas smithii	Cape Shoveler	Endemic
Bradornis mariquensis	Marico Flycatcher	Endemic
Buteo rufofuscus	Jackal Buzzard	Endemic

Scientific	English Name (Rob 7)	General Status
Calendulauda sabota	Sabota Lark	Endemic
Certhilauda semitorquata	Eastern Long-billed Lark	Endemic
Chersomanes albofasciata	Spike-heeled Lark	Endemic
Cinnyris afra	Greater Double-collared Sunbird	Endemic
Emberiza impetuani	Lark-like Bunting	Endemic
Estrilda melanotis	Swee Waxbill	Endemic
Eupodotis afraoides	Northern Black Korhaan	Endemic
Eupodotis barrowii	Barrow's Korhaan	Endemic
Granatina granatina	Violet-eared Waxbill	Endemic
Hirundo spilodera	South African Cliff-Swallow	Endemic
Lamprotornis nitens	Cape Glossy Starling	Endemic
Laniarius atrococcineus	Crimson-breasted Shrike	Endemic
Laniarius ferrugineus	Southern Boubou	Endemic
Macronyx capensis	Cape Longclaw	Endemic
Mirafra fasciolata	Eastern Clapper Lark	Endemic
Monticola explorator	Sentinel Rock-Thrush	Endemic
Monticola rupestris	Cape Rock-Thrush	Endemic
Myrmecocichla formicivora	Anteating Chat	Endemic
Oenanthe monticola	Mountain Wheatear	Endemic
Parisoma subcaeruleum	Chestnut-vented Tit-Babbler	Endemic
Parus niger	Southern Black Tit	Endemic
Passer diffusus	Southern Grey-headed Sparrow	Endemic
Passer melanurus	Cape Sparrow	Endemic
Ploceus capensis	Cape Weaver	Endemic
Prinia flavicans	Black-chested Prinia	Endemic
Pternistis natalensis	Natal Francolin	Endemic
Pternistis swainsonii	Swainson's Spurfowl	Endemic
Sigelus silens	Fiscal Flycatcher	Endemic
Sphenoeacus afer	Cape Grassbird	Endemic

Scientific	English Name (Rob 7)	General Status
Spizocorys conirostris	Pink-billed Lark	Endemic
Spreo bicolor	Pied Starling	Endemic
Stenostira scita	Fairy Flycatcher	Endemic
Tadorna cana	South African Shelduck	Endemic
Telophorus zeylonus	Bokmakierie	Endemic
Tricholaema leucomelas	Acacia Pied Barbet	Endemic
Turdus smithi	Karoo Thrush	Endemic
Zosterops virens	Cape White-eye	Endemic

10.5.2.3 Reptiles

The presence of and limited availability of rocky out crops within the broader project area may indicate that only a few reptile species are present. Of these species, two have been assigned a Red Data status; and these species are listed in Table 10-8.

Table 10-8: Red Data Reptile Species that could occur in project area

Species name	Common English name	NEMBA Status
Lamprophis aurora	Aurora House Snake	Rare
Python natalensis	Southern African Python	Least Concern

10.5.2.4 Amphibians

Amphibians are considered good indicators of changes to the whole ecosystem because they are sensitive to changes in both the aquatic and terrestrial environments (Waddle, 2006). The presence of suitable habitat within the study area should provide a number of different species of amphibians.

According to Carruthers (2001), frogs occur throughout southern Africa. A number of factors influence their distribution, and they are generally restricted to the habitat type they prefer, especially in their choice of breeding site. The choices available of these habitats coincide with different biomes, these biomes in turn, are distinguished by means of biotic and abiotic features prevalent within them. Therefore, a collection of amphibians associated with the Savanna biome will all choose to breed under the prevailing biotic and abiotic features present. Red Data Amphibians expected to occur on site are listed in Table 10-9.

Table 10-9: Rare Amphibian Species that could occur in the study area

Scientific name	Common name	NEMBA Status
Pyxicephalus adspersus	Giant Bullfrog	LC

10.5.2.5 Invertebrates

Insects are vital to the functioning of the earth's ecosystems in their present form and help to maintain the balance that allows the vast diversity of life to coexist. Other insects turn the soil or feed on decomposing matter, thus playing important roles in nutrient cycling. Virtually every aspect of ecosystem functioning is dependant in some way on insects, which are the main non-plant drivers of ecosystem dynamics (Afribugs.com). Red Data species are listed in Table 10-10. The specific Red Data conservation status was not always known.

Table 10-10: Red Data Lepidoptera (moths and butterflies) species

Scientific name	Habitat	NEMBA status[6]
Acraea (Acreae) machequena	Bushveld	LC
Aloeides dentatis maseruna	Grassland	LC
Andronymus neander neander	Bushveld	LC
Gegenes hottentota	Riparian	LC
Lepidochrysops hypopodia	Grassland	Red Data
Lepidochrysops praeterita	Grassland	EN
Metisella meninx	Riparian	LC
Neita neita	Bushveld	LC
Platylesches dolomitica	Grassland	LC
Spialia paula	Bushveld	LC
Tuxentius melaena griqua	Riparian	DD

10.6 Surface Water

10.6.1 Regional Hydrological Setting

South Africa is divided into 9 Water Management Areas (WMA), managed by their own water boards. Each of the WMAs is made up of quaternary catchments which relate to the drainage regions of South Africa.

The KPS MRA is located in the Olifants Water Management Area 2 (WMA 2), with the proposed WTP footprint and associated pipeline falling in quaternary catchment B20G. Within this quaternary catchment, lies in the greater Wilge River Catchment which is upstream of the Loskop Dam Catchment. The quaternary catchments are shown in Plan 7, Appendix 2.

[6] Threat Status Key: LC – Least Concern, NT – Near Threatened; VU – Vulnerable; DD – Data Deficient; and EN – Endangered.

Table 10-11 present the surface water attributes of the B20G quaternary catchment namely Mean Annual Precipitation (MAP), Mean Annual Runoff (MAR), and Mean Annual Evaporation (MAE) were obtained from the Water Resources of South Africa 2012 Study (WR2012).

Table 10-11: Summary of the surface water attributes of the B20G quaternary catchment

Quaternary Catchment	Catchment Area (km^2)	Rainfall Zone	MAP (mm)	MAR (mm)	MAR $m^3 x 10^6$	Evaporation Zone	MAE (mm)
B20G	519.4	B2C	669	44.0	22.87	4A	1689

Water Resources of South Africa 2012 Study

10.6.1.1 Rivers and Drainages

The proposed WTP footprint and associated pipelines are located within KPS MRA which is situated on the south west boundary of the of the B20G quaternary catchment. This catchment is characterised by several streams in the upper reaches of the Olifants River system.

The mine is located upstream of where the Saalklapspruit originates and surface runoff from the site joins a tributary of the Saalklapspruit, and flows on a northerly direction to join the Wilge River which eventually joins the Olifants River at the outlet of the quaternary catchment.

There are number of unnamed drainage lines that are tributaries to the Saalklapspruit downstream of the project site before its confluence with the Wilge River. As indicated in the project description above, the treated water is proposed to be discharged at one of the tributaries to the Saalklapspruit.

10.6.1.2 Streamflow Evaluation

There are no streamflow measuring stations along the Saalklapspruit and the surrounding Grootspruit and Tweefonteinspruit which are located north-east of KPS. The Saalklapspruit is considered as an ephemeral stream as it does not flow throughout the entire year. However, during the 2014 site assessments undertaken by Digby Wells, flow measurements were taken using a flow meter to obtain the average velocity of the Saalklapspruit when there is flow. The average flow on the downstream section of Saalklapspruit was measured to be 0.1 m/s, with the maximum flow estimated to be 0.2 m/s.

10.6.2 Surface water use

On a regional scale, the Wilge River catchment is more rural in nature with the main activity being agriculture around the towns of Bronkhorstspruit and Delmas (DWAF, 2009). Historical coal mining, previously concentrated in the Middelburg and Witbank Dam catchments is

expanding into the Wilge River Catchment. Irrigation agriculture is dominantly practiced within this catchment with the largest irrigation areas located downstream of Loskop Dam.

The predominant users of the surface water resources within the project catchments can be generalised as agricultural and mining.

10.6.3 Water Quality

Water quality monitoring at KPS and the surrounding areas has been undertaken by SAEC since 2004 and the historic results will be presented in the EIA. The recorded water quality data have been benchmarked against the Loskop Dam water quality objectives and the RWQOs for the Wilge River Catchment (proposed water standard for water to be discharged into the Saalklapspruit).

Table 10-12 below provides a summary of the historical water quality interpretations on the surface water monitoring points that were previously sampled before. The sample points referred to are displayed in Plan 8, Appendix 2.

Table 10-12: Historical Water quality data interpretation

Sampling Sites	Baseline Water Quality Interpretation
Wel SW7	Site SW7, a downstream point from the existing KPS mining area, showed good water quality during the 2014 sample run. However, in 2009 the water quality was very poor, with elevated TDS, Alk, SO_4, Ca, Mg, Na, Mn and EC exceeding the IWQO. These are parameters that could be related to mining that took place upstream from this site.
Wel SW8	Site SW8, most downstream point on the Saalklapspruit, shows parameters of concern similar for the 2014 and 2009 sampling runs. These parameters include Cl, Alk, Na, K, Mn, with additional parameters which were above the IWQO only in 2009 being SO_4, EC and Al.

The recent water quality baseline and trends will be provided in the EIA phase of this report.

10.7 Groundwater

The project area is located in the Upper Olifants River Catchment which comprises of three distinct groundwater systems as follows (Hodgson and Krantz, 1998):

- Upper weathered aquifer;
- Fractured aquifer; and
- Pre-Karoo fractured aquifer.

The upper weathered aquifer occurs predominantly as a perched aquifer overlying impermeable shale or clay layers. The upper weathered aquifer is usually low yielding but

has an excellent water quality as a result of dynamic groundwater flow washing away leachable salts.

The fractured aquifer occurs beneath the weathered aquifer and within fresh sediments. The sediments are typically well cemented and limit significant permeation of water, with the presence of secondary structures or fractures providing the only pathway for groundwater movement. The yields for the aquifer system are typically low and the coal seams frequently display the highest hydraulic conductivities.

The Pre-Karoo aquifers are located at great depths and, as a result, have only been intersected on a few occasions. The boreholes that have intersected the Pre-Karoo aquifer are general low yielding and have inferior water quality and recharge capabilities due to the overlying Dwyka tillite.

10.7.1 Groundwater levels and flow direction

Groundwater level data was acquired from the KPS ongoing monitoring database. The recorded data reveals that groundwater levels vary between 1.1 and 19.9 metres below ground level (mbgl), with an average of 8.8 mbgl. The groundwater flow direction is predominantly in a south to north direction varying slightly at various sites as shown in Plan 9, Appendix 2. Groundwater elevation varies from 1591 mamsl and 1501 mamsl.

The monitoring points referred to are displayed in Plan 10, Appendix 2.

Table 10-13: KPS Groundwater Level

Site ID	X m (WGS29)	Y m (WGS29)	Groundwater Level (mbgl)
			30/04/2018
KGMB10	3503.594	-2883061	1.11
KGMB13	-899.654	-2882131	8.22
KGMB4	3741.852	-2880535	6.82
KGMB7	1687.491	-2882710	8.80
KGMB8	-862.613	-2882935	3.45
BSW3	3672.977	-2879636	18.83
BWS4	4367.32	-2881941	14.07
KGMB11B	-8.90731	-2882310	-
KGMB6	3687.146	-2882583	3.28

Site ID	X m (WGS29)	Y m (WGS29)	Groundwater Level (mbgl)
KGMB16	2319.232255	-2882768	2.91
KGBH17	1081.146475	-2882054	14.63

10.7.2 Groundwater Quality

Groundwater quality data was received from the KPS monitoring database and is compared to the South African Water Quality Guidelines (SAWQG) for domestic use, livestock water and irrigation uses (Department of Water Affairs and Forestry, 1996). The purpose of the interpretation is to determine the current groundwater quality in the groundwater and whether the boreholes have been affected by pollution. The water quality results are displayed in Table 10-14 below. The following observations were made:

- pH values varied between 3 at BWS3 and 8 at KGMB4 with an average pH of 6.4. Borehole BSW3 fall below the targeted water quality range for both domestic as well as irrigation limits. While KGMB11B falls below the targeted/recommended pH of 6.5 for irrigation. The rest of the samples are within the SAWQG . The low pH at BWS3 and KGMB11B is indicative of possible contamination from berms and the stockpiles area.
- All samples are below the recommended SAWGQ for TDS except BSW4 at 702 mg/L.
- Borehole KGMB4, KGMB9, BWS4 and KGMB11B exceeded the recommended total suspended solids limits of 50 mg/L for irrigation except BWS4, KGMB6 and KGMB16.
- All samples exceeded the recommended turbidity range for domestic use.
- All samples are above the domestic use limits of 32 mg/L for Ca except BWS4, KGMB6 and KGMB16.
- All samples are within the recommended SAWQG for Mg except BWS4 exceeding the domestic use limits of 30 mg/L.
- The sodium concentrations for all samples fall within the SAWQG.
- The potassium concentrations for all samples fall within the SAWQG.
- The sulphate concentration for all samples fall within the recommended livestock watering limits of 1000 mg/L while all samples also fall within the domestic use limits of 200 mg/L except BWS4 at 436 mg/L.
- Most of the samples exceed the domestic use limits for nitrates except borehole KGMB11B, KGMB6 and KGMB16.
- The fluoride concentrations for all samples are within the SAWQG limits.

- The aluminium concentrations for all samples except KGMB11B are within the recommended SAWQG limits.
- The iron concentrations for all samples except KGMB11B are within the recommended SAWQG limits.
- The manganese concentration mostly exceeds the SAWQG for domestic use except KGMB4, KGMB9 and KBSW3.

In summary, BWS4 and KGMB11B seems to be the most contaminated boreholes compared to other boreholes with BWS4 the worst water quality.

Table 10-14: Groundwater Quality Monitoring in March 2018

Sample ID	Date	pH	EC	TDS	TSS	Total Alkalinity	Turbidity	Ca	Mg	Na	K	Cl	SO4	NO3-N	F	Al	Fe	Mn	N_Amonia	PO4	Si
SAWQG	Domestic Use	6-9	NG	450	NG	NG	1	32	30	100	50	100	200	6	1	0.15	0.1	0.05	NG	NG	NG
	Livestock	NG	NG	1000	NG	NG	NG	1000	500	2000	NG	1500	1000	100	2	5	10	10	NG	NG	NG
	Irrigation	6.5-8.4	NG	NG	50	NG	NG	NG	NG	70	NG	NG	NG	NG	2	5	5	0.02	NG	NG	NG
KGMB4	2018/03/29	8	19	100	90	30	25	5	3	9	1	5	15	8	<0.2	0.01	<0.01	<0.01	0.2	<0.1	3
KGMB9	2018/03/29	7	12	276	238	7	121	4	4	9	1	5	1	50	<0.2	0.01	0.01	0.02	<0.2	<0.1	6
BSW3	2018/03/29	7	25	264	20	70	12	14	8	21	6	17	15	29	<0.2	0.01	0.01	<0.01	<0.2	<0.1	3
BWS4	2018/03/29	3	88	702	131	-	196	73	38	41	3	11	436	14	0.23	0.12	0.47	0.49	0.26	<0.1	4
KGMB11B	2018/03/29	6	13	82	416	58	270	8	3	11	4	4	6	1	<0.2	0.54	0.12	0.08	<0.2	<0.1	27
KGMB6	2018/03/29	7	45	328	38	98	99	39	21	24	7	32	118	<0.1	0.21	0.02	0.01	0.08	<0.2	<0.1	8
KGMB16	2018/03/29	7	40	324	20	58	22	35	19	24	5	5	173	2	0.35	0.01	0.02	0.45	<0.2	<0.1	4

Notes:

NG – No guideline

SAR – Sodium Absorption Ratio

Values highlighted blue indicate that the measured value exceed the SAWQG for domestic use, brown indicate that the measured value exceeds the SAWQG for livestock watering and green indicate that the measure value exceeds the SAWQG for irrigation use. Red indicates that the measured value exceeds more than one of the above water quality guidelines.

10.8 Wetlands

10.8.1 National Freshwater Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) provides information of wetland and river ecosystems for integrating into freshwater ecosystem and biodiversity planning and decision-making processes. The strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources contained therein were considered to evaluate the importance of the wetland areas (Nel *et al.* 2011). Plan 11, Appendix 2, depicts the distribution of NFEPA wetlands in the vicinity of the Project area. Two wetland types have been identified form the NFEPA database within the Project area, namely a Channelled Valley Floor wetland situated on the northern portion of the WTP Project area and a Bench Depression situated west of the WTP area within the MRA, however, this is subject to verification during the baseline assessment phase of the Pojrect.

The NFEPA wetlands have been ranked in terms of importance in the conservation of biodiversity. The aforementioned wetlands have been ranked 2. Rank 2 wetlands are important wetlands that fall within 500 m of an IUCN threatened frog point locality or threatened water-bird point locality. Alternatively, they fall mostly within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes or has been identified by experts at the regional review workshops as containing wetlands of exceptional Biodiversity importance, with valid reasons documented or as containing wetlands that are good, intact examples from which to choose. It is important to note that the NFEPA's are delineated and studied at a desktop and low resolution level. Thus, the wetlands delineated via during site investigation done through this study may differ from the NFEPA data layers.

10.9 Aquatic Ecology

The aquatic systems associated with the project area were identified and classified according to their specific Sub-Quaternary Reach (SQR) as described by DWS (2018). According to the DWS (2018), the Present Ecological Status and Ecological Importance and Sensitivity (PESEIS) data gathered, the watercourse of concern consists of the upper reaches of the Saalklapspruit (i.e. B20G-01099 SQR). Furthermore, an unclassified tributary of this SQR (DWS, 2018) is planned to receive the proposed KPS WTP discharge. Therefore, the quality of this water, together with any potential impacts associated with its discharge, should be of main focus in terms of preserving the aquatic ecology of the adjoining Saalklapspruit SQR. Table 10-15 below outlines the gathered PESEIS information pertaining to the Saalklapspruit SQR of concern.

Table 10-15: Desktop Information for the Upper Saalklapspruit SQR (B20G-01099)

Component	Obtained Data
SQR Length	41.57 km
Present Ecological Status	C (moderately modified)
Default Ecological Category	B (minimally modified)
Ecological Importance (EI)	High
No of expected fish species	4
No of expected macroinvertebrate taxa	39
Ecological Sensitivity (ES)	High
Fish and invertebrate sensitivity to physio-chemical modifications	Moderate
Invertebrate velocity sensitivity	High
Stream size sensitivity to flow and water level changes	High

According to the above gathered data (DWS, 2018), the Saalklapspruit SQR is categorised as moderately modified (ecological category C). Impacts pertaining to this categorisation, relevant to their significance, include the following:

- **Small:** inundation, natural areas / reserves and roads;
- **Moderate:** abstraction, increased flows, algal growth, low water crossings, irrigation, urban effluent, small farm dams and vegetation removal;
- **Large:** agricultural lands, exotic vegetation and mining; and
- **Serious:** mining effluent.

Furthermore, the ecological integrity of the reach is considered to be high due to important expected invertebrate taxa rather than fish species (DWS, 2018). Additionally, the catchment is dominated by endangered grassland units comprised of two protected and five endemic expected species (DWS, 2018) contributing to this high importance classification.

The Ecological Status of the reach is also considered to be high due to the expectance of flow-dependent invertebrates and additional vertebrates sensitive to flow and water level changes (DWS, 2018). Due to the small stream size of the river, sensitivity of the river to changes in flow and water levels has also been classified as high (DWS, 2018).

10.10 Noise

The South African National Standards (SANS) 10103:2008 “The measurement and rating of environmental noise with respect to annoyance and to speech communication” provide acceptable sound level limits for specific zones such as rural, urban or industrial districts. Table 10-16 provides the typical rating levels for noise in the specified districts.

Table 10-16: Typical Rating Levels for Noise in Districts (SANS 10103, 2008)

Type of District	Equivalent continuous rating level ($L_{Reg.T}$) for noise (dBA)					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
	$L_{R,dn}$ [a]	$L_{Req,d}$ [b]	$L_{Req,n}$ [b]	$L_{R,dn}$ [a]	$L_{Req,d}$ [b]	$L_{Req,n}$ [b]
Residential Districts						
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
Non-Residential Districts						
d) Urban districts with some workshops, with business premises, and with main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

NOTE 1 If the measurement or calculation time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table might result.

NOTE 2 If the spectrum of the sound contains significant low frequency components, or when an unbalanced spectrum towards the low frequencies is suspected, special precautions should be taken and specialist advice should be obtained. In this case the indoor sound levels might significantly differ from the values given in columns 5 to 7

NOTE 3 In districts where outdoor LR,dn exceeds 55 dBA, residential buildings (e.g. dormitories, hotel accommodation and residences) should preferably be treated acoustically to obtain indoor LReq,T values in line with those given in table 1.

NOTE 4 For industrial districts, the LR,dn concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n =70 dBA can be considered as typical and normal.

NOTE 5 The values given in columns 2 and 5 in this table are equivalent continuous rating levels and include corrections for tonal character, impulsiveness of the noise and the time of day.

NOTE 6 The noise from individual noise sources produced, or caused to be produced, by humans within natural quiet spaces such as national parks, wilderness areas and bird sanctuaries, should not exceed a maximum Weighted sound pressure level of 50 dBA at a distance of 15 m from each individual source.

a) The values given in columns 2 and 5 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness of the noise and the time of day.

b) The values given in columns 3, 4, 6 and 7 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness.

The project area is categorised as an industrial district which is likely to experience levels at 70dBA. The existing ambient climate in the area had previously been estimated in 2002 by sampling the noise levels preceding the commencement of the mining activities at KPS. During that previous assessment, the area surrounding the proposed development site was characterised by the presence of mining and industrial activities.

With KPS being in its operational phase it is expected that the area surrounding the proposed WTP project area is more severely characterized by mining activities.

Ogies is a railway traffic control centre for the busy main line from the Rand to the East of the country, as well as the coal export line to Richards Bay. In addition, the busy R545 and R555 meet in Ogies and, it is a hub of commercial activities for the communities in the surrounding area (Malherbe, F le R. 2002). The noise levels are expected to be indicative of areas within zones of heavy commercial and light industrial districts and likely to measure between 50dBA and 65dBA during the daytime and between 45dBA and 55dBA during the night time.

The countryside is characterised as very gently undulating, and the present topography is expected to provide little natural screening against the propagation of noise. This is especially true for the low frequency noise typically generated by diesel-powered equipment (Malherbe, F le R. 2002). The noise levels are likely to be between 40dBA and 45dBA during the daytime and between 30dBA and 45dBA during the night time.

Open land has a commercial rural character, and large tracts are cultivated for maize or similar crops. Acoustic ground conditions may be assumed to be ‘soft’, which will affect the propagation of noise from the source to the receiver. In winter, when fields are bare, this natural mitigation may be considerably reduced (Malherbe, F le R.2002).

10.11 Heritage Resources

The cultural heritage baseline description considered the predominant landscape based on the identified heritage resources within the regional and local study area. Table 10-17 presents an overview of the broad timeframes for the major periods of the past in Mpumalanga.

Table 10-17: Archaeological periods in Mpumalanga, adapted from Esterhuysen & Smith (2007)

The Stone Age	Earlier Stone Age (ESA)	2 million years ago (mya) to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 Common Era[7] (CE)
A gap appears in the records in Mpumalanga between approximately 7000 and 2000 Before Common Era (BCE).		
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1850 (Behrens & Swanepoel, 2008)

The region is underlain by the greater Springs-Witbank Coalfield, which makes up a portion of the coal-bearing Ecca Group within the Karoo Supergroup. Other significant features within the Ecca Group include the *Pietermaritzburg*, *Vryheid* and *Volksrust Formations* (Groenewald & Groenewald, 2014).

The *Vryheid Formation* is the primary potential fossil-bearing layer underlying the project area and, as such, is of very high palaeo-sensitivity (SAHRA, 2013b; 2017). These layers were deposited roughly 180 million years ago in a deltic environment. Fossil plants that could be expected within the *Vryheid Formation* include: *Glossopteris* leaves, roots and inflorescences; and *Calamites* stems. Mammal-like reptiles and mammals may potentially be included in coal deposits, but these are rarely preserved with plant fossils (Bamford, 2012; 2016).

The archaeological record begins with the Stone Age. In southern Africa, this comprises three broad phases, determined according to the stone tools and the material culture produced by the various hominid species through time. These phases are: the ESA, MSA and LSA (as defined in Table 10-17 above).

The ESA is not represented in the available data and is therefore not considered in this assessment. The MSA dates from approximately 300 kya to 20 kya and is characterised by the use of good-quality raw material (Clark, 1982; Deacon & Deacon, 1999). Early MSA lithic industries are characterised by high proportions of blades, as well as beads, bone tools, ochre and pendants. The LSA dates from 40 kya to the historical period. The lithics characterising the LSA are highly specialised, where specific tools were created for specific purposes (Mitchell, 2002). Diagnostic tools include scrapers and segments and bone tools

[7] Common Era (CE) refers to the same period as *Anno Domini* (“In the year of our Lord”, referred to as AD): i.e. the time after the accepted year of the birth of Jesus Christ and which forms the basis of the Julian and Gregorian calendars. Years before this time are referred to as ‘Before Christ’ (BC) or, here, BCE (Before Common Era).

are also included in LSA assemblages. In southern Africa, the LSA is closely associated with hunter-gatherers, which may include San groups, such as the Basarwa and Bathwa (Makhura, 2007). These peoples are commonly regarded as being the first inhabitants of Mpumalanga.

The Farming Community is divided into the EFC and the LFC; however, only the latter is represented in the regional study area. The LFC is represented by stonewalling or other tangible surface indicators including ceramics and evidence of domesticated animals (e.g. faunal remains or dung deposits). The historical period[8] is commonly characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is largely artificial, as the people, politics and trends continue between the LFC and the historical period.

Throughout the transitions between the LFC and the historical period (and throughout the historical period as well), population growth, climatic variation and trade significantly impacted the groups on the Mpumalanga Highveld, resulting in the rise of power blocs, violent displacement and political displacement (Makhura, 2007). European settlers, trader, missionaries and travellers moving into the interior further added to the instability across the Mpumalanga Highveld (Landau, 2010).

Within the project area, coal deposits have been exploited since the 1860s, by European settlers (Pistorius, 2008). Ogies, the town, was established in 1885 on the farm Ogiesfontein (Falconer, 1990) which coincided with an upswing in the coal mine industry, as seen by the opening of several mines in 1889 in the area, including: the Brugspruit Agies, Douglas Mine (at Balmoral), Maggies Mine, and the Steelkoolspruit Mine.

10.11.1 Identified Heritage Resources

Figure 10-2 presents a breakdown of the tangible heritage resources identified within the region. In total, the figure considers 610 recorded heritage resources based on desktop identification. The predominant heritage resources demonstrate affiliations with burial grounds and graves (62.6%) and the historical built environment (30.3%). This notwithstanding, expressions of all phases of the Stone Age, the LFC, recent history and historical battlefields have also been recorded.

[8] In southern Africa, especially in Mpumalanga, the last 500 years represents a formative period that is marked by enormous internal economic invention and political experimentation that shaped the cultural contours and categories of modern identities outside of European contact. This period is currently not well documented, but is being explored through the 500 year initiative (Swanepoel, *et al.*, 2008)

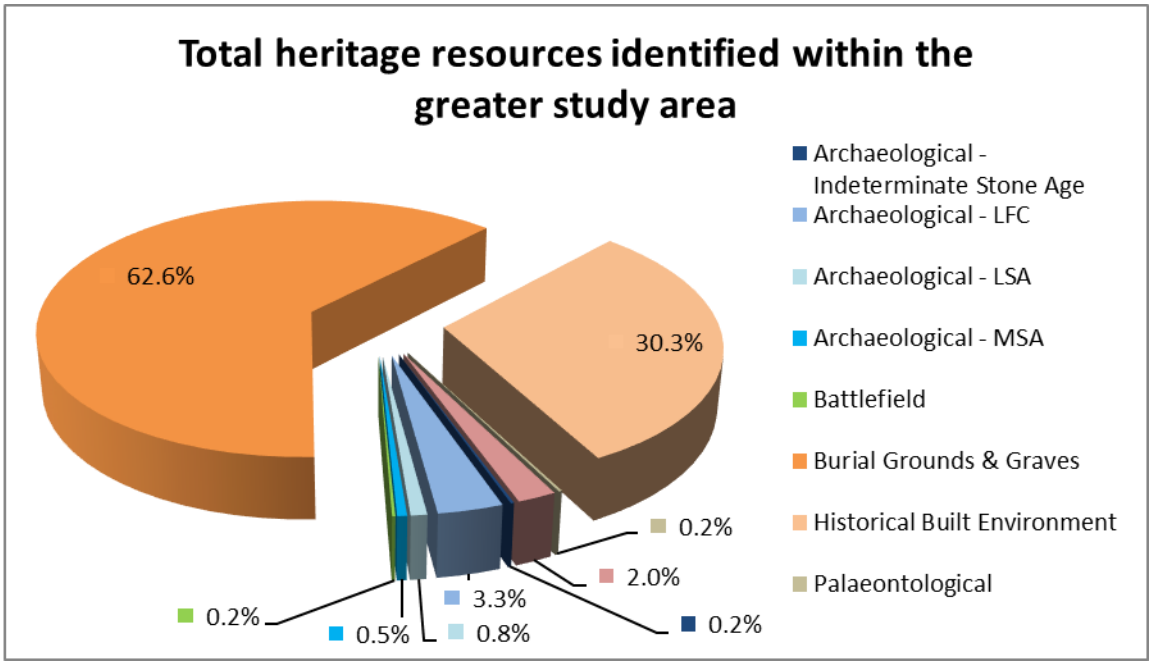


Figure 10-2: Heritage resources identified within the greater study area

Within the KPS MRA, four heritage resources, namely graves have been identified as shown in Figure 10-3 below.

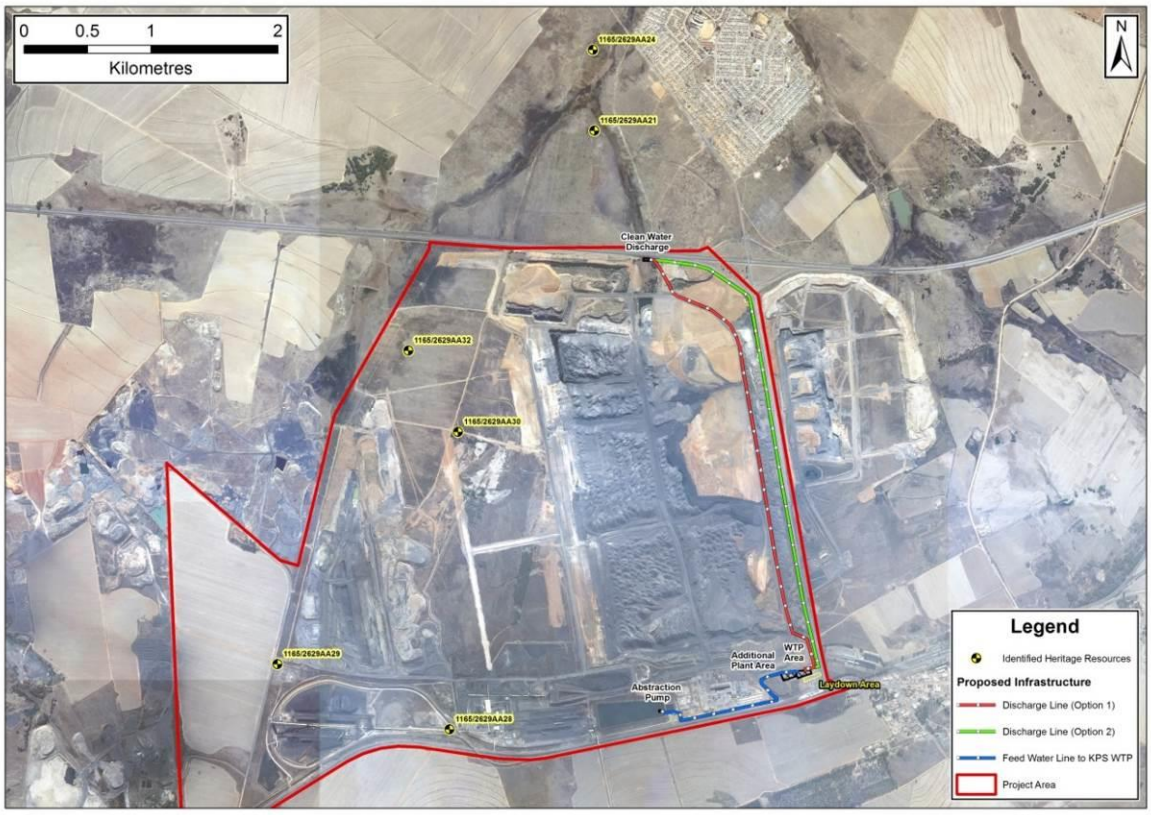


Figure 10-3: Identified Heritage Resources

10.12 Socioeconomic Characteristics

The socioeconomic characteristic of the project area have been categorised in terms of change processes. The change processes that were considered in this scoping assessment included the following:

- **Geographic processes** refer to the processes that affect the land use of the local area.
- **Demographic processes** refer to the composition of the local community in terms of variables such as age, gender, race, language, etc.
- **Economic processes** refer to the economic activities in the local society, including an assessment of peoples' livelihoods, and to a lesser extent, the macro-economic factors that affected the local community as a whole.
- **Institution and Legal processes** refer to the processes that affect service delivery to the local area.
- **Socio-cultural processes** refer to the local culture of the area, i.e. the way in which the local community live.

The socio-economic baseline profile presented in the following subsections focuses on a primary and secondary study areas (namely Emalahleni Ward 30 for the primary study area; and Nkangala District Municipality (NDM) and Emalahleni Local Municipality (ELM) for the secondary study area).

10.12.1 Geographical Processes

Geographical processes relate to land use patterns and infrastructure in the area. According to the Emalahleni Spatial Development Framework (SDF), the local municipality is the most industrialised area in the district, characterised by a large concentration of underground and open pit coal mines, and power stations. The Maputo Development Corridor traverses the ELM and connects the municipality with Mozambique, Botswana, Namibia and other parts of South Africa. Emalahleni City (Witbank) is a first order service centre providing services to surrounding towns, rural areas and smaller villages. The southern part of the ELM forms part of the so-called "Energy Mecca" of South Africa due to rich deposits of coal reserves that resulted in the establishment of mines and power stations.

10.12.1.1 Land Use within the Primary Study Area

KPS is situated in Ward 30 of ELM and the closest human settlement is the town of Ogies, located along the R555, some 600 m to the east of KPS and the proposed WTP site. Phola is located approximately 4.5 km north of the site, along the R545.

As described in the Heritage Resources baseline above, Ogies was originally established as a mining village for the Oogjes-Tweefontein. Modern-day Ogies forms part of the Richards Bay export initiative through its proximity to the southern railway line and the Ogies railway

station that handles a substantial portion of the country's rail freight. Ogies is also a service centre to the surrounding farms and is home to grain silos, service industries and a co-operative. According to the ELM SDF, the land around Ogies and Phola is prime agricultural land, causing some conflict between urbanisation,agriculture and mining.

10.12.2 Demographical Processes

Demographical processes refer to the composition of the local population and consider variables such as population size, growth and density, gender, age, household sizes and spatial distribution of the population. As the proposed WTP will be located in the mine's existing footprint (i.e. a brown-fields area), the primary area of impact is defined as Ward 30 of the ELM (the ward in which the mine is situated).

10.12.2.1 Baseline Demographical Profile

According to Census 2011, Mpumalanga consists of approximately 4 million people which makes up roughly 7.8% of the population of South Africa (Statistics South Africa, 2011; Wazimap, 2017). The province has 17 local municipalities grouped into three districts. The NDM is home to close on 1.4 million people, or roughly a third of the population of Mpumalanga. The NDM consists of six local municipalities, of which ELM is the biggest, in terms of the population. The ELM population size is around 395 466 people, or 30.23 % of the population of NDM (9.79 percent of the population of Mpumalanga). Ogies, the closest town to the proposed WTP, has a population of 1 230 people in 352 households (Census 2011). An overview of the demographic profile of both the primary and secondary study areas is presented in Table 10-18 below.

Table 10-18: Overview of the Population Size within the Greater Study Area

Population	Ward 30	ELM	NDM	Mpumalanga
Total population	13 617	395 466	1 308 129	4 039 939
Population density (people/km^2)	53	147	77	53
Total households	3 994	123 560	366 307	1 102 205
People per household	3	3	4	4

Source: Adapted from Wazimap (2017) using Census 2011 data

According to Statistics SA (Statistics by Place, 2011), 95.4 % of the population of ELM live in an urban setting and 4.6% of the population live on farms.

Table 10-19 below presents an overview of the racial breakdown of the population within the greater study area. The population is made up of a predominantly Black African population with each of the other races represented in each of the study areas. ELM includes a higher than average white population.

Table 10-19: Population Groups in Percentages Across the Greater Study Area

Population Group	Ward 30	ELM	NDM	Mpumalanga
Black African	95.7	81.3	87.9	90.7
Coloured	1.0	1.7	1.1	0.9
Indian/Asian	0.4	0.9	0.7	0.7
White	2.4	15.7	9.9	7.5
Other	0.6	0.4	0.3	0.2

Figure 10-4 below presents an overview of the age distribution of the secondary study area. From this graph it is evident that the working age population (ages between 15 and 64) are the predominant age group in all areas. The NDM overall has the largest group of children (aged 14 and younger), followed by Ward 30. The senior citizen category (aged 65+) are the smallest age group in all areas – especially in Ward 30 where they only constitute approximately 2,5% of the population.

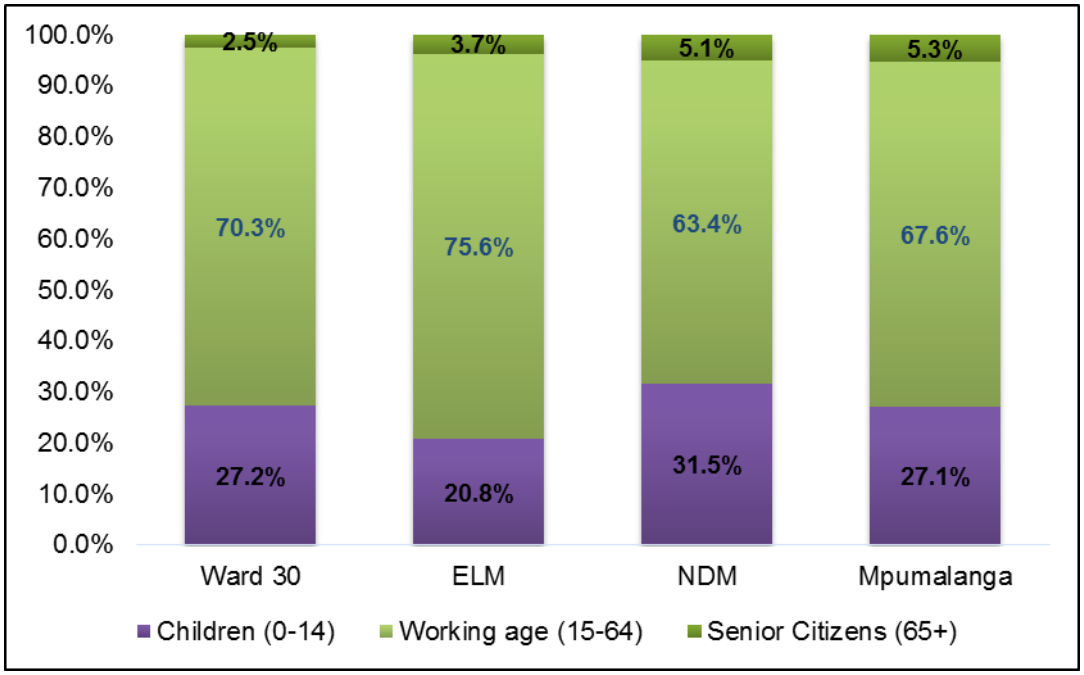


Figure 10-4: Age-range distribution of the populations within the greater study area

The population of the greater study area is fairly evenly spread between the two genders. Ward 30, ELM and NDM have slightly more males, whereas Mpumalanga as a whole has a large female population.

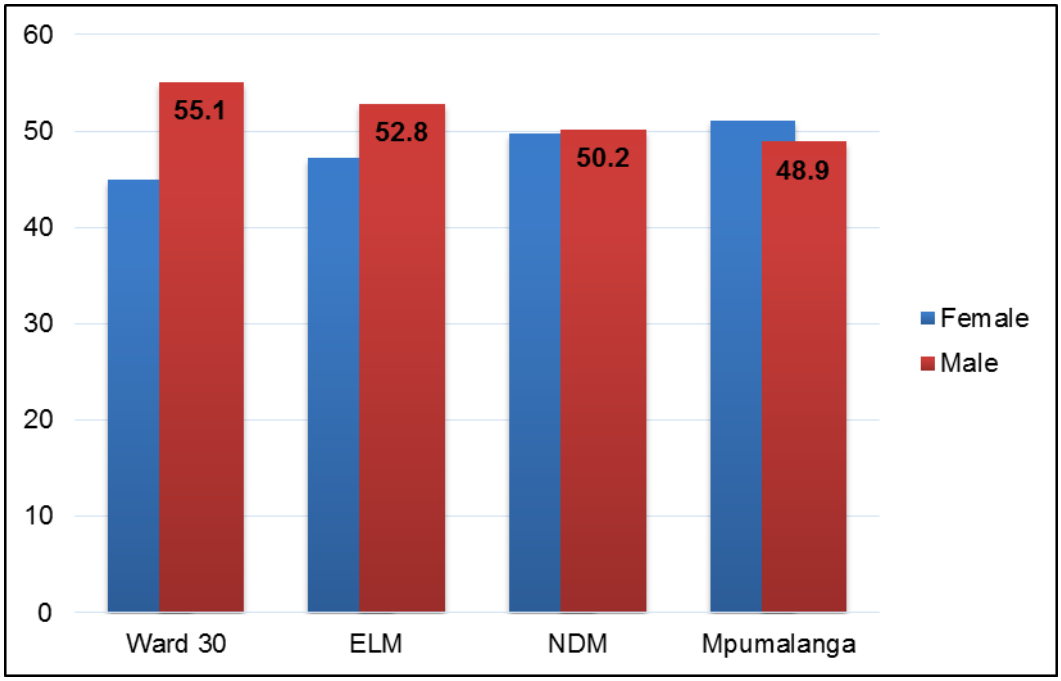


Figure 10-5: Gender-distribution (%) of the populations within the greater study area

10.12.3 Economic Processes

The economic baseline profile provides a description of the current economic activities within the study area. It typically considers variables such as employment rates, employment sectors, and the education profile of the community.

10.12.3.1 Baseline Economic Profile

An overview of the education profile of the greater study area is presented in Figure 10-6 below. From this graph it is evident that the vast majority of people have obtained some level of secondary education (this includes people who are still at school). Close to a third of the population has completed their secondary and tertiary education. On average, less than 10% of the population in the greater study area have had no schooling (including children who are not yet of school going age).

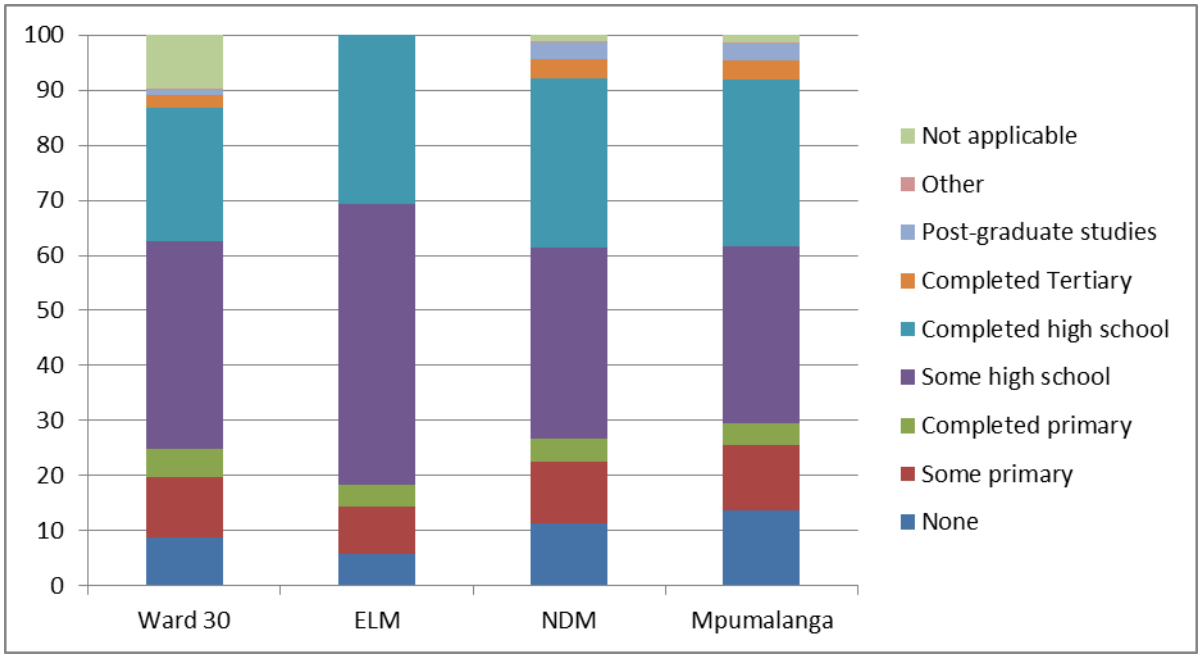


Figure 10-6: Education profile of the greater study area

Figure 10-7 below shows the employment status for the population within the greater study area. When excluding the “not economically active” population (those who are either too young to work or are unable to work for some reason), it is evident that on average more than two thirds of the study area is employed. Emalahleni has an overall employment rate of 69,2% whereas the primary study area averages at 60,2%. Despite these high employment rates, the unemployment rate, including work-seekers, averages approximately a third of the overall population, which is still considered to be a fairly high unemployment rate compared to the national employment rate average.

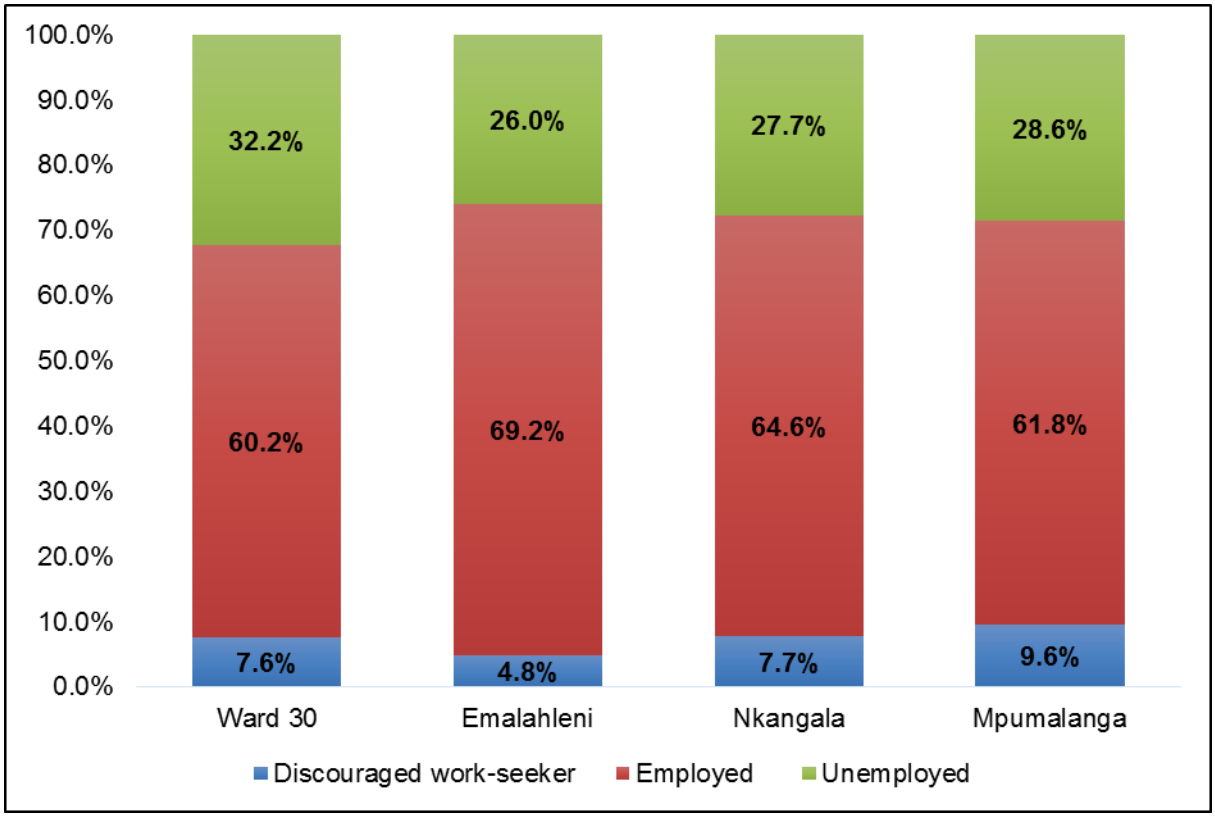
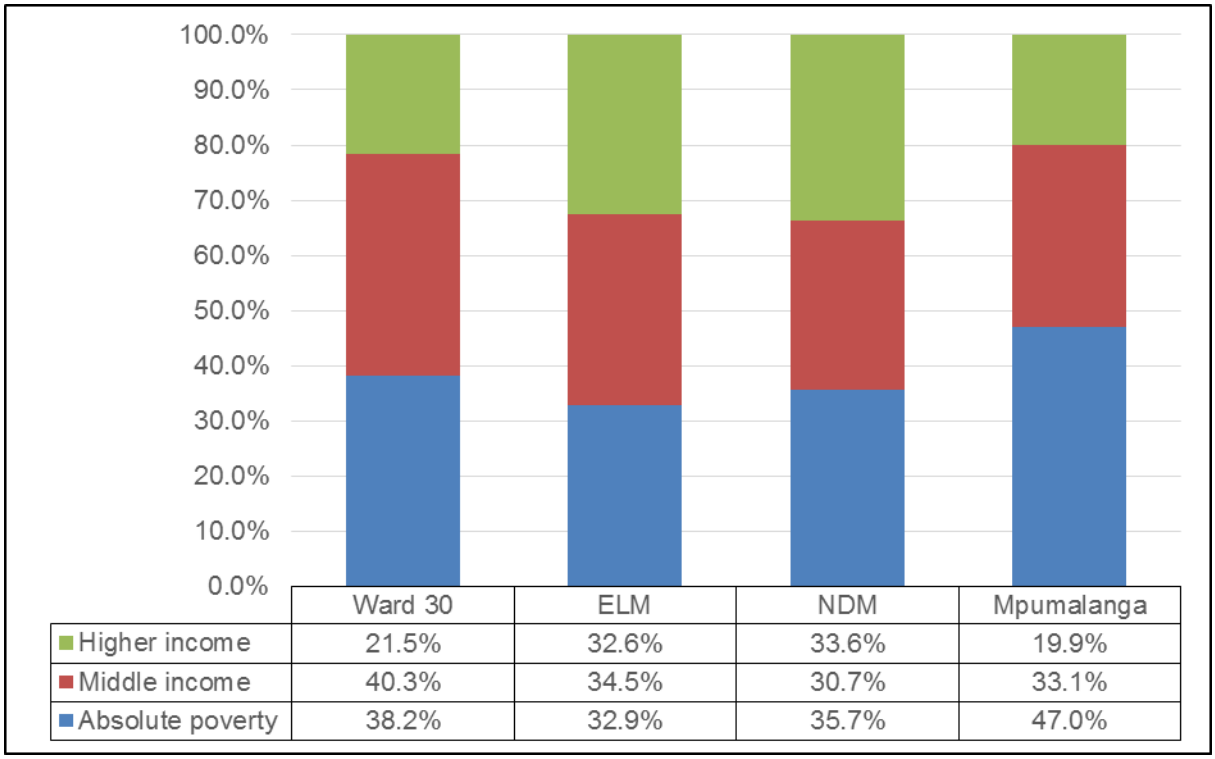


Figure 10-7: Employment status within the population of the greater study area

Linked to the employment rate above, the annual household income of the greater study area is presented in Figure 10-8 below. On average, more than a third (38.5%) of households in the greater study area live in absolute poverty, which is defined as an annual household income of R 19,200.00 or less (or ≤ R 1,600.00 per month) for a family of four, i.e. the family is unable to meet their basic food needs. The primary study area by far has the most households (close on a half, 40,3%) who are considered middle-class (defined as ≤ R 76 000 per annum). Both the ELM and the NDM have a fairly large concentration of households, 32,6% and 33,6% respectively, who fall into the higher income bracket (R 76 801 or more per annum).



	Ward 30	ELM	NDM	Mpumalanga
Higher income	21.5%	32.6%	33.6%	19.9%
Middle income	40.3%	34.5%	30.7%	33.1%
Absolute poverty	38.2%	32.9%	35.7%	47.0%

Figure 10-8: Annual household income across the greater study area (2011)

According to the ELM Integrated Development Plan (IDP) for 2018-2019, the number of households who receive a social grant has increased by more than 30,000 between 2011 and 2016. This is indicative of a population becoming more reliant on public resources to meet their basic needs.

In 2015, the Gross Domestic Product by Region (GDP-R) for NDM constituted R 123 billion (NDM, 2017). This makes up 41.2% of the Gross Domestic Product (GDP) of Mpumalanga and 3.1% of the national GDP. This was the largest contribution to Mpumalanga in terms of the district municipalities. The economy of NDM has shown an average annual increase of 1.4% between 2005 and 2015, compared to an average annual increase of 1.95% for Mpumalanga (and 2.58% for South Africa) for the same period. ELM contributed R 60.21 billion to NDM (48.82%), despite showing negative average annual growth between 2005 and 2015.

Table 10-20 summarises the most important broad economic sectors in terms of the Gross Value Added (GVA). The table also highlights the economic sectors which employ the most people within the study area.

Table 10-20: Economic structure within the greater study area, adapted from NDM

Economic Contributors	Ward 30	ELM	NDM	Mpumalanga
Largest	Not known	Not known	Mining	Mining
Second largest	Not known	Not known	Community Services	Community Services
Third largest	Not known	Not known	Trade	Trade
Contributors of employment				
Largest	Not known	Not known	Trade	Trade
Second largest	Not known	Not known	Community services	Community services
Third largest	Not known	Not known	Mining	Finance

ELM is predominantly industrial and was originally known for mining (NDM, 2017). The Tress Index, which is a measure of how diverse the economy is within the municipality, was utilised. A Tress Index of zero represents a totally diverse economy while a number closer to 100 represents a more vulnerable economy to exogenous variables. ELM has a Tress Index rating of 25.6 which indicates a fairly diverse economy. The economy includes 27 'hubs' and over 883 business, including multi-national corporations. Many of which are linked to the mining industry. NDM has a Tress Index of 48 and Mpumalanga has a rating of 35.4 which demonstrate a slightly higher economic vulnerability than the ELM.

10.12.4 Empowerment and Institutional Processes

Empowerment and Institutional processes relate to the role, efficiency and operation of government sectors and other organisations within the area in terms of service delivery.

10.12.4.1 Home ownership

The ownership of households is more varied across the different study areas, as shown in Figure 10-9. In Mpumalanga and NDM, houses are most commonly owned and fully paid off. The second-most common form of ownership is renting. In ELM, the opposite is observed, where renting is more common. In Ward 30, full ownership is the most common type of home ownership. This is indicative of the length of time people have been residing in the area (assuming the average bond period is 20 years), which in turn would increase their place attachment. People with a stronger place attachment are more likely to become involved in a project process that might affect their quality of life in an attempt to influence the outcome of the decision taken by the competent authority.

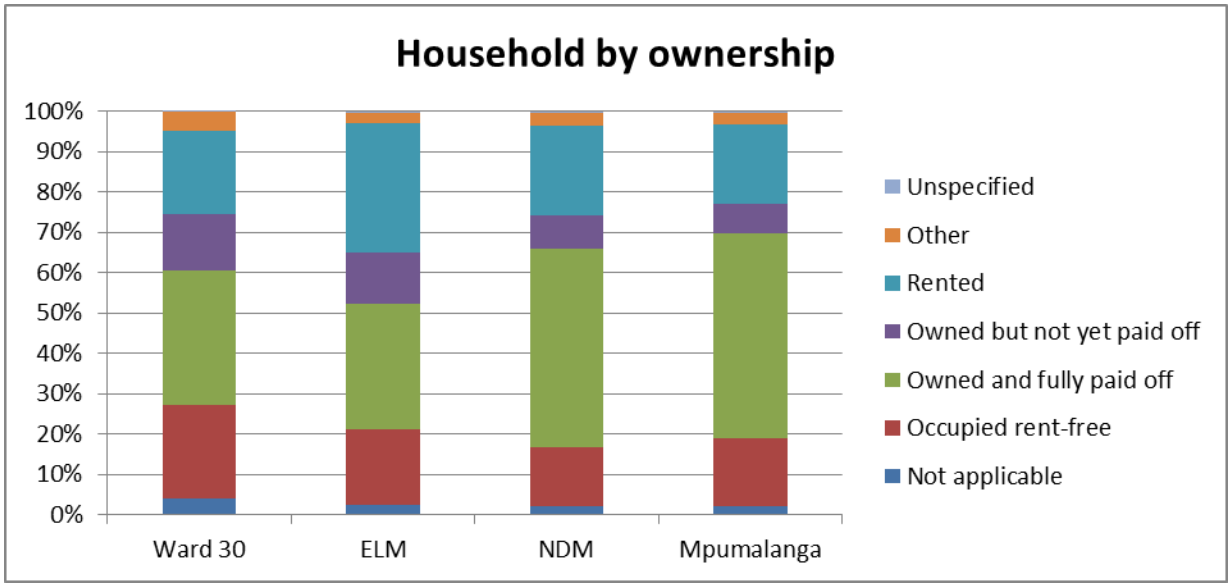


Figure 10-9: Ownership by households within the greater study area

10.12.4.2 Municipal Services

An overview of households' access to municipal services is provided in Table 10-21 below. From the data it is evident that the majority of households within the greater study area have access to municipal services, with the exception of refuse removal in the district and the province at large where most people rely on their own forms of waste disposal, including informal disposal at unlicensed sites. Although the majority of households on average (61,3%) have access to toilet facilities on par with RDP standards (any flush system connected to either a sewerage system or septic tank), this service only extends to just over half (55,5%) of households in the primary study area. By far the majority of households (80,6% on average) in the ELM (including Ward 30) receive their water from the local authority, which means that it should be treated water.

Table 10-21: Overview of Municipal Services within the Greater Study Area

Type of Service	Ward 30	ELM	NDM	Mpumalanga
Energy – cooking	To be determined (tbd)	Electricity (70,8%)	tbd	tbd
Energy – heating	tbd	Electricity (63,0%)	tbd	tbd
Energy – lighting	tbd	Electricity (73,4%)	tbd	tbd
Refuse removal	Removed by local authority (55,6%)	Removed by local authority (74,3%)	Own disposal (51,3%)	Own disposal (51,9%)
Sanitation services	RDP and above (55,5%)	RDP and above (73,6%)	RDP and above (61,6%)	RDP and above (54,5%)
Water	Regional/local water scheme (73,3%)	Regional/local water scheme (87,8%)	Regional/local water scheme (83,5%)	Regional/local water scheme (73,6%)

10.12.5 Socio-Cultural Processes

Socio-cultural processes relate to the way in which humans behave, interact and relate to each other and their environment, as well as the belief and value systems which guide these interactions.

10.12.5.1 General Background of the Primary Study Area (Ogies and Phola)

Ogies was established in 1885 under the name Oogjes on the farm Oogjesfontein. This was followed by opening of two mines – the Oogjes-Tweefontein Mine in 1903 and the Ogies Navigation Colliery in 1936.

Agriculture continues to play an important role in the town's growth and development. Ogies serves as the main service centre to the surrounding farms and is home to a number of grain silos, service industries and a co-operative. The ELM SDF (2015) classifies the agricultural land around Ogies and Phola as "prime agricultural land", which places pressure on development priorities, i.e. maintaining the balance between agricultural use and urbanisation and other forms of land use (e.g. mining, power production, etc.).

Commercial and retail activities in Ogies are predominantly centred along the R545 and the R555. The residential area of Ogies is concentrated towards the east and south of route P29-1 (Emalahleni Road). The SDF states that maintenance of public spaces and resources, for example roads, open spaces, public buildings, etc., are generally lacking and require attention.

Phola is a township located approximately 5 km north of Ogies, north of the N12. Informal settlement appears to be quite common in Phola and can be found on the southern and northern boundaries as well as the central parts of the town.

The economy of these two towns is not very diversified – most of its residents are employed at either the Kendal power station or nearby mines. Future spatial development is curbed by the extent of coal undermining in the area.

10.12.5.2 Crime Rate

There is one police station in Ogies servicing the primary study area. Considering the crimes reported at this police station between 2011 and 2016 (see Figure 10-10), it is evident that the number of crimes reported was fairly stable between 2011 and 2014. It then peaked in 2014/5, after which the overall incidence of crime again decreased somewhat in 2015/16. Most crimes reported are crimes against the person and includes murder, attempted murder, sexual offences, all forms of assault, and robbery. This is followed by commercial crime, including shoplifting and property-related crimes (house burglaries and theft of and from vehicles).

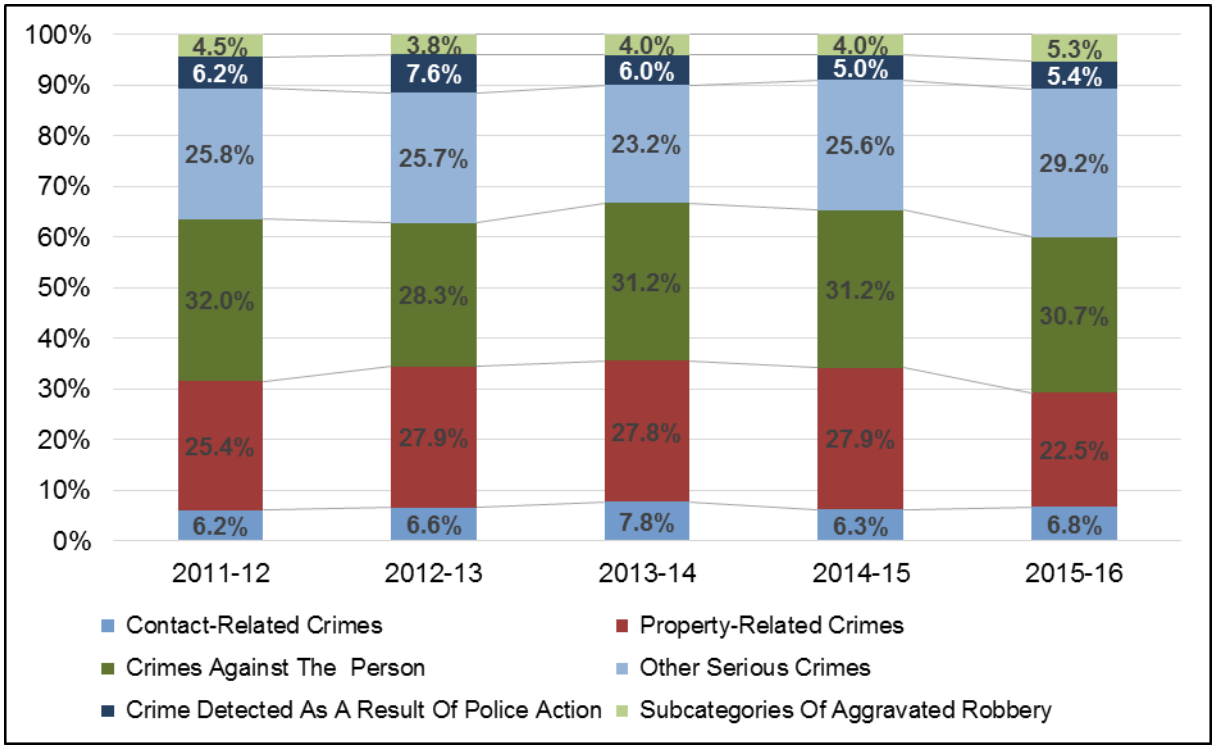


Figure 10-10: Crime Rate as reported at the Ogies Police Station (2011-2016)

10.12.5.3 Health

In 2015, an estimated 212 000 people in NDM were HIV positive (NDM, 2017). This represents 32.1% of the population of the district and was calculated using the model created to estimate HIV/AIDS rates by the Actuarial Society of Southern Africa (ASSA) in 2008. The estimation includes an average annual growth of 3.31% between 2005 and 2015 for NDM. This annual growth rate is higher than that of Mpumalanga and South Africa.

Table 10-22 below provides an overview of the health services in the greater study area. Even though there are a number of healthcare practitioners in Ogies and one clinic, there are no hospitals close-by and patients are referred to the hospitals in Emalahleni, some 30 km from site.

Table 10-22: Health care facilities within the greater study area

Facility type	Ward 30	ELM	NDM
Hospital		3	9
Community Health Centres		5	22
Clinic	1	10	68
Mobile clinic (functioning)		6	18
Mobile clinic (non-functioning)		3	11

11 Item 2(h)(v): Impacts identified

The preliminary list of impacts as well as their assumed significance, which will be investigated further in the EIA Phase, is presented in detail in Section 15 (Table 15-1) below. The following have been identified as key potential impacts:

- Loss of flora and disturbance of fauna;
- Soil erosion and compaction;
- Dust and noise generation;
- Disturbance of wetland habitat;
- Alteration of natural flow regime due to discharge into the Saalklapspruit resulting in habitat modification for aquatic biota;
- Siltation of surface water resources and wetlands; and
- Contamination due to spills or poor waste management practices.

The following key risks have been identified for the project:

- Spills/leaks of hazardous materials, waste or contaminated water from storage facilities or pipelines resulting in land and water contamination;
- Project area flooding due to an extreme rainfall event resulting in impacts to aquatic ecology, wetlands and surface water quality;
- Unmet community expectations and actions resulting in project disruptions; and
- Hydrocarbon spill from vehicles and machinery resulting in land and water contamination.

The proposed Project is also likely to result in positive impacts mainly pertaining to socio-economic improvements through increased job opportunity during the construction phase and improved public health and safety through reducing the risk of water pollution as a result of uncontrolled discharges or spillage of mine affected water.

11.1 Item 2(h)(vi): Methodology used in determining the significance of the environmental impacts

The methodology to identify, determine and assess the potential impacts is provided in this section and will be utilised by the relevant Specialists during the EIA Phase.

11.1.1 Impact Assessment Methodology

To clarify the purpose and limitations of the impact assessment methodology, it is necessary to address the issue of subjectivity in the assessment of the significance of environmental impacts. Even though Digby Wells, and the majority of EIA practitioners, propose a

numerical methodology for impact assessments, one has to accept that the process of environmental significance determination is inherently subjective.

The weight assigned to each factor of a potential impact, and also the design of the rating process itself, is based on the values and perception of risk of members of the assessment team, as well as that of the I&AP's and authorities who provide input into the process.

The perception of the probability of an impact occurring is dependent on perceptions, aversion to risk and availability of information.

The purpose of the EIA process is to provide a structured, traceable and defendable methodology of rating the relative significance of impacts in a specific context.

11.1.2 Impact Rating

The impact assessment methodology utilised during the EIA Phase for the Project consists of two phases namely impact identification and impact significance rating.

Impacts and risks have been identified based on a description of the activities to be undertaken. Once impacts have been identified, a numerical environmental significance rating process will be undertaken that utilises the probability of an event occurring and the severity of the impact as factors to determine the significance of a particular environmental impact.

The severity of an impact is determined by taking the spatial extent, the duration and the severity of the impacts into consideration. The probability of an impact is then determined by the frequency at which the activity takes place or is likely to take place and by how often the type of impact in question has taken place in similar circumstances.

Following the identification and significance ratings of potential impacts, mitigation and management measures were incorporated into the EMP.

Details of the impact assessment methodology used to determine the significance of physical, bio-physical and socio-economic impacts are provided below.

The significance rating process follows the established impact/risk assessment formula:

The significance rating process follows the established impact/risk assessment formula:

Significance = Consequence x Probability x Nature

Where

Consequence = Intensity + Extent + Duration

And

Probability = Likelihood of an impact occurring

And

Nature = Positive (+1) or negative (-1) impact

Note: In the formula for calculating consequence, the type of impact is multiplied by +1 for positive impacts and -1 for negative impacts

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 11-2. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation has been applied; post-mitigation is referred to as the residual impact. The significance of an impact is determined and categorised into one of seven categories (The descriptions of the significance ratings are presented in Table 11-3).

It is important to note that the pre-mitigation rating takes into consideration the activity as proposed, (i.e., there may already be some mitigation included in the engineering design). If the specialist determines the potential impact is still too high, additional mitigation measures are proposed.

Table 11-1: Impact assessment parameter ratings

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
7	Irreplaceable loss or damage to biological or physical resources or **highly** sensitive environments. Irreplaceable damage to **highly sensitive** cultural/social resources.	Noticeable, on-going natural and / or social benefits which have improved the overall conditions of the baseline.	International The effect will occur across international borders.	Permanent: The impact is irreversible, even with management, and will remain after the life of the project.	Definite: There are sound scientific reasons to expect that the impact will definitely occur. >80% probability.
6	Irreplaceable loss or damage to biological or physical resources or **moderate to highly** sensitive environments. Irreplaceable damage to cultural/social resources of **moderate to highly** sensitivity.	Great improvement to the overall conditions of a large percentage of the baseline.	National Will affect the entire country.	Beyond project life: The impact will remain for some time after the life of the project and is potentially irreversible even with management.	Almost certain / Highly probable: It is most likely that the impact will occur. <80% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
5	Serious loss and/or damage to physical or biological resources or **highly** sensitive environments, limiting ecosystem function. Very serious widespread social impacts. Irreparable damage to highly valued items.	On-going and widespread benefits to local communities and natural features of the landscape.	Province/ Region Will affect the entire province or region.	Project Life (>15 years): The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Likely: The impact may occur. <65% probability.
4	Serious loss and/or damage to physical or biological resources or **moderately** sensitive environments, limiting ecosystem function. On-going serious social issues. Significant damage to structures / items of cultural significance.	Average to intense natural and / or social benefits to some elements of the baseline.	Municipal Area Will affect the whole municipal area.	Long term: 6-15 years and impact can be reversed with management.	Probable: Has occurred here or elsewhere and could therefore occur. <50% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
3	Moderate loss and/or damage to biological or physical resources of **low to moderately** sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	Local Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.
2	**Minor loss and/or effects** to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	Limited Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
1	**Minimal to no loss** and/or effect to biological or physical resources, not affecting ecosystem functioning. Minimal social impacts, low-level repairable damage to commonplace structures.	Some low-level natural and / or social benefits felt by a very small percentage of the baseline.	Very limited/Isolated Limited to specific isolated parts of the site.	Immediate: Less than 1 month and is completely reversible without management.	Highly unlikely / None: Expected never to happen. <1% probability.

Table 11-2: Probability/consequence matrix

Significance																																				
-147	-140	-133	-126	-119	-112	-105	-98	-91	-84	-77	-70	-63	-56	-49	-42	-35	-28	-21	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147
-126	-120	-114	-108	-102	-96	-90	-84	-78	-72	-66	-60	-54	-48	-42	-36	-30	-24	-18	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126
-105	-100	-95	-90	-85	-80	-75	-70	-65	-60	-55	-50	-45	-40	-35	-30	-25	-20	-15	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105
-84	-80	-76	-72	-68	-64	-60	-56	-52	-48	-44	-40	-36	-32	-28	-24	-20	-16	-12	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84
-63	-60	-57	-54	-51	-48	-45	-42	-39	-36	-33	-30	-27	-24	-21	-18	-15	-12	-9	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63
-42	-40	-38	-36	-34	-32	-30	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Consequence

Table 11-3: Significance rating description

Score	Description	Rating
109 to 147	A very beneficial impact that may be sufficient by itself to justify implementation of the project. The impact may result in permanent positive change	Major (positive) (+)
73 to 108	A beneficial impact which may help to justify the implementation of the project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and / or social) environment	Moderate (positive) (+)
36 to 72	A positive impact. These impacts will usually result in positive medium to long-term effect on the natural and / or social environment	Minor (positive) (+)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the natural and / or social environment	Negligible (positive) (+)
-3 to -35	An acceptable negative impact for which mitigation is desirable. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural and / or social environment	Negligible (negative) (-)
-36 to -72	A minor negative impact requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the natural and / or social environment	Minor (negative) (-)
-73 to -108	A moderate negative impact may prevent the implementation of the project. These impacts would be considered as constituting a major and usually a long-term change to the (natural and / or social) environment and result in severe changes.	Moderate (negative) (-)
-109 to -147	A major negative impact may be sufficient by itself to prevent implementation of the project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts are likely to be irreversible and/or irreplaceable.	Major (negative) (-)

11.2 Item 2(h)(vii): The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

The overall positive and negative impacts are addressed, and the individual alternatives which have been considered for this Project, in relation to the alternatives proposed in Table 11-4 below.

Table 11-4: Alternatives and Impacts

Alternative	Option	Positive Impact	Negative Impact
Water Treatment Options	Water Active	Can meet the RWQOs	Requires infrastructure that may impact the environment
	Passive	Less infrastructural requirements	Cannot meet the RWQOs
	In-Situ Treatment	Less infrastructural requirements	Cannot meet the RWQOs
WTP location	Option 1	In proximity to existing amenities therefore limiting area of disturbance	-
	Option 2	In previously disturbed area	-
	Option 3	In previously disturbed area	-
	Option 4	In previously disturbed area	-
WTP design	Fixed Installation	-	0.5 ha footprint disturbance
	Modular installation	-	0.5 ha footprint disturbance
WTP technology	-	-	Contamination risks associated with hazardous solid and liquid waste generation and storage
Pipeline routes	Option 1	No positive impact	Traverses rehabilitated lands and risk of contamination associated with spillages

Alternative	Option	Positive Impact	Negative Impact
	Option 2	Avoids rehabilitated area	Contamination risks associated with spillages
Waste Disposal	On-site disposal	-	Potential for leachability and possible groundwater pollution.
	Off-site disposal	No new waste impacts on KPS	Cumulative impacts/additional pressure on existing landfill site.
The No-Go Option	-	No positive impact anticipated	Continue to pose a health and safety risk to the community and the natural environment that could occur if mine affected water is inadequately managed.

11.3 Item 2(h)(viii): The possible mitigation measures that could be applied and the level of risk

Possible mitigation measures that could be applied to risks regarding the site layout will be considered in detail as part of the EIA Phase. The infrastructure layout plan will be designed to limit, prevent and avoid potential environmental and social impacts. The layout plan will also take into consideration the comments received form I&APs once the Public Participation Process has been initiated as well as the findings of the specialist investigations as part of the EIA Phase. The preliminary mitigation types for the assumed risks (to be confirmed during the EIA Phase) are also listed in Table 15-1 below.

12 Item 2(h)(ix): The outcome of the site selection Matrix and Final Layout Plan

The final layout plan will be confirmed during the EIA Phase and included in the Draft EIA Report.

13 Item 2(h)(x): Motivation where no alternatives sites were considered

The preliminary alternatives considered for the Project include the WTP location, WTP design, pipeline routes and the “No-Go” alternative. Refer to sections 9.1 above.

14 Item 2(h)(xi): Statement motivating the preferred site

The site selection for the WTP infrastructure considered size requirements, proximities to the water abstraction and discharge point as well as the current environmental state of the footprint.

The preferred WTP location is characterised as disturbed cleared land located between the Balancing Dam and Saalklapspruit discharge point. As a disturbed site, this will result in less further impact to the environment.

15 Preliminary Identification of impacts, risks and mitigation measures

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities for the purpose of meeting a project need. An impact can be positive or negative, and the same activity can lead to impacts that are perceived as positive by certain stakeholder groups, and negative by others.

Significance of an impact can be reduced (if the impact is negative) or enhanced (if the impact is positive) by the implementation of management or mitigation/enhancement measures. This is achieved through the following:

- Identify alternatives that could lead to the avoidance of the impact occurring at all;
- Implement measures to reduce/enhance the likelihood of an impact occurring by ensuring effective management; or
- Implement procedures that will ensure timely and effective measures in the event of an impact occurring.

A detailed impact assessment will be undertaken during the EIA Phase based on the finding of the specialist studies. The significance of an impact ultimately determines the level of mitigation required to reduce the impact significance to acceptable levels. An Environmental Management Plan (EMP) will be compiled to accompany the EIA and will include detailed mitigation measures to address each identified impact.

Table 15-1 provides a preliminary identification of activities the proposed projects will be associated with, the potential impacts, and associated possible mitigation and management measures. In accordance with the EIA Regulations stipulating the contents of a Scoping Report, this table identifies the following:

- The impacts and risks associated with various aspects of the proposed development, including the nature, significance, consequence, extent, duration and probability of such identified impacts;

- The degree to which these impacts can be reversed (by mitigation or lapse of time), may cause irreplaceable loss of resources and can be avoided, managed or mitigated;
- The positive and negative nature of impacts that the proposed activity 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; and
- Possible mitigation measures that could be applied and level of residual risk.

The significance ratings of the preliminary impacts identified below are cognisant of the fact that the preferred project location is a brownfields site.

Table 15-1: Preliminary Impacts and Mitigation Measures

No	Activity	Aspect	Impact / Risks	Phase	Probability	Duration	Scale / Extent	Magnitude	Nature of Impact	Mitigation Type (can the impact be reversed, avoided, managed or mitigated?)	Residual Risk
1	Site Establishment	Flora and Fauna	Loss of flora and disturbance of fauna (undisturbed land only)	Construction	Probable	Medium term	Project site	Moderate	Negative	▪ Construction activities should take place in the already disturbed areas identified and the footprint of project activities must be limited as far as possible; and ▪ Avoid areas of high ecological sensitivity; and ▪ Provision must be made where possible to allow for fauna movement.	Low
2	Site Establishment & construction activities	Soil	Erosion, compaction, loss of topsoil	Construction	Probable	Medium term	Project site	Low	Negative	▪ Strip any topsoil and stockpile separately; and ▪ Implement erosion and contamination prevention measures.	Low
3	Construction of infrastructure	Air Quality	Dust generation	Construction	Probable	Short term	Project site	Low	Negative	▪ Limit footprint of disturbed areas; ▪ Implement erosion control mechanisms; and ▪ Implement dust control mechanisms.	Low
4	Construction of infrastructure	Socio-Economic Environment	Creation of temporary job opportunities	Construction	Definite	Short Term	Municipal	Moderate	Positive	▪ Ensure procurement practices focus on local employment and local skills development	Low
5	Construction and operation of infrastructure	Noise	Noise generation	Construction & Operation	Likely	Project Life	Project site	Low	Negative	▪ Install noise suppression mechanisms on construction machinery and vehicles.	Low
6	Construction and operation of infrastructure	Wetlands	Destruction of Wetland Habitat	Construction	Probable	Medium Term	Site and Surrounds	Moderate-High	Negative	▪ Set Buffer Zone; and ▪ Implement an alien invasive management plan.	Medium
7	Construction and operation of infrastructure	Wetlands	Altered hydrological flow of wetland	Operation	Probable	Medium Term	Isolated	High	Negative	▪ Set Buffer Zone; and ▪ Establish and implement appropriate of stormwater systems at WTP	Low
8	Construction and operation of infrastructure	Wetlands & surface water	Erosion and siltation	Construction	Probable	Medium Term	Project site	High	Negative	▪ No workers or vehicles allowed in buffer zone; and ▪ Erosion protection measures.	Low
9	Construction and operation of infrastructure	Wetlands & surface water	Additional impermeable surfaces resulting in increased	Construction	Likely	Project Life	Local	Moderate	Negative	▪ Implement erosion preventions; and ▪ Implement stormwater management measures	Low

No	Activity	Aspect	Impact / Risks	Phase	Probability	Duration	Scale / Extent	Magnitude	Nature of Impact	Mitigation Type (can the impact be reversed, avoided, managed or mitigated?)	Residual Risk
			runoff, erosion and altered runoff patterns								
10	Construction and operation of infrastructure	Heritage Resources	Damage to Heritage Resources	Construction	Unlikely	Permanent	Project site	Very High	Negative	▪ Worker education; ▪ Demarcation of sites; and ▪ Establishment and implementation of a Chance Find Procedure	Low
11	Construction & presence of development	Visual	Visual intrusion for nearby receptors	Construction & Operation	Probable	Project Life	Local	Moderate	Negative	▪ Vegetation should only be removed when and where necessary. ▪ Establishment of visual barriers where possible.	Low
12	Discharge into the Saalklapspruit	Surface water & aquatic ecology	Alteration of natural flow regime due to discharge into the Saalklapspruit resulting in habitat modification for aquatic biota	Construction & Operation	Probable	Project Life	Local	Moderate	Negative	▪ Install and maintain water dissipation structure; ▪ Implement stormwater management measures; and ▪ Establish and implement biomonitoring programme.	Medium
13	Handling of hazardous chemicals on site during	Surface water, groundwater, wetlands, aquatic ecology & soils	Contamination due to spills or poor waste management practices	Construction & Operation	Probable	Project Life	Project site	Moderate	Negative	▪ Implement waste management plan; ▪ Implement ISO standards for bunded areas; and ▪ Prohibit and prevent dumping in or near water courses.	Low
14	Presence of development	Biodiversity	Reduced ecological functioning	Operation	Likely	Medium Term	Project site	Moderate	Negative	▪ Monitor alien invasive species encroachment and control	Low
15	Presence of the Development	Groundwater	Reduction in Recharge	Construction	Likely	Project Life	Project site	Low-Moderate	Negative	▪ No mitigation possible or necessary, but water levels should be monitored. Reduced recharge due to increased impermeable surfaces may be compensated.	Low
16	Implementation of project	Socio-Economic Environment	Improved public health and safety through reduced water pollution risk	Construction	Definite	Medium Term	Municipal	Moderate-High	Positive	▪ Establish and implement an infrastructure maintenance plan; and ▪ Implement a surface and groundwater monitoring programme	Low

No	Activity	Aspect	Impact / Risks	Phase	Probability	Duration	Scale / Extent	Magnitude	Nature of Impact	Mitigation Type (can the impact be reversed, avoided, managed or mitigated?)	Residual Risk
17	Discharge of treated water into the Saalklapspruit	Surface water, groundwater, wetlands & aquatic ecology	Improved water quality in the Saalklapspruit	Operation	Likely	Project Life	Local	Moderate-High	Positive	▪ Ensure the quality of water discharge meets the RWQOs for the Wilge River Catchment through continuous monitoring at the discharge point.	Low

16 Item 2(i): Plan of study for the environmental impact assessment process

The purpose of the EIA phase will be to investigate the potential negative and positive impacts of a proposed project activity on the environment. The potential impacts will then be quantified to assess the significance that an impact may pose on the receiving environment. The objectives of the EIA process are to:

- Ensure that the potential biophysical and socio-economic impacts of the proposed Project, including those as a result of blasting and potential traffic impacts, are taken into consideration during the decision making process;
- Ensure that the Project activities undertaken do not have a substantial detrimental impact on the environment by presenting management and mitigation measures that will avoid and/or to reduce those impacts;
- Ensure that I&APs are informed about the proposed Project and the PPP to be followed;
- Ensure that I&APs are given an opportunity to raise concerns; and
- Provide a process aimed at enabling authorities to make an informed decision, especially in respect of their obligation to take environmental and social considerations into account when making those decisions.

The purpose of this Plan of Study is to explain the approach that will be followed in undertaking the EIA and EMP Compilation. Appendix 2 of the EIA Regulations, Section 2(1)(h) prescribes the required contents of the Plan of Study as follows:

(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including−

i. a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
ii. a description of the aspects to be assessed as part of the environmental impact assessment process;
iii. aspects to be assessed by specialists;
iv. a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;
v. a description of the proposed method of assessing duration and significance;
vi. an indication of the stages at which the competent authority will be consulted;
vii. particulars of the public participation process that will be conducted during the environmental impact assessment process;
viii. a description of the tasks that will be undertaken as part of the environmental impact assessment process; and

ix. identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored (Section 15 above).

A summary of the proposed Plan of Study for the EIA Phase is contained in Table 16-1, based on the EIA Regulations, 2014 (as amended).

Table 16-1: Plan of Study

Requirement	Response
Alternatives to be assessed in the EIA Phase.	The EIA will include further detailed assessment of site layout alternatives based on environmental sensitivities identified through the specialist studies.
Aspects to be assessed as part of the EIA.	The EIA Phase will assess the overall aspects affected by the proposed project in relation to Listed and non-listed project activities. The potential impacts of the preferred alternative will be assessed in the EIA phase in terms of the following aspects: ▪ Soils, Land Use and Land Capability; ▪ Air Quality, Noise and Visual; ▪ Surface- and Groundwater; ▪ Aquatic Biodiversity; ▪ Fauna & Flora; ▪ Wetlands; ▪ Heritage resources; and ▪ The socioeconomic environment.
Aspects to be assessed by specialists in the EIA Phase (Specialist methodologies for the EIA Phase are discussed in Section 16.1, below)	The following specialist studies will be undertaken: ▪ Soil, Land Use, Land Capability, and Impact Assessment; ▪ Fauna and Flora Impact Assessment; ▪ Aquatic Ecology Impact Assessment; ▪ Wetlands Impact Assessment; ▪ Groundwater Impact Assessment; ▪ Surface Water Impact Assessment; ▪ Socioeconomic Impact Assessment; ▪ Heritage Impact Assessment; ▪ Visual Impact Assessment; and ▪ Noise Impact Assessment. In addition, a Financial Provision and Closure Liability Assessment, as well as a Rehabilitation Plan, will be included in the EIA.
Method of Assessing Impacts (including duration and significance)	Please refer to Section 11.1 of this Report for the proposed Impact Assessment Methodology.

Requirement	Response
An indication of the stages at which the competent authority will be consulted	DMR will be / has been consulted as follows: ▪ Pre-Application consultation meeting was held on 21 May 2018; ▪ Provided a copy of the Draft Scoping Report for comment; ▪ Submit copy of updated scoping report for consideration. ▪ Provided a copy of the Draft EIA Report for comment; and ▪ Submit a copy of the Final EIA Report for consideration.
Public Participation	An I&AP database has been compiled from current research and the previous EIA Processes for KPS. I&APs will be invited to comment on this Draft Scoping Report for a 30 day period (see Section 9.2 for more detail). Comments received will be synthesized in a Comments and Response Report (CRR) and included in the updated scoping report. Similar to this scoping phase, I&APs will also be provided an opportunity to comment on the Draft EIA Report in due course. It is further proposed that Public Meetings be held during the Scoping and EIA Phases to ensure effective communication with stakeholders.
Tasks that will be undertaken during the environmental impact assessment process	The following tasks will be undertaken during the EIA phase: ▪ Further define the project activities; ▪ Further assess the project alternatives based on technical, economic, social and environmental criteria; ▪ Supplement the legal review of the project; ▪ Undertake detailed (updated) specialist investigations; ▪ Confirm services requirements (water, electricity, sewage etc.) ▪ Assess potential impacts using the methodology provided herein; ▪ Provide detailed and feasible mitigation and management measures in an EMP; and ▪ Public participation activities, including public and key stakeholder meetings.

16.1 Specialist Methodologies for the EIA Phase

The subsections below provide detail for the specialist studies included.

16.1.1 Soil, Land Capability and Land Use Assessment

A Soil, Land Capability and Land Use Impact Assessment will be undertaken including the components discussed below.

16.1.1.1 Field Survey

A study of the soils present on the proposed KPS WTP, laydown area, feed water line and clean water discharge line will be conducted during a field visit. The site will be traversed on foot. A hand soil auger will be used to determine the soil type and depth. The soil will be

augered to the first restricting layer or 1.5 m depth. Survey positions will be recorded as waypoints using a handheld GPS. Other features such as existing open trenches will be helpful to determine soil types and depth. The soil forms (types of soil) found will be identified using the South African Soil Classification System namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991). The following attributes will be included at each observation:

- Soil form and family (Taxonomic Soil Classification System for South Africa, 1991);
- Soil depth;
- Soil colour;
- Current land use; and
- Land capability.

Two soil samples will be taken for soil fertility and texture analysis during the site visit.

16.1.1.2 Land Use

The current land use will be identified by aerial imagery and during the on-site inspection. The land use categories are split into:

- Cultivated;
- Plantations;
- Natural;
- Waterbodies;
- Mines; and
- Urban Built-Up.

16.1.1.3 Land Capability

Land capability will be determined by assessing a combination of soil, terrain and climatic features which is based on eight classes (I, II, III-VIII). Land capability is defined by the most long term sustainable land use under rain-fed conditions. Land capability is divided into classes and each class is defined as the potential for the land to support cultivation and is divided from land that is suitable for cultivation to land that is unsuitable for cultivation.

16.1.1.4 Impact Assessment

A Soil, Land Capability and Land Use Impact Assessment will be provided based on the outcome of the baseline assessment and will include recommended mitigation measures necessary to address impacts associated with the project.

16.1.2 Fauna and Flora Impact Assessment

A Fauna and Flora Impact Assessment will be undertaken as discussed below.

16.1.2.1 Vegetation Survey

A single season floristic survey will be conducted during the growing season (the rainy season when most plants are in flower or seeding) to determine the species composition of the project area. The project area is defined as the pipeline route that will be constructed, the WTP and Laydown area footprint, and the discharge point where water will be pumped into the Saalklapspruit. This will give an indication of the actual species present on site and these will be discussed in context of plant communities (should the area support distinct communities, due to its degraded nature) within the ecosystem of the area. The protected, endemic, exotic, alien invasive and culturally significant species will also be discussed as separate issues and related back to relevant legal requirements. Furthermore the identification of red data and protected species as listed according to the IUCN List, NEMBA and other Provincial and National legislation will be completed.

Depending on the vegetation and terrain the Braun-Blanquet sampling, belt or line transect methods could be used during vegetation assessments, however should dominant vegetation types require other methods to be used, then these shall be motivated.

16.1.2.2 Faunal Survey

A field survey will be conducted concurrently with vegetation survey to identify all animals observed in the area. Any ecological indicators, such as calls, tracks and dung will also be noted and regarded as the presence of that particular animal. An invertebrate assessment will include sweep-netting for insects, which will be preserved in alcohol for identification purposes. Detailed fauna lists will be generated and discussed and related back to the floristic component of the area. The probability of occurrence for species not observed during field surveys will be updated if applicable regarding available habitats. Protected and endemic species will be the focus of discussion. The number of sample plots will vary for each component of the faunal survey.

The current status of the faunal environment will be determined and an evaluation of the extent of site-related effects in terms of certain ecological indicators, as well as identification of specific important ecological attributes such as rare and endangered species, protected species, sensitive species and endemic species will be made. The faunal environment and habitat will be characterised in relation to biota and the extent of site related effects.

16.1.2.3 Impact Assessment

To complete the impact assessment phase for Ecology (Fauna and Flora,) the following will be completed:

- Impact assessment of the proposed KPS WTP project in terms of fauna and flora will be included for undisturbed areas; and
- Mitigation measurements to manage identified impacts on the ecosystems present will be included.

16.1.3 Aquatic Biodiversity Impact Assessment

An aquatic assessment is required for the associated Saalklapsruit and adjoining tributary, as the proposed clean water pipe will be discharging into this system which would likely facilitate change to the functionality of the system. To conduct the assessment the following will be undertaken:

- Conduct a baseline aquatic biodiversity assessment along the Saalklapspruit and adjoining tributary during a single survey:
  - Determine the Present Ecological Status (PES; or Ecological Category) of Saalklapspruit, and
  - Assess the Ecological Importance and Sensitivity (EIS) of the sub-quaternary reach.
- During the field survey the following will be undertaken:
  - In situ water quality parameters will be measured using water quality meters. In situ water quality assessment is expected to help to identify (or exclude) a potential causal basis by which to interpret the biological responses identified at the time of the field survey and as such, each of the water quality parameters measured will be compared to the interim Resource Water Quality Objectives (RWQOs) for their respective management units.
- Provide a professional opinion and assessment of the potential impacts of the proposed activities Saalklapspruit and adjoining tributary, as well as recommend potential mitigation measures, if applicable; and
- Recommend a proposed aquatic biomonitoring programme, if deemed necessary.

16.1.4 Wetlands Impact Assessment

The wetland specialist study will undertake the following key measures in defining the EIS and PES of the freshwater resources (wetlands) within and in the vicinity of the study area:

- A detailed desktop assessment will be undertaken in order to gain background information on wetlands that will potentially be affected by the activities of the proposed project. Databases that will be investigated include the South African National Biodiversity Institute (SANBI) National Freshwater Ecosystem Priority Area (NFEPA) database and the DWS Resource Quality Information Services (RQIS) PES/EIS database;
- Verification and delineation of the freshwater resources in the vicinity of the proposed project will take place according to “DWAF, 2008: A Practical Guideline Procedure for the Identification and Delineation of Wetlands and Riparian Zones”. Aspects such as soil morphological characteristics and wetness and vegetation types will be used;
- All freshwater features identified will be mapped using a handheld GPS and the use of applicable GIS software;

- Appropriate buffers will be determined for the wetlands identified in the vicinity of the proposed project;
- A freshwater resource classification assessment will be done according the Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland systems (Ollis *et al.,* 2013);
- The Present Ecological State (PES) will be assessed according to indices such as the Wet-Health / Index of Habitat Integrity as advocated by Macfarlane *et al.,* (2008) and DWA (2007), respectively as applicable;
- The EIS will be determined based on the DWA (1999) method;
- Based on the findings of both the desktop and the in-field verification assessment, a detailed impact assessment will be completed;
- Recommendations on management and mitigation measures (including opportunities and constraints) with regards to the proposed project will be provided in the wetland impact assessment in order to improve, manage and mitigate impacts on the freshwater ecology of the area should approval be obtained;
- Monitoring requirements will also be discussed and set out.

16.1.5 Groundwater Impact Assessment

The following will be provided as part of the desktop groundwater assessment:

- Geochemical study and waste classification; and
- Groundwater impact assessment and mitigation planning.

16.1.5.1 Site Visit

A site visit has been conducted to familiarise the groundwater team with the groundwater settings of the proposed treatment plant area in relation to the nearby mining activities and receiving environment.

16.1.5.2 Geochemistry and Waste Classification

A geochemical assessment was proposed to evaluate if the brine to ensure that the off-site disposal requirements will be met, although uncertainty exists regarding the acquisition of a suitable sludge sample for the waste classification and analysis. A waste classification will also be conducted to assess the liner requirements of the sludge ponds / drying beds based on the leachate characteristics as per the National Environmental Waste Act, 2008 (Act No. 59 of 2008) (NEMWA).

16.1.5.3 Groundwater Impact Assessment

The impact assessment methodology will be used and shall include the following:

- Identification of groundwater impacts based on the desktop study and site visit;

- Impact assessment, including the cumulative impacts on the region by the proposed project; and
- Discussion on mitigation measures.

An impact assessment report will summarise the results of the field investigation, including current water use, aquifer and geology characterisation, and groundwater quality (baseline hydrogeology).

16.1.6 Surface Water

A Surface Water Impact Assessment will be undertaken in accordance with the methodology discussed below.

16.1.6.1 Site Visit

The site assessment will include the following:

- A site visit will be undertaken to determine, assess and verify the hydrological characteristics within and around the project area; and
- Four (4) surface water samples along the Saalklapspruit and surrounding tributaries as well as measuring the stream flow on the Saalklapspruit will be taken and analysed.

16.1.6.2 Floodline Determination

The 1:100 year floodlines on the Saalklapspruit were delineated in 2009 during the EMP studies by SRK. This will need to be updated taking into consideration the proposed discharge volumes from the water treatment plant. The following tasks will be undertaken as part of updating the determined floodlines:

- Determine the 1:100 year peak flows using the Design Rainfall Estimation program;
- Prepare geometric data for input into the HEC-RAS 4.1.0 using HEC-GeoRAS 10.2, an extension of ArcGIS 10.2;
- Undertake hydraulic modelling using the HEC-RAS 4.1.0 to determine the 1:100 floodlines;
- Import HEC-RAS results into HEC-GeoRAS 10.2 and perform flood inundation mapping to produce the 1:100 year floodlines; and
- Produce plan/map indicating the delineated 1:100 year floodlines and a 100 m buffer.

It must be noted that the study will only determine the indicative floodlines, hence can only be used for environmental purposes and not for detailed engineering design purposes.

16.1.6.3 Water Balance

The following tasks will be undertaken:

- Review the existing water balance to gain understanding of the entire mine water system, and explaining the drivers of water within the system and management thereof, i.e:
  - Process flows and volumes;
  - Capacities of water storage facilities;
  - Water inflows required to be pumped from Balancing Dam to the proposed KPS WTP and subsequent discharge;
  - Rainfall and runoff volumes from the clean and dirty areas;
- Update a GoldSim based water balance which indicates the inflows, potential losses & outflows and transfers within the mine system

16.1.6.4 Impact Assessment

The impact assessment will be undertaken by:

- Defining the existing and potential surface water impacts that could result from the proposed discharge of water into the Saalklapspruit; and
- Recommending mitigation measures to prevent and/or minimise the identified potential surface water impacts during construction, operational and decommissioning phase of the project.

A monitoring program will be updated to assist the mine with monitoring of these potential impacts thereby enable immediate management measures.

16.1.7 Reserve Determination

In fulfilment of the EA process for the proposed Project, an Intermediate Ecological Reserve Determination (or Ecological Water Requirements study) was conducted for the quaternary catchment associated with the Saalklapspruit in 2015. In collaboration between Digby Wells Environmental, GroundTruth and a few other consultants, the approach comprised of a number of driver and response indicators (including habitat, hydrology, geomorphology, aquatic macro-invertebrates, fish and riparian vegetation), as well as a follow-up specialist workshops to assess appropriate 'Ecological Reserve' for the Saalklapspruit and potential ecological consequences of activities within the study area. Since the findings and outcomes of this study are expected to still be valid, it is not deemed necessary to redefine the 'Ecological Reserve' at this time.

16.1.8 Social Impact Assessment

The objectives of the Social Impact Assessment (SIA) will be to determine the impacts the WTP will have on the social environment. This process will be aligned with the social studies previously completed for the KPS Colliery; with a focus on identifying and assessing the potential social impacts associated with the WTP. The development of impact management

measures will entail a review of current methods, and aligning them to suit the additional social impacts expected to arise from the development and operation of the WTP.

16.1.8.1 Impact assessment phase

The objectives of the impact assessment phase will be met by undertaking the following activities:

- ***Qualitative data collection*** will be undertaken by means of key informant interviews (either individual meetings or group discussions). A maximum of five (5) such engagement sessions will be conducted, involving representatives of local government, local community leadership, potentially-affected land owners and land users, local business operators and the like. The main aims of such consultation will be to: (a) assess stakeholders' perceptions, concerns and expectations regarding the Project and its cumulative effects; (b) verify baseline socio-economic information contained in the Scoping Report; (c) identify potential impacts that the proposed WTP will have on people's lives and livelihoods; and (d) help identify possible mitigation measures to avoid or reduce negative impacts and enhance any positive impact of the proposed Project;
- ***Information from other specialist studies:*** Relevant information will be obtained from specialists conducting other specialist studies as part of the EIA, on the anticipated biophysical, visual and heritage impacts that could give rise to indirect socio-economic impacts;
- ***Updating of the socio-economic baseline profile:*** On the basis of the information collected by means of the abovementioned activities, the baseline profile will be updated to include primary social data; which will form the basis for identifying socio-economic impacts of the proposed project;
- ***Impact identification and assessment:*** Potential social impacts will be identified through information obtained from interviews with key informants, specialist opinion and experience from other mine water treatment plants. Each impact will be rated to determine its severity and significance, using a recognised rating system;
- ***Mitigation/ enhancement measures and recommendations:*** Social mitigation measures prescribed in the approved EIA for the KPS Colliery will be assessed to determine their applicability in managing the identified impacts associated with the WTP. Where required, these measures will be amended and additional measures prescribed, with the aim of avoiding or ameliorating negative social impacts and enhancing potential positive impacts. The rating exercise described above will be repeated to assess the severity and significance of any residual impacts remaining after mitigation measures have been implemented; and
- ***Reporting:*** the results of the study will be presented in the form of a specialist SIA report that will be incorporated into the final EIA report once reviewed by the client.

16.1.9 Heritage Impact Assessment

A Heritage Resource Management (HRM) process will be conducted in accordance with the NHRA and will comprise the following primary deliverables:

- Heritage Desktop Gap Analysis;
- Notification of Intent to Develop (NID); and
- Statutory Comment Feedback (SCF Report).

Digby Wells proposes to lodge a Request for Exemption for further heritage studies, including a Palaeontological Impact Assessment (PIA), as part of the NID. It is the opinion of Digby Wells, based on the nature of the project, that the potential for impacting palaeontological resources is low. It is understood that the proposed pipeline will not impact heritage resources at depth below the surface. The area earmarked for the development of the pipeline has been previously disturbed, further decreasing the likelihood of impacting palaeontological or archaeological heritage.

The Project Area has been previously assessed in terms of an Archaeological Impact Assessment submitted to SAHRA online via SAHRIS by Dr J. van Schalkwyk. Final Statutory Comment** issued by SAHRA regarding this report recommended that a palaeontological chance finds procedure be developed and included in the EMP submitted on behalf of the Klipspruit Colliery, in lieu of completing a PIA (SAHRIS Case ID 4801 in reference to the BHP Billiton Klipspruit Colliery and SAHRA Reference 9/2/284/0003, Letter dated 19 February 2014).

16.1.9.1 Data Collection

Data Collection will entail desktop based literature review to gather baseline information aimed at identifying known heritage resources. Information will be primarily sourced from previously completed heritage reports available on the South African Heritage Resources Information System (SAHRIS).

To motivate for the recommendation and Request for Exception (RfE), a pre-disturbance survey will be undertaken to verify the presence or absence of heritage resources generally protected in terms of Sections 34, 35 and 36 of the NHRA.

16.1.9.2 Notification of Intent to Develop (NID)

The NID will constitute an abbreviated project description and a brief outline of heritage resources that may be expected in the project area, based on the results of data collection. Proportionate to the nature of the Project, Digby Wells proposes the NID include a recommendation and RfE from further heritage assessments and / or requirements. It must be noted, however, that the granting of the RfE by the Heritage Resources Authorities (HRAs) is outside the control of Digby Wells.

The NID will be submitted online via the SAHRIS to the SAHRA and Mpumalanga Provincial Heritage Resources Authority (MPRHA) after review by SAEC.

16.1.9.3 Statutory Comment Feedback

Statutory Comment on the NID will be collated into a SCF report to communicate actions to enable SAEC to adhere to HRA conditions.

16.1.10 Visual Impact Assessment

A Visual Impact Assessment (VIA) is a specialist study performed to identify the visual impacts of a proposed project on the surrounding environment. The project will be investigated in terms of the topographic and visual characteristics of the receiving environment.

At a desktop level, aerial photography will be analysed to characterise the landscape. The following are objectives for the Visual Baseline:

- Examine aerial photography available for the project area;
- Identify potential visual receptors that will may impacted on by the proposed project;
- Examine topographical, slope, and aspect models created in ArcGIS 3D Analyst Extension; and
- Describe the baseline visual aspects of the project area in a specialist report.

The DEM created in during the desktop assessment will be used as an input to create a theoretical viewshed model using ArcGIS 3D Analyst Extension; this will be done to establish the degree of visibility that the proposed infrastructure is likely to have. The height of the proposed above ground infrastructure will be taken into consideration in the modelling process.

The following are objectives for the Visual Impact Assessment:

- Create a theoretical viewshed model in ArcGIS 3D Analyst Extension;
- Identify sensitive visual receptors that will potentially be impacted on by the proposed project;
- Identify the impacts, pre- and post-mitigation that the proposed infrastructure will have on the topographical and visual landscape, by rating the scale, duration, severity and probability of the impacts occurring;
- Describe the current and post development visual aspects of the project area in a specialist report; and
- Provide mitigation measures and recommendations in an attempt to reduce the potential visual impacts.

16.1.11 Noise Impact Assessment

A Noise Impact Assessment will be undertaken to identify the noise impacts of the proposed project on the surrounding environment. The methodology to be employed is discussed below.

16.1.11.1 Site Visit

A site visit will be conducted during which baseline noise monitoring will be carried out at selected receptors to establish the current baseline soundscape. All measurements will be taken in accordance with the National Noise Control Regulations as well as the SANS 10103. Recordings from the sound level meter are then plotted in graphical format and then analysed in relation to the regulations and guidelines.

16.1.11.2 Noise Impact Assessment

The expected noise levels from the proposed project will be quantified by means of the dispersion mapping software 'Soundplan'. The Mapping isopleths will indicate what the expected noise levels will be at the receptors.

The baseline information will be included in an environmental noise impact assessment report, which will be compared to the noise quantification results. It can then be determined whether the proposed project will be in compliance with the relevant regulations and guidelines. The report will also include recommended mitigation measures as well as recommended action plans to minimise the impact of noise on the surrounding environment.

16.1.12 Rehabilitation, Decommissioning and Mine Closure Plan and Financial Provision Estimate

A Final Rehabilitation, Decommissioning and Mine Closure Plan, Annual Rehabilitation Plan (ARP) and Risk Assessment will be undertaken as part of this proposed project with the objective of determining the financial provision estimate. There are a number of tasks which need to be completed. These tasks are explained separately below.

16.1.12.1 Risk Assessment

An internal risk workshop will be conducted for the WTP proposed project. A qualitative risk assessment will be completed and all the possible environmental risks associated with the rehabilitation and closure activities will be identified and/or updated.

The Workplace Risk Assessment and Control (WRAC) method will be used. Through the risk assessment the closure criteria will be determined and/or updated and will, therefore, ensure that SAEC mitigate any potential risks during closure. These criteria will be determined for all aspects of the proposed project. The findings during the risk workshop will provide input into the Environmental Risk Report (ERR).

16.1.12.2 Infrastructure and Mapping and Measurements

A critical component of a closure cost calculation is the mapping of infrastructure. Infrastructure mapping is achieved using mine layout plans, final designs, aerial photography where available, site visit and Geographic Information System (GIS) software.

16.1.12.3 Rates Determination

Rate formulation takes into consideration the total labour costs, equipment hire costs and fuel costs, thus providing accurate and defendable rates. The rates will be in a format compatible with the system to be used for the liability assessment. Rates will be agreed upon with the mine and used for the calculation as the standard rates for demolition and rehabilitation.

16.1.12.4 Closure Cost Calculations

One closure cost model will be compiled using Microsoft Excel. The closure cost model calculates the cost of demolishing, removing and rehabilitating each component of the proposed infrastructure.

16.1.12.5 Report Compilation

The Financial Provision Regulations requires that the quantum of the financial provision be calculated through detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for the following:

- Annual rehabilitation, as reflected in the ARP;
- Final rehabilitation, decommissioning and closure of the mining operations as per the Rehabilitation and Closure Plan (RCP) which includes the findings of the environmental risk assessment; and
- Remediation of latent or residual environmental impacts.

To comply with Regulation 11 of the Financial Provision Regulations (2015), Digby Wells will compile an integrated Environmental Risk Report and Annual Rehabilitation Plan. Both will be incorporated into the RCP. Furthermore, the existing RCP for the KPS Colliery will be reviewed and utilised to assist with the compilation of the RCP for the WTP.

17 Item 2(l): Other Information required by the competent authority

Compliance with the provisions of Sections 24(4) (a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998) the EIA report must include the:-

17.1 Impact on the socio-economic conditions of any directly affected person

Potential negative and positive impacts may arise as a result of the proposed project. Positive impacts include reduced health and safety risks associated with excessive mine affected water which poses a risk of contamination of both surface and groundwater if incorrectly handled. Negative impacts include the potential for increased nuisance impacts

(dust, noise and visual intrusion) due to the construction and operation of the WTP as well as contamination due to pipeline spillages.

17.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

Heritage resources may be impact on by the development of the WTP and establishment of the associated pipeline routes. Given that the infrastructure has been strategic planned over disturbed areas/ rehabilitated areas, it is not anticipated that heritage resources will be identified. As such, impacts associated within proposed project area are not expected to be significant. Further investigation will however be undertaken during the EIA Phase and mitigation measures for any unknown heritage resources which may be uncovered during the construction and operational phases will be provided.

18 Other matters required in terms of sections 24(4)(a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. Refer to Section 9.1 for alternatives assessed.

19 Undertaking regarding correctness of information

I, _Xanthe Taylor_, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

Signature of the EAP:

Date: 28 June 2018

20 Undertaking regarding level of agreement

I, _Xanthe Taylor_, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

Signature of the EAP:

Date: 28 June 2018

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Appendix 1: EAP Qualifications and CV

Appendix 2: Plans

Appendix 3: Stakeholder Engagement Announcement Materials