FINAL SCOPING REPORT

FOR THE

THABAMETSI COAL MINE

EXXARO COAL (PTY) LTD

DMR REFERENCE: LP30/5/1/2/2/10013MR

SUBMITTED WITH DUE REGARD TO CONSULTATION WITH COMMUNITIES AND INTERESTED AND AFFECTED PARTIES

As required in terms of Regulation 49 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)

NOVEMBER 2012

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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This document has been prepared by **Digby Wells & Associates (Pty) Ltd**.

Report Title: **EXXARO COAL (PTY) LTD – THABAMETSI COAL MINE FINAL SCOPING REPORT**

Project Number: **EXX564**

Name	Responsibility	Signature	Date
Brett Coutts	Report writer		6 November 2012
Lerato Ratsoenyane	Report writer		31 October 2012
Danie Otto	Project Sponsor		27 August 2012
Andries Wilke	Director		23 August 2012

EXECUTIVE SUMMARY

Exxaro Coal (Pty) Ltd (Exxaro) is proposing to develop the Thabametsi Coal Mine (the "Thabametsi Project") on the farms McCabesvley 311 LQ, Van Der Waltspan 311 LQ, Zaagput 307 LQ, Jackhalsvley 309 LQ and Vaalpensloop 313 LQ, situated near the town of Lephalale in the Waterberg District Municipality (DM) of the Limpopo Province. In April 2007, Exxaro was granted a Prospecting Right [DMR Ref: LP30/5/1/1/2/907PR] in terms of Section 17(1) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) for the above properties.

A Mining Right Application (MRA) for the proposed project was submitted to the Regional Office of the Department of Mineral Resources (DMR) in April 2012. The MRA was accepted by the DMR as per signed acceptance letter dated 03 August 2012 [DMR Ref: LP30/5/1/2/2/10013MR].

In fulfilment of the requirements stipulated in Section 39 of the MPRDA, an Environmental Impact Assessment (EIA) process will be undertaken for the proposed project.

Project applicant

Exxaro is a South African-based mining group, listed on the Johannesburg Stock Exchange. Exxaro has a diverse commodity portfolio in coal, mineral sands, base metals and industrial minerals. The applicant contact details are presented in Table 1.

Table 1: Contact details of the project applicant

Company name:	Exxaro Coal (Pty) Ltd		
Contact person:	Mr Christo Reeders		
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Project overview

The Thabametsi Project is an undeveloped coal resource in the Waterberg Coalfield and will be developed as an independent coal mine adjacent to the existing Grootegeluk Coal Mine (Grootegeluk) which is owned and operated by Exxaro. Marapong and Onverwacht are the closest towns to the project.

The objective of the Thabametsi Project is to initially mine coal via opencast and underground methods for supply to an independent power producer (IPP) coal-fired power station, to be developed by Exxaro north of the proposed Thabametsi Project.

During the development phase Run of Mine (RoM) coal will be trucked to Grootegeluk Mine. The expansion of the Thabametsi Mine is to follow the rail capacity expansions and raw water supply additions to the area. At this point in time it is foreseen that from 2021 both Power Station Coal (PSC) and Semi-Soft Coking Coal (SSCC) will be produced. The RoM coal suitable for PSC and SSCC will be put on rail to the respective clients. Underground mining will start in 2022 producing Metallurgical Coal (Met Coal) RoM which will be transported to the Southern Mine Complex plant for beneficiation.

Environmental consultants

Exxaro appointed Digby Wells Environmental ("Digby Wells") as independent environmental consultants to investigate the environmental, socio-economic and cultural aspects of the Thabametsi Project. Table 2 presents the contact details of the environmental consultants.

Table 2: Contact details of the environmental consultants

Company name:	Digby Wells Environmental		
Contact person:	Brett Coutts		
Physical address:	Fern Isle, Section 10 359 Pretoria Avenue Randburg	*Postal address:*	Private Bag X10046 Randburg 2125
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Email:	brett.coutts@digbywells.com		

Purpose of this report

The purpose of this Final Scoping Report (FSR) is to present the results of the scoping phase for the proposed project and subsequently, to recommend a Plan of Study for the EIA phase.

Therefore the specific objectives of this report are to:

- Describe the methodology applied to undertaking the scoping phase for the proposed project, including consultation with identified stakeholders *(Section 1)*;
- Describe the existing baseline environmental conditions of the proposed project area prior to the proposed project (*Section 2);*
- Identify the anticipated environmental, social and cultural impacts of the proposed project, including cumulative impacts *(Section 3)*;
- Identify feasible alternatives for the proposed project that should be considered during the EIA phase *(Section 4);*

- Present findings of the Public Participation Process (PPP) undertaken to identify salient issues and concerns that need to be investigation during the EIA phase (*Section 5*); and
- Formulate a Plan of Study which describes the nature and extent of investigations to be undertaken during the EIA phase (*Section 6).*

Approach and methodology for the Public Participation Process

The PPP is an important process in the development of the Thabametsi Project and has the sole purpose of providing a platform to Interested and Affected Parties (I&APs) to raise issues of concern, comments and suggestions that will assist in the planning and design stages of the proposed project.

The DMR stipulated time frame requires the results of the consultation within 30 days from the signed acceptance letter (03 August 2012). As such, the results thereof will be submitted to the DMR by 02 September 2012.

However, the consultation process continued after the 30 days deadline for the submission of the DSR and further in-depth consultation was undertaken to substantially inform the EIA process and to comply with the requirements of Section 39(3)(b)(ii) and (iii) of the MPRDA, read with Regulations 50(c), (d) and (f).

Conclusions and recommendations

The overarching objectives of the EIA process will be to:

- Prepare integrated sensitivity maps for the study area based on the findings of environmental, socio-economic and cultural assessments as input into the project design process;
- Identify and assess the significance of potential impacts associated with the projects and;
- Recommend mitigation and enhancement measures to ensure that the development is undertaken in such a way as to promote the positive impacts and to minimise the negative impacts.

Based on an assessment of the existing baseline conditions of the proposed Thabametsi Project site and surrounding areas, an investigation of potentially sensitive cultural, socio-economic and environmental features should be undertaken during the EIA phase in order to assess the significance of anticipated impacts and formulate appropriate management plans.

The potentially sensitive cultural, socio-economic and environmental features identified through baseline investigations include:

- *Graves and cemeteries* – There is a high likelihood that formal and informal burial sites and graveyards exist near residential structures and agricultural fields. This will be confirmed through archaeological surveys and the PPP;
- *Archaeological sites* – There is a high likelihood of Stone Age lithic scatters that could occur in the project area. A Phase 1 Heritage Impact Assessment (HIA) will be undertaken following the submission of a Notice of Intent to Develop (NID) to the responsible heritage resources authorities;

- *Nature-based tourism industry* – The land use of the project site and surrounding areas is dominated by eco-tourism based activities, such as hunting and game farming. The co-existence of mining in close proximity to game hunting, nature based and eco-tourism should be considered by undertaking a sustainability assessment of the proposed project;
- *Public infrastructure* – Service delivery of all basic services in the Lephalale Local Municipality (Lephalale LM) is a challenge and infrastructure is insufficient. Due to increased industrial development and population growth in the Lephalale LM, there is an increased demand for housing, with an existing housing backlog. Impacts should be investigated, in collaboration with government departments and local government, to identify feasible options for public-private partnerships;
- *Traffic* – Most road systems are in disrepair and eroded, being insufficient to handle the increased traffic that mining and other industrial developments created. A Traffic Impact Assessment (TIA) should be conducted to formulate suitable plans to mitigate impacts;
- *Air quality* – The Waterberg is a National Priority Area in terms of Section 18(1) the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA) and therefore, impacts on ambient air quality will have to be carefully managed during project implementation;
- *Protected trees* – A number of nationally protected tree species in terms of the National Forestry Act, 1998 (Act No. 30 of 1998) occur within the project area, and would need to be removed / destroyed within the mining and infrastructure footprint areas. A detailed flora survey will be undertaken and a suitable protected tree identification and permit application for the required protected tree permits will be compiled;
- *Pans* – Small, shallow pans occur at several places in the project area and are fed by rainwater. These pans are a unique feature in the landscape and could potentially be sensitive in terms of the biodiversity and ecological services they provide; and
- *Fauna* – The presence of Red Data species (including amphibians such as bull frogs, birds, mammals, reptiles etc.) is highly likely due to the presence of pans within the proposed project site. Some protected arthopods such as Baboon Spiders may occur. The impact of the project on these species will be investigated during the fauna and wetland assessments to be undertaken for the proposed project.

Scope of work

In order to address the above mentioned concerns and meet the overall objectives of the EIA Process, the following plan of study is recommended:

- *Geology* – Descriptions of the general and site specific pre-mining geology and an assessment of the implications of the pre-mining geology on project development and subsequent environmental impacts;
- *Topography* – Descriptions of the general and site specific pre-mining topography and an assessment of the implications of the topography on project development and subsequent impacts to surface water drainage and the existing visual landscape;

- *Climate* – Descriptions of the general and site-specific historic climate statistics and conditions and an assessment of the implications of the climate on project development and subsequent environmental impacts;
- *Soils and land capability* – Soil survey and mapping of study area to determine the effective depth of the soil(s), agriculture potential, erodibility and misuse of soils, land capability and the suitability of soils for rehabilitation purposes in order to assess the impacts of topsoil stripping on soils and formulate a soil stripping guide and plan;
- *Hydrology* – Description of the surface water baseline aspects of the site and surrounding areas, including catchments, runoff, storm water flows and volumes and flood lines on all river sections in close proximity to activities, in order to identify potential surface water impacts and propose mitigation measures;
- *Hydrogeology* – A desktop study and gap analyses of the hydrogeological conditions of the proposed site, as well as a hydrocensus, geophysics, drilling, aquifer testing and geochemical material testing in order to construct a numerical groundwater model and develop a Groundwater Management Plan and monitoring network for the proposed project;
- *Terrestrial ecology* – An ecological assessment which will include the identification of vegetation communities, structures and composition, compilation of fauna and flora species lists, dominant species and invasive species, as well as the description of fauna habitats and identification of Red Data, protected and endemic species. Impacts of the project on terrestrial ecology will be assessed and a Biodiversity Action Plan compiled to avoid and mitigate impacts;
- *Wetlands* – The delineation of wetlands that occur in the proposed project boundary and undertaking of a wetland functional assessment and determination of wetland ecological integrity in order to assess impacts of the project activities on wetlands and determine the necessary mitigation measures;
- *Heritage assessment* – Completion of a Heritage Impact Assessment (HIA) that will include archaeological and palaeontological componenst, as well as an assessment of any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict and cultural landscapes or viewscapes;
- *Air quality* – Compilation of a quantitative air quality dispersion model of air pollutants arising from all potential sources at the proposed mine and recommendation of mitigation measures to control dust due to the mining operations;
- *Noise and vibration* – A specialist environmental noise impact assessment, including noise dispersion models indicating the expected noise propagation from the proposed coal mining activities. The study will assess, via predictive noise modelling, the potential impact of the noise emissions from the proposed coal mining activities on the surrounding environment. The study will include baseline noise measurements and also provide recommendations in terms of the mitigation and monitoring measures;
- *Visual* – An assessment of the visual/aesthetic character and topography of the project area and receiving environment, viewshed models and sensitive receptors in

order to identify and assess potential impacts on the visual character of the site and propose necessary mitigation measures;

- *Social* – A socio-economic assessment will consider the project's area of impact from a social perspective, baseline socio-economic conditions in the project's area of impact and possible social impacts that may arise as a result of the project. Practical and cost-effective mitigation and enhancement measures to avoid or ameliorate the negative social impacts and enhance the positive impacts will be recommended;
- *Traffic* – Determination of existing traffic flows on the adjacent road network in order to quantify the regional traffic and investigate any required road upgrading in the area, as well as other mitigation measures;
- *Sustainability* – Assessment of the sustainability of either mining or game farming on the areas possibly affected by the proposed mining activities, including the development of a matrix of social, economic and ecological factors to be compared between the two options of mining and game farming and an assessment of the economic impacts through a comparative economic analysis of mining and game farming activities; and
- *Closure* – Closure planning and the development of future rehabilitation and closure plans for the project, including compilation of a closure framework to set the context for the closure planning of the mining operation and an interim closure plan during the operational period of the mine to guide the closure planning of the mining operation and associated closure-related costing over its operational life.

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ACRONYMS

AIA	Archaeological Impact Assessment
AMD	Acid Mine Drainage
ARC	Agricultural Research Council
BID	Background Information Document
CM	Continuous Miner
CRR	Comments and Response Report
Digby Wells	Digby Wells Environmental
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
ESA	Early Stone Age
Exxaro	Exxaro Coal (Pty) Ltd
FSR	Final Scoping Report
GDP	Gross Domestic Product
GIS	Geographic Information System
GRDM	Groundwater Resources Directed Measures
Grootegeluk	Grootegeluk Coal Mine
HGM	Hydrogeomorphic
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
ISCW	Institute for Soil Climate and Water
IWUL	Integrated Water Use License
IWWMP	Integrated Waste and Water Management Plan
LED	Local Economic Development
LEDET	Limpopo Department of Economic Development, Environment and Tourism
Lephalale LM	Lephalale Local Municipality

Limpopo DoA	Limpopo Department of Agriculture
Limpopo CoGHSTA	Limpopo Department of Co-operative Governance, Human Settlements and Traditional Affairs
Limpopo DRDLR	Limpopo Department of Rural Development and Land Reform
Limpopo SSC	Limpopo Provincial Shared Services Centre
LoM	Life of Mine
LSA	Late Stone Age
MAP	Mean Annual Precipitation
masl	metres above sea level
MCWAP-2	Phase 2 of the Mokolo and Crocodile (West) Augmentation Project
Met Coal	Metallurgical Coal
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
MRA	Mining Right Application
MSA	Middle Stone Age
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NDP	National Development Plan
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:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NGDB	National Groundwater Data Base
NID	Notice of Intent to Develop
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PPP	Public Participation Process
PRECIS	Pretoria Computerised Information System
PSC	Power Station Coal
RoM	Run of Mine
SAGDT	South African Groundwater Decision Tool
SAHRA	South African Heritage Resources Agency
SANAS	South African National Accreditation Systems
SANS	South African National Standard
SANBI	South African National Botanical Institute

SDF	Spatial Development Framework
SLP	Social and Labour Plan
SSCC	Semi-Soft Coking Coal
TIA	Traffic Impact Assessment
VIA	Visual Impact Assessment
Waterberg DM	Waterberg District Municipality
WARMS	Water Use Registering and Licensing Data Base
WMA	Water Management Area
WML	Waste Management License
WRC	Water Research Commission
WTW	Water Treatment Works

PART A: SCOPING REPORT

The purpose of this report is to present the results of the scoping phase for the development of the proposed Thabametsi Coal Mine (the "Thabametsi Project") on the farms McCabesvley 311 LQ, Van Der Waltspan 311 LQ, Zaagput 307 LQ, Jackhalsvley 309 LQ and Vaalpensloop 313 LQ situated near the town of Lephalale in the Waterberg District Municipality (DM) of the Limpopo Province (Plan 1 – Appendix A).

Exxaro Coal (Pty) Ltd (Exxaro) was granted a Prospecting Right [DMR Ref: LP30/5/1/1/2/907PR] in terms of Section 17(1) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) for the above properties in April 2007.

A Mining Right Application (MRA) for the proposed project was submitted to the Regional Office of the Department of Mineral Resources (DMR) in April 2012. The MRA was accepted by the DMR as per signed acceptance letter dated 03 August 2012 [DMR Ref: LP30/5/1/2/2/10013MR].

In fulfilment of the requirements stipulated in Section 39 of the MPRDA, an Environmental Impact Assessment (EIA) process for the proposed project is being undertaken. This report concludes the first phase of the EIA process for the proposed project, namely the scoping phase in terms of the MPRDA[1].

The Draft Scoping Report (DSR) was made available for public review from 03 September until 03 October 2012. Comments received during this review period have been incorporated into this Final Scoping Report (FSR) that will be submitted to the DMR for review.

1 METHODOLOGY APPLIED TO CONDUCT SCOPING

The methodology for the scoping phase for the proposed Thabametsi Project consisted of two integrated processes that were undertaken concurrently, namely:

- *Public Participation Process (PPP)* – Allows Interested and Affected Parties (I&APs) to participate in the project design, planning and decision-making phases by providing the opportunity to raise issues, comments and concerns with regards to the

[1] Other authorisations that are required for the proposed Thabametsi Project before its legal commencement include:

- Environmental authorisation for activities listed in terms of the National Environmental Management Act, 1998 (Act No.107 of 1998) as amended (NEMA);
- Integrated Water Use License (IWUL) for Section 21 water uses in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA);
- Waste Management License (WML) for waste management activities in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA); and
- Heritage approval from the South African Heritage Resources Agency (SAHRA) in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).

Please be advised that applications for these authorisations have not yet been submitted to the relevant authorities. Environmental scoping reports in support of these applications and in fulfilment of the requirements of all relevant legislation will be prepared in due course and made available for public review. Other environmental authorisation applications may also be required and will be identified in consultation with authorities.

proposed project. The issues that have been identified will be used to inform and guide specialist environmental and social studies during the EIA phase; and

- *Desktop environmental investigations* – Aimed to identify potentially significant environmental features that may be impacted on by the proposed project in order to further define the scope of work for specialist environmental and social studies during the EIA phase.

This section describes the steps to be followed during the PPP, specifically in relation to the identification of I&APs for the Thabametsi Project. The objectives of the PPP during the scoping phase were:

- To identify any affected communities, landowners and/or occupiers of the affected properties;
- To notify in writing and consult with the all parties registered as I&APs;
- To share information pertaining to the project and the potential positive and negative impacts it may have on communities and affected parties;
- To provide an opportunity for comment and review of environmental documents to be prepared for the project in order to enable an open and transparent participation process; and
- Record issues raised and provide responses with the applicants and specialists opinion collated into a Comments and Response Report (CRR).

The DSR was made available for public review between 06 September and 06 October 2012 and all comments received after the submission of the DSR to the DMR have been included. The additional consultations to be undertaken after the submission of this FSR will be included in the Draft EIA Report.

To date, the following activities were completed as part of the PPP for the scoping phase:

- Compilation and distribution of landowner notification letters to the directly affected landowners of the privately owned properties to inform them of the proposed project and to request access in order to conduct initial consultation meetings and preliminary specialist field work;
- Compilation and distribution of a Background Information Document (BID) in English and Afrikaans to provide information on the project, the specialists studies to be undertaken, the required legal processes for the proposed project, consultation time frames and announcement of information sharing meeting and review dates of the DSR;
- Distribution of a reply sheet in order to register anyone who may feel they are interested and/or affected by the proposed project;
- Publication of newspaper advertisements in English, Afrikaans and SeTswana in local newspapers, including the Northern News Bushveld Bulletin and Ntshebele on 24 August and 31 August 2012 ;
- Placing of notices on-site and at various public places;
- One-on-one consultations with the directly affected farm landowners and farm managers who were available at the time of the consultations;
- Public Open Day and Information sharing meeting held on 18 September 2012; and

- Compilation of a CRR (Version 1) with comments received until 08 October 2012.

1.1 Name the communities as defined in the guideline, or explain why no such communities were identified

The Thabametsi Project will be situated on the following farm properties:

- McCabesvley 311 LQ;
- Van Der Waltspan 310 LQ;
- Zaagput 307 LQ;
- Jackhalsvley 309 LQ; and
- Vaalpensloop 313 LQ.

The above properties are privately owned by farmers or companies and are used mainly for agricultural purposes, including cattle and game farming, as well as eco-tourism based activities. As such, no communities exist or own any of the above properties. However, it is important to note that the nearest local communities have settled in the local township areas of Marapong and Onverwacht located approximately 10 km and 19 km respectively from the proposed project site.

The regional and local settings of the Thabametsi Project are depicted in Plan 1 and Plan 2, respectively (Appendix A – Plans). Proof of consultation with affected landowners is provided in Appendix B of this report.

1.2 State whether or not the community is also the landowner

The directly affected landowners were identified by means of Windeed and title deeds searches and by verifying the information with the Lephalale Local Municipality (Lephalale LM), the Limpopo Department of Rural Development and Land Reform (Limpopo DRDLR) and the Limpopo Department of Agriculture (Limpopo DoA). The findings confirm that the MRA is on privately-owned properties.

1.3 State whether or not the Department of Land Affairs was identified as an I&AP

The Limpopo DRDLR, including the Limpopo Provincial Shared Services Centre (Limpopo SSC) and the Limpopo DoA have been identified as commenting authorities in order to confirm the existence of land claims (if any) and to gather any comments in respective of the potential impact of the project on agricultural land. The Commission on Restitution of Land Rights for Limpopo has also been notified of the proposed project.

1.4 State specifically whether or not a land claim is involved

Digby Wells has notified and sent an information request to the Commission on Restitution of Land Rights of the proposed project and enquired if there are any land claims on the affected property. Digby Wells received a fax correspondence from Mr TA Maphoto from Limpopo DRDLR on 18 September 2012 acknowledging receipt of Digby Wells correspondence dated 14 September 2012 and that the matter was receiving the necessary attention.

1.5 Name the Traditional Authority identified by the applicant

The Limpopo Department of Co-operative Governance, Human Settlements and Traditional Affairs (Limpopo CoGHSTA) has been identified as a stakeholder during the consultation process. The applicant (Exxaro) and Digby Wells were informed through consultation with the Lephalale Local Municipality Mayoral Committee that there are rural settlements in the Lephalale area that also need to be consulted regarding the project. This is to ensure the involvement and upliftment of rural communities through social engagement. Digby Wells will be undertaking a community meeting with the relevant rural communities identified during the EIA phase.

1.6 List the landowners identified by the applicant

The landowners of the affected properties included in the MRA for the proposed project is summarised in Table 3. The current land tenure of the MRA area is geographically illustrated in Plan 3 (Appendix B).

Table 3: Land tenure

Property	Ownership
McCabesvley 311 LQ	Exxaro Coal (Pty) Ltd
Van Der Waltspan 311 LQ	Quick Leap Investment 284 (Pty) Ltd Mr Christo van Wyk
Zaagput 307 LQ	Zaagput Boerdery CC Mr Gideon Erasmus
Jackhalsvley 309 LQ	Sasol Mining (Pty) Ltd Representative - Mr Jacques du Plessis
Vaalpensloop 313 LQ Remaining Extent	Louis Rossel Trust Mr Louis Rossel
Vaalpensloop 313 LQ Portion 1	Dr Carien du Toit

1.7 List the lawful occupiers of the land concerned

The landowner of the farm Jackhalsvley 309 LQ has leased the property to a farmer who manages the farm. There may be other lawful occupiers on the privately owned properties. This will be verified once the consultation with farm workers has been undertaken and the results thereof will be presented in the Draft EIA and EMP Report.

1.8 Explain whether or not other persons' (including on adjacent properties) socio-economic conditions will be directly affected by the proposed mining operation and if not, explain why not

Exxaro owns the majority of the surface rights on the surrounding properties to the southeast of the Thabametsi Project, due to their existing mining operations at Grootegeluk.

The following privately-owned properties surrounding the project area are used for agricultural purposes, including game and cattle farming:

- Eenzaamheid 512 LQ (Eskom Holdings Limited) (slightly affected by 500 m blast radius);
- Vergulde Helm 316 LQ (Hennie Hills Family Trust – Mr Henry Hills) (slightly affected by 500 m blast radius);
- Buffelsjagt 317 LQ (Hennie Hills Family Trust – Mr Henry Hills);
- Massenberg 305 LQ (Mr C.Z Grobler);
- Smitspan 306 LQ (Utafutji Trading 75 (Pty) Ltd;
- Minnasvlakte 258 LQ (Mr H. Steenekamp); and
- Graaffwater 456 LQ (Portion 2) (Mr J.L. Wolmarans).

The socio-economic conditions of these land owners (Plan 3) and their lawful occupiers are anticipated to be directly affected in the following ways:

- Impacts on the businesses and livelihoods of directly affected and surrounding landowners involved in nature-based tourism activities, such as game farming and hunting, resulting in positive and/or negative change to their socio-economic conditions;
- Safety and security due to the possible increase in poaching, theft and land invasion leading to informal settlements on farming areas;
- Concern on the already stressed public road infrastructure, shortages of housing and water supply in the municipal area;
- Competition over water resources;
- Impact on fauna and flora due to existing and proposed mining developments;
- Loss of the potential development rights of land owners on affected properties for the duration of the project's life; and
- Potential relocation of lawful farm occupiers, resulting in positive and/or negative change to their socio-economic conditions.

To the southwest of the proposed project, Sekoko Coal (Pty) Ltd. is planning a coal mining operation on the farm Hooikraal 315 LQ (refer to Plan 3).

The proposed Marapong-Boikarabelo Effluent Transfer Pipeline to be developed by Ledjadja Coal (Pty) Ltd will run to the south of the Thabametsi Project, with another linear infrastructure project, the Boikarabelo Coal Mine railway link, to be located approximately 3.6 km to the west of the proposed project.

Although there are a number of existing and proposed mining related activities surrounding the project area, the socio-economic conditions of the owners and operators of these projects will not be directly affected by the proposed Thabametsi Project. The existing and

proposed development projects surrounding the Thabametsi Project is illustrated in Plan 4 (Appendix A).

Other indirect impacts on the socio-economic conditions of directly affected persons and communities in the vicinity of the project are described in Section 3.4.2 and Section 3.4.3 of this report.

1.9 Name the Local Municipality identified by the applicant

The Thabametsi Project will be situated approximately 30 km northwest of Lephalale in the jurisdiction of Lephalale Local Municipality (LM), which forms part of the Waterberg District Municipality (DM).

1.10 Name the relevant Government Departments, agencies and institutions responsible for the various aspects of the environment, land and infrastructure which may be affected by the proposed prospecting or mining operation

The authorities identified for the Thabametsi Project have been grouped according to the sphere of their influence, as listed in Table 4.

Table 4: Regulating authorities relevant to the MRA for the Thabametsi Project

Group	Authority	Level of Influence
National	• Department of Environmental Affairs (DEA); and • South African Heritage Resources Agency (SAHRA).	Commenting authorities
Provincial	• DMR, Limpopo.	Competent authority
	• Department of Rural Development and Land Reform, Limpopo; • Limpopo Provincial Shared Services Centre; • Limpopo Department of Economic Development, Environment and Tourism (LEDET); • Limpopo Department of Roads & Transport; • Department: Public Works, Limpopo; • Department of Water Affairs, Limpopo; • Limpopo Department of Co-operative Governance, Human Settlements and Traditional Affairs; • Department of Agriculture, Limpopo; and • Department of Health and Social Development, Limpopo.	Commenting authorities

Group	Authority	Level of Influence
Municipalities	• Waterberg DM (including all relevant Divisions within the District); and • Lephalale LM (including all relevant Divisions within the Municipality)	Commenting authorities
Parastatals	• Eskom Holdings (Pty) Ltd; and • Transnet Freight Rail.	I&APs
Surrounding mining companies	• Sekoko Resources (Pty) Ltd; • Sasol Mining (Pty) Ltd, Sasol Mafutha (Pty) Ltd and Sasol Mining Mafutha (Pty) Ltd; • Temo Coal Mining (Pty) Ltd; • Anglo American Thermal Coal South Africa;; and • Ledjadja Coal (Pty)Ltd.	I&APs
Environmental and community groups and forums	• Lephalale Development Forum; • Agri SA; and • Transvaal Agricultural Union.	I&APs

1.11 Confirm evidence that the landowners or lawful occupiers of the land in question, and any other interested and affected parties including all those listed above, were notified, and has been appended hereto

The MPRDA and NEMA emphasise the need for proper, accurate, sufficient and on-going information sharing to all I&APs to ensure that I&APs understand what the project entails and to make informed comments on the project.

The following methods have been used to disseminate information about the environmental authorisation process for the Thabametsi Project:

- A Background Information Document (BID) was compiled and hand-delivered to potentially affected, adjacent and surrounding landowners from 23 August 2012. The BID provided:
    - Details of the project;
    - Specialists studies to be undertaken;
    - Legal processes to be followed;
    - Consultation time frames;
    - Announced the date of an information sharing meeting to be held; and
    - Announced the date of public review of the DSR.

- A reply sheet was attached to the BID to allow anyone who may feel that they are interested and/or affected by the proposed project to register as I&AP;
- Publication of newspaper advertisements in local newspapers, namely the Northern News, Bushveld Bulletin on 24 and 31 August 2012 in English and Afrikaans respectively and on the Ntshebele addition from week 24 August – 06 September 2012;
- Placing of notices on-site and at various public places from 23 August 2012;
- One-on-one consultations with the directly affected farm landowners who were available at the time, from 23 August 2012 to 02 October 2012;
- Presentation at a Lephalale Municipal Mayoral Committee meeting held on 17 September 2012; and
- Sharing of information during the Public Open Day and Information Sharing Meeting held on 18 September 2012.

It should be noted that other local languages (Afrikaans and SeTswana) were considered during the compilation of the information material to ensure effective communication and that all the information is understood by stakeholders including vulnerable groups.

Proof of the newspaper adverts and photographic evidence of site notice locations is included in Appendix B.

2 A DESCRIPTION OF THE EXISTING STATUS OF THE CULTURAL, SOCIO-ECONOMIC AND BIOPHYSICAL ENVIRONMENT, AS THE CASE MAY BE, PRIOR TO THE PROPOSED PROSPECTING OR MINING OPERATION

2.1 Confirm that the identified consulted interested and affected parties agree on the description of the existing status of the environment

The public participation process (PPP) for the Thabametsi Project has commenced and a process of engagement with I&APs has taken place. Relevant information documentation has been distributed to relevant authorities and I&APs. Consultation meetings with some of the directly affected and surrounding landowners have taken place. It is evident from the discussions held during the consultation process that the status of the existing environment has changed significantly due to rapid industrial and mining developments in the area. Major concerns raised on the current state of the environment are related to:

- Scarcity of water resources to supply the town and for agricultural purposes; There has been an increase in theft, animal poaching and breakings on private farms. As such, the landowners no longer feel safe to continue with their nature-based activities;
- Degraded roads and over capacitated use of public infrastructure including roads and safety concerns;
- Lack of communication and cooperation from the mining industries in respect to land acquisition issues which then impact on farm landowners to make decisions regarding the future of their farms;

- Local communities not considered for employment opportunities at the mine; and
- Need for skills transfer to the local communities and promotion of rural development with co-operation from the local municipality.

2.2 Describe the existing status of the cultural environment that may be affected

The Waterberg Region has a rich cultural heritage comprised of archaeological remains dating to the pre-colonial and historic periods of South Africa.

Since the onset of mining and related activities at Exxaro's Grootegeluk, a decrease of the population in the area was a general occurrence due to frequent droughts, uneconomical farming units and a general shortage of infrastructure and work possibilities for the local population. Since then the population of the area has significantly increased due to the influx of people associated with industrial development.

This has resulted in a diverse mixture of cultures represented within the area's population. No unique cultural elements are therefore expected to be affected by the proposed project.

2.3 Describe the existing status of any heritage environment that may be affected

2.3.1 Visual environment and sense of place

The visual, scenic and cultural components of the environment can be seen as a resource, much like any other resource, which has a value to individuals, to society and to the economy of the region (Oberholzer, 2005).

Although the Waterberg region to the west of Lephalale has been earmarked for development, much of the natural vegetation is still intact. The dominant vegetation in the area is mixed bushveld with an average canopy height of around 4m to 6m. Large trees of up to 15m are present as scattered individuals. Land uses in the area include game farming, nature-based tourism, agriculture, mining and associated char plant and power generation in the form of coal-fired power stations. The study area is located in an industrial environment, surrounded by the Grootegeluk Coal Mine and Char Plant, the Matimba Power Station, Medupi Power Station (under construction) and associated discard and ash dumps.

The R33 and R510 are important arterial routes in the region as they provide access to tourists travelling to and from Botswana. Secondary roads in the region such as the D2001 and D175 are used as alternative routes for 4x4 enthusiasts travelling to Botswana.

The main visual receptors that are present in the project area include:

- Tourists on farms used for eco-tourism activities, including hunting farms and photographic safaris;
- Land owners and farm workers;
- Residents of Onverwacht, Marapong and Lephalale; and
- Travellers on local roads.

The visual sensitivity of receptors is dependent on the nature of the receptors. Receptors in residential areas or nature reserves have a high sensitivity while receptors in industrial or mining areas have a low sensitivity. Because the identified receptors are situated in scenic area, they will have a high sensitivity.

2.3.2 Graves and cemeteries

North of the nearby town Lephalale, on the farm Grootfontein 501 LQ, a cemetery is to be found where some Damara kings were buried. Numerous small family cemeteries are also located on nearby farms.

There is also a high likelihood that formal and informal burial sites and graveyards exist near residential structures and agricultural fields on the directly affected properties. A single grave was recently recorded adjacent to the Kuipersbult road.

2.3.3 Archaeological environment

The Waterberg Region has a rich heritage comprised of archaeological remains dating to the pre-colonial and historic periods of South Africa. Archaeological artefacts in the region primarily include Stone Age lithics and Iron Age ceramics and settlement patterns.

2.3.3.1 Regional archaeological environment

The best example of a Stone Age site in the Waterberg region is the Olieboomspoort Shelter which lies approximately 60 km south-east of the Thabametsi Project area. Excavations at the Olieboomspoort Shelter yielded Early Stone Age (ESA) bifacial lithics and Middle Stone Age (MSA) hand axes (Van der Ryst, 2007). The Late Stone Age (LSA) was of the Wilson industry and the ceramic were of the *Eiland* and *Bambata facies* (Van der Ryst, 2007).

Rock art sites associated with the LSA hunter-gatherers are also found in the region. For example, Nelsons Kop is a small protrusion located within the Thabametsi Project area that has LSA engravings of animal spoor, cupules and other incisions. In a southern African context, the LSA is closely associated with hunter-gatherer groups, such as the San. Due to the nomadic nature of LSA people, open sites are difficult to identify and are usually poorly preserved. In contrast, the caves and shelters offer better preservation of archaeological artefacts and rock art that than the open sites.

During the Iron Age, two significant migrations occurred through the study area. The two migrations represent different branches of the general southerly Bantu migration. The first migration forms part of the initial stages of the Early Iron Age Happy Rest sub-branch, while the second later migration is from the Moloko sub-branch. Two different ceramic styles from the Moloko Branch become visible in the archaeological record around 1500 CE. The *Letsibogo facies* has been recorded in the Motloutswe drainage basin in Botswana and in the Blouberg in the Limpopo Province. The *Madikwe facies* has been recorded from the Makapan Valley area west into Botswana. Stylistically, the *Letsibogo facies* and the *Madikwe facies* differ in terms of the decoration technique employed. The *Letsibogo facies* emphasises punctates as opposed to stabs and fingernail impressions found in the *Madikwe facies*. Both these facies predate stonewalling prescribed to Sotho-Tswana speakers (Huffman, 2007).

During the Historic Period, the first colonial settlers arrived in the late 1800s. Common cultural features associated with the colonial farmers include farm houses, family graveyards, cattle posts, and fields.

A Phase 2 Archaeological Impact Assessment (AIA) that was completed for the Boikarabelo Coal Mine that is to be situated approximately 40 km north-west of the Thabametsi Project area was undertaken by Digby Wells in September 2009 and February 2010. The archaeological remains from the mitigation project included ceramics, lithics and faunal remains. Surface collections of ceramics indicated a probable early Moloko facies and at least one site had been identified to the *Letsibogo facies*. The relative age of the sites were therefore inferred to range from the late 17th to late 18th centuries CE.

2.3.3.2 Local archaeological context

A Phase 1 Heritage Impact Assessment (HIA) was conducted by Pistorius (2010) on the farms McCabesvley 311 LQ, Van Der Waltspan 310 LQ, Zaagput 307 LQ, Jackhalsvley 309 LQ, Graaffwater 456 LQ and Goedehoop 467 LQ. The Phase 1 HIA revealed scatters of stone tools dating from the Stone Age; historical houses; and formal and informal burial sites and cemeteries (Pistorius, 2010).

An aerial imagery survey of the project area further revealed that the current landscape within which the Thabametsi Project will take place is primarily rural. The industrialised landscape essentially comprises sites, places and structures related to the industrial development of Grootegeluk near the project area. Based on the wider region and on the Phase 1 HIA conducted by Pistorius (2010) on the study area, heritage resources are expected to occur within the project area. Stone Age lithic scatters are expected to occur at open sites but Stone Age lithic concentrations are more likely to occur near and around rocky outcrops. Historical structures such as houses and settlements may be found.

2.4 Describe the existing status of any current land uses and the socio-economic environment that may be directly affected

2.4.1 Development policy context

Rapid economic growth and a massive electrification programme have resulted in an energy crisis in South Africa. To contribute to meeting the energy needs of the country, plans are in place to develop the Waterberg Coalfields to fire new power stations and other energy-delivery technologies (CSMI, 2010a). The Waterberg Coalfields currently under development are located in the northwest of the district, with Lephalale the biggest settlement in the area.

The proposed site for the Thabametsi Project is located within this north-western region and the extensive coal resources present in this coalfield is the main motive for the development of the Lephalale LM as South Africa's new coal, energy and petrochemical hub. These development plans are embedded in national policy documents, including the Integrated Resource Plan (IRP) (2010) and the National Development Plan (NDP) which emphasise the need to develop the electricity generation sector to support the growth of the national economy and its developmental objectives.

Policy documents such as the Limpopo Employment, Growth and Development Plan (2009 – 2014); Lephalale Local Municipality Integrated Development Plan (IDP) (2011/2012) and the draft Environmental Management Framework (EMF) (2010) for the Waterberg DM; and the Local Economic Development (LED) Plan (2008), Integrated Development Plan (IDP) (2011/2012) and the Spatial Development Framework (SDF) (2009) for the Lephalale LM, all

recognise that the municipality is on the verge of major economic development in view of the government's plans to proclaim the Limpopo Coal, Energy and Petrochemical Cluster as a means of utilising the potential of the Waterberg Coalfield to produce energy for the national economy.

Another sector which is targeted by the Lephalale LM as development priority to stimulate job creation and economic growth is the local eco-tourism sector. Mining, industrial and urban development in the region is, however, impacting on existing game farming and eco-tourism activities and therefore, there seems to be an ambiguity in terms of the municipality's policy objectives to develop both the energy and eco-tourism sectors. The need for clarity on what the government's long-term plans are in respect of further development of the Waterberg Coalfield is highlighted in the draft EMF (2010) for the Waterberg DM.

More information on the development policy context of the proposed Thabametsi Project in relation to the key municipal growth and development policies is provided in Box 1 to Box 4.

Based on a review of the economic and development policy context of the proposed project, it is evident that no fatal flaws exist although there are certain challenges with respect to the development of the coal-and energy to the cost of the tourism sector. This potential conflict will be examined in more detail during the EIA phase of this project.

Box 1: Limpopo Employment, Growth and Development Plan (2009 – 2014) and implications for the Thabametsi Project

The purpose of the Limpopo Employment, Growth and Development Plan (2009 – 2014) is to articulate a development vision for the Limpopo Province that can be shared by all communities in the province and to craft a strategy from the vision in which all these communities can participate.

The document defines five main objectives that were derived from the medium-term strategic framework of the national government:

- Create decent work and sustainable livelihoods by way of competitive industrial cluster promotion, infrastructure construction and various national development programmes;
- Improve the quality of life of citizens through effective education (including skills development), reliable health care, alert policing, comfortable housing, social grants and sport, with specific emphasis on their own participation in these processes;
- Promote rural development, food security and land reform in order to spread the benefits of economic growth beyond the urban areas;
- Raise the effectiveness and efficiency of the developmental state by way of effective organisation structuring and recruiting, targeted training and the building of a culture of service and responsibility, integrated development management; and co-operation between all organisations in the development process; and
- Give specific attention and allocate sufficient resources to the high-priority challenges of regional co-operation, sustainable development and climate change; Black Economic Empowerment; and informal economies.

The document recognises that the development of the coal, energy and petrochemicals

cluster is critical to the achievement of the above employment, growth and development objectives. The further need to develop this cluster in a way as to address the cross-cutting issues of sustainable development and climate change is also stated.

The provincial approach to sustainable development of this cluster is to make use and rely on existing mechanisms for sustainable development and integrated environmental management, such as the EIA process in terms of the NEMA and the implementation of an EMF for the Waterberg DM.

One of the objectives of the EIA process for the proposed Thabametsi Project is therefore to assess the long-term sustainability of the proposed project in relation to provincial development needs in an attempt to design environmental and social management programmes that will facilitate achievement of the provincial development objectives.

Box 2: Draft Environmental Management Framework for the Waterberg District Municipality and implications for the Thabametsi Project

The EMF for the Waterberg DM is an initiative of the DEA in partnership with the LEDET and the Waterberg DM. The objectives of the EMF are to identify the existing development pressures and trends in the area and to develop a system to guide future developments in an environmentally responsible manner (Waterberg EMF, 2010).

The draft EMF report was released in October 2010 and is currently in its final stages of review. The report recognises the role of mining in the development of the district over the medium to long-term and states that one of the main obstacles in planning future mining activities in the area is the lack of clarity regarding the government's long-term plans for the Waterberg Coalfield. The district also requires a commitment from government to supply sufficient water, transport infrastructure and other infrastructure for proper planning to take place.

The draft EMF report defines 11 different Environmental Management Zones, illustrated in Figure 1, according to its environmental sensitivity and the priority needs of the area. The Thabametsi Project is located within Zone 4: Mining Focus Areas. This zone represents areas of significant mineral resources that are of strategic national importance.

Table 5 presents a summary of the desired state objectives for this Environmental Management Zone and its implications for the proposed Thabametsi Project.

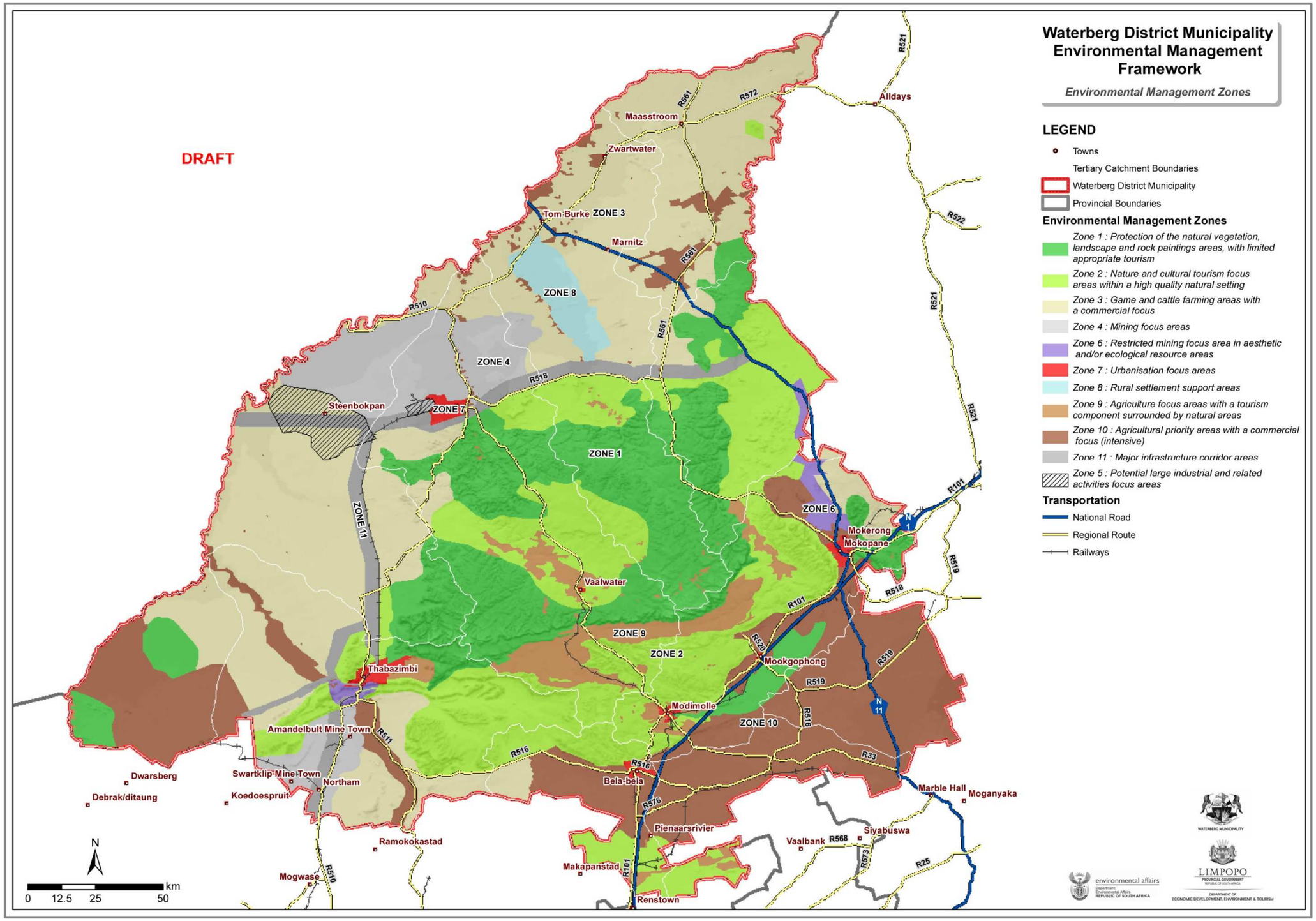


Figure 1: Environmental Management Zones *(Source: Waterberg EMF, 2010)*

Table 5: Implications of the EMF of the Waterberg District Municipality on the proposed Thabametsi Project

Aspect	Desired state	Applicability
Water utilisation	• Larger scale water utilisation is critical to support mining; and • Mining should not be allowed to proceed unless the necessary water allocations and permits are in place.	• Large scale beneficiation of coal will only commence once Phase 2 of the Mokolo and Crocodile (West) Augmentation Project (MCWAP-2) is implemented by the DWA. It is expected that this project will be operational by 2018/19. There is however a concern that there may be water constraints in Phase 1 of the development; and • Mining will not be undertaken without an approved Water Use License for all water uses.
Water quality	• Water quality should not be allowed to deteriorate; • Legislation to protect water quality and prevent pollution should be strictly enforced; and • Heavy penalties should be imposed on pollution caused by mining.	• An Integrated Waste and Water Management Plan (IWWMP) will be compiled for the project with the objective to prevent and minimise water quality impacts, with specific focus on preventing groundwater quality impacts and deterioration of surface water quality in the Limpopo River catchment.
Conservation	• Conservation of natural habitat should be the primary focus of *required buffer areas around mining sites*; and • Preference should be given to catering for threatened species that may occur in this zone.	• The potential of incorporating the Thabametsi Project area into the greater Manketi Strategy is being considered. The Manketi Strategy is an integrated local sustainable development tourism initiative by Exxaro.
Game and cattle	• Game and cattle farming should be the	

Aspect	Desired state	Applicability
farming	default activity in parts of the zone that is not used for mining.	
Agriculture	• Agriculture is not desired in this zone; and • Existing agricultural activities may continue provided that such activities are not expanded.	• Agricultural plantation will not be considered as a potential post-closure land use for the Thabametsi Project. Preference should be given to conservation and/or game and cattle farming.
Service infrastructure	• Service infrastructure should be sufficient to support both mining and other developments in the area; • Transport infrastructure is of particular importance as is currently insufficient; • A strategy for the transport of coal out of the Waterberg District, by rail or by road should be carefully planned; and • Service infrastructure development in the area should also cater for the influx of people associated with the new developments in these zones.	• Opportunities for the Thabametsi Project to support and/or facilitate government in development of service infrastructure will be considered; and • Transnet has recently embarked on a R300 billion expansion strategies which are to be implemented over the next seven years which includes the expansion of the rail capacity from the Waterberg area to enable the railing of the beneficiated coal. From 2021 both Power Station Coal (PSC) and Semi-Soft Coking Coal (SSCC) will be produced. The Run of Mine (RoM) suitable for PSC and SSCC will be put on rail to the respective clients. Underground mining will start in 2022 producing Metallurgical Coal (Met Coal) RoM which will be transported to the Southern Mine Complex plant for beneficiation.
Solid waste disposal	• All solid waste should be discarded at permitted solid waste sites; • Sufficient permitted solid waste disposal sites should be established at key locations to deal with the waste generated in this	• Waste management measures for the Thabametsi Project will be formulated as part of the EMP and Waste Management License (WML) application for the project.

Aspect	Desired state	Applicability
	zone; • Strict enforcement and proper management at such sites is necessary to minimise negative impact; and • Recycling collection points should be encouraged wherever possible.	
Sewage treatment and disposal	• Sewage treatment plants and disposal sites capable of properly dealing with the sewage and waste water generated in the area is necessary to prevent pollution of rivers and streams.	• The Thabametsi Project will have its own sewage treatment plant and landfill site to treat and dispose of sewage and general waste generated by the project. This will be permitted and all permit application will be done during the EIA phase during which a separate waste licence and water use license will be applied for.
Employment	• Employment in the zone should be focused on providing opportunities for local unemployed people; and • This should go hand in hand with appropriate education and training.	• A Social and Labour Plan (SLP) was submitted as part of the MRA and promotes the employment and training of local people.

Box 3: Local Economic Development Plan (2008) for the Lephalale Local Municipality and implications for the Thabametsi Project

The key strategic thrusts recommended in this LED (2008) for the Lephalale LM are:

- Promoting the Coal and Petro-chemical Cluster;
- Supporting livestock farmers on communal land;
- Growing the tourism and recreation industry;
- Assisting the informal sector; and
- Improving service delivery.

In order to achieve these objectives, the LED Plan defines certain programmes and projects to be implemented by the municipality. This includes plans to develop necessary housing and social infrastructure; skills development; local supply chain development; the development of by-products and waste products from mining and coal beneficiation; and strategic environmental assessment to promote development of the coal and petro-chemical cluster.

The need to engage with key role players in this sector, such as Exxaro is one of the cornerstones of the programme implementation strategy.

In terms of the tourism and recreation industry, the proposed Thabametsi Project will impact on existing eco-tourism activities that are being undertaken in the area, such as game farming and hunting. A sustainability assessment will be undertaken during the EIA process in order to further investigate the sustainability of competing land uses for the Thabametsi Project in relation to the achievement of municipal policy objectives.

Box 4: Spatial Development Framework for the Lephalale Local Municipality and implications for the Thabametsi Project

The SDF for the Lephalale LM was published in July 2009 with the purpose of guiding the form and location of future physical development in the municipal area. The focus of the plan is essentially on addressing "…the imbalances of the past…" in terms of unsustainable urban forms (M&DS, 2009).

The SDF defines indicative structuring elements, including nodes, corridors and linkages, to give future structure to the urban and rural form of the municipal area. The structuring elements directly relevant to the Thabametsi Project and possible implications for the project are limited to the upgrade of the existing Stockpoort dirt road from Grootegeluk to the border post.

A new access road for the Thabametsi Project will be constructed from the existing Stockpoort road. This access road will be constructed in an east-west direction and will run from the existing Stockpoort road on the farm Vooruit 449 LQ. As the design is not final yet, three alternatives will be considered – the alternatives will be investigated during the EIA phase of the project. A Traffic Impact Assessment (TIA) will be required to assess the impact of the project construction and operational phase traffic on the existing and upgraded

Stockpoort road.

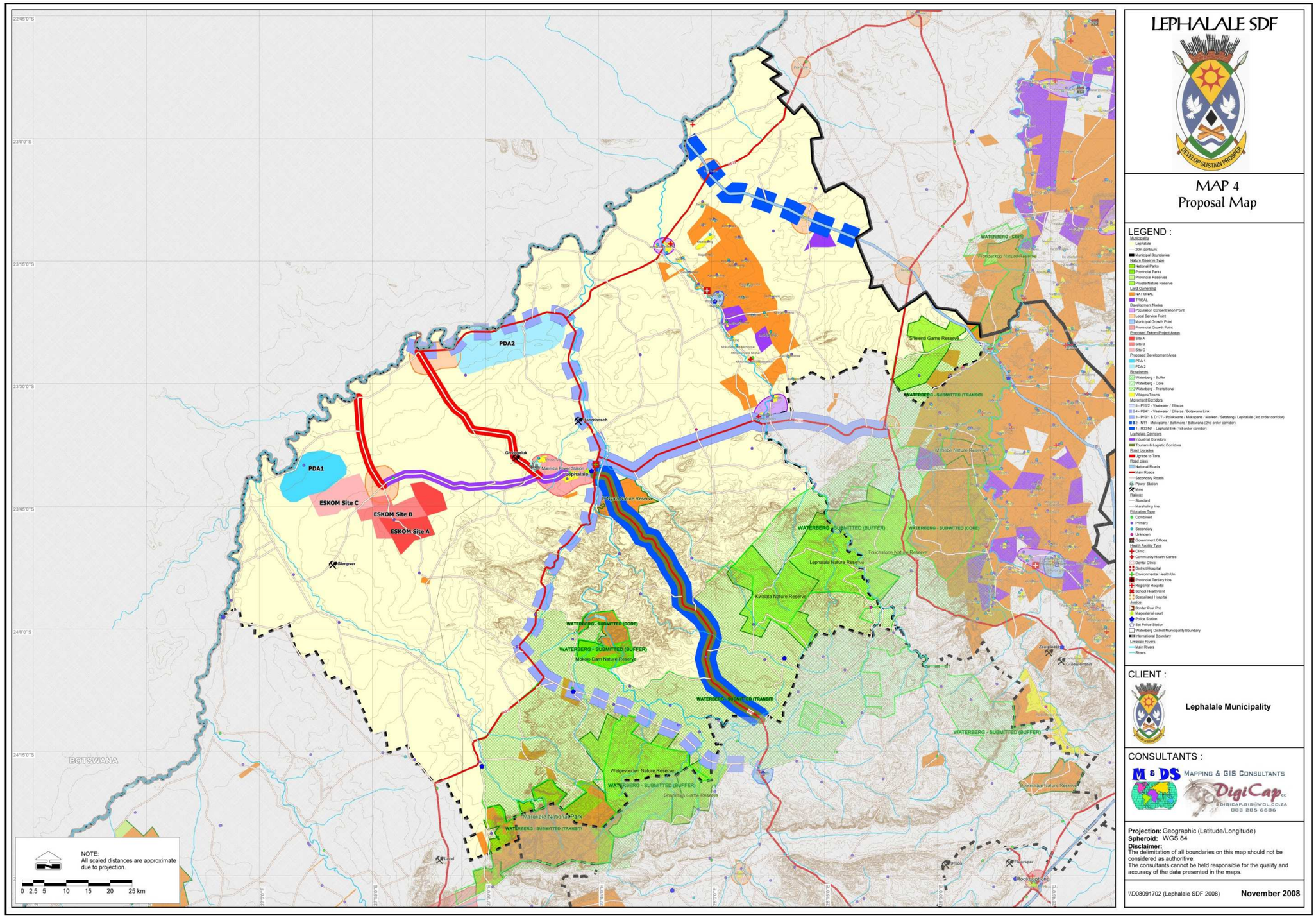


Figure 2: Spatial Development Framework *(Source: Lephalale SDF, 2009)*

2.4.2 Population size and density

The population characteristics of any geographical area is key to the development process, as it affects economic growth through the provision of labour and entrepreneurial skills and determines the demand for the production output.

In 2009, the Lephalale LM had an estimated total population of between 126 000 and 130 000. Before the onset of the mining and related activities at Exxaro's Grootegeluk, a decrease of the population in the Lephalale LM was a general occurrence due to frequent droughts, uneconomical farming units and a general shortage of infrastructure and work possibilities for the local population. Since 2007, it is estimated that the population has grown at a rate of nearly 30% with the growth concentrated in and around the town of Lephalale (Lephalale IDP, 2012/2013).

Approximately 90 000 people living in the Lephalale LM are rural and combined with the recently experience rapid population growth rates in the town of Lephalale, this is a clear indication of increasing urbanisation in the Lephalale LM and the important role that industrial development plays in attracting large population numbers. In 2008, The IDP for the Lephalale LM estimated that the future population of Lephalale LM is expected to increase with approximately 17 000 people by 2014. The drastic increase would necessitate development of additional social facilities and municipal infrastructure.

There are 49 proclaimed townships in the Lephalale LM, of which the majority are located around the town of Lephalale. The provincial growth point of Lephalale covers approximately 33 km^2 within a 10 km radius and houses more than 18 000 people in approximately 5 000 housing units. Spatially, the growth point forms three distinct nodes, namely Onverwacht, Lephalale and Marapong. Vast tracts of land exist between these nodes and this enables compact development of the Lephalale town through infill development in the future.

Although the availability of land is not a limiting factor, the extension of bulk and reticulation based services to these dispersed and other notably small settlements is cost inefficient (Lephalale SDF, 2009). To realise infill development, the SDF must clearly provide for scheduling of land release for development and must prioritise critical development corridors.

2.4.3 Land tenure

Approximately 10% of the land in the Lephalale LM is currently owned by the state and held in trust by the chiefs for various communities. The Lephalale LM owns limited and/or no land and this represents a serious challenge as the pressure for development in the town of Lephalale is likely to create upward pressures on the urban land market (Lephalale SDF, 2009).

Contributing to the spatial development challenges faced by the Lephalale LM, low income earners and unemployed seeking job opportunities in the Lephalale region are also likely to be attracted and if not well-managed, the high land cost in and around the town of Lephalale will necessitate the poor and the low middle class to the outskirts of town, which might lead to illegal squatting.

The Waterberg DM is further part of an extensive land distribution programme. IDP (2011/2012) for the Waterberg DM acknowledges that land reform issues are complex and that challenges continue with regard to land tenure, land access, land restitution and land administration. Within the Lephalale LM, approximately 14.1% of municipal area is subject to land claims (Lephalale IDP, 2011/2012), with a total of 102 outstanding land claims (Waterberg IDP, 2011/2012).

A request for confirmation of land claims has been requested for the properties on which the Thabametsi Project is to be located.

2.4.4 Major economic activities

The structure of the economy and the composition of its employment provide valuable insight into the dependency of an area on specific sectors and its sensitivity to fluctuations of global and regional markets.

The largest contribution to the Gross Domestic Product (GDP) of the Waterberg DM comes from the mining sector, with a share of almost half (49%) of the GDP in the district, followed by the finance sector (11%) (Waterberg EMF, 2010). Although mining is by far the biggest contributor to the GDP, it is not the largest contributor in terms of employment opportunities, providing only 16% of total employment opportunities. The agricultural sector provides the highest percentage of employment opportunities in the region (26.98%), but is one of the smallest contributors to the total GDP (3%) of the Waterberg DM.

Currently, the existing Grootegeluk Coal Mine offers a great number of job opportunities to local as well as other labour. The Matimba Power Station and other secondary businesses and industries, offering additional job opportunities, commenced after the mining activities in the region were initiated.

As illustrated in Table 6, the mining and quarrying sector grew by 23.4% between 2005 and 2010. In addition, the rapid rate in which mining created employment between 2001 and 2007, signals a trend that mining will become the biggest employer in the Waterberg DM in the near future (Waterberg EMF, 2010). It is therefore probable that existing local employment opportunities are indirectly reliant on the future growth of the mining-and energy sector.

In addition to the mining sector, game farming and other agricultural activities border the project location and play an important part of the local eco-tourism sector. Eco-tourism is currently the largest sector within the tourism industry in the Waterberg DM, with business tourism growing rapidly due to the developments taking place in the area. According to the Lephalale LED (2008), hunting is the predominant draw card to the region that accounts for 31% of visitors to the area. However, industrial development puts pressure on these activities and the industry players have indicated their concern that the game farming and eco-tourism sectors are not taken into consideration when developments are planned (Waterberg EMF, 2010).

Since some of the farms on which the Thabametsi Project will be located and adjacent properties are currently used for hunting activities, the potential conflict will likely take place and will need to be addressed in the EIA phase of the project.

Table 6: Gross Value Added of the Lephalale Local Municipality's economy, 2005 to 2010 *(Source: Quantec, 2010)*

Sectors	2005	2010	CAGR 2005 - 2010
	R'million		%
Primary sector	1 289.4	3 319.1	20.8%
Agriculture, forestry & fishing	187.7	171.0	-1.8%
Mining and quarrying	1 101.7	3 148.1	23.4%
Secondary sector	462.0	229.5	-13.1%
Manufacturing	98.7	63.3	-8.5%
Electricity, gas & water	318.6	124.7	-17.1%
Construction	44.7	41.5	-1.5%
Tertiary sector	1 049.3	862.2	-3.9%
Wholesale and retail trade	250.4	195.7	-4.8%
Transport & communication	204.3	193.1	-1.1%
Finance & business	296.9	230.4	-4.9%
Social & personal services	66.2	52.7	-4.4%
General government	231.5	190.2	-3.9%
TOTAL GVA	**2 800.7**	**4 410.7**	**3.9%**

2.4.5 Labour force

Employment and unemployment rates are important indicators of socio-economic well-being. Before the commencement of mining and related activities in the Lephalale LM, the unemployment rate was very high. The non-utilisation of many farms due to arid conditions, as previously described, contributed to the unemployment rate. Despite the large number of job opportunities offered by the subsequent development of the mine, the power station and other secondary businesses and industries, the surrounding areas still represent a part of the country with a very high unemployment rate.

As illustrated in

Table 7, just under two thirds of the working age population in the Lephalale LM were not economically active in 2010. Of the available labour force, 23% were unemployed, which means that it was lower than in the rest of the country. Considering that the labour force participation rate in the Lephalale LM was smaller than in South Africa, the lower unemployment rate does not necessarily reflect better socio-economic conditions in the Lephalale LM when compared to the rest of the country.

Table 7: Labour force statistics *(Source: Quantec, 2010)*

Indicators	South Africa	Limpopo	Waterberg DM	Lephalale LM
Working-age population	32 011 442	3 288 076	403 773	55 544
Non-economically active	15 754 899	2 125 961	219 028	34 173
Labour force	16 256 543	1 162 115	184 744	21 371
Employed	12 041 486	798 252	147 065	16 341
Unemployed	4 215 057	363 863	37 679	5 030
Unemployment rate	**25.9%**	**31.3%**	**20.4%**	**23.5%**
Labour participation rate	**50.8%**	**35.3%**	**45.8%**	**38.5%**

2.5 Describe the existing status of any infrastructure that may be affected

It has been widely recognised by numerous local, district and regional government policies and frameworks that service delivery of all basic services in the Lephalale LM is poor and that infrastructure is insufficient.

2.5.1 Waste management and sanitation

Only 26.6% of households in Lephalale LM currently receive waste removal services. There are only two permitted landfill sites and an unknown number of non-registered landfill sites within the area, all of which are located in rural areas. With regard to sanitation, only 84.9% of the local population have access to a toilet (flush/chemical/pit toilet). Main improvements to sanitation delivery rely on the immediate provision of an additional capacity of 10 Ml/d to meet current and projected future demands (Waterberg IDP, 2011/2012). The lack of capacity in providing waste removal services, landfill sites and sanitation has resulted in project proponents developing their own waste management and disposal facilities.

For this purpose, the Thabametsi Project will be applying for a Waste Management License (WML) in terms of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM:WA) for all related waste management activities and no dependency on municipal waste disposal infrastructure will be created.

2.5.2 Water supply and water users

Before commencement of the mining activities in the area, water was extracted mainly from sand wells in the Mokolo River. Currently, the main external source of water supply is from the Mokolo Dam to the mine and other users. It is anticipated that the proposed mine will obtain water from Grootegeluk Coal Mine for the construction phase. It should be noted that DWA has granted Grootegeluk a water license for 7,6Mm³/water from the Mokolo dam. A portion of this water is allocated to Phase 1 of the Thabametsi Project. The source of water

for the future mine phases will be supplied from a new sorce which will be the MCWAP-2 pipeline from the Crocodile River at Thabazimbi. It is expected that this project will be operational by 2018/19.

Raw water is also treated by Exxaro at the Zeeland Water Treatment Works (WTW) for use by Grootegeluk Coal Mine and for supply to the Lephalale LM for domestic purposes. Grootegeluk Coal Mine currently also supplies raw water to other bulk raw water users such as Eskom's Matimba power station.

It has been widely recognised by numerous local, district and regional government policies and frameworks that the limited water supply within the Lephalale LM has and is currently hindering development (Waterberg IDP, 2011/ 2012).

2.5.3 Public transport and transport infrastructure

Public transport in the form of buses, taxis and trains are available, yet they do not meet the requirements of the current working population. Vehicle ownership is limited and thus the majority of people walk or use public services. There are twelve taxi routes in Lephalale serviced by five taxi associations. The bus service provides the Lephalale LM with a fleet of 155 vehicles at three terminals, one of which is informal. The Waterberg IDP (2011/2012) recognises that the majority of roads used by public transport services are gravel and below standard, requiring upgrading, improved storm water management, lighting, parking and general road infrastructure. There are no trains available for public transport.

Roads in the Lephalale LM are adequately connected with district, provincial and national roads. However, most road systems are in disrepair and eroded, being insufficient to handle the increased traffic mining and other industrial developments created. This is especially with regard to the R33, which runs through the Lephalale town and is the busiest route in the district. This route lacks maintenance and requires an upgrade (Waterberg EMF, 2010).

A new access road for the Thabametsi Project will be constructed from the existing Stockpoort road. This access road will be constructed in an east-west direction and will run from the existing Stockpoort road on the farm Vooruit 449 LQ. As mentioned above the final route is not finalised yet and three alternatives will be considered and investigated during the EIA phase of the project.

2.5.4 Electricity infrastructure

Despite the Lephalale LM being declared the Limpopo Coal and Energy Petrochemical Cluster, the Waterberg IDP (2011/2012) confirms that there is currently an electrical supply deficit in the area. This is partially related to the challenges and costs associated with establishment of electricity transmission and distribution infrastructure in low population density areas that are dominant in the Lephalale LM. The backlog in electrical supply is expected to be eradicated upon the industrial development of the Lephalale LM and will also improve the service delivery of electricity at the provincial and national levels.

The Thabametsi Project will supply coal to an Independent Power Producer (IPP) power station to be developed by Exxaro..

2.5.5 Housing

Due to increased industrial development and population growth in the Lephalale LM, there is an increased demand for housing, with the current housing backlog estimate at 20 575 (Waterberg IDP, 2011/2012). Approximately 22% of this backlog is directly linked to the development of industrial, energy and mining projects in the Lephalale LM.

The backlog of housing and the increased population size expected due to the influx of migrant labourers into the energy and industrial cluster will exacerbate current pressures on basic service delivery, particularly with the growth of informal settlements.

2.5.6 Social infrastructure

Social infrastructure inclusive of educational, social and health facilities, police stations and recreational and sports facilities are determining factors with regard to a community's welfare and ability to develop sustainably.

Before mining activities started, the Lephalale LM had one primary and one secondary school. Since then, a total of 59 schools have been established in the Lephalale LM, of which 53 are primary schools, one secondary and five combined primary- and secondary schools (Waterberg IDP, 2011/2012). The overarching challenge for the Lephalale LM in the provision of education is its rural nature, the lack of educational facilities and water limitations. Due to the widely dispersed rural nodes, access to transport is problematic (Waterberg IDP, 2011/2012).

Health care and social welfare within the Lephalale LM are provided for by two hospitals, six clinics, and seven mobile clinics (Waterberg IDP, 2011/2012). There is no indication of community health centres and day care centres offering care to disabled community members.

2.6 Describe the existing status of the biophysical environment that will be affected, including the main aspects such as water resources, fauna, flora, air, soil, topography

2.6.1 Geology

The Thabametsi Project will exploit coal from the central part of the Waterberg Coalfield, which is hosted in the sedimentary rocks of the Karoo Supergroup. The Waterberg Coalfield strikes approximately 88 km east-west and 40 km north-south in South Africa, but extends westwards into Botswana where it is named that Mmamabula Coalfield.

The Waterberg Coalfield is a featureless bush covered plain located approximately 900 masl. Nelsonskop, an erosional relict of Clarens Sandstone forms the only prominent landmark in the coalfield.

An extensive sand cover, derived from the Karoo and Waterberg sandstones overlies the Karoo and older rocks, while other recent deposits such as surface limestone (calcrete) and ferricrete are also present. No outcrops of the coal bearing Karoo strata, comprising of the Volksrust and Vryheid Formations, occur in this area. The geology of the area is illustrated in Plan 5 (Appendix A).

The coalfield is fault bounded along the southern and northern margins and can be called a 'graben'. In the south, the Eenzaamheid Fault forms the southern limit of the Waterberg Coalfield. Rocks belonging to the Waterberg Group (Mogalakwena Formation) occur south of this fault. In the north, the Zoetfontein Fault was active before and after deposition of the Karoo Sequence while the Daarby- and Eenzaamheid Faults, as most of the other faults in the Waterberg Coalfield, are younger than the Karoo Sequence.

The original sedimentary basin in which the coal was formed does not differ much from the present boundaries although the southern rim of the basin extended much further south than the present southern boundary, the Eenzaamheid Fault. Sedimentation occurred in a shallow east-west trough and the general direction of transport was east north-east to south-west. In the southern part of the coalfield, Karoo sediments were deposited on the Waterberg Group. North of the Zoetfontein Fault, Karoo sediments were deposited on Archaean rocks. In the eastern part of the coalfield, granite and basic rocks belonging to the Bushveld Igneous Complex formed the palaeofloor.

Only a few dolerite dykes outcrop in the south-eastern portion of this coalfield and no sills have been encountered in any borehole.

The Daarby Fault, with a displacement of approximately 350 m divides the coalfield into a shallow opencast mineable western part and a deep north-eastern part, where coal occurs at a depth of between 200 m and 400 m below surface and can only be extracted through underground mining.

The Thabametsi Project is situated on the shallow part of the coalfield where most of the Clarens, Elliot, Molteno and Beaufort Formations are weathered away. Most of the Karoo Sequence (Clarens sandstone and younger formations) are preserved in the downthrown block east of the Daarby Fault.

2.6.2 Topography

The topography of the Waterberg area is generally featureless, except for elevation differences caused by Nelsonskop (922 m) in the north and the Waterberg range (3600 m) in the south. In order to assess the topography of the area, a digital terrain model (DTM) was created using 20 m contours, spot heights and trig beacons. The DTM was created using ArcGIS 3D Analyst and aerial photography (2008) was sourced from the Chief Directorate: National Geo-spatial Information to identify surface features.

The DTM is portrayed in Plan 6 and indicates that the project site is flat. Heights range from 920 masl on the northern boundary to 925 masl on the southern boundary of the site. The lower lying central areas of the site are situated at 900 masl. General topographical drainage appears to be in an east-north-easterly direction towards the Mokolo River and consists primarily of dry and sandy gullies, such as the Sandloop River.

The slope of the project site is in the vicinity of 0% to 3% which reaffirms the flat nature of the area. Isolated features in the north of the site have slightly steeper slopes of between 3% and 10%. No natural drainage channels occur on the proposed site and could be ascribed to its flat topography and highly permeable sands. The main surface features identified from

aerial photography that occur within the project boundary include farm houses, game fences, farm roads, agricultural areas, non-perennial pans and mixed bushveld vegetation.

2.6.3 Climate

The description of the climate of the Thabametsi Project site is based on climatic data for the Lephalale weather station (No. 06743418) between 1998 and 2010. The project site falls within the Northern Arid Bushveld climatic region with warm summers and moderate, dry winters.

2.6.3.1 Rainfall

The mean monthly rainfall recorded at the Lephalale weather station between 1998 and 2010 is illustrated in Figure 3, which shows that the majority of rainfall received in the area occurs during the summer months of November and December. This record will be updated for the EIA phase.

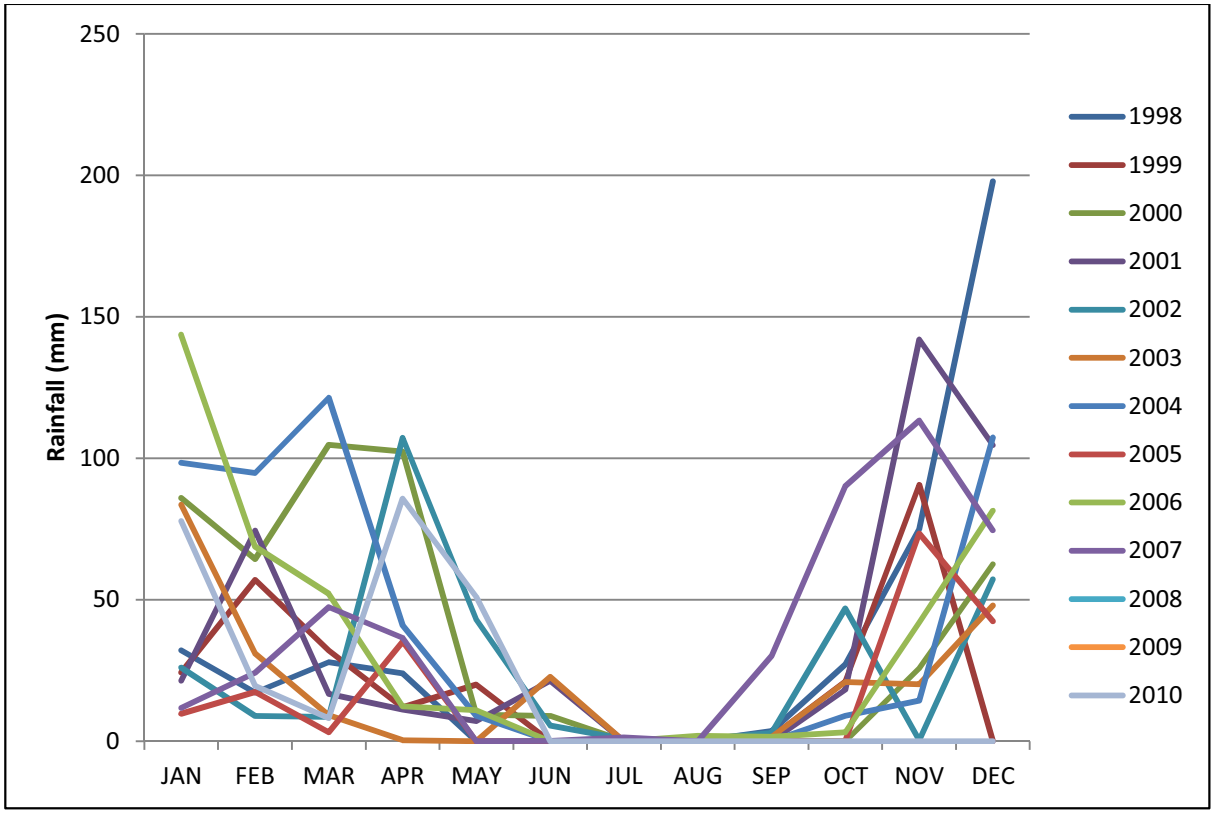


Figure 3: Total rainfall at the Lephalale weather station, 1998 to 2009

2.6.3.2 Temperatures

The average maximum temperatures for the region are reached from November to January with temperatures reaching a maximum of 33 °C. The average minimum temperatures are reached during June and July with a minimum temperature of 5°C, as illustrated in Figure 4. Evaporation during the summer is approximately 14 mm/d and the humidity is low (Lephalale weather station).

2.6.3.3 Mean annual wind direction and wind speed

The prevailing winds are from the northeast. Stormy conditions do not usually occur but the wind speed will increase during the months of August and September. Figure 5 provides a graphical indication of the prevailing wind.

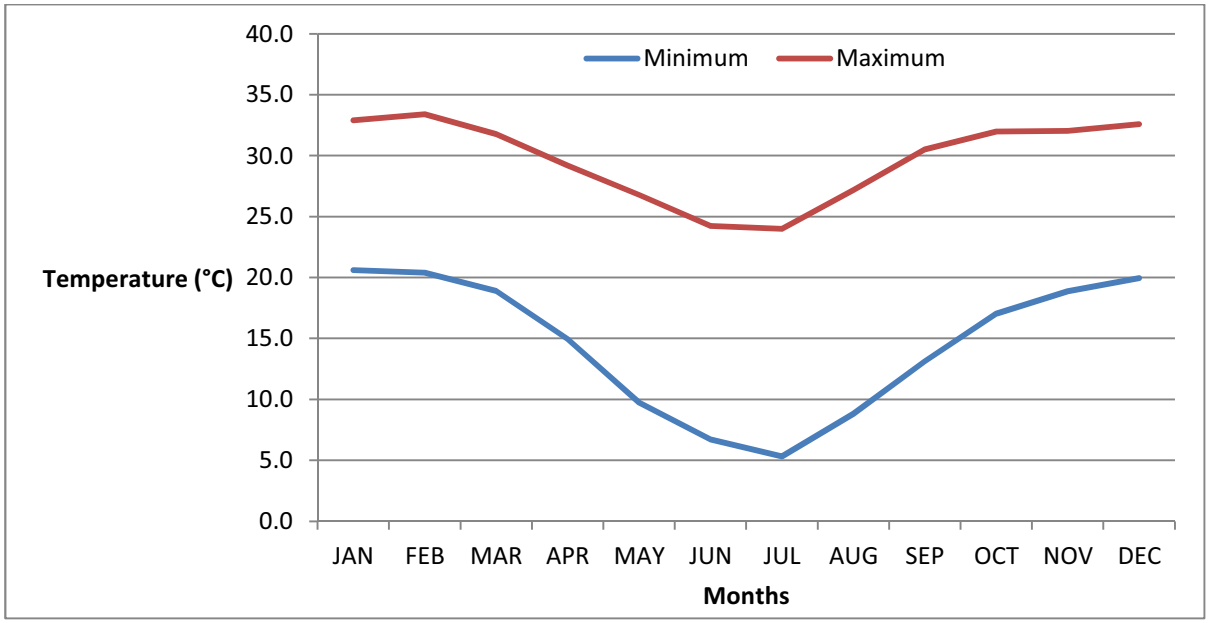


Figure 4: Average daily temperatures at the Lephalale weather station, 1998 to 2010

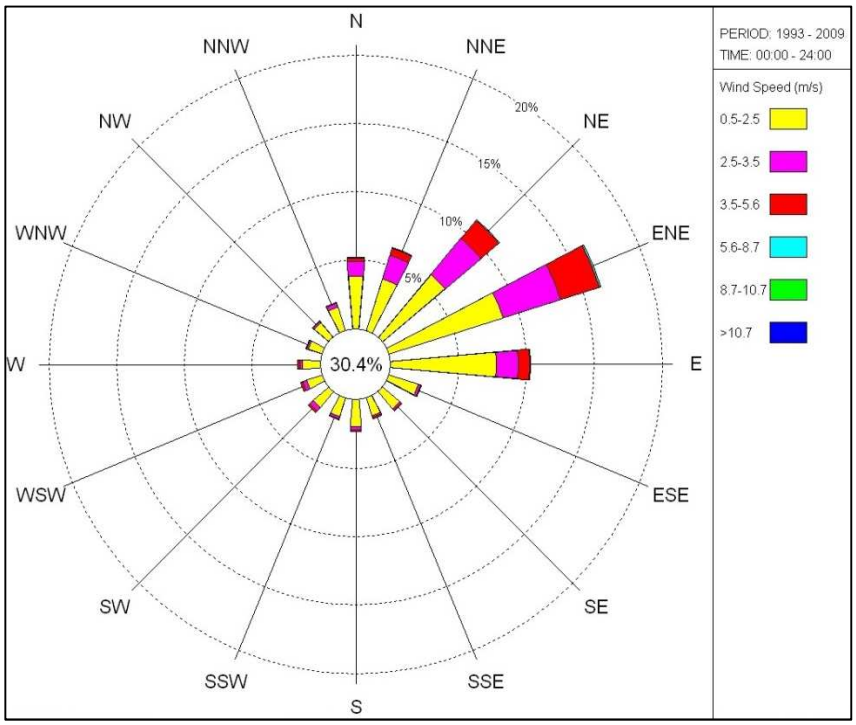


Figure 5: Annual mean wind direction and wind speed recorded at Lephalale weather station, 1998 to 2010

2.6.4 Surface water resources

The project area is situated within Limpopo Water Management Area (WMA) and falls within the Mokolo River catchment. The surface water catchment stretches from the Waterberg Mountains in the south to the upper reaches of the Sandloop River and includes the Mokolo Dam (upstream from mining activities) and a number of small tributaries that join the main Mokolo River up to its confluence with the Limpopo River.

The proposed Thabametsi Project is located within the quaternaries A41E and A42J. This area is characterised by high evaporation rates of 1 600 mm and low Mean Annual Precipitation (MAP) of 400 mm.

The proposed project area itself is surrounded by two major rivers, namely the Mokolo River in the east and the Limpopo River in the northwest. These rivers are approximately 23 km and 27 km from the site, respectively. Both catchments are characterised by gentle slopes of below 0.5% and surface water is found only after high-rainfall events, as most of the rainwater seeps into the sandy soils. Small, shallow pans occur at several places in the project area and collect the rainwater that has not seeped away.

The project site has been delineated into three catchments draining in opposite directions, as illustrated in Figure 6.

The smaller, east catchment drains in an easterly direction towards the main flow path which is an unnamed tributary of the Sandloop River, which then drains into the Mokolo River. Beyond the Sandloop River and Mokolo River confluence, some 42 km downstream, the Mokolo River eventually links up with the Limpopo River. Run-off from the southern catchment also drains into the Sandloop River.

The west catchment drains in a westerly direction. There is no properly defined watercourse in this catchment and runoff mainly occurs as sheet flow to the Limpopo River.

2.6.5 Groundwater

According to the DWAF (2003), the groundwater yields from the aquifers in the project area range from 0.1 to 2.0 l/s. The dominant geological features in the area include surface limestone, mudstone, carbonaceous shale with coal seams and siltstone lithology, which are characterised by poor groundwater potentials.

As stated above, the project site is located within the A41E quaternary catchment and according to the South African Groundwater Decision Tool (SAGDT), Groundwater Resources Directed Measures (GRDM), National Groundwater Data Base (NGDB) and the Water Use Registering and Licensing Data Base (WARMS), the catchment has a relatively fair groundwater exploitation potential of up to 6 Mm^3/a.

The project area is predominantly used for game farming with only small-scale agricultural activities being present. Borehole yields from the regional aquifers are relatively low and groundwater cannot be pumped in quantities sufficient for crop irrigation purposes.

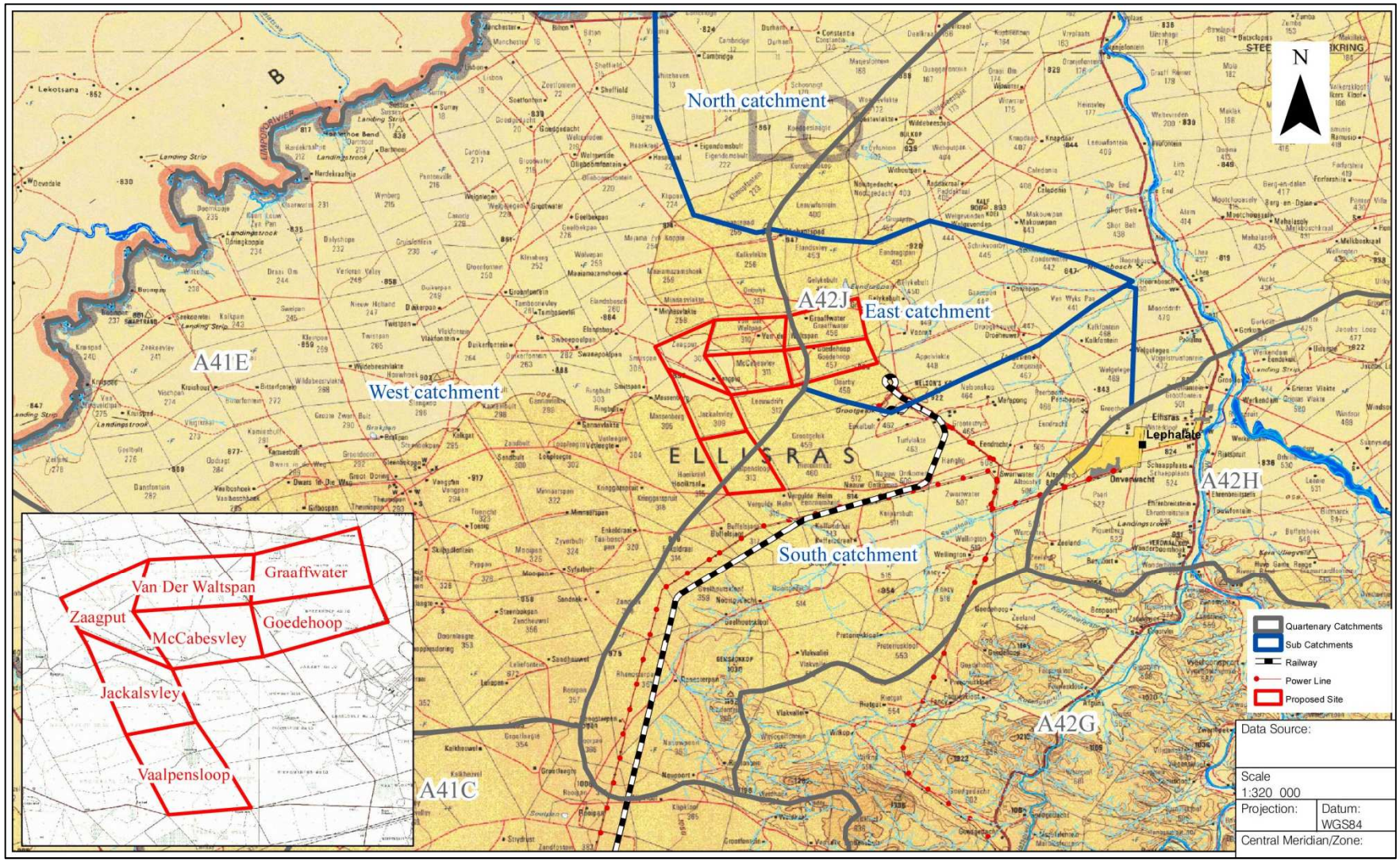


Figure 6: Surface water catchments of the Thabametsi project area

2.6.6 Soil

The Thabametsi Project site is a stabilised dune system, with deep, sandy, well-drained and carbonaceous soils distributed over the catena. The land types from the Institute for Soil Climate and Water (ISCW) of the Agricultural Research Council (ARC) that were taken into consideration during the identification of soils potentially occurring on the site are illustrated in Plan 7.

Shallow Mispah soils are expected to occur on rocky outcrops in the landscape with effective depth up to the limiting geology. Deeper Clovelly and Hutton soils are expected to occur along the slopes of the dune system characterised by well-aerated, deep, sandy profiles and there is a possibility these soils are most probably wind transported deposits.

Natural pans can be observed within the project site which will be associated with carbonaceous soil horizons represented by Etosha, Askam and Plooysberg soils. The soft- and hardbank carbonate horizons of the Etosha, Askam and Plooysberg soils are $CaCO_3$ deposits in different forms of consistency and indicative of a prolonged negative water balance facilitating the upward migration and deposition of carbonates.

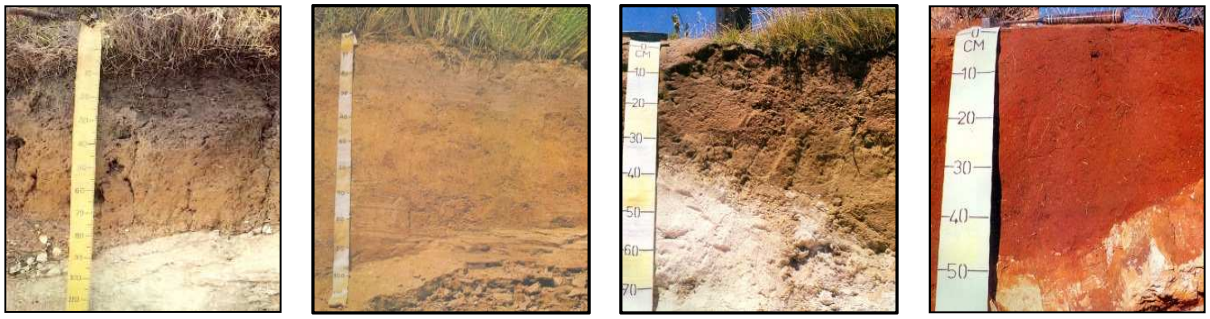
The Orthic A-Horizon of all the soils mentioned is most likely to be rich in organic matter and micro-organism activity, representing a delicate micro-habitat.

The Red Apedalic B-Horizon (Hutton) and Yellow Apedalic B-Horizons (Clovelly) are characterised by well-aerated and drained sandy soil profiles with average clay contents of between 10% and 15% represented by predominantly 1:1 clay minerals.

The anticipated soil types that might occur in the area of investigation are illustrated in Figure 7.

2.6.7 Land capability

The land capability as a function of effective soil depth is most likely to be classified as grazing and/or wilderness with the occurrence of natural freshwater and/or salt pans. The occurrence of wetlands will have to be carefully assessed as a function of soil types and associated hydrology in combination with the occurrence of vegetation indicator species.



Askam soils

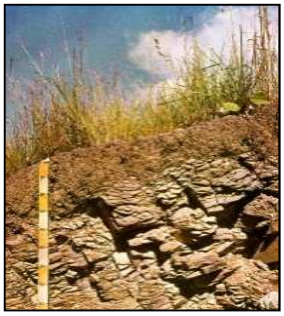
Clovelly soils

Etosha soils

Plooysberg soils

Hutton soils

Gamoep soils



Mispha soils

Figure 7: Illustrations of soil types anticipated to be found in the Thabametsi project area

2.6.8 Land use

The region receives low rainfall and the shortage of freely available water is considered the main cause for land-use conflict between low-intensity uses (i.e. game farming and hunting, agronomy and conservation) and high-intensity uses (i.e. mining and urban development) (Waterberg EMF, 2010).

The principal land uses in the north-western region of the Lephalale LM where the proposed Thabametsi Project is situated include:

- Agricultural land devoted mainly to game and cattle farming;
- Game farms and lodges including the Manketti Nature Reserve, owned by Exxaro and managed by Ferroland;
- Residential and industrial areas, i.e. Onverwacht, the town of Lephalale and Marapong;
- Grootegeluk mining, coal beneficiation and transport infrastructure;
- Char plant;
- The existing Matimba Power Station;
- The Medupi Power Station which is currently under construction; and
- Sewage works on the farms Zongezien and Nelsonskop.

2.6.9 Air quality

Existing sources of pollution in the region are the Grootegeluk Coal Mine, Char Plant and the Matimba Power Station. The air quality in the area is also impacted on by the occasional veld fires during winter months. Mine waste dumps at Grootegeluk, adjacent to the proposed project area, have been burning for several years as a result of spontaneous combustion. These dumps emit gases such as CO_2 and SO_2.

To summarise, the existing sources of atmospheric emissions which occur in the vicinity of the proposed Thabametsi Project include:

- Grootegeluk coal mining operations;
- Grootegeluk sintel char plant;
- Matimba Power Station and associated ash dump;
- Morupule Power Station (~140km to the northwest in Botswana);
- Brickworks operating at Hangklip;
- Household fuel combustion in townships;
- Sewage works on the farm Nelsonskop;
- Windblown dust from open areas and agricultural activities;
- Vehicle exhaust releases and road dust entrainment along paved and unpaved roads in the area; and
- Infrequent veld fires occurring in the area.

In view of the establishment of the Limpopo Coal, Energy and Petrochemical Cluster, the Minister of Environmental Affairs has recently declared the Waterberg as a National Priority Area in terms of Section 18(1) the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA). The DEA hereby aims to provide regulatory certainty to ensure future sustainable development in the area and maintain national ambient air quality standards.

2.6.10 Noise

The current ambient noise levels on site are expected to be no different from noise levels associated with rural districts. The South African National Standards guidelines (SANS 10103:2008) for typical noise levels in rural districts indicate that noise levels should not exceed 45 dBA during the day time and should not exceed 35 dBA during the night time. Previous noise assessments undertaken in areas in close proximity to the Thabametsi Project indicate that the ambient noise levels are below the SANS 10103:2008 day- and night-time guideline limits.

The main noise sources in the area, are the mining activities at Grootegeluk Coal Mine (blasting/railway lines/conveyor belts, etc.) as well as the construction activities at the Medupi Power Station, but the distance of these noise sources to the site are too great to impact on the ambient noise levels at the proposed Thabametsi Project as well as impact on any noise sensitive receivers surrounding the proposed project area. The sources of noise and its associated impacts will be further investigated during the specialist noise assessment as part of the EIA phase of the project.

The vehicular activity on the road between Lephalale and Steenbokpan may intermittently impact on the ambient noise levels where it runs adjacent to the southern boundary of the proposed Thabametsi Project area. The noise associated with vehicular activity and its associated impacts will be further investigated during the specialist noise assessment as part of the EIA phase of the project.

2.6.11 Flora

The Thabametsi Project lies within the Savana Biome, which covers over one-third the area of South Africa (Low & Rebelo, 1996).

The landscape consists of undulating to flat plains at an altitude of 700 m to 1100 m. The soil is mostly coarse, sandy and shallow, overlying granite, quartzite, sandstone or shale (Low & Rebelo, 1996).

Within the project area the vegetation varies between Sweet Bushveld and Mixed Bushveld, according to Van Rooyen and Bredenkamp (1996).

2.6.11.1 Mixed Bushveld (Veld Type 18) as described by Acocks (1988)

Two main variations are recognizes within the Mixed Bushveld (Veld Type 18) of Acocks (1988) namely, the *Combretum apiculatum* Veld and the Mixed *Terminalia – Dichapetalum* Veld.

Combretum appiculatum veld (Veld Type 18a; Acocks, 1988))

This Veld Type occurs at an elevation of 750 – 1 050 m above sea level and receive a rainfall of 350 – 650 mm per annum. The soil is shallow with the prominent geology consisting of granite, sandstone, quartzite and shale, covered by a shallow layer of gritty yellow-grey sandy loam ouklip. The following prominent variations are present:

- *Combretum appiculatum* veld proper – This bush is very uniform, and rather dense, *Combretum appiculatum* being dominant throughout, with a small admixture of several other bushes and trees such as *Acacia caffra, Combretum imberbe, Dichrostachys cinerea, Lannea discolour* and *Sclerocarya birrea,* sometimes also *Albizia anthelmintica* and *Kirkia acuminata.* Many of the grasses species present are sweet and include species such as *Aristida congesta* subsp *barbicollis, Digitaria eriantha, Eragrostis* sp and *Schmidtia pappophoroides.* Less abundant are *Anthephora pubescens, Stipagrostis uniplumis, Brachiaria nigropedata, Eragrostis superba* and *Themeda triandra;*
- *Combretum - Pterocarpus* veld – This veld is a dense uniform mixture of *Combretum apiculatum* and *Pterocarpus rotundifolius* bushes, less varied than the *Combretum* veld and with a sourer type of grass. Other bushes include *Dichrostachys cinerea* and *Terminalia sericea.* The common grasses are *Aristida congesta* subsp *barbicollis, Digitaria eriantha, Eragrostis* sp (*Eragrostis trichophora*), with much *Anthephora pubescens, Aristida stipitata, Brachiaria nigropedata, Eragrostis racemosa, Heteropogon contortus* and *Schmidtia pappophoroides.* There is more *Elionurus muticus* than in the pure *Combretum* veld. The soil is very shallow with ouklip being frequently exposed on the ground surface.

Mixed Terminalia – Dichapetalum veld (Veld Type 18b; Acocks, 1988)

The following variations of this veld are recognised namely:

- *Terminalia* veld proper;
- *Combretum – Terminalia* veld;
- *Sclerocarya – Burkea* veld;
- *Burkea* veld;
- *Acacia nigrescens – Combretum apiculatum* veld;
- Opens *Sclerocarya* veld; and
- *Dombeya rotundifolia – Acacia rehmanniana* veld.

2.6.11.2 Limpopo Sweet Bushveld (Mapping Unit SVcb 19) as decribed by Mucina & Rutherford (2006)

The Thabametsi Project lies within the Limpopo Sweet Bushveld (Mapping Unit SVcb 19) (Mucina & Rutherford, 2006). The Conservation Target (% of area) from National Spatial Biodiversity Assessment (NSBA, 2004) is 19%, while only 0.6% is protected. Less than 1% statutorily conserved and limited to reserves straddling the southeastern limits of the unit, for example the D'Nyala Nature Reserve. Very little of the veld type is conserved in other reserves.

The Limpopo Sweet Bushveld (Mapping Unit SVcb 19) extends from the lower reaches of the Crocodile and Marico Rivers around Makoppa and Derdepoort, respectively, down the Limpopo River Valley including Lephalale and into the tropics past Tom Burke to the Usutu border post and Taaiboschgroet area in the north but also occurs on the Botswana side of the border.

The rainfall is low and the area is regarded to be good for game and cattle farming due to the high grazing capacity of the sweet veld (Mucina & Rutherford, 2006). The vegetation structure consists of short open woodland with a variety of shrubs and small trees. The grass sword is well developed in undisturbed areas while in disturbed areas the vegetation is dominated by thickets of trees which are nearly impenetrable such as *Dichrostachys cinerea* and *Acacia mellifera* (Mucina & Rutherford, 2006).

Important taxa include the following:

- *Tall trees*: *Acacia robusta* and *A. burkei.*
- *Small trees*: *Acacia erubescens, A. fleckii, A. nilotica, A. senegal* var*. rostrata, Albizia anthelmintica, Boscia albitrunca, Combretum apiculatum* and *Terminalia sericea.*
- *Tall shrubs: Catophractes alexandri, Dichrostachys cinerea, Phaeoptilum spinosum, Rhigozum obovatum, Cadaba aphylla, Combretum hereroense, Commiphora pyracanthoides, Ehretia rigida* subsp*. rigida, Euclea undulata, Grewia flava* and *Gymnosporia senegalensis.*
- *Low shrubs: Acacia tenuispina, Commiphora africana, Felicia muricata, Gossypium herbaceum* subsp*. africanum* and *Leucosphaera bainesii.*
- *Graminoids: Digitaria eriantha* subsp*. eriantha, Enneapogon cenchroides, Eragrostis lehmanniana, Panicum coloratum, Schmidtia pappophoroides, Aristida congesta,*

Cymbopogon nardus, Eragrostis pallens, E. rigidior, E. trichophora, Ischaemum afrum, Panicum maximum, Setaria verticillata, Stipagrostis uniplumis and *Urochloa mosambicensis;* and

- <u>Herbs:</u> *Acanthosicyos naudinianus, Commelina benghalensis, Harpagophytum procumbens* subsp. *transvaalense, Hemizygia elliottii, Hermbstaedtia odorata, Indigofera daleoides, Kleinia fulgens* and *Plectranthus neochilus.*

2.6.11.3 Sweet Bushveld (Vegetation Type 17) as described by Van Rooyen & Bredenkamp (1996)

Van Rooyen and Bredenkamp (1996) describe the area to be Sweet Bushveld (Vegetation Type 17). The Sweet Bushveld (Vegetation Type 17) as described by Van Rooyen and Bredenkamp (1996) is synonyms to the Arid Sweet Bushveld (Veld Type 14) as described by Acocks (1988). Sandy areas are dominated by trees such as Silver Cluster leaf (*Terminalia sericea*), Sandpaper Raisin (*Grewia flavescens*) and the Umbrella thorn (*Acacia tortillis*). Here the herbaceous component is often dominated by grasses such as Broom grass (*Eragrostis pallens*), Kalahari Sand Quick (*Schmidtia pappophoroides*), Hairy Love Grass (*Eragrostis trichophora*), Black footed grass (*Brachiaria nigropedata*), Common russet grass (*Loudetia simplex*), Long awned grass (*Aristida stipatata*) and other Aristida spp.

On shallower and dryer soils, Common corkwood (*Commiphora pyracanthoides*), Velvet Raisin (*Grewia flava*), Shepherds tree (*Boscia albitrunca*) and Red Bushwillow (*Combretum apiculatum*) are more prominent and dense, nearly impenetrable thickets of Blue thorn (*Acacia erubescens*), Black thorn (*Acacia mellifera*) and Sickle bush (*Dichrostachys cinerea*) are often encountered.

Grasses including Guinea grass (*Panicum maximum*), Small Panicum (*P.coloratum*), Foxtail Buffalo grass (*Cenchrus ciliaris*), Wool grass (*Anthephora pubescens*), Bottle brush grass (*Enneopogon scoparius*) and Bushveld signal grass (*Urochloa mosambicensis*) may be dominant (Low & Rebelo 1996).

The succulent herb*, Piranthus atrosanguinensis* is regarded to be biogeographically important taxa for the area (Mucina & Rutherford, 2006).

2.6.11.4 Mixed Bushveld (Vegetation Type 18) as described by Van Rooyen and Bredenkamp (1996b)

The MIxed Bushveld (Vegetation Type 18) as described by Van Rooyen and Bredenkamp (1996) is synonyms to the Mixed Bushveld (Veld Type 18) and the Sourish Mixed Busveld (Veld Type 19) as described by Acocks (1988).

According to Van Rooyen & Bredenkamp (1996b) this vegetation type is largely present. The vegetation varies from dense, short Bushveld to open tree savanna. The soil is mostly coarse, sandy and shallow, overlying granite, quartzite, sandstone or shale. The vegetation of this vegetation type varies from a dense, short Bushveld to a rather open tree savanna. Red Bushwillow (*Combretum apiculatum)* is dominant on shallow soils.

Shrubs and trees include *Acacia caffra* (Common Hook-thorn), *Dichrostachys cinerea* (Sickle bush), *Lannea discolour* (Live-long), *Sclerocarya birrea* and *Grewia* species. The grazing is

sweet and the herbaceous layer is dominated by grasses such as *Digitaria eriantha* (Finger grass), *Schmidtia pappophoroides* (Sand Quick), *Anthephora pubescens* (Wool Grass), *Stipagrostis uniplumis* and various *Aristida* and *Eragrostis* species. *Terminalia sericea* (Silver Cluster leaf) dominates on the deeper and more sandy soils with *Ochna pulcra* (Peeling Plane), *Grewia flava* (Wild Raisin), *Peltiphorum africanum* and *Burkea africana* often prominent woody species, with *Eragrostis pallens* (Broom Grass) and *Perotis patens* (Purple Spike Cat's tail) prominent.

2.6.11.5 Red data species which could occur in the region

The Pretoria Computerised Information System (PRECIS) list was obtained from the South African National Botanical Institute (SANBI) which lists all the Red Data plant species officially recorded by SANBI for QDS 2327DA. These species are listed in Table 8.

Table 8: Red data plant species that occur in the region *(Source: PRECIS)*

Species name	Family	Status
Acalypha caperonioides var. *caperonioides*	Euphorbiaceae	Data Deficient
Eulalia aurea	Poaceae	Near Threatened
Euphorbia waterbergensis	Euphorbiaceae	Rare
Corchorus psammophilus	Malvaceae	Threatened

2.6.11.6 Protected plant species which occur in the project area

A number of nationally protected tree species in terms of the National Forestry Act, 1998 (Act No. 30 of 1998) are expected to occur within the Thabametsi Project area and are listed in Table 9. Species protected under the Limpopo Environmental Management Act (Act No. 7 of 2003) (LEMA) and the National Environmental Management: Biodiversity Act (Act No. 10 of 2004 (NEMBA) will be listed and specifically adressed in the EIA. This list will be expanded upon during the EIA investigations with other information sources that may not be available yet. Studies undertaken for the neighbouring Grootegeluk Coal Mine, the proposed new power station and other projects in the area will also be used in this regard.

2.6.12 Fauna

Fauna expected to occur on site include assemblages within terrestrial and wetland ecosystems, including mammals, birds, reptiles, amphibians and invertebrates.

Each of these assemblages occurs within unique habitats and the ecological state of these habitats directly relates to the number of species found within them. The main habitats occurring in the project area are Bushveld plains and pans with little altitudinal variation.

The presence of all species listed in the following sections will be determined during the field surveys to be undertaken for the Thabametsi Project.

Table 9: Protected tree species which occur in the region

Family	Species	Common name	Illustration
Anacardiaceae	*Sclerocarya birrea*	Marula	
Capparaceae	*Boscia albitrunca*	Sheperds Bush Tree	

Family	Species	Common name	Illustration
Combretaceae	*Combretum imberbe*	Leadwood	
Fabaceae	*Acacia erioloba*	Camel Thorn	

*Though not observed on the areas affected as yet, the protected Tamboti (*Spirostachys africana*) may also occur.

2.6.12.1 Mammals

The various farms within the Thabametsi Project area are actively engaged in the wildlife industry; however, they do not have the same mammal diversity or richness. This is due to preferences of farm managers in stocking of camps. Numbers of species are therefore controlled by means of management measures.

Not all mammal species that occur within the Thabametsi Project area are indigenous to the region. Furthermore, all mammal species are actively protected and managed primarily for the economic gains, but indirectly the area serves as a refuge for a variety of small and large mammal species, which would not occur in the area otherwise.

The variety of vegetation types occurring in the area of interest ensures an ecologically diverse assemblage of plant species which in turn supports a variety of mammal species. Red Data mammals that are expected to occur on site are listed Table 10. This red data and protected species list will be updated during the EIA phase taking the IUCN red data list, the protected species listed by the Limpopo Environmental Management Act (Act No. 7 of 2003) and the National Environmental Management: Biodiverity Act (Act no. 10 of 2004) into consideration.

Table 10: Red Data Mammal Species that occur in the Greater Waterberg Area

Genus	English name	Status
Damaliscus lunatus lunatus	Tsessebe	Endangered
Hippotragus niger niger	Sable antelope	Vulnerable
Hyaena brunnea	Brown Hyena	Near Threatened
Leptailurus serval	Serval	Near Threatened
Lutra maculicollis	Spotted-necked Otter	Near Threatened
Mellivora capensis	Honey Badger	Near Threatened
Miniopterus schreibersii	Schreiber's Long-fingered Bat	Near Threatened
Myotis tricolor	Temminck's Hairy Bat	Near Threatened
Myotis welwitschii	Welwitsch’s Hairy Bat	Near Threatened
Rhinolophus clivosus	Geoffroy's Horseshoe Bat	Near Threatened
Rhinolophus darlingi	Darling's Horseshoe Bat	Near Threatened
Rhinolophus blasii	Peak-saddle Horseshoe bat	Vulnerable
Cleotis percivali	Short□eared Trident Bat	Critically Endangered
Acinonyx jubatus	Cheetah	Vulnerable
Crocuta crocuta	Spotted hyaena	Near Threatened
Atelerix frontalis	South African Hedgehog	Near Threatened

Genus	English name	Status
Hippotragus equinus	Roan Antelope	Vulnerable
Manis temminckii	Pangolin	Vulnerable
Panthera pardus	Leopard	Vulnerable
Pipistrellus rusticus	Rusty bat	Near Threatened
Rhinolophus clivosus	Geoffroy's Horseshoe	Near Threatened
Rhinolophus darlingi	Darling's Horseshoe Bat	Near Threatened
Ceratotherium simum	White rhino	Least Concern*
Tatera leucogaster	Bushveld gerbil	Data Deficient

2.6.12.2 Birds

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). Land cover is directly linked to habitats within the study area.

The diversity of these habitats should give rise to many different species. According to Roberts (2006), almost 400 species of birds have been identified in the area; the majority of these birds are comprised of Bushveld species. Of the birds that could be present within QDS 2327 DA, CA and CB, 24 have been assigned a Red Data status. These species are listed in the Table 11.

Table 11: Red data bird species that could potentially occur in the Waterberg Area

Genus	English name	Local status	Red data status	RBL[2] no.
Ciconia nigra	Black Stork	-	Near-threatened	84
Leptoptilos crumeniferus	Marabou Stork	Rare	Near-threatened	89
Mycteria ibis	Yellow-billed Stork	-	Near-threatened	90
Phoenicopterus roseus	Greater Flamingo	-	Near-threatened	96
Phoenicopterus minor	Lesser Flamingo	-	Near-threatened	97
Anas smithii	Cape Shoveler	Endemic	-	112

[2] Robert's Bird List, 2006.

Gyps coprotheres	Cape Vulture (Griffon)	-	Vulnerable	
Gyps africanus	White backed Vulture	-	Vulnerable	
Torgos tracheliotos	Lappet faced Vulture	-	Vulnerable	
Aquila rapax	Tawny Eagle	-	Vulnerable	
Sagittarius serpentarius	Secretarybird	-	Near-threatened	118
Aquila ayresii	Ayres's Hawk-Eagle	Rare	-	138
Polemaetus bellicosus	Martial Eagle	-	Vulnerable	140
Circus macrourus	Pallid Harrier	-	Near-threatened	167
Falco peregrinus	Peregrine Falcon	-	Near-threatened	171
Falco biarmicus	Lanner Falcon	-	Near-threatened	172
Falco naumanni	Lesser Kestrel	-	Vulnerable	183
Francolinus natalensis	Natal Francolin	Endemic	-	196
Francolinus swainsonii	Swainson's Spurfowl	Endemic	-	199
Podica senegalensis	African Finfoot	-	Vulnerable	229
Afrotis afraoides	Northern Black Korhaan	Endemic	-	239.1
Tringa ochropus	Green Sandpiper	Rare	-	265
Hirundo spilodera	South African Cliff-Swallow	Endemic breeding	-	528
Myrmecocichla formicivora	Anteating Chat	Endemic	-	595
Sigelus silens	Fiscal	Endemic	-	698

	Flycatcher			
Stenostira scita	Fairy Flycatcher	Endemic	-	706
Cinnyris afer	Greater Double-collared Sunbird	Endemic	-	785
Zosterops virens	Cape White-eye	Endemic	-	796

Red data and protected species lists will be updated during the EIA phase taking the IUCN red data list, the protected species listed by the LEMA and NEMBA into consideration.

2.6.12.3 Reptiles

According to Carruthers (2007) substrate is an important factor determining which habitats are suitable for which species of reptile. The presence of few rocky out crops within the study area is could mean few reptile species are present. Of the reptile species expected to occur on site, two have been assigned a Red data status. These species are listed in below.

Table 12 below.

Table 12: Red data reptile Species which could occur in the Waterberg Area

Species name	English name	Status
Lamprophis aurora	Aurora House Snake	Rare
Python natalensis	Southern African Python	Vulnerable

2.6.12.4 Amphibians

Due to their sensitivity to changes in the aquatic and terrestrial environments, amphibians are considered to be exceptional indicators of changes to the entire (Waddle, 2006). Numerous species of amphibians are dependent on the aquatic environment for reproduction (Duellman & Trueb, 1986).

In addition, because of their permeable skin, amphibians are sensitive to water quality and UV radiation (Gerlanc & Kaufman, 2005; Taylor et al., 2005). Activities such as feeding and dispersal are spent in terrestrial environments (Waddle, 2006).

According to Carruthers (2001), numerous factors influence the distribution of amphibians, but for the reason that amphibians have porous skin they usually thrive in warm and damp habitats. The presence of suitable habitat within the study area ought to provide a number of different species of amphibians.

Frogs occur throughout southern Africa (Carruthers, 2001). Various factors influence their distribution and they are commonly restricted to the habitat type they prefer, more 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.

A collection of amphibians associated with the Savanna biome will thus choose to breed under the prevailing biotic and abiotic features present. All the species of frogs associated with the Savanna biome is distinguished into diverse niches, such as banks of pans, open water, inundated grasses, reed beds, trees, rivers and open ground, all of which are present within the area of interest.

Red data Amphibians expected to occur on site are listed in Table 13. This red data and protected species list will be updated during the EIA phase taking the IUCN red data list, the protected species listed by the Limpopo Environmental Management Act (Act No. 7 of 2003) and the National Environmental Management: Biodiverity Act (Act no. 10 of 2004) into consideration.

Table 13: Rare Amphibian species that occur in the Waterberg Area

Genus	English name	Conservation status
Afrixalus aureus	Golden Leaf-Folding Frog	Rare
Hyperolius pickersgilli	Pickersgill's Reed Frog	Rare
Pyxicephalus adspersus	Giant Bullfrog	Endangered

2.6.12.5 Invertebrates

The Red data invertebrate species that are expected to occur in the project area are listed in Table 14 below.

Table 14: Red Data Lepidoptera species occurring in the Waterberg Area

Scientific name	Habitat	Conservation status
Acraea (Acreae) machequena	Bushveld	Red Data
Aloeides dentatis maseruna	Grassland	Vulnerable
Tuxentius melaena griqua	Riparian	Red Data
Lepidochrysops hypopodia	Grassland	Red Data
Lepidochrysops praeterita	Grassland	Red Data
Spialia paula	Bushveld	Red Data
Metisella meninx	Riparian	Red Data
Andronymus neander neander	Bushveld	Red Data
Gegenes hottentota	Riparian	Vulnerable
Platylesches dolomitica	Grassland	Vulnerable
Neita neita	Bushveld	Red Data

This red data and protected species list will be updated during the EIA phase taking the IUCN red data list, the protected species listed by the LEMA and NEMBA into consideration.

Other red data species recorded recently in the Lephahale area, include two species of baboon spiders, also listed as red data species, namely *Ceratogyrus darlingi* (horned baboon spiders) and *Augacephalus junodi* (*Pterinochilus junodi*) (golden baboon spiders). Another two different species of baboon spiders that may potentially be present include *Ceratogyrus bechuanicus* (Starbust Horned Baboon Spider) and *Ceratogyrus brachycephalus* (Rhino-horned Baboon Spider).

2.6.13 Wetlands

The potential for the presence of wetlands in the study area is regarded as low, since the surrounding soils have a high sand content and are therefore well drained. The surrounding soils are characterized by deep sands that promote surface water infiltration and groundwater aquifer recharge.

However, based on the findings of the desktop wetland assessment, a number of isolated and connected seasonal pans were identified. According to Allan *et. al*. (1995) pans result from sediment scouring due to the swirling wind action that creates circular or bean-shaped seasonal pans. The pan floors are normally lined with an impermeable layer such as calcrete that minimises infiltration rates. Some of the pans are completely isolated while some are connected to each other by wooded drainage lines. The woody vegetation associated with the wooded drainage lines is of a physical structure that is distinct from that of surrounding areas.

Some of the wooded drainage lines could not be confirmed as wetland areas at desktop level and therefore were labelled as areas of interest until ground truthing can be undertaken. The wetland areas which have been delineated at desktop level as well as additional areas of interest which will be investigated are presented Plan 8.

3 IDENTIFICATION OF THE ANTICIPATED ENVIRONMENTAL, SOCIAL OR CULTURAL IMPACTS, INCLUDING THE CUMULATIVE IMPACTS, WHERE APPLICABLE

3.1 Provide a description of the proposed prospecting or mining operation including a map showing the spatial locality of infrastructure, extraction area, and any associated activities

The objective of the proposed Thabametsi Project is to mine coal via opencast and underground methods on the farms McCabesvley 311LQ, Van Der Waltspan 311LQ, Zaagput 307LQ, Jackhalsvley 309LQ and Vaalpensloop 313LQ (both Portion 1 and Restant). The locations of the main coal extraction, beneficiation and associated infrastructure areas are illustrated in Plan 9, Plan 10 and Plan 11 (Appendix A). The planned production rate will increase to 33.7 Mtpa of product in 2030.

This section provides a background with regards to the location of the proposed mining areas, associated infrastructure such as access roads, power lines, conveyor belt routes, discard dump facilities, water storage facilities and pipelines, pollution control dams, offices, primary and secondary crushing plants, coal beneficiation plants, diesel and lubricant storage facilities, etc.

3.1.1 North Complex

3.1.1.1 Mining

Truck and shovel opencast mining methodology will be used during the mining of North Complex. The open pit will be established on the farm McCabesvley 311 LQ, advancing onto Zaagput 307 LQ and towards the later years of mining on the farm Van Der Waltspan 310 LQ. The boxcut will be constructed near the south-eastern corner of the proposed opencast mine pit as indicated in Plan 10. Mining will occur from the boxcut predominantly in a western direction, then in a northern direction and then from west to east.

Exxaro proposes that four benches will be established, of which two overburden and two coal benches. The bench height will be approximately 30 m. The overburden bench #1 will be established if the total overburden thickens exceeds 30 m. The stripping operation will remove the topsoil and subsoil will expose the hard overburden of the next cut. The continuity of this process is essential in order to ensure that sufficient workroom is maintained.

The initial topsoil and subsoil will be hauled to a designated area and stored until it can be used for rehabilitation. The hard overburden will be drilled and blasted. The hard overburden and plant discard material will also be hauled to a designated dumping area during the initial state. When a steady state is reached, waste materials will be backfilled and rehabilitation will commence as part of the backfilling process.

Once the overburden has been removed, the run-of-mine (“ROM”) coal will be transferred to the plant by means of a load and haul operation initially, followed by an in-pit crushing and conveying system in future. For this purpose and for backfilling, the main coal beneficiation complex and discard dump has been located adjacent to the main pit, mostly in the vicinity of the farm Van der Waltspan 310 LQ. This open cast pit, coal beneficiation plant and associated discard disposal facilities will be known as the Northern Mine Complex.

To summarise, the open cast pit mining process involves various steps and Figure 8 below illustrates the actions involved, classified sequentially as follows:

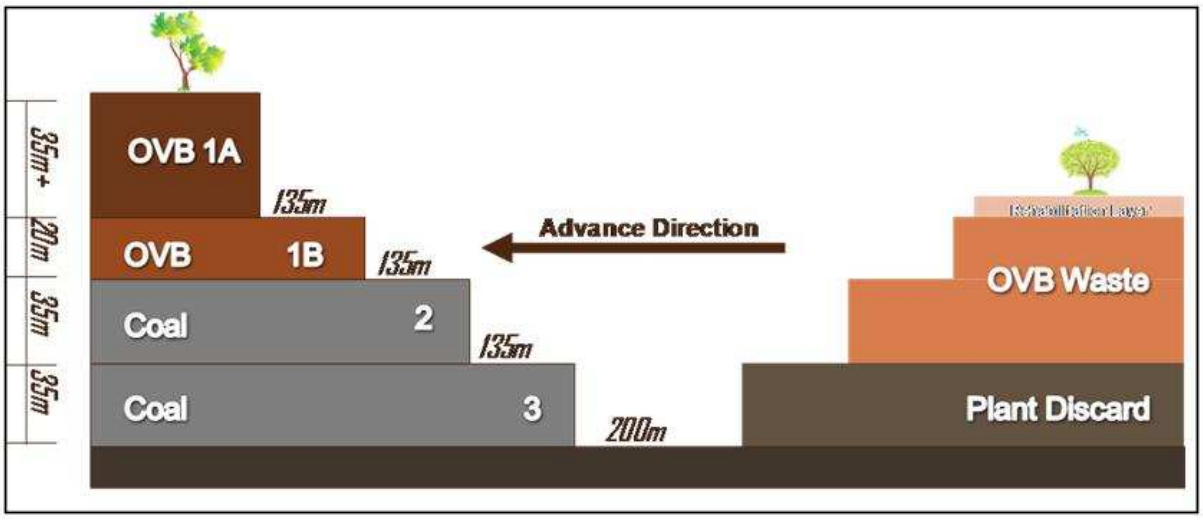


Figure 8: Actions involved with open pit mining

The sequence of mining can be classified as follows:

- Vegetation clearance;
- Strip topsoil;
- Remove sub-soil;
- Drill and blast hard overburden;
- Load and haul the hard overburden;
- Clean the top of the coal;
- Drill and blast coal;
- Load and haul coal; and
- Backfill all waste according to the backfilling procedure.

3.1.1.2 Processing Plant

The plan is to construct beneficiation facilities at the North Complex for the production of ROM coal as well as various beneficiated products including an Eskom type of steam coal and a semi-soft coking coal ("SSCC"). For the IPP type steam coal the processing plant will mainly consist of crushing, screening and materials handling processes and equipment.

The basic plant design consists of a crushing and screening plant, a ROM stockpile from which material is fed into the beneficiation plant which is followed by a stock yard system and a discard handling system.

The process block flow diagram for the coal preparation plant ("CPP") is shown in Figure 9 below.

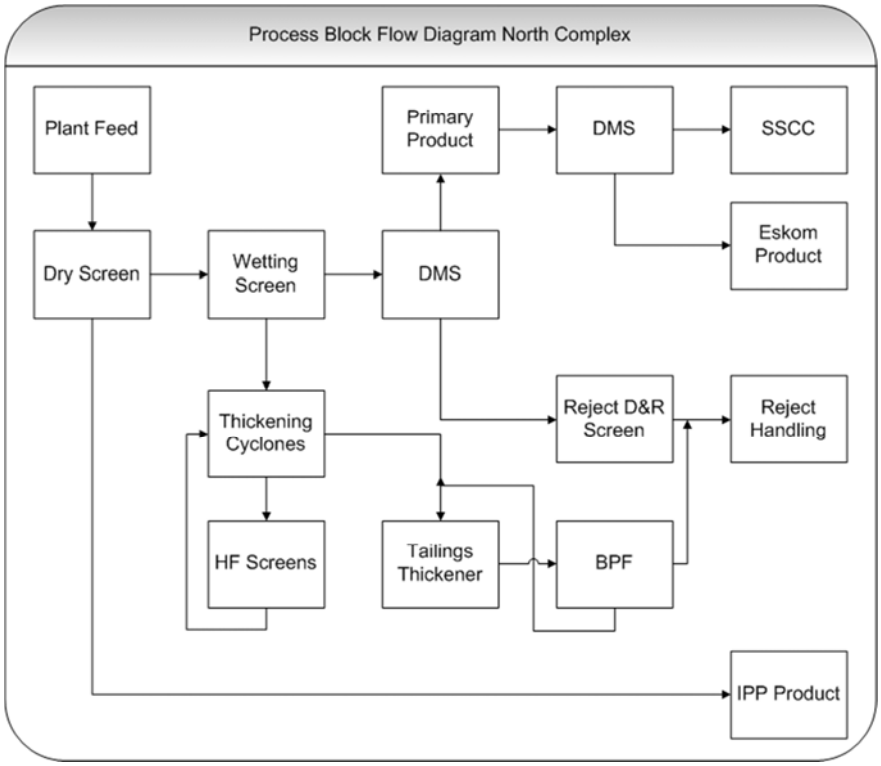


Figure 9: Coal Processing Plant North Complex

ROM from the pit will be crushed and stockpiled in a bunker. From the bunker material will be feeding the dry screening plants for stage crushing and/or by-passing of fine coal. From the screening plants the coal will be feeding pre-wetting/de-sliming screens.

The coal will then go through 2 dense medium separation cycles to produce Eskom coal and semi soft coking coal respectively.

Discards will be generated in the beneficiation plant. For as long there is insufficient space in the pit (five to ten years) discards and overburden will be stacked on a surface dump next to the pit. After the mine have been opened sufficiently all discards and overburden shall be used for backfilling of the mined-out pit.

Feed to and reclaiming from the stockyard is via a series of wide conveyors.

The plants high level operating parameters are as follows:

Table 15: Plant high level operating parameters

Processing Plant Eskom/SSCC	
ROM Dry Tons Max	34 Mt/year
Production hours	6300 hours/year
Product Dry tons	21-25 Mt/year
Products	SSCC = 2.5mtpa and Eskom =15.5mtpa

Processing Plant Eskom/SSCC	
	IPP = 12 mtpa

3.1.1.3 Infrastructure

The infrastructure layout will be developed into three definite functional areas; administration area, plant area and mining area.

Administration area

The administration area contains all the general admin buildings as well as the Materials Management Store, Restaurant, Change House, Security and Training and the Guard House and Entrance. General water supply and treatment infrastructure is also situated in this area.

Plant area

The Plant Administration, Plant Workshop and the Laboratory are situated in this area where the major plant building is situated. Also in this area are original equipment manufacturer ("OEM") Workshops, Hazardous waste and General waste areas.

Mining area

This area is close to the mining area and is totally separate from the other facilities. The mining area infrastructure includes:

- Shift change over area with ablutions;
- Temporary fuel depot;
- Heavy vehicle wash bay;
- Garage and Lube store;
- Bulk fuel storage area;
- Mining wash bay and tyre bay;
- Mining store;
- Mining OEM workshop;
- Mining administration; and
- Geological exploration shed.

A definite red area can be defined in this area separating operations from administration.

Temporary Infrastructure

Temporary infrastructures will be required during the construction phase for the establishment of the permanent infrastructure. This includes amongst others:

- Temporary potable and raw water supply;
- Temporary electrical connection;
- Client project offices;
- Temporary access control;
- Fencing;
- Temporary fuel installation;

- Construction water dams;
- Temporary waste handling area;
- Construction Village; and
- Temporary sewer treatment plant.

3.1.2 South Complex

3.1.2.1 Mining Underground

Underground mining will be located on the farms Jackhalsvley 309 LQ and Vaalpensloop 313 LQ (both Portion 1 and Restant) and will be known as the Southern Mine Complex. The underground board and pillar method with stooping, i.e. final pillar extraction technique will be used. The access will be achieved by a box-cut, or mini-pit, in the lowest depth of the coal resource on the south-eastern corner of the farm Vaalpensloop 313 LQ. Coal from the mini-pit will be hauled to a crushing and screening plant from where it will be fed into the washing plant for further beneficiation. A plant discard area has been designed for the Southern Mine Complex.

Two main developments will be established from the mini-pit, through a north-south running dyke which giving access to each mining zone. The main development in each mining zone will establish a single secondary development. After the development is completed, production panels will be mined, using the return stooping. The necessary developments will also be stooped in each zone, which will be sealed after the total extraction of the zone. Coal will be mined using a Continuous Miner ("CM"). The roof of the mine will be supported using a roof-bolting machine after each cut by the CM. ROM coal will be hauled by shuttle cars to the feeder breaker, which will doze the ROM coal onto a conveyor belt and to the crushing and screening plant. This material will then be fed to the washing plant for beneficiation.

The underground mining process can be summarised as follows:

- Cut coal using the CM and transported to the feeder by the shuttle cars;
- Doze coal onto the conveyor belt using feeder-breaker and transport ROM to the beneficiation plant via conveyor belt;
- Store coal on product stockpiles; and
- Transport product to market via rail.

3.1.2.2 Mining Mini Pit

The mining method will be an open pit using bench mining technique. Four benches will be established, two overburden (if overburden thickness is higher than 30m, if not only one bench, bench 2) and two coal benches. Bench height will be approximately 30m.

The stripping operation removes the topsoil and subsoil exposes the hard overburden of the next cut. The continuity of this process is essential in order to ensure that sufficient workroom is maintained. The initial topsoil and subsoil will be hauled to a designated area and be used for rehabilitation later on. . The hard overburden will be drilled and blasted. The hard overburden material also will be hauled to a designed dumping area during the initial state. The plant discard material will be also hauled during the initial state to a designed dumping are. When steady state is reached, all waste materials is backfilled and

rehabilitated adequately addressed by means of a backfilling process. Once the overburden has been removed, the coal (run of mine) is transferred to the plant by means of a loading and hauling operation.

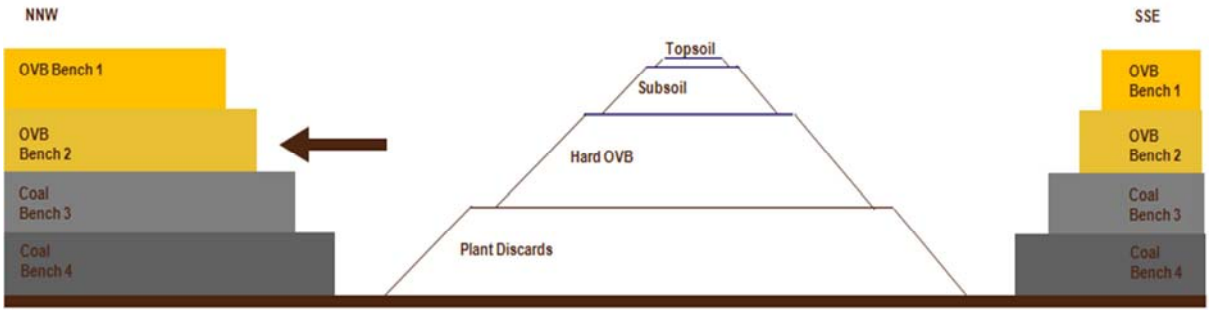


Figure 10: Actions involved with mini pit mining

Figure 10 above involves the following actions, classified sequentially as follows:

a) Strip top soil;

b) Remove sub-soil;

c) Drill and blast hard overburden;

d) Load and Haul the hard overburden;

e) Clean the top of the coal;

f) Drill and blast coal;

g) Load and haul coal; and

h) Backfill all waste according to the backfilling procedure (at the bottom plan discard material covered by the hard overburden material and sealed by the soft overburden material, the surface is rehabilitated by topsoil).

3.1.2.3 Processing Plant Underground

The processing plant for the underground mining section will be very similar to the processing plant described for the open cast mining section. Figure 11 hereunder describes the process on a high level.

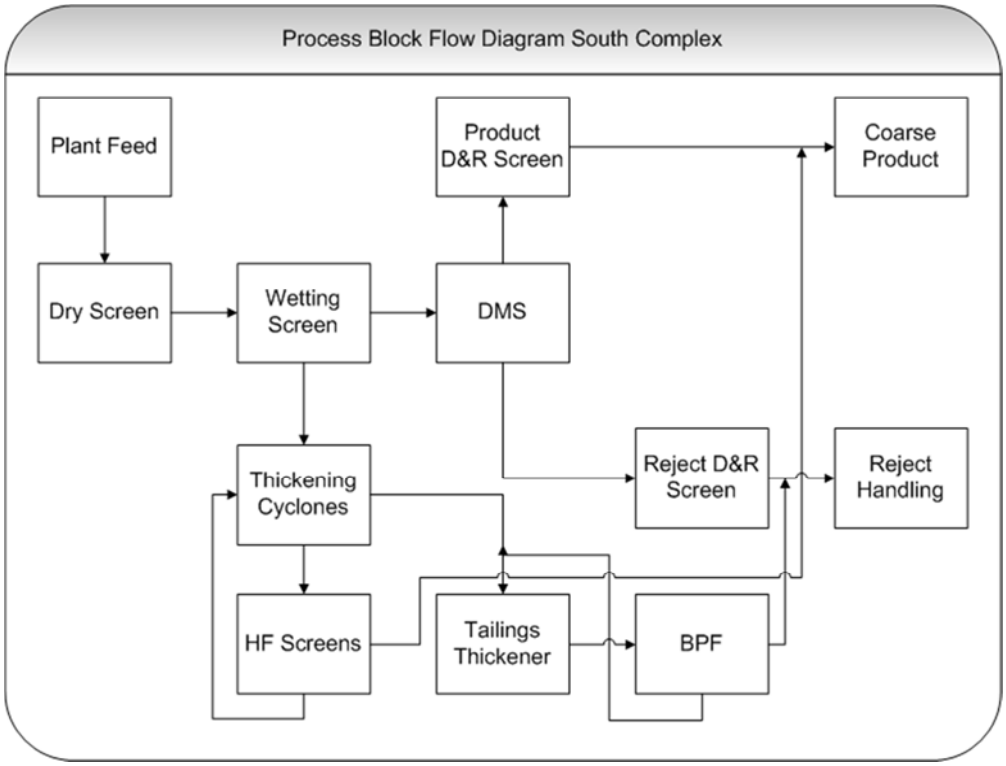


Figure 11: Coal Processing Plant South Complex

The plant will be designed to treat 2-3 Mtpa of ROM materials. The ROM material at a top size of 350 mm will be received from the mining operation. The coal will be crushed to -80 mm through a crushing section. This material will then be fed to the washing plant for beneficiation. The beneficiation plant will split the material between rejects and metallurgical coking coal. The product will be fed via conveyors to the product stockyard area and the discard material goes to the rejects handling facility.

Table 16: Processing plant underground high level operating parameters

Processing Plant Underground	
ROM Dry Tons Max	2-3Mtpa
Production hours	6300 hours/year
Product Dry tons	1.5-2.5Mtpa

3.1.2.4 Processing Plant Mini Pit

The Basic plant design for the mini pit consists of a crushing and screening plant feeding a ROM stockpile from which material is fed into the single stage beneficiation plant where the product and discards will be separated. The discards will be stacked discard areas outside the pit until the pit development is sufficient to allow backfilling. The product (Eskom type steam coal) will be blended and handled on a stockyard before dispatched on rail. The plant will be designed to treat 12 million tons per annum (t/yr) of ROM material. The slimes will

be thickened and then sent to the filter plant where the filter cake will be produced and sold as product or discarded.

The plant will be designed to treat 2-3 Mtpa of ROM materials. The ROM material at a top size of 350 mm will be received from the mining operation. The coal will be crushed to -80 mm through a crushing section. This material will then be fed to the washing plant for beneficiation. The beneficiation plant will split the material between rejects and metallurgical coking coal. The product will be fed via conveyors to the product stockyard area and the discard material goes to the rejects handling facility.

Table 17: Processing plant mini pit high level operating parameters

Processing Plant Mini Pit	
ROM Dry Tons Max	12 Mt/year
Production hours	6300 hours/year
Product Dry tons	5-6Mtpa

3.1.2.5 Infrastructure

The infrastructure layout developed into two definite functional areas; the administration area and the plant area

Administration area

The administration area contains all the general admin buildings like the workshops the offices and the stores.

Plant area

The plant area contains the storm water dam, the pollution control and the water treatment plan.

3.1.3 Project time frames

It is proposed that the initial mining activities will start within a year after the MRA has been granted by the DMR. The development of the mine (construction and preparation) will be done over a two-year period including mining activities such as overburden stripping where after the production of coal will commence.

The mine will be developed in a phased approach, starting with the initial development of the main pit in 2014/2015 and ramping up gradually to full production of the main pit, mini pit and the underground sections around 2025. Infrastructure will be developed as the various sections are phased in starting with very limited infrastructure for the first five years.

The coal production is planned to start in 2017 with ROM being produced from the mining development in the main pit which will be transported to Grootegeluk for beneficiation until 2019. The Thabametsi Project will have a Life of Mine (“LOM”) of approximately 40 years.

From 2019, the coal necessary for the IPP power station will be produced and transported via conveyor belt to the IPP site which is to be located to the north of the Thabametsi Mine.

Coal products will also be beneficiated for other domestic and export port markets and the timing thereof is dependent on the availability of water supply.

3.1.4 Project infrastructure and resource requirements

3.1.4.1 General

In addition to the general mining infrastructure rail and road access will be required to and from the mine as well as electricity supply (power lines and a sub-stations) and water supply (reservoirs, pipelines and booster pumps).

3.1.4.2 Water supply

The raw water consumption for the coal preparation plants will be approximately 900L per tonne of ROM to be beneficiated. It is important to note that this figure includes the coal preparation plant and excludes dust suppression for the entire mine.

The existing supply of raw water to the area is a constraint. Therefore large scale beneficiation of coal is only likely to commence only once MCWAP-2 is implemented by the DWA. It is expected that this project will be operational by 2018/19.

A discard dump is under investigation. Provision will be made for a footprint of both a five year and 40 year discard dump facilities in order to ensure the best practice.

3.1.4.3 Rail transport

Transnet has recently embarked on a R300 billion expansion strategy which is to be implemented over the next seven years which includes the expansion of the rail capacity from the Waterberg area to enable the railing of the beneficiated coal. From 2021 both Eskom steam coal and SSCC will be produced. These products will be put on rail to the respective clients. Underground mining will start in 2022 producing ROM which will be transported to the Southern Mine Complex plant for beneficiation from where the product will be railed to customers.

3.2 Describe any listed activities (in terms of the NEMA EIA regulations) which will be occurring within the proposed prospecting or mining operation

The activities listed in terms of the EIA Regulations that are applicable to the proposed Thabametsi Project are described in Table 18.

Table 18: Applicable NEMA listed activities for the Thabametsi Project

GNR	No	Activity description	Project activity
544	9.	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water-	Raw water pipeline (3 250 m^3/hr) Portable water pipeline (680 m^3/hr)

GNR	No	Activity description	Project activity
		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 facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b. where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.	
544	10.	The construction of facilities or infrastructure for the transmission and distribution of electricity – i. outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or ii. inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	Eskom Switchyard 33kV switchroom 40 Mva Transformers Underground electrical cables 33kV Plant substation 33 kV 132 kV electrical overhead power line 33kV overhead electrical power line

GNR	No	Activity description	Project activity
544	11.	The construction of: i. canals; ii. channels; iii. bridges; iv. dams; v. weirs; vi. bulk storm water outlet structures; vii. marinas; viii. jetties exceeding 50 square metres in size; ix. slipways exceeding 50 square metres in size; x. buildings exceeding 50 square metres in size; or xi. infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.	Confirm that no channels; bridges; dams; weirs; or bulk storm water outlet structures will be constructed within a watercourse or within 32 metres of a watercourse.
544	12.	The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010;	Raw water buffer dam.
544	13.	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;	Bunded oil storage above ground combined capacity 120m^3 (120 000 litre)

GNR	No	Activity description	Project activity
544	22.	The construction of a road, outside urban areas, i. with a reserve wider than 13,5 meters or, ii. where no reserve exists where the road is wider than 8 metres, or iii. for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	Opencast pit area – road reserve wider than 30 meters Surfaced roads (7.8 meters wide) Gravel roads (6 meters wide) Haul roads (24 meters wide)
544	23.	The transformation of undeveloped, vacant or derelict land to - i. residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or ii. residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; - except where such transformation takes place for linear activities.	Staff parking Bus and taxi stop Training centre Future training centre Clinic Security offices Change house Future change house Admin building
545	3.	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	Temp fuel depot (diesel storage 240 000m^3) Bunded fuel storage above ground combined 1000m^3
545	5.	The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the	Raw water buffer dam Portable reservoir Utility pump station Stormwater dam 1

GNR	No	Activity description	Project activity
		generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or 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 that Act will apply.	Stockpile areas Discard dump 3 Stormwater dam 2 Raw water dam No 2 Containerized sewerage treatment facility Stormwater dam 3 Stormwater dam 4 Stormwater dam 5 Plant thickeners
545	7.	The construction of i. airports, or ii. runways or aircraft landing strips longer than 1,4 kilometres.	Helipad close to admin building
545	8.	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	40 Mva Transformers Future 40 Mva transformer
545	15.	Physical alteration of undeveloped vacant or derelict land for residential retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for: i. linear development activities; or ii. agriculture or afforrestation where activity 16 in this Schedule will apply.	Staff Parking Bus and taxi stop Training centre Future training centre Clinic Security offices Change house Future Change house Admin building
545	18.	The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before 03 July 2006 and which have not been authorised by a competent authority in terms of the Environmental Impact	

GNR	No	Activity description	Project activity
		Assessment Regulations, 2006 or 2009, made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006,- i. it is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998); ii. it is a road administered by a provincial authority; iii. the road reserve is wider than 30 metres; or iv. the road will cater for more than one lane of traffic in both directions.	
545	26.	Commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), except where such commencement requires basic assessment in terms of Notice No. R544 of 2010.	Confirm that there will be no activities that will require a atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

3.3 Specifically confirm that the community and identified interested and affected parties have been consulted and that they agree that the potential impacts identified include those identified by them

The PPP has been initiated and the relevant information documentation distributed to I&APs, although parties have not yet been able to comment on the identification of potential impacts associated with the proposed project.

All impacts identified by I&APs will be taken into account during the EIA phase for the Thabametsi Project in order to design management plans to avoid or reduce negative impacts, while enhancing the positive impacts associated with the proposed project.

Some of the main socio-economic, environmental and sustainability issues that were identified during consultation with I&APs in the Waterberg area during consultation on other mining developments in the region include:

- The expected impact on the game hunting, nature and eco-tourism based tourism businesses operated by farmers due to mining developments in close proximity to these businesses;

- Need for an assessment of the socio-economic and environmental sustainability of mining versus agriculture and tourism in terms of Section 39 (3) b (ii) of the MPRDA;
- Need for existing and future mining companies to assess the cumulative impacts of mining on local communities and agriculture activities in the area;
- Expected increase in noise, dust and traffic levels and the impact thereof on local communities and the already stressed public-shared infrastructure;
- Disturbance of the fauna and flora on farms of surrounding landowners;
- Loss of sense of place and the "African" or "Bushveld" experience;
- Expected job and local procurement opportunities for the affected local communities;
- The need for skills development and training of local communities to equip them for employment in the mining industry and other industrial developments in the area;
- Concern about the pressure on delivery of housing and related shared municipal service infrastructure (i.e. roads, water supply, etc.) to meet the demands of new mining developments and industrial;
- Major concern regarding water supply for mining developments and the need to assess potential impacts on downstream water users and underground boreholes; and
- Safety and security due to increased poaching and theft, as well as associated land invasion leading to informal settlements on farming areas.

3.4 Provide a list and description of potential impacts on the cultural environment, if applicable

3.4.1 Provide a list and description of potential impacts identified on the heritage environment, if applicable

The anticipated impacts of the proposed Thabametsi Project on the heritage environment are listed in Table 19.

Table 19: Anticipated impacts on the heritage environment

Nature	Phase of project	Direction of change	Extent of impact
Altered sense of place, or the "African" and "Bushveld" experience.	Construction and operation	Negative/ negative	Site and surrounds
The arterial roads R510 and R33, and secondary roads D1675, D2001 and D2816 are important tourists roads for those travelling to Botswana. These roads are visible in the preliminary viewshed and will have a visual impact on tourists if visible in the practical viewshed.	Construction and operation	Negative	Site and surrounds
The potential visual impact on, and loss of sense of place for tourism operations	Construction and	Negative	Site and

Nature	Phase of project	Direction of change	Extent of impact
such as hunting and photographic safaris.	operation		surrounds
The potential visual impact of dust generated during mining operations on tourism, farm houses and settlements.	Construction and operation	Negative	Site and surrounds
Potential alteration, damage to or destruction of archaeological sites, more specifically sites with subsurface Late Stone Age artefacts.	Construction and operation	Negative	Site
Potential alteration, damage to or destruction of historical buildings and structures older than 60 years.	Construction and operation	Negative	Site and surrounds
Potential alteration, damage to or destruction of burial sites and cemeteries.	Construction and operation	Negative	Site

3.4.2 Provide a list and description of potential impacts identified on the socio-economic conditions of any person on the property and on any adjacent or non-adjacent property who may be affected by the proposed prospecting or mining operations

The anticipated impacts of the proposed project on the socio-economic conditions of directly affected and adjacent land owners and other persons in the vicinity of the project are listed in Table 20.

Table 20: Anticipated socio-economic impacts

Nature	Phase of project	Direction of change	Extent of impact
Increase in the GDP of the national and local economies due capital expenditure during project planning and construction.	Construction	Positive	Local and national
Increase in government revenue due to international investment attracted by the project.	Construction and operation	Positive	Local and national
Exacerbation of some of the developmental challenges currently experienced in the Lephalale LM, specifically basic service delivery and the maintenance of infrastructure.	Construction and operation	Negative	Local

Nature	Phase of project	Direction of change	Extent of impact
Coal mining and beneficiation projects area associated with significant ecological, visual and noise impacts and therefore, the project is expected to create additional pressure on the local eco-tourism industry.	Construction and operation	Negative	Surrounding area
Possible decline in the standard of living of the households dependent on the activities of the surrounding eco-tourism activities.	Construction and operation	Negative	Surrounding area
Stimulation of the local business tourists and real estate industry due to the influx of workers and contractors.	Construction and operation	Positive	Local
Disruption of daily movement patterns and lives of people due to increased traffic on local roads.	Construction and operation	Negative	Local
Impact on property and land values in the surrounding area.	Construction and operation	Negative/ positive	Surrounding area
Increased development in supporting infrastructure and services.	Construction and operation	Positive	Local
Upon closure of the mine it can be anticipated that the stimulation of the local business tourist and real estate industries will be affected as workers and contractor move out of the local area.	Decommissioning and closure	Negative	Local

3.4.3 Provide a list of potential impacts (positive and negative) on employment opportunities, community health, community proximity and links to the Social and Labour Plan

The anticipated impacts on employment opportunities and communities due to the proposed Thabametsi Project are listed in Table 21.

Table 21: Anticipated impacts on employment opportunities and communities

Nature	Phase of project	Direction of change	Extent of impact
Creation of employment in local and national economies though direct and	Construction and operation	Positive	Local and national

Nature	Phase of project	Direction of change	Extent of impact
multiplier effects as a result of capital expenditure and construction activities.			
Skills development due to the creation of new employment opportunities.	Construction and operation	Positive	Local and National
Improved standard of living of households directly or indirectly benefiting from created employment opportunities.	Construction and operation	Positive	Local and national
Possible decline in the standard of living of the households dependent on the activities of the surrounding game farming activities.	Construction and operation	Negative	Surrounding area
Influx of workers and job seekers resulting in changes to population demographics.	Construction and operation	Negative	Local
Possible increase in road accidents and deterioration of local road conditions due to increase in traffic	Construction and operation	Negative	Local
Increase in social pathologies associated with influx of migrant labourers and job seekers to the area	Construction and operation	Negative	Surrounding area
Added pressure on basic services and social and economic infrastructure	Construction and operation	Negative	Local
Investment in the local community and economic development projects as part of Exxaro's corporation and social investment plans.	Construction and operation	Positive	Local
After closure there will be a reduction in employment with respect to this mine. It is anticipated that other employment opportunities will be presented as the coal mining industry develops in the area.	Decommissioning and closure	Negative	Local

3.4.4 Provide a list and description of potential impacts identified on the biophysical environment including but not limited to impacts on flora, fauna, water resources, air, noise, soil, etc.

3.4.4.1 Topography

Opencast and underground coal mining are known to have significant impacts on the topography of the mine site in that large amounts of soils and overburden must be removed in order to access the coal reserves. The anticipated impacts of project activities on the topography are described in Table 22.

Table 22: Anticipated impacts on the topography

Nature	Phase of project	Direction of change	Extent of impact
The main opencast pit and mini-pit will result in a change in topography as topsoil and overburden will be removed in order to accesses the coal reserves below the surface.	Construction and operation	Negative	Local
The removed topsoil will be placed in dumps which will alter the topography and drainage patterns of the site.	Construction and operation	Negative	Local
The construction of mine infrastructure such as roads, buildings, railway lines and dams will alter the topography and drainage patterns of the site. Accidental diesel and oil spillage.	Construction and operation	Negative	Local
Decommissioning, rehabilitation and closure will restore topography closer to its original state.	Decommissioning and closure	Positive	Local

3.4.4.2 Soils and land capability

Opencast coal mining significantly impacts on the soils and land capability of mining sites as soils must be removed from the mining footprint in order to access the coal reserves. Other areas are usually impacted through the movement of heavy vehicles and machines.

Impacts on the quality and quantity of soils, as well as the fragmentation of available land through infrastructure placement eventually impacts on the land capability of the affected site. The anticipated impacts of project activities on soils and land capability are described in Table 23.

Table 23: Anticipated impacts on soils and land capability

Nature	Phase of project	Direction of change	Extent of impact
Loss of topsoil due to stripping, handling and placement of the soil associated with the pre-construction land clearing.	Construction	Negative	Site
There is a high probability that topsoil will be loss due to wind and water erosion, which will alter the soils properties. Stockpiling and subsequent mixing of soil layers during handling will ultimately have a negative effect on altering the basic soil properties.	Construction	Negative	Site
Alteration of the natural surface topography due to re-profiling during construction after stripping will have an accumulation effect on the soils.	Construction	Negative	Local
Topsoil may be contaminated during the removal by machinery and transport to topsoil stockpiles. Contamination of stockpiled soil may occur due to seepage or contact with dirty surface water.	Construction and operation	Negative	Site
Change in land use as the mine is constructed and operated potentially resulting in the loss of land capability in terms of mixed grazing land use.	Construction and operation	Negative	Site
Compaction of soils for the construction of roads, buildings and the movement of heavy machinery on exposed surfaces.	Construction and operation	Negative	Site
Rehabilitation of soils and vegetation on site during the decommissioning and closure phases.	Decommissioning and closure	Positive	Site
De-grading in land use and land capability during the rehabilitation phase when compared to the pre-existing state of the environment.	Decommissioning and closure	Negative	Site

3.4.4.3 Water resources

The main activities that constitute significant water uses in the catchment area in which the Thabametsi Project is situated include:

- Agricultural activities, mainly livestock watering;
- Industrial activities, mainly coal-fired power generation at the Matimba Power Station and construction of Medupi Power Station;
- Mining and coal beneficiation, mainly at Grootegeluk Coal Mine; and
- Domestic water supply by municipalities.

It has been widely recognised by numerous local, district and regional government policies and frameworks that the limited water supply within the Lephalale LM has and is currently hindering development. These activities all impact on the quality of water, which further impacts on the availability of supply of water to fulfil basic human and ecological needs.

Possible impacts on water resources that can arise from mining activities relate to both the volume and quality of water entering or leaving water resources and are summarised in Table 24.

Table 24: Anticipated impacts on water resources

Nature	Phase of project	Direction of change	Extent of impact
Potential contamination of key surface water resources such as the Sandloop, Mokolo and Limpopo River.	Construction and operation	Negative	Local and regional
Reduced availability to downstream/down-gradient water users due to changes in water quantity or flow regime.	Construction and operation	Negative	Local and regional
Reduced availability of water to surrounding water users due to physical obstruction from mine infrastructure (open pits, residue deposits, etc.).	Construction and operation	Negative	Local and regional
Damage to the aquatic ecosystem due to substances contained in accidental spillage or contaminated runoff from the mine.	Construction and operation	Negative	Local and regional
Scouring effect on stream banks and bed due to runoff from the mine (clean water diversions, storm water drains, road culverts, etc.).	Construction and operation	Negative	Local

Nature	Phase of project	Direction of change	Extent of impact
Increased erosion from areas of exposed soils leading to increase in suspended solid content.	Construction and operation	Negative	Local
Alteration of flooding risk due to changes in catchment hydrology.	Construction and operation	Negative/ Positive	Local and regional
Rehabilitation after decommissioning.	Decommissioning and closure	Positive	Local
Rehabilitation of aquatic ecosystems.	Decommissioning and closure	Positive	Local
Contouring of the landscape to improve surface water runoff to avoid contamination of aquatic ecosystems.	Decommissioning and closure	Positive	Local

3.4.4.4 Groundwater aquifers

The anticipated impacts of the Thabametsi Project on groundwater aquifers are listed and described in Table 25.

Table 25: Anticipated impacts on groundwater aquifers

Nature	Phase of project	Direction of change	Extent of impact
Potential impact on water boreholes used by farmers for agricultural activities and associated reliance on groundwater resources.	Construction and operational	Negative	Local
Groundwater inflow into the open pits during mining.	Operational	Negative	Local
Groundwater quality and quantity impacts by mining and coal beneficiation.	Operational	Negative	Local and regional
Formation of Acid Mine Drainage (AMD) from exposed coal surfaces and backfilling of overburden.	Operational	Negative	Local and regional
Contamination of groundwater as a result of decommissioning activities e.g. compaction of soils and potential hydrocarbon spillages.	Decommissioning and closure	Negative	Local and regional

Nature	Phase of project	Direction of change	Extent of impact
Decant post closure once groundwater levels return to normal.	Post closure	Negative	Local and regional

3.4.4.5 Air quality

Particulates present the main pollutant of concern from mining operations. Fugitive dust from materials handling operations, wind erosion, crushing and screening and vehicle entrainment on paved and unpaved roads are classified as routine emissions and are fairly constant throughout the year. Other sources of fugitive dust associated with open cast mining operations include drilling and blasting activities.

The anticipated impacts of the proposed project on air quality in the vicinity of the project site are listed in Table 26.

Table 26: Anticipated impacts on air quality

Nature	Phase of project	Direction of change	Extent of impact
Vehicle activity on paved and unpaved roads leading to gaseous and particulate emissions, as well as fugitive dust.	Construction and operation	Negative	Local
Opencast and underground mining operations, including drilling and blasting, leading to fugitive dust.	Operation	Negative	Local
Materials handling operations and conveyors, leading to fugitive dust.	Construction and operation	Negative	Local
Wind erosion from topsoil and RoM storage piles leading to fugitive dust.	Operation	Negative	Local
Spontaneous combustion of overburden stockpiles, discard dumps and coal stockpiles if not properly managed.	Operation	Negative	Local
Rehabilitation after decommissioning.	Decommissioning and closure	Positive	Local
Dust fall-out will remain an impact during decommissioning	Decommissioning	Negative	Local
Rehabilitation of exposed surfaces with vegetation.	Decommissioning and closure	Positive	Local
Elimination of windblown coal dust.	Decommissioning	Positive	Local

Nature	Phase of project	Direction of change	Extent of impact
	and closure		

3.4.4.6 Noise levels

The Thabametsi Project is anticipated to result in a significant increase in current day- and night-time ambient noise levels of the project site. A description of the anticipated impacts is provided in Table 27.

Table 27: Anticipated impacts on noise levels

Nature	Phase of project	Direction of change	Extent of impact
Increase in ambient noise levels beyond the proposed project site due to the high sound power levels produced by the associated internal combustion engines and reverse alarms of construction and mining equipment.	Construction and operational phase	Negative	Local
Increase in ambient noise levels beyond the proposed project site due to the high sound power levels produced by explosives during blasting.	Construction and operational phase	Negative	Local
Increase in ambient noise levels on local roads used for the transport of construction materials and equipment to the site.	Construction and operational phase	Negative	Local
Increase in ambient noise levels along conveyor belt routes.	Operational phase	Negative	Site
Rehabilitation after decommissioning.	Decommissioning and closure	Positive	Local
Noise levels during decommissioning similar to that of the construction phase.	Decommissioning	Negative	Local
Reduced noise levels after final closure.	Post closure	Positive	Local

3.4.4.7 Fauna and flora

During the construction phase, infrastructure required for the development of the area will be constructed. This will continue through operations as the pit expands. The major impacts on vegetation and animal life are expected to occur during this phase. Removal of vegetation is the primary negative impact, including the removal of topsoil. Vegetation removal results in a

loss of species and habitat and as a result the general ecosystem are negatively affected. The anticipated impacts on fauna and flora are described in Table 28.

Table 28: Anticipated impacts on fauna and flora

Nature	Phase of project	Direction of change	Extent of impact
Loss of vegetation cover and abundance of species through clearing of vegetation to facilitate the construction of the opencast mining areas and all mining related infrastructure at both complexes.	Construction and operational phase (pit expansion)	Negative	Site
Damage and destruction of indigenous flora, including Red Data (should red data species be recorded / potential red data species listed by PRECIS List) and protected trees in the areas surrounding the construction area	Construction and operational phase (pit expansion)	Negative	Site
Loss of / or contamination of topsoil, essential to plant growth due to it containing nutrients, organic matter and local seed may occur through the soil removal process. Without topsoil, little plant life is possible.	Construction and operation	Negative	Site
Increased likelihood of alien vegetation colonisation in disturbed areas as the natural competition has been eradicated. Disturbance of natural vegetation creates a favourable environment for exotic and weedy plant species to establish.	Construction and operation	Negative	Site
Risk of water pollution by heavy vehicles and machinery which indirectly leads to negative effects on vegetation.	Construction and operation	Negative	Site
Increased dust generation from vehicular activity and deposition thereof on plant leaves, blocking stomata and inhibiting evapotranspiration.	Construction and operation	Negative	Site
The decrease of the available habitat for animal life.	Construction and operation	Negative	Site
Habitat destruction, such as damage to	Construction	Negative	Site

Nature	Phase of project	Direction of change	Extent of impact
soil cover and vegetation, which provide food, shelter and nesting sites for animals. The degradation and destruction of natural vegetation will result in the permanent removal and decreased availability of natural habitat of reptiles, birds, frogs, insects and mammals present within the areas.	and operation		
Pressure will be placed on resources within the greater area due to increased competition for resources by species able to migrate.	Construction and operation	Negative	Local
Ground dwelling and burrowing species will be disturbed or killed by machinery removing soil.	Construction and operation	Negative	Site
Noise created during construction will have a negative effect on fauna, causing them to move away from the affected areas.	Construction and operation	Negative	Site
Risk of increased poaching and damage to flora for fire wood collections as increased numbers of workers enter the area.	Construction and operation	Negative	Local
Interference of natural movement patterns due to linear structures such as pipelines, conveyors and fences.	Operation	Negative	Local
On-going rehabilitation during the operational phase.	Operation	Positive	Site
Increase in vegetation cover post closure as rehabilitation is complete. Induce ecological succession with intent of establishing sustainable cover to prevent erosion.	Post Closure	Positive	Site
Rehabilitation of vegetation resulting in less exposed surfaces and soil erosion.	Post Closure	Positive	Site

3.4.4.8 Wetlands and aquatic environments

Several pans were identified in the proposed Thabametsi Project site and anticipated impacts from mining and other project activities are listed in Table 29.

Table 29: Anticipated impacts on wetlands and aquatic environments

Nature	Phase of project	Direction of change	Extent of impact
The removal of topsoil and vegetation to initiate the mining operation and the placement of infrastructure for the proposed mining operation may result in a permanent removal of selected wetland areas. The wetlands within the project area may be biodiversity hotspots as the surrounding area is relatively dry.	Construction and operation	Negative	Local and regional
The change in land use from natural vegetation to hardened surfaces will result in an increase in the amount and energy of storm water generated from the project area. The terrestrial soils around the area are generally highly erodible and therefore pose a constant and significant threat to the excessive deposition of sediment within the wetlands.	Operational	Negative	Local
Seepage from the discard dumps into the surrounding areas may impact on wetland water quality. Deterioration of water quality within the wetland areas will have a negative impact on biodiversity. E. g. pans to the west of the open pit.	Operational	Negative	Local
Improved wetland water quality as areas are rehabilitated.	Decommissioning and closure	Positive	Local
Minimisation of siltation of aquatic environments.	Decommissioning and closure	Positive	Local

3.4.5 Provide a description of potential cumulative impacts that the proposed mining operation may contribute to, considering other identified land uses which may have potential environmental linkages to the land concerned

The local area is on the verge of major economic development in view of the government's plans to proclaim the Limpopo Coal, Energy and Petrochemical Cluster as a means of utilising the potential of the Waterberg Coalfield to produce energy for the national economy.

Proposed future mining and industrial developments in the region are illustrated in Plan 4 and include the following:

- IPP Power Station (Exxaro);
- Grootegeluk Coal Mine (existing);
- Char Plant (existing);
- Matimba Power Station (existing);
- Boikarabelo Coal Mine (Resource Generation);
- Mafutha Project (Sasol Mining);
- Sekoko Waterberg Colliery (Sekoko Coal);
- Medupi Power Station (Eskom);
- Eskom proposed site for development of another coal-fired power station;
- Mmamabula Energy Complex in Botswana (CIC Energy Corp); and
- Rezoning of properties in the project area for the development of a residential area and an industrial park.

A list of likely cumulative impacts that are expected to occur in the region is provided in Table 30.

Table 30: Anticipated cumulative impacts

Nature	Direction of change	Extent of impact
Contribution to energy security in the country.	Positive	National
Diversification of the local economy.	Positive	Local and Regional
Improved standard of living of the directly and indirectly affected households.	Positive	Local and national
Urban sprawl and/or expansion of informal settlements.	Negative	Local
Added pressure on local service delivery and infrastructure, including roads, water and sewage treatment works, schools, police services and waste management facilities.	Negative	Local
The use of imported labour, due to unavailability of local skilled labourers causing tension in local communities.	Negative	Local
Greater conflicts between eco-tourism and industrial	Negative	Local

Nature	Direction of change	Extent of impact
development in the area. Large-scale impact on the game farming and hunting industry is expected.		
Possible increase in poverty in the area due to greater influx of job seekers and inability of the economy to absorb these job seekers or generate employment.	Negative	Local
The visual impact of developments, including new coal-fired power stations and mines in the area is significant and imprints an industrial element onto the Bushveld character of the area.	Negative	Local and regional
The rapid expansion of the Lephalale urban areas currently resembles a typical “boom town” with all its uncertainties and inability to maintain the old values and expectations of residents.	Negative	Local
Increased pressure on the water resources and the availability of water to maintain the reserves required to supply basic human and ecological needs.	Negative	Local and regional
It is highly likely that light pollution will have a marked influence on the landscape character in the evening;	Negative	Local and regional
Potential significant negative changes in the air quality of the district and the Lephalale area in particular, is likely to occur in future due to the development of the Limpopo Coal, Energy and Petrochemical Cluster.	Negative	Local and regional
Due to the visually homogenous landscape character it is anticipated that the angled shapes of waste dumps and box cuts will have a significant impact on the visual attributes of the landscape.	Negative	Local
Currently the area is rich in biodiversity and mostly in a good to pristine ecological state. Compounded effects of lighting, noise, traffic, water and groundwater abstraction and the physical reduction in habitat has cumulative impacts on ecology, species and wildlife. Conservation of areas around the proposed infrastructure for this project and others with wildlife corridors and green belts, as well as a regional offsetting plan can have a positive impact on the environment.	Positive	Regional

4 LAND USE OR DEVELOPMENT ALTERNATIVES, ALTERNATIVE MEANS OF CARRYING OUT THE PROPOSED OPERATION, AND THE CONSEQUENCES OF NOT PROCEEDING WITH THE PROPOSED PROSPECTING OR MINING OPERATION

4.1 Provide a list of and describe any alternative land uses that exist on the property or on adjacent or non-adjacent properties that may be affected by the proposed prospecting or mining operation

Game farming and other agricultural activities border the project location, game farming plays an important part of the local eco-tourism sector. Eco-tourism is currently the largest sector within the tourism industry in the Waterberg DM, with business tourism growing rapidly due to the developments taking place in the area.

However, industrial development puts pressure on these activities and the tourism industry players have indicated their concern that the game farming and eco-tourism sectors are not taken into consideration when developments are planned.

Since some of the farms on which the Thabametsi Project will be located and adjacent properties are currently used for hunting activities, the potential conflict will likely take place and will need to be addressed in the EIA phase of the project.

4.2 Provide a list of and describe any land development identified by the community or interested and affected parties that are in progress and which may be affected by the proposed prospecting or mining operation

The PPP has been initiated and the relevant information documentation distributed to I&APs. Any other land developments that are in progress on directly affected and surrounding properties that may be affected by the Thabametsi Project will be identified in consultation with I&APs and presented in the FSR.

As discussed, known land developments that are being planned in vicinity of the Thabametsi Project include:

- Sekoko Coal (Pty) Ltd – Coal mining operation on the farm Hooikraal 315 LQ located to the southwest of the Thabametsi Project;
- Ledjadja Coal (Pty) Ltd – The proposed Marapong-Boikarabelo Effluent Transfer Pipeline that will run to the south of the Thabametsi Project; and
- Ledjadja Coal (Pty) Ltd – The Boikarabelo Coal Mine railway link, to be located approximately 3.6 km to the west of the Thabametsi Project.
- Solar energy (Cennergi)

4.3 Provide a list of and describe any proposals made in the consultation process to adjust the operational plans of the mine to accommodate the needs of the community, landowners and interested and affected parties

The PPP has been initiated and the relevant information documentation distributed to I&APs for their comment. Any suggestion made which may influence the project design is included in the FSR.

4.4 Provide information in relation to the consequences of not proceeding with proposed prospecting or mining operation

The proposed Thabametsi Project will produce coal to be used in an IPP power station. Through other beneficiation methods the project will produce a range of coal products to meet the needs of future growth in demand from other sectors, including coking and metallurgical coal.

With the current energy crisis being experienced in South Africa, the undeveloped coal reserves in the Thabametsi Project area are well positioned to meet additional coal needs for power generation.

By not proceeding with the proposed mining operation and not mining the coal reserves available, the use of a coal reserve for the generation of electricity at a time where a much-publicised inability to generate sufficient electricity to sustain economic growth exists will be prevented. Exxaro's is further proposing the development of an IPP coal-fired power station to generate electricity from the Thabametsi coal resources and the no-go option will therefore result in a no-go for the IPP power station.

The current land use is one of agriculture in the form of cattle and game farming and eco-tourism. The no-mining option will result in the continuation of such land use. Although economically viable, the continuation of agriculture will not provide the level of short-term economic growth to the area that mining would offer, such as increased employment of residents in the area, greater economic input into the area allowing better development of the towns and surrounding areas, and greater socio-economic stability in the area. After mine closure and rehabilitation of mined areas, the land capability may return to agriculture , allowing the continuance of certain agricultural practices. The mine will also promote sustainable local economic development, to give communities the skills required to remain economically viable and successful after mine closure.

If the project were not to proceed, the additional economic activity, skills development and available jobs would not be created, the coal reserves would remain unutilised, the current land uses and economic activities would continue as at present, with little or no economic growth developing in the region. There are currently no foreseeable significant environmental impacts that will outweigh the economic benefits that would be generated by the project, however this will be further assessed during the environmental impact assessment.

If Exxaro were not to proceed with the proposed operation, mining of these coal reserves will not necessarily be avoided, as another application in terms of the MPRDA can be made by another company. Unless the government declares the area "off limits" to mining, mining houses will continue to attempt to mine the coal reserves.

Mining is in line with the future development plans of the area and as the available coal reserves in Mpumalanga decline, and as the demand for coal is still increasing, mining development in the Waterberg Coalfield is inevitable.

The current land use is game farming and the no-go option will result in the continuation of this land use.

4.5 Provide a description of the most appropriate procedure to plan and develop the proposed prospecting or mining operation

4.5.1 Provide information on its response to the findings of the consultation process and the possible option to adjust the prospecting or mining project proposal to avoid potential impacts identified in the consultation process

Further information on responses made by the project applicant to the recommendations of I&APs on project design and avoidance of potential impacts will be provided once detailed consultation has been undertaken and the relevant specialist studies have been conducted in order to assess the significance of potential impacts that were identified.

4.5.2 Describe accordingly the most appropriate procedure to plan and develop the proposed prospecting or mining operation with due consideration of the issues raised in the consultation process

The appropriate procedure to plan and develop the proposed Thabametsi Project is to ensure that I&APs received regular updates on the status of the project plans and designs, thereby allowing I&APs to give continuous input into the planning and design process.

It is also crucial that cumulative impacts of mining activities be considered through a collaborative effort between all existing and future mining operations, energy projects and industrial development in order to address the important issue of long-term sustainability of the resources in the area.

5 A DESCRIPTION OF THE PROCESS OF ENGAGEMENT OF IDENTIFIED INTERESTED AND AFFECTED PARTIES, INCLUDING THEIR VIEWS AND CONCERNS

5.1 Provide a description of the information provided to the community, landowners, and interested and affected parties to inform them in sufficient detail of what the proposed prospecting or mining operations will entail on the land, in order for them to assess what impact the prospecting will have on them or on the use of their land

The following methods have been used to disseminate information about the environmental authorisation process for the Thabametsi Project:

- A BID was compiled and hand-delivered to potentially affected, adjacent and surrounding landowners from 23 August 2012. The BID provided:
    - Details of the project;
    - Specialists studies to be undertaken;
    - Legal processes to be followed;
    - Consultation time frames;
    - Announced the date of an information sharing meeting to be held; and
    - Announced the date of public review of the DSR;

- A reply sheet was attached to the BID to allow anyone who may feel that they are interested and/or affected by the proposed project to register as I&AP;
- Publication of newspaper advertisements in local newspapers, namely the Northern News, Bushveld Bulletin on 24 and 31 August 2012 in English and Afrikaans respectively and on the Ntshebele addition from week 24 August – 06 September 2012;
- Placing of notices on-site and at various public places from 23 August 2012;
- One-on-one consultations with the directly affected farm landowners who were available at the time, from 23 August 2012;
- Presentation at the Lephalale Mayoral Committee meeting on 17 September 2012;
- Sharing of information during the Public Open Day and Information Sharing Meeting held on 18 September 2012.

It should be noted that other local languages (Afrikaans and SeTswana) were considered during the compilation of the information material to ensure effective communication and that all the information is understood by stakeholders including vulnerable groups. Proof of all public information sharing material is provided in Appendix B of this report.

5.2 Provide a list of which of the identified communities, landowners, lawful occupiers, and other interested and affected parties that were in fact consulted

The identified landowners and other I&APs that were consulted to date, as well as the method of consultation is indicated in Table 28 of this report. Proof of consultation with identified landowners and other I&APs is included in Appendix B.

5.3 Provide a list of their views in regard to the existing cultural, socio-economic or biophysical environment, as the case may be

The following are potential impacts identified by I&APs:

- The farms are mostly used for agricultural purposes (cattle and game farming) and tourism related activities. The farming activities therefore provide an income for landowners;
- The farms provide a sense of African Experience to international tourists who visit the area and peace and tranquillity to landowners;
- The issue around water supply for mining developments is of concern as farmers use borehole water which may be impacted by mining activities;
- There are no well-established education and training facilities for children near the farms; and
- An open and transparent communication process must be undertaken between mining companies and affected landowners.

The Plan of Study for the EIA phase of the project has been prepared in an attempt to undertake specialist studies that aim to address the above concerns. Please refer to Section 6 for the Plan of Study.

5.4 Provide a list of their views raised on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting or mining operation

The following are potential impacts identified by I&APs:

- The nature-based and other eco-tourism based activities conducted by landowners will be affected and a decline in game/trophy hunting activities is expected with the proposed development;
- Noise, dust pollution, traffic congestion and light pollution are some of the issues raised to date which may impact landowners;
- Water is of concern as boreholes may be impacted by mining activities;
- The social ills associated with the development of a mine such as prostitution, drunkenness and an increase in establishment of informal settlements due to job seekers is expected and of concern;
- The safety and security of landowners on their properties is of concern. Safety and security issues have been raised as the farms have game and thus there may be poaching and theft which may occur as a result; and
- Mining companies can assist with the establishment of education and skills development facilities for children to learn more about the mining industry and other beneficial programmes which may be needed in future to address the issue of unemployment and illiteracy.

The Plan of Study for the EIA phase of the project has been prepared in an attempt to undertake specialist studies that aim to address the above concerns. Please refer to Section 6 for the Plan of Study.

5.5 Provide a list of any other concerns raised by the aforesaid parties

Other issues and concerns that were identified by I&APs during the initial consultation stages of the PPP are presented below. The detailed comments and responses on the impacts identified are addressed on the CRR attached as Appendix B. Communication and negotiation between landowners and the mining company was raised as crucial and must be undertaken prior to any development occurring on affected properties. Some of the private landowners are of the opinion that it would be advisable that their properties be purchased to avoid all the negative impacts to their lives and families.

Response: Exxaro has initiated the negotiation process with directly affected landowners to discuss issues regarding land acquisitions on private farms from October 2012. Please note however that these consultations conducted by Exxaro do not form part of the PPP for the proposed project and thus have been excluded in this report.

The Plan of Study for the EIA phase of the project has been prepared in an attempt to undertake specialist studies that aim to address the above concerns. Please refer to Section 6 for the Plan of Study.

5.6 Provide the applicable minutes and records of the consultations

A presentation was made to the Mayoral committee of the Lephalale Municipality on 17 September 2012. The discussions are recorded as part of the Comments and Response Report (Appendix B).

A public open house session was held from 10:00 – 12:00. A Public Information Sharing Meeting was held with Interested and Affected Parties (I&APs) including directly affected and surrounding farm landowners, representatives from relevant state departments and political members, community representatives from Marapong and Lephalale, representatives from mining companies, as well as the general public on Tuesday, 18 September 2012 at the Mogol Club – Conference Room, Lephalale, Limpopo Province. The minutes and records of consultation with I&APs during the initial phases of the PPP are provided in Appendix B of PPP report.

Table 31: Register of consultation with I&APs – private land owners

Farm name	Land owner	Contact person and responsibility	Date and method of consultation
McCabesvley 311 LQ	Exxaro Coal (Pty) Ltd	• Mr Johannes Molepo – Farm Manager	Meetings on site in July, 15 August 2012 and 23 August 2012.
Jackhalsvley 309 LQ	Sasol Mining (Pty) Ltd	• Mr Farai Chamisa – Environmental Manager for Waterberg projects; • Mr Piet Nel de Vos – Manager: Land & Rights; and • Mr Hardus Steenkamp – Farm Manager.	D. Otto had telephonic discussions with Mr. H Steenkamp on 14 August 2012.
Vaalpensloop 313 LQ Remaining Extent	Louis Rossel Trust	• Mr Rossel – Farm Landowner	D Otto and C O'Connor had telephonic discussions with Mr Rossel on 14 August 2012. Further discussions are proposed to be held on 01 to 02 November 2012
Vaalpensloop 313 LQ Portion 1	C Du Toit	• Dr du Toit – Farm Landowner	One-on-one consultation meeting held on 31 August 2012.
Van Der Waltspan 310 LQ	Quick Leap Investment 284 (Pty) Ltd	• Ms Christiaan van Wyk – Farm Landowner	One-on-one consultation meeting held on 03 September 2012.

Farm name	Land owner	Contact person and responsibility	Date and method of consultation
Zaagput 307 LQ	Zaagput Boerdery CC	• Mr Gideon Erasmus	D Otto and O O'Connor met Mr Gideon Erasmus on 14 and 15 August 2012. One-on-one consultation meeting held on 23 August 2012.
Massenberg 305 LQ	Mr Zacharias Christiaan Grobler	• Mr Zacharias Christiaan Grobler	One-on-one consultation meeting held on 01 October 2012.
Eendracht 505 LQ	Mr Johannes Jurgens Lamprecht	• Mr Johannes Jurgens Lamprecht	One-on-one consultation meeting held on 02 October 2012.
Buffelsjagt 317 LQ and Vergelde Helm 316 LQ	Hennie Hills Family Trust	• Mr Henry Hills	One-on-one consultation meeting held on 02 October 2012.
Vetleegte 304 LQ	Mr Petrus Stephanus Sauer	• Mr Petrus Stephanus Sauer	One-on-one consultation meeting held on 02 October 2012.

The following Authorities have been informed of the Thabametsi Project through the distribution of the BID on 29 August 2012 and other information material. Digby Wells will undertake consultation meetings with the relevant authorities as the PPP progresses.

Table 32: Register of consultation with Authorities

Authority, group or institution	Contact person and responsibility	Date and method of consultation
South African Heritage Resources Agency (SAHRA)	• Mr Phillip Hine Cultural Officer in Archaeology	14 September 2012 Tracking number: PE 602 137 073 ZA Received correspondence from Mr Hine on the 17 September 2012.
Department: Rural Development and Land Reform, Limpopo	• Mr T.A Maphoto Provincial Land Claims Commissioner	14 September 2012 Tracking number: PE 602 137 042 ZA Received correspondence from Mr Maphoto 14 September 2012.
Limpopo Provincial Shared Services Centre	• R.E Dowelani Acting Chief Director: Shared Services	14 September 2012 Tracking number: PE 602 146 035 ZA
Limpopo Department of Economic Development, Environment and Tourism	• Mr Victor Mongwe Senior Manager: Environmental Impact Management Division	14 September 2012 Tracking number: PE 602 146 061 ZA
Limpopo Department of Roads & Transport	• Mr Ntau Letebele	14 September 2012 Tracking number: PE 602 137 060 ZA

Authority, group or institution	Contact person and responsibility	Date and method of consultation
	Head of Department • Mr M I Majadibodu • Mr R.A Els	18 September 2012 Public Open Day and Information sharing meeting
Department: Public Works, Limpopo	• N. Moloto Head of Department	14 September 2012 Tracking number: PE 602 137 039 ZA
Department of Water Affairs, Limpopo	• A. Matukane Chief Director, Limpopo Region • Ms Norah Ntsoane • Ms Polane Matshwi • Ms Phuti Ramolobeng	14 September 2012 Tracking number: PE 602 146 044 ZA Public Open Day and Information sharing meeting on 18 September 2012
Department of Agriculture, Limpopo	• Mr M.S Monakedi • Ms Nosipho Dlamini	14 September 2012 Tracking number: PE 602 146 075 ZA Public Open Day and Information sharing meeting on 18 September 2012
Limpopo Department of Co-operative Governance, Human Settlements and Traditional Affairs	• Ms Nana Manamela Head of Department	14 September 2012 Tracking number: PE 602 137 025 ZA

Authority, group or institution	Contact person and responsibility	Date and method of consultation
Department of Health and Social Development, Limpopo	• Ms Daisy Mafubelu Head of Department	14 September 2012 Tracking number: PE 602 137 056 ZA
Waterberg DM (including all relevant Divisions within the District)	• Mr Mokopane Letsoalo Municipal Manager	14 September 2012 Tracking number: PE 602 137 250 ZA
Lephalale LM (including all relevant Divisions within the Municipality)	• AS Naidoo Municipal Manager	14 September 2012 Tracking number: PE 602 137 232 ZA
Department of Environmental Affairs (DEA)	• Mr Lutendo Tshifhango Environmental Manager	14 September 2012 Tracking number: PE 602 146 058 ZA
Department of Energy: Limpopo Regional Office	• Cate Mashapu Officer: Directorate Mineral Regulation	14 September 2012 Tracking number: PE 602 137 215 ZA

5.7 Provide information with regard to any objections received

No objections were received thus far. Recommendation was made that the negotiations with the affected landowners must be undertaken as soon as possible to ensure that the relocations are undertaken smoothly to accommodate the game breeding season.

6 DESCRIBE THE NATURE AND EXTENT OF FURTHER INVESTIGATIONS REQUIRED IN THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT, INCLUDING ANY SPECIALIST REPORTS THAT MAY BE REQUIRED

The purpose of this Plan of Study is to propose the basis upon which the EIA phase for the Thabametsi Project will be prepared. The Plan of Study will guide the environmental and social project team during their investigations and can be used by the relevant authorities as an aid to facilitate the evaluation of the EIA and EMP.

The overarching objectives of the EIA process will be to:

- Prepare integrated sensitivity maps for the study area based on the findings of environmental, socio-economic and cultural assessments as input into the project design process;
- Identify and assess the significance of potential impacts associated with the projects; and
- Recommend mitigation and enhancement measures to ensure that the development is undertaken in such a way as to promote the positive impacts and to minimise the negative impacts.

6.1 Specialist studies

Further studies will be required during the EIA phase of the project to provide sufficient background information on the state of the cultural, socio-economic and environmental conditions of the project site and to complete an informed evaluation of the potential impacts identified during the scoping phase.

The specialist investigations that will be conducted as part of the EIA process are described below.

6.1.1 Soil and land capability assessment

6.1.1.1 Deliverables

The following deliverables will be provided as part of this study:

- A soil report explaining the requested occurrence of soil types, soil and land capability status including land use; and
- Maps indicating the determined delineations in the designated project area.

The objectives of the soil and land capability assessment are to:

- Prepare a detailed map of soil forms present in the project site;
- Measure the effective depth of the soils;

- Determine the agriculture potential of soils;
- Determine the erodibility of the soils and identify signs of possible misuse of soils;
- Assess the existing land capability and land use of the soils;
- Verify the preliminary delineation of the wetland using the field verification;
- Identify and assess the significance of the impacts associated with project activities on soils;
- Determine the chemical, mineralogical and physical properties of representative soil forms;
- Identify and delineate wetland soils;
- Assess the suitability of soils for rehabilitation purposes; and
- Formulate a soil stripping guide and plan for the construction and operational phases of the project.

6.1.1.2 Methodology

In order to meet the objectives of the investigation the following scope of work is proposed:

- Collection and review of all available geological and land type data available for the project area;
- Undertake a soil survey on flexible grid of 150 m x 150m for the opencast mining areas and 300 m x 300m for all related infrastructure according to standard methods and techniques;
- Take one sample at 300 mm and 600 mm intervals per soil type. Any other anomalies, i.e. salinity and signs of contamination will also be sampled for verification;
- Compile a soil map in the investigation area (1:10 000 scale), with descriptions based on the Taxonomical Soil Classification System of South Africa; and
- Determine the agricultural potential of soils based on a function of rainfall, effective soil depth and soil wetness.

6.1.2 Surface water assessment

6.1.2.1 Deliverables

The deliverables that will be provided for the surface water assessment include the following:

- The development of a LoM water balance;
- Assessment of effect on Mean Annual Runoff;
- Surface water (hydrology) assessment report including flood lines if applicable; and
- Suitably scaled plans indicating the local setting, quaternary catchment, sub-catchments and monitoring sites;

6.1.2.2 Methodology

The surface water assessment will be undertaken in three phases as detailed below.

Desktop assessment

A desktop assessment will be conducted to achieve the following objectives:

- Catchment description including the water users downstream of the site and the land use (and water use) practices in the area around the site;
- Surface water environment characterisation using available information such as Water Research Commission (WRC) Reports and Geographic Information Systems (GIS) to determine the regional and local drainage network;
- Selection of water quality sampling location up- and downstream of the site to determine the baseline of the surface water environment pre-mining. The baseline will be used to evaluate the impacts that arise from the project on the downstream surface water resources and water users; and
- Hydrological assessment will be conducted to determine the base flow, 1:50 and 1: 100 year flood volumes.

Site assessment

The site visit will be conducted to confirm the site characterisation and to collect surface water quality samples from pans on site. The collected samples will be submitted to a South African National Accreditation Systems (SANAS) accredited laboratory for physical and chemical analysis.

Report compilation

The report compilation process will detail the following:

- Site characterisation, catchment and water use description;
- Hydrology report on the base flow, 1:50 and 1:100 flood volumes;
- Water quality baseline status of the laboratory data benchmarked against the South African National Standard (SANS) 241 for drinking water or Resource Water Quality Objectives set out by the DWA, if available;
- Impact assessment of the impacts that could arise from the proposed project description and weighting of the significance of the impacts;
- Recommendation of mitigation measures to minimise or reduce the significance of the impacts on the surface water quantity and quality;
- Surface water management plan indicating where possible the placement of water conveyances and containment facilities guided by the DWA Best practise guidelines; and
- Surface water quality monitoring programme indicating areas to be monitored, frequency of monitoring, database management and reporting.

6.1.3 Hydrogeological assessment

6.1.3.1 Deliverables

The deliverables of the groundwater assessment include the following:

- Groundwater impact assessment report with mitigation measures to minimize or reduce the significance of potential impacts on the groundwater environment
- Groundwater management plan aligned with best practice guidelines
- Groundwater level and quality monitoring programme indicating monitoring points, monitoring frequency, constituents to be analysed and reporting

6.1.3.2 Methodology

Desktop assessment

A desktop assessment will be conducted to gather and interpret relevant existing information

Hydrocensus

The information that will be obtained during the hydrocensus on the Thabametsi project and surrounding properties will include:

- A complete inventory of groundwater users;
- Available groundwater monitoring points;
- Water levelsfrom available boreholes
- Water samples from representative boreholes to evaluate the baseline water quality.

Geophysics

A surface geophysical survey will be conducted to assist with structural interpretation and the identification of potential targets for drilling in the vicinity of the proposed Thabametsi mine development.

Drilling

To be able to obtain an indication of the hydrological parameters of the underlying aquifer(s) percussion boreholes will be drilled at locations identified through the interpretation of the surface geophysical survey and geological data. The boreholes will be constructed in order to facilitate future groundwater monitoring.

Drilling supervision will be conducted by a qualified geo-technician with field experience in drilling of hydrogeology boreholes. The following information will be recorded during drilling supervision.

- Site coordinates,
- Colour, drilling chip size at 1 m intervals,
- Vertical geology succession and degree of weathering;
- Depth of drilling and borehole construction; and
- Depth of water strikes, individual water strike yield, final / accumulative blow yield and rest water level after completion.

6.1.3.3 Aquifer testing

The successful boreholes drilled during this investigation will be aquifer tested to determine aquifer responses and to calculate the parameters presenting the aquifer hydro-dynamics underlying the investigation area. Aquifer testing of high yielding boreholes will involve a calibration test prior to conducting constant discharge tests.

Geochemical material testing

Representative (composite) material samples of the coal and overburden will be collected and submitted for standard static geochemical tests including: Synthetic Precipitation Leach Procedure (SPLP) tests, Acid Base Accounting, mineralogical and total elemental

composition. Where such samples are not available on site samples will be collected from the neighboring Grootegeluk operation. Conceptual model

A regional conceptual model for this area has already been completed for theexisting Grootegeluk operations. New information obtained during the drilling and aquifer testing phase around the proposed Thabametsi project will be incorporated into the existing conceptual baseline description to make it more site specific.

The conceptual model will describe the groundwater environment in terms of the following:

- The groundwater system:
- Aquifers - these are rock units or open faults and fractures within rock units that are sufficiently permeable (effectively porous) to allow water flow;
- Interconnections between aquifers;
- Boundaries that result in the change or interruption of groundwater flow; and
- Hydro stratigraphic units - these are formations, parts of formations, or a group of formations displaying similar hydrologic characteristics that allow for a grouping into aquifers and associated confining layers.
- The groundwater flow system:
- Precipitation, evapotranspiration;
- Runoff, groundwater head data which yields groundwater flow;
- Hydraulic parameters;
- Recharge and discharge areas, exchange of groundwater and surface water; and
- Hydro-chemical data including major ions.

Numerical modelling

The existing regional scale model that was constructed for Grootegeluk Mine will be used to construct a refined model or the proposed Thabametsi project using grid zooming. The newly acquired data during the fieldwork phase will also be incorporated into the conceptual and numerical model for the Thabametsi project.

Mass and contaminant transport modelling will be conducted to:

- Assess potential impacts on the groundwater system i.e. delineation of plume migration and dewatering/mounding. The results from the geochemical testing will be used as input parameters for pollution plume modelling where applicable;
- The cumulative impact of the existing Grootegeluk Mine and the proposed Thabametsi development will be modelled; and
- Model boundaries will be defined as such that the groundwater model boundaries will be clear from any possible impacts during and after the mining process.

Reporting

A groundwater report will be compiled and shall include:

- Methodology of the work undertaken;
- Hydrocensus and groundwater intrusive work results;

- Description of the groundwater baseline conditions and the conceptual groundwater model;
- Maps, plans and figures to describe the groundwater characteristics;
- Numerical modelling and results;
- Groundwater impact assessment with mitigation measures to minimize or reduce the significance of potential impacts on the groundwater environment
- Groundwater management plan aligned with best practice guidelines
- Groundwater level and quality monitoring programme indicating monitoring points, monitoring frequency, constituents to be analysed and reporting
- Maps and plans in GIS format to describe numerical model results and impacts.

6.1.4 Air quality assessment

6.1.4.1 Deliverables

The deliverables of this assessment include the following:

- Determination of baseline ambient air quality with ambient air quality standards;
- Development of an air emission inventory, taking cognisance of the minimum standards/criteria limits for certain point source emissions;
- Assessment of human health impacts/sensitive receptors based on the nature and extent of the atmospheric emissions;
- Assess the cumulative effects of the mine's additive contributions and align information with respect to the Waterberg National Priority Area; and
- Recommend mitigation measures incorporating best practice environmental options that would prevent, control, abate or mitigate pollution.

6.1.4.2 Methodology

Baseline assessment

The objective of the baseline assessment is to determine the baseline air quality conditions and the influence of local prevailing weather conditions on the atmospheric dispersion and dilution potential of pollutants released into the atmosphere. Activities that will be undertaken during the baseline assessment will include:

- Evaluation of site-specific meteorological data;
- Identification of existing sources of emissions and characterisation of ambient air quality within the airshed using available monitoring data;
- Installation of dust fallout monitoring units at relevant receptors to monitor dust fallout baseline levels for a twelve month period;
- Sampling of dust buckets on a monthly basis according to the ASTM D1739 method; and
- Identification of potential sensitive receptors, such as local communities, as well as environmental constraints in terms of air quality.

Emissions inventory

An air emission inventory will be prepared taking cognisance of the minimum standards/criteria limits for certain point source emissions.

Compiling a comprehensive emissions inventory for the operational phases of the mine will take into account emissions during routine conditions, including coal handling facilities and vehicle emissions.

Dispersion modelling

Emissions from the mine will be modelled to determine the ambient air quality concentrations. The result of the dispersion modelling will be contour plots (maps) presenting the results of the assessment.

Comparison of the predicted concentrations will be made with the ambient monitoring data (if available) and with the South African National Air Quality Standards (SANAQS) to determine compliance.

Impact assessment

The anticipated and cumulative impacts of the activities on the ambient air quality of the area will be identified and discussed. The impact assessment will be undertaken looking at the operations of the existing mine and new developments (based on available measured ambient air quality data if available).

Air Quality Monitoring Programme

Recommendations will be provided regarding the mitigation and management of the identified impacts in the form of monitoring programme.

6.1.5 Noise impact assessment

6.1.5.1 Deliverables

An environmental noise impact assessment report will be compiled and will contain the following:

- Baseline noise measurements;
- Noise impact assessment via noise dispersion models; and
- Recommended mitigation measures and noise monitoring plans.

6.1.5.2 Methodology

The following activities will be undertaken during the noise impact assessment:

Baseline noise measurements

In order to assess ambient noise levels, baseline noise monitoring will be conducted at various noise sensitive receptors surrounding the proposed mining activities.

All measurements will be taken in accordance with the guidelines of the SANS 10103:2008. The measurements will be taken for a 24-hour period, taking into account the daytime as well as night time noise characteristics.

Impact assessment and mitigation

The baseline information will be included in an environmental noise impact assessment report, along with the quantification of the noise sources that will be produced by the proposed mining activities. The impacts of the proposed mining activities on the ambient noise levels of the area will be assessed by comparing the baseline information with the propagated noise levels. The propagated noise levels will be represented by noise dispersion models using the Sound Plan dispersion software.

Suitable mitigation measures and action plans required to reduce noise impacts will be recommended.

6.1.6 Fauna and flora assessment

6.1.6.1 Deliverables

A terrestrial biodiversity assessment report will be compiled and will include the findings of the vegetation survey and fauna survey as detailed below. Potential impacts on terrestrial biodiversity will be identified and the significance of these impacts assessed in order to determine suitable mitigation measures that can be included in a Biodiversity Management Plan for the Thabametsi Project.

6.1.6.2 Methodology

Vegetation survey

A floristic survey will be conducted during the wet and dry season to determine the species composition of the area of interest. 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) 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.

The Braun-Blanquet sampling method will be used during vegetation survey, however should dominant vegetation types require other methods be used, then these shall be motivated. The Braun-Blanquet method allows for the following to be compiled:

- Vegetation classification regarding plant communities within the area and sub communities and variations of these;
- Species list for each plant community, including diagnostic and dominant species.
- Invasive species (if present) for each plant community;
- Exotic species (if present) for each plant community;
- Protected and/or endemic species for each plant community; and
- Culturally significant plant species within each community.

Animal 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. The survey will include an assessment of the following terrestrial biodiversity indicators:

- *Mammals*

  A list of all potential mammals will be compiled by means of desktop study and all potential red data species will be highlighted with short habitat descriptions;

  The presence of mammals will be evaluated using tracks, dung, ecological indicators, non-fatal traps and visual sightings of the animals themselves. A full survey to determine species richness will be carried out. Night surveys will also be conducted to recorded and identify nocturnal mammals. Motion detected cameras will alos bu used to record mammals present in the study area. The following will be recorded:

  - All mammals encountered or noted during the surveys;
  - Mammals recorded by means of traps and motion-detected cameras;
  - Tracks and dung of mammals encountered during the survey;
  - A list of the most prominent mammal species;
  - A list of rare and endangered species encountered during the survey, as well as species listed according to the results of a desktop study but which were not recorded during the survey; and
  - A list of protected species that occur on the potential list but not recorded during the site visits or surveys.

- Birds

  Visual sightings will be conducted with binoculars and identification will be obtained from recognised field guide text books. A complete list of bird species encountered within the boundaries of the study area will be compiled. The optimal method for the sampling has not yet been determined. The following will be recorded:

  - All birds encountered or noted during the surveys;
  - A list of the most prominent birds encountered and possible species that can be expected to be present;
  - A list of rare and endangered species encountered during the survey;
  - Possible migration species that are not on site during the survey will be assessed from literature surveys; and
  - A species list of all the birds that can possibly be present within the relevant grid in which the farms are situated will be compiled using the Roberts' Multimedia Birds of Southern Africa.

- Amphibians and Reptiles

  The presence of amphibians and reptiles will be evaluated and all frogs and reptiles encountered will be recorded. The adopted techniques will include pitfall traps, nets, visual and audio sampling methods. The following will be recorded:

  - All frogs, snakes, lizards and tortoises encountered or noted during the surveys;

- A list of the most prominent amphibian and reptile species;
- A list of rare and endangered species encountered during the survey, as well as species listed according to the results of a desktop study but which were not recorded during the survey; and
- A list of protected species that occur on the potential list but not recorded during the site visits or surveys.

6.1.7 Wetland and aquatic assessment

6.1.7.1 Deliverables

The soils within the project area are very well drained and have very high sand content, therefore these soils lack the evidence of hydric indicators. According to DWAF guidelines for wetland delineations (2005), these areas should be treated as special cases where the wetland delineation methodology is conducted using the following indicators:

- Identify potential offset areas;
- Terrain Unit Indicator – helps to identify those parts of the landscape where wetlands are more likely to occur;
- Soil Form Indicator – identifies the soil forms, which are associated with prolonged and frequent saturation;
- Soil Wetness Indicator – identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and,
- Vegetation Indicator – identifies hydrophilic vegetation associated with frequently saturated soils.

6.1.7.2 Methodology

Due to the lack of hydric indicators in the soils located within the project area and surroundings, wetland delineations and assessments will be conducted in-conjunction with the floral assessments. Specific typical wetland vegetation will be used to identify and delineate wetland areas.

In accordance with the method described by Kotze *et al.* (2007), a Level II ecological functional assessment of the wetland areas will be undertaken. This methodology provides for a scoring system to establish the services of the wetland ecosystem. The onsite wetlands will be grouped according to homogeneity and assessed utilising the functional assessment technique, WET-EcoServices, developed by Kotze *et al.* (2007) to provide an indication of the benefits and services.

A present ecological status analysis will be conducted in order to establish baseline integrity (health) for the delineated wetlands. In order to determine the integrity (health) of the characterized hydrogeomorphic (HGM) units for the project area, the WET-Health tool will be applied. According to Macfarlane *et al.* (2007) the health of a wetland can be defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition.

The wetland health assessment attempts to assess hydrological, geomorphological and vegetation health in three separate modules in order to estimate similarity to, or deviation

from, natural conditions. The tool is structured such that a low score (close to 0) provides an indication of good health, while a high score (close to 10) provides an indication of poor health.

6.1.8 Land use and sustainability assessment

Development is influenced by a range of factors which are often guided by financial and economic objectives. As the demand for primary commodities increases due to population growth and increasing global energy requirements, it is becoming increasingly important for society to recognize that for economic growth to be sustainable while maintaining the quality of life, more needs to be done to understand the 'trade-offs' that will need to be made in future to ensure that more appropriate development takes place.

It is recognized that as development pressures continue to rise, there will be an increasing need to better inform and guide future development by considering development 'trade-offs'.

A Sustainable Development Assessment in South Africa's mining sector provides an innovative approach to considering sustainable development options where, for example, an increasing demand for coal, driven by increasing domestic energy demands, is stimulating an increase in coal mining activities. This has led to conflict between mining and farming land-uses as mines seek to respond to increasing demand for coal. As per Golder Associates scope of work provided.

6.1.9 Visual impact assessment

A Visual Impact Assessment (VIA) is a specialist study performed to identify the visual impacts of the proposed project on the surrounding landscape. "Visual, scenic and cultural components of the environment can be seen as a resource, much like any other resource, which has a value to individuals, to society and to the economy of the region" (Oberholzer, 2005).

The VIA is required to identify any visual impacts of the proposed mining activities on the surrounding environment on tourism, hunting, etc.

Considering the nature and scale of the project, GIS applications will be used extensively in order to generate objective and quantifiable data. An example of such an application is viewshed analysis/visibility analysis, which determines areas in a given study area that will have unobstructed view lines to the proposed project. The extent and degree of visibility is generally a good indicator of the magnitude of visual impact that may be associated with a specific project.

6.1.10 Heritage impact assessment

The required heritage assessments will be conducted in terms of Section 38 of the NHRA. In terms of Section 38, a HIA can only commence subsequent to the submission of a Notice of Intent to Develop (NID) to the responsible heritage resources authorities, namely SAHRA.

6.1.10.1 Deliverables

The following deliverables will be provided as part of the heritage assessment:

- Submission of a NID and supporting Heritage Statement for the proposed Thabametsi Project to SAHRA;
- Preparation of a terms of reference for the Phase 1 HIA, as informed by SAHRA; and
- Submission of a Phase 1 HIA report to SAHRA.

6.1.10.2 Methodology

The heritage assessment for the Thabametsi Project will consist of two main phases, namely the Heritage Statement phase and the Phase 1 HIA.

Heritage Statement and Notification of Intent to Develop

A Heritage Statement will be compiled and will include sufficient information regarding existing and potential heritage resources that may occur in the project location. The nature and extent of the development must also be described in sufficient detail to enable SAHRA to determine whether a HIA is required and the terms of reference for the HIA.

The Heritage Statement will be submitted with the NID and will contain details of the following:

- Project background;
- Details of properties on which the proposed project will take place, including regional and site maps, footprints of proposed infrastructure;
- Landowner details and permission;
- Details of known and/or potential heritage resources located in the vicinity of the proposed project area identified through preliminary assessment of potential or envisaged impacts on heritage resources;
- Preliminary statement of significance of existing or potential heritage resources; and
- Specialist motivation whether or not a HIA is required.

Phase 1 Heritage Impact Assessment

The Phase 1 HIA aims to identify sites and their significance and provide management recommendations. The Phase 1 HIA can only be undertaken subsequent to a terms of reference being received from SAHRA.

The following activities may take place during the Phase 1 HIA:

- Identification and mapping of heritage resources in the area affected;
- Assessment of the significance of identified resources based heritage assessment criteria set out in section 6(2) of the NHRA;
- Assessment of the impact of the development on such heritage resources;
- Evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- Results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- Consideration of alternatives where heritage resources are to be adversely affected; and

- Recommended mitigation of any adverse effects during and after the completion of the Thabametsi Project.

6.2 Assessment of project alternatives and delineation of sensitive and no-go areas

The process to delineate areas that are considered sensitive based on the findings of the specialist studies undertaken and therefore, will be excluded from the project development footprint will be described and maps delineating these areas will be presented. These areas may include:

- Pans and wetlands;
- Areas of high biodiversity;
- Areas with high concentrations of protected trees;
- Archaeological sites of significance;
- Graves and/or cemeteries;
- Animal migration routes; and
- Areas near sensitive receptors that may be impacts through noise, vibration and dust generation.

GIS will play an integral part in the mapping of sensitive and no-go areas. The use of mapping in environmental work is integral, as maps provide the means through which an operation can be viewed within a spatial context. This means that data gathered in the field as well as existing data available for the study area can be visualised, assessed and queried in a holistic manner. The result of this process often reveals spatial relationships and interactions which are otherwise undetected, which in turn may result in cost-saving solutions.

The findings of this assessment will be integrated into a land use plan for the proposed site.

6.3 Identification and assessment of impacts

6.3.1 Impact identification

Impact identification is performed by use of an input and output model, which serves to guide the assessor in assessing all the potential instances of ecological and socio-economic change, pollution and resource consumption that may be associated with the activities required during the construction, operational, closure and post-closure phases of the project.

Outputs may generally be described as any changes to the biophysical and socio-economic environments, both positive and negative in nature, and also include the product and waste produced by the activity. During the determination of outputs, the effect of outputs on the various components of the environment (e.g. topography, water quality, etc.) is considered.

For this purpose, a list of project activities was examined to determine whether it would be a driving force that results in a potentially significant impact on the biophysical and socio-economic environments.

6.3.2 Perceived impacts

During consultation with I&APs, perceived impacts will be identified. These perceived impacts will become part of the impact assessment and significance rating in order to differentiate between probable impacts and perceived impacts.

6.3.3 Impact rating

The impact rating process is designed to provide a numerical rating of the various environmental impacts identified by use of the input and output model. The significance rating process follows the established impact/risk assessment formula:

	Significance	= Consequence x Probability
Where	Consequence	= Severity + Spatial Scale + Duration
And	Probability	= Likelihood of an impact occurring

The severity, spatial scale, duration and probability of an impact occurring are assigned a rating out of seven as indicated in Table 33.

The matrix calculates an overall significance rating out of 147. Impacts are rated prior to mitigation and again after consideration of the mitigation measure proposed in the EMP.

The significance of an impact is determined by reference the significance rating to the probability consequence matrix shown in Table 34 after which it is categorised into one of four categories, as indicated in Table 35.

Table 33: Impact assessment parameter ratings

Rating	Severity		Spatial scale	Duration	Probability
	Environmental	**Social, cultural and heritage**			
7	Very significant impact on the environment. Irreparable damage to highly valued species, habitat or eco system. Persistent severe damage.	Irreparable damage to highly valued items of great cultural significance or complete breakdown of social order.	International The effect will occur across international borders.	Permanent without mitigation No mitigation measures of natural process will reduce the impact after implementation.	Certain/definite The impact will occur regardless of the implementation of any preventative or corrective actions.
6	Significant impact on highly valued species, habitat or ecosystem.	Irreparable damage to highly valued items of cultural significance or breakdown of social order.	National Will affect the entire country.	Permanent with mitigation Mitigation measures of natural process will reduce the impact.	Almost certain/highly probable It is most likely that the impact will occur.
5	Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate.	Very serious widespread social impacts. Irreparable damage to highly valued items.	Provincial/regional Will affect the entire province or region.	Project life The impact will cease after the operational life span of the project.	Likely The impact may occur.
4	Serious medium term environmental effects. Environmental damage can be reversed in less than a year.	On-going serious social issues. Significant damage to structures/ items of cultural significance.	Municipal area Will affect the whole municipal area.	Long term 6 to 15 years.	Probable Has occurred here or elsewhere and could therefore occur.
3	Moderate, short-term effects but not affecting ecosystem functions. Rehabilitation requires intervention of external specialists and can be done in less than a month.	On-going social issues. Damage to items of cultural significance.	Local Local extending only as far as the development site area.	Medium term 1 to 5 years.	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.
2	Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with or without help of external consultants.	Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Limited Limited to the site and its immediate surroundings.	Short term Less than 1 year,	Rare or improbable Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the project but has happened elsewhere. The possibility of the impact occurring is very low as a result of design, historic experience or implementation of adequate mitigation measures.
1	Limited damage to minimal area of low significance. Will have no impact on the environment.	Low-level repairable damage to commonplace structures.	Very limited Limited to specific isolated parts of the site.	Immediate Less than 1 month.	Highly unlikely Expected never to happen.

Table 34: Probability consequence matrix

Significance		Consequence (severity + scale + duration)								
		1	3	5	7	9	11	15	18	21
Probability / Likelihood	1	1	3	5	7	9	11	15	18	21
	2	2	6	10	14	18	22	30	36	42
	3	3	9	15	21	27	33	45	54	63
	4	4	12	20	28	36	44	60	72	84
	5	5	15	25	35	45	55	75	90	105
	6	6	18	30	42	54	66	90	108	126
	7	7	21	35	49	63	77	105	126	147

Table 35: Significance summary table

High	108- 147	
Medium-High	73 – 107	
Medium-Low	36 – 72	
Low	0 – 35	

6.4 Cumulative impact assessment

A qualitative assessment of the potential cumulative impacts of the proposed project and existing and proposed developments in the reasonable future, such as the other coal mining and industrial developments in the Waterberg Coalfields will be undertaken.

A list of likely cumulative impacts that are expected to occur in the region was provided in Table 30 and will guide the assessment during the EIA phase.

6.5 Public Participation Process

The methodology for consultation adopted for the Thabametsi Project will be conducted in line with the requirements as per the DMR's "*Standard Directive Guidelines for Consultation with Communities and I&APs*". NEMA will be used as best practice guideline to achieve a fair and open consultation process.

As the PPP has commenced and progressed towards the final stages of the Scoping Report. The following have been undertaken:

- One-on-one consultation meetings which were held with other affected and surrounding landowners as well as the relevant authorities from end of August until October 2012;
- A public information sharing meeting held on 18 September 2012 to be held at Mogol Club in Lephalale will inform and consult with any other I&APs with regards to the proposed project and gather any additional issues of concern and comments;
- The CRR compiled with all the collated issues from the one-on-one consultation meetings as well as from the public meeting;
- Compilation of the notification letters to inform the I&APs of the Final Scoping Report and the opportunity to comment from 12 November 2012 to 03 December 2012; and
- On-going communication with I&APs and relevant authorities will proceed.

6.5.1 Consultation during EIA Phase

The PPP will proceed to the EIA Phase and the following activities are anticipated:

- Compilation and distribution of notification information to announce the availability of the Draft EIA and EMP Report to the public for review and comment for 30 days commenting period;
- Community and farm workers meetings to be held as part of the process of gathering input and engaging with vulnerable groups;
- A Feedback meeting to be held to provide feedback on the outcome from the specialist findings during the impact assessment phase and mitigation and management measures developed from the EMP to minimise or avoid negative impacts and optimise on positive benefits. The content of the Draft EIA and EMP will be discussed at this meeting;
- Updating the CRR version 2 report which will appended to the Final EIA and EMP Report;
- Notification letters to be distributed regarding the Final EIA and EMP Report for public review;
- On-going communication with I&APs and relevant authorities; and
- Should the MRA be granted, I&APs will be notified thereof of the outcome of the decision and the appeal process to be followed.

6.6 Rehabilitation plan

Once the land use/s has been identified and suitable long-term land use objectives formulated, a rehabilitation plan needs to be compiled. The rehabilitation plan must focus on the following:

- Rehabilitation aspects / topics, including reclamation objectives and associated measures for attainment of long-term:
    - Physical stability of surface reclamation, high wall, subsidence areas etc;

  - Environmental quality, especially in terms of possible contaminated water decant and contamination of local groundwater;
  - Land use / land capability from the work under the Land use plan;
  - Health and safety considerations posed by reclaimed pit and related areas;
  - Biodiversity;
  - Aesthetic quality; and
  - Social issues.
- "Progressive rehabilitation options" where possible, areas / portions of the open pits, subsidence areas that can be rehabilitated in conjunction with operational activities and the alignment of this with the overall mine planning;
- Statutory requirements, both at local and national level; and
- Performance and monitoring.

It is important to use the following supporting information, gathered during baseline studies in order to develop the above rehabilitation plan:

- Local groundwater situation and the possible influence on the long-term water balance;
- Long term water balance indicating the period to possible decant as well as the anticipated rate and quality;
- Geochemical analysis of spoils material to be used for pit in-filling and / or to be used for on-going / concurrent rehabilitation. This also includes the requirements for possible selective spoils handling;
- Soil survey of the disturbed (pits / subsidence areas) and adjacent areas not only to inform the possible land capability but also the nature of the material which could be applied to reduce possible ingress through in-filled areas;
- Vegetation of the surrounding areas and the application of this information with rehabilitation and alignment with the overall biodiversity requirements for the mine; and
- The local surface water situation and the re-instatement of local drainage lines and / or possible rerouting of these to reduce possible (pit) discharge.

6.7 Time frames for the EIA process

The EIA process commenced in August 2012 and will continue until the end of January 2013. The preliminary schedule for the activities to be undertaken during the EIA process is presented in Table 36.

Table 36: Schedule of the EIA process

Milestones	Date
Application phase	**April – August 2012**
• Submit MRA	• 24 April 2012
• Acceptance of MRA	• 03 August 2012
Scoping phase	**August 2012 – September 2012**

Milestones	Date
• Public announcement of EIA process	• 23 August 2012
• Distribute information material	• 23 August 2012
• Submit DSR	• 31 August 2012
• DSR for public review	• 06 September 2012 – 06 October 2012
• Lephalale LM meeting	• 17 September 2012
• Public meeting	• 18 September 2012
• FSR for submission	• 8 November 2012
EIA phase	**September 2012 – January 2012**
• Undertake specialist assessments	• 3 September 2012 – 8 November 2012
• Draft EIAR for public review	• 5 December 2012 – 25 January 2013
• Public feedback meeting	• 20 January 2013
• Submit final EIAR	• 31 January 2013

7 CONCLUSION AND RECOMMENDATIONS

Based on an assessment of the existing baseline conditions of the proposed Thabametsi Project site and surrounding areas, an investigation of potentially sensitive cultural, socio-economic and environmental features should be undertaken during the EIA phase in order to assess the significance of anticipated impacts and formulate appropriate management plans.

The potentially sensitive cultural, socio-economic and environmental features identified through baseline investigations are described in Table 37.

The MPRDA and NEMA emphasise the need for proper, accurate, sufficient and on-going information sharing to all I&APs to ensure that I&APs understand what the project entails and to make informed comments on the project.

The PPP for the Thabametsi Project has commenced and issues raised from the public have been documented for DMR's consideration. The results from the consultation process have indicated the following which needs to be considered in the development of the Thabametsi Project:

- Communication and engagement from Exxaro is crucial in ensuring mutual relations with private landowners. If information is not communicated in terms of how Exxaro proposes to purchase the privately owned properties, it may lead to distrust issues and resilience from the landowners to co-operate in the environmental studies;
- The lack of water supply in the area is critical. Exxaro needs to ensure that various alternative and recycling methods are used to preserve water for mining activities;
- Safety and security is a concern;
- Mitigation and management measures need to be implemented to reduce or minimise dust, noise, blasting, and traffic congestion impacts on the local communities; and
- Employment and local procurement opportunities must be communicated to the Municipality and to the public in order to ensure that the local economy benefits from the project.

Table 37: Potentially sensitive features requiring further investigation

Feature	Description	I&AP concern	
		Yes	No
Graves and cemeteries	There is a high likelihood that formal and informal burial sites and graveyards exist near residential structures and agricultural fields.	X	
Archaeological sites	There is a high likelihood of Stone Age lithic scatters that could occur in the project area.		X
Nature-based tourism industry	The land use of the project site and surrounding areas is dominated by eco-tourism based activities, such as hunting and game farming. The co-existence of mining in close proximity to game hunting, nature and eco-	X	

Feature	Description	I&AP concern	
		Yes	No
	tourism based tourism should be considered.		
Public infrastructure	Service delivery of all basic services in the Lephalale LM is poor and that infrastructure is insufficient.	X	
Housing backlogs	Due to increased industrial development and population growth in the Lephalale LM, there is an increased demand for housing, with the current housing backlog estimate at 20 575.	X	
Traffic	Most road systems are in disrepair and eroded, being insufficient to handle the increased traffic mining and other industrial developments created.	X	
Air quality	The Waterberg is a National Priority Area in terms of Section 18(1) the NEM: AQA and therefore, impacts on ambient air quality will have to be carefully managed during project implementation.	X	
Red data and Protected species	A number of National Protected Tree Species in terms of the National Forestry Act, 1998 (Act No. 30 of 1998) are expected to occur within the project area, as well as Red Data species listed by IUCN, NEMBA and LEMA.	X	
Pans	Small, shallow pans occur at several places in the project area are rainwater fed. These pans are a unique feature in the landscape and could potentially be sensitive in terms of the ecological services they provide.		X
Amphibians	The presence of Red data amphibian species is highly likely due to the presence of pans within the proposed project site.		X

PART B: IDENTIFICATION OF THE REPORT

Herewith I, the person whose name and identify number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises the results of consultation as contemplated in Section 16 (4) (b) or 27 (5) (b) of the Act, as the case may be.

Full names and surname	
Identity number	
Signature	

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Appendix A: Plans

Appendix B: Public Participation Report