mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Scoping Report

for Listed Activities Associated with the Proposed Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province

DMR Reference Number: MP30/5/1/2/2/10236MR

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

Name of Applicant:	Dagsoom Coal Mining (Pty) Ltd
Tel no:	0824538007
Fax no:	-
Postal Address:	17 Flemming Street, Mill Hill, Bryanston, 2191
Physical Address:	17 Flemming Street, Mill Hill, Bryanston
File Reference Number SAMRAD:	**MP30/5/1/2/2/10236MR**

This document has been prepared by Digby Wells Environmental.

Report Type:	**Draft Scoping Report**
Project Name:	**Integrated Environmental Impact Assessment for the Proposed Dagsoom Coal Mining Project near Ermelo, Mpumalanga Province**
Project Code:	**DAG5603**

Name	Responsibility	Signature	Date
Anela Sotashe	Report Compiler		April 2019
Xanthe Taylor	Project Manager		May 2019
Barbara Wessels	Project Sponsor		May 2019

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

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

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

OBJECTIVE OF THE SCOPING PROCESS

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

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

EXECUTIVE SUMMARY

Introduction

Dagsoom Coal Mining (Pty) Ltd (Dagsoom) currently has an authorised Prospecting Right (reference number MP 30/5/1/1/2/1820 PR) which was authorised by the Department of Mineral Resources (DMR) and lapses on 05 May 2019.

Dagsoom has submitted applications for Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and a Mining Right Application in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) to extract coal on on Portions 1, 2 and 7 of the Farm Twyfelaar 298IT and on the Remaining Extent (RE) of the Farm Klipfontein 283IT.

The application was received by the DMR on 30 April 2019 (reference number: MP 30/5/1/2/2/10236 MR

The farm is located near Sheepmoor town within the Msukaligwa Local Municipality, situated in the Highveld sub-region of the Gert Sibande District Municipality in the Mpumalanga Province.

Project applicant

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

Company name:	Dagsoom Coal Mining (Pty) Ltd
Contact person:	Hilton Philpot
Physical address:	17 Fleming Street, Mill Hill, Bryanston, 2060
Telephone:	-
Cell phone:	0824538007
Email:	hilton@pitsa.co.za

Project overview

The proposed Twyfelaar Coal Mining Project is a “greenfields” Project, meaning there is currently no mining activity on the proposed site. The proposed site is situated on the eastern escarpment of the Mpumalanga Highveld coalfield. Dagsoom proposes to extract the coal through underground mining by means of mine adits. The Run of Mine (RoM) coal will be conveyed from the mine adits to the process plant. Numerous wetlands and hillside seepage areas were identified in the area and most of the potentially opencast mineable resource is therefore not considered in the mine plan. The proposed mine sections on Twyfelaar North, Twyfalaar South and Klipfontein will therefore be underground mines, with all plant infrastructure around the mine access area on Twyfelaar North (the northern side of the project area on the farm Twyfelaar.

The proposed infrastructure required includes the following:

- Underground Mine accessed by adits;
- Access and haulage roads;
- Adits;
- Ventilations fans;
- Wash plant;
- Pollution control dam;
- Raw water pump station and process water pump station;
- Raw water pipeline and process water pipeline;
- Electricity supply;
- Potable water treatment plant and associated tanks;
- Sewage treatment plant;
- Reverse Osmosis plant;
- Change houses;
- Offices and ablution facilities;
- Workshops and cable workshops;
- Refuel bays;
- Weighbridges and weighbridge control rooms; and
- Access control offices.

The position for each section access is selected based on the most appropriate position for a mine access, together with the associated surface infrastructure positioned outside the identified wetlands, but with a practical view on the seam access, mine layout, ventilation considerations, terrace for product handling and access road from the main road..

The coal reserves are scheduled to be mined with continuous miners and conventional drill-and-blast sections. Each production section will be mined at a rate of about 240 kilo tonnes per annum (ktpa) or 20 kilo tonnes per month (ktpm), which is the industry benchmark due to the low seam height to be mined. Stooping production rates may increase up to 30 ktpm due to less support requirements.

The total maximum production for this mine is planned to be 480 ktpa or slightly higher during stooping operations with two continuous miner sections. The operating cost of the mine is also directly in relation to the production rate. This Life of Mine schedule allows a life of mine of 13 years.

Purpose of this report

The purpose of this Scoping Report includes the following:

- To provide a description of the proposed Project and its activities;
- To provide a high-level baseline environment;
- To predict potential impacts as a result of the Project and its activities;
- To provide a detailed plan of study for the Environmental Impact Assessment (EIA) Phase; and
- To share Project information with Interested and Affected Parties (I&APs) and to record comments and issues.

Environmental consultants

Digby Wells Environmental has been appointed by Dagsoom as an independent Environmental Assessment Practitioner (EAP) to conduct the following for the proposed project:

- Environmental Impact Assessment (EIA) according to National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- Integrated Water Use Licence (IWULA) according to National Water Act, 1998 (Act No. 36 of 1998) (NWA);
- All relevant specialist studies in support of the applications; and
- The required Public Participation Process (PPP).

The details of the Environmental Assessment Practitioner are as follows.

Company name:	Digby Wells Environmental
Contact person:	Xanthe Taylor
Physical address:	Turnberry Office Park, 48 Grosvenor Road, Bryanston, 2191
Telephone:	011 789 9495
Email:	Xanthe.taylor@digbywells.com

Approach and Methodology for the PPP

A PPP as per the EIA Regulations, 2014 (as amended) has been initiated, which is central to the investigation of environmental and social impacts, as it is important that stakeholders who are affected by the Project are given an opportunity to identify concerns to ensure that local knowledge, needs and values are understood and taken into consideration as part of the EIA process.

This Draft Scoping Report is available for public comment for a period of 30 days and all comments or concerns raised will be recorded and responded to in the Comments and Responses Report (CRR). The 30-day comment period is from 09 May 2019 to 07 June 2019.

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

- A Background Information Document (BID) was distributed;
- Newspaper advertisement was placed in the Highveld Tribune**;**
- An announcement letter including a registration form was distributed to identified I&APs via email;
- Site notices were placed around the site on 09 May 2019; and
- A hard copy of the Draft Scoping Report has been made available at the Sheepmoor Police Station. Furthermore, and an electronic copy can be accessed and downloaded from the Digby Wells website - www.digbywells.com (Public Documents).

Project Alternatives

The alternatives considered in this report and during the pre-feasibility studies undertaken include the mining method, resource access, mining equipment requirements, production and scheduling, employment and the “No-Go” alternative (the option of not proceeding with the Project).

Conclusions and Recommendations

Through the preliminary assessment of the baseline environment, groundwater and wetland aspects may be the most negatively impacted environments as a result of the Project. Further drilling and stability of the area is required to understand the risk of subsidence in the proposed mining areas. Prospecting continues on the site which will assist in determining the viability to mine all three mining areas underground.

The EIA Phase will allow for an in-depth assessment of the impacts, potential mitigations and further recommendations with regards to the proposed Project proceeding.

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1 Introduction

Dagsoom Coal Mining (Pty) Ltd (hereafter Dagsoom) applied for a Mining Right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) for an underground coal mine on Portions 1, 2 and 7 of the Farm Twyfelaar 298IT and on the Remaining Extent (RE) of the Farm Klipfontein 283IT. The application process will include:

- An Integrated Environmental Authorisation Application, a Scoping and Environmental Impact Assessment (S&EIA) process as promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA),
- The National Environmental Management: Waste Act, 2008 (Act No. 56 of 2008) (NEM:WA); and
- A Water Use Licence Application (WULA) and associated Integrated Water and Waste Management Plan (IWWMP) in terms of the National Water Act, 1998 (Act No. 36 of 1998) (NWA.

The resource location is approximately 40 km south-east of Ermelo, close to the N2 in the direction of Piet Retief. The project area is situated on the eastern escarpment of the Mpumalanga Highveld in the Ermelo Coal Field

The coal will be accessed through adits (an entrance to an underground mine),. The surface topography is rather mountainous, with plateaus and valleys between mountain ridges in typical escarpment topography. The surface is predominantly used for livestock grazing, as well as commercial and subsistence farming activities. The majority of the surface rights to areas where mining activities are likely to take place are owned by the Government.

2 Project applicant

Dagsoom is the proponent in this application. The details of the applicant are presented in Table 2-1.

Table 2-1: Contact details of the Applicant

Name of Applicant:	Dagsoom Coal Mining (Pty) Ltd		
Contact person:	Hilton Philpot		
Physical address:	17 Fleming Street, Mill Hill, Bryanston, 2060		
Postal address:	P O Box 1222, Cramerview, 2060		
Postal code:	2060	**Cellphone:**	0824538007
Telephone:	-	**Fax:**	-
Email:	hilton@pitsa.co.za		

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

Digby Wells Environmental has been appointed by Dagsoom as the Environmental Assessment Practitioner (EAP) to manage the application processes. The details of the EAP are contained in Table 2-2 and the Curriculum Vitae and EAP qualifications are attached in Appendix 1.

Table 2-2: Contact details of the EAP

Name of Practitioner:	Xanthe Taylor
Telephone:	011 789 9495
Fax:	011 789 9498
Email:	Xanthe.Taylor@digbywells.com

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

This section provides details regarding the EAP's qualifications and experience.

2.2.1 The qualifications of the EAP

Ms Taylor holds the following degrees/ diplomas:

- BA Honours Environmental Management, UNISA, 2013
- BA English and Psychology, UNISA 2009

2.2.2 Summary of the EAP's past experience

Xanthe has almost eight years' experience and has been involved in various projects within the environmental field. The majority of Xanthe's experience is in the mining sector for applications governed by NEMA and its Regulations (2010 and 2014),the MPRDA, NEM:WA and the NWA.

Her experience comprises managing integrated mining applications, compiling application forms, Basic Assessment Reports, Scoping Reports, EIA Reports, Environmental Management Programmes, Water Use Licences and Integrated Water and Waste Management Plans, Section 29 and Section 31 Amendment Reports, Section 102 Amendment Reports, Exemption Applications, Appeals processes, and auditing.

3 Item 2(b): Description of the property

Table 3-1 contains the details of the farm portions included in the application, the municipal district and nearest town to the site.

Table 3-1: Property Description

Farm Name:	Portion 1 of the Farm Twyfelaar 298 IT Portion 2 of the Farm Twyfelaar 298 IT Portion 5 of the Farm Twyfelaar 298 IT Portion 7 of the Farm Twyfelaar 298 IT Portion 8 of the Farm Twyfelaar 298 IT Portion 9 of the Farm Twyfelaar 298 IT Remaining Extent of the Farm Twyfelaar 298 IT Remaining Extent of the Farm Klipfontein 283 IT
Application Area (Ha):	Approximately 2438.7 ha
Magisterial District:	Gert Sibande District Municipality
Distance and direction from nearest town:	Approximately 8 km west of Sheepmoor town
21 digit Surveyor General Code for each farm portion:	T0IT00000000028300000 T0IT00000000029800001 T0IT00000000029800002 T0IT00000000029800005 T0IT00000000029800007 T0IT00000000029800008 T0IT00000000029800009 T0IT00000000029800000

4 Item 2(c): Locality map

The Locality Map is shown in Figure 5-1 below and attached as Appendix 2.

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

The preliminary infrastructure layout plan is shown in Figure 5-2 below and attached in Appendix 2.

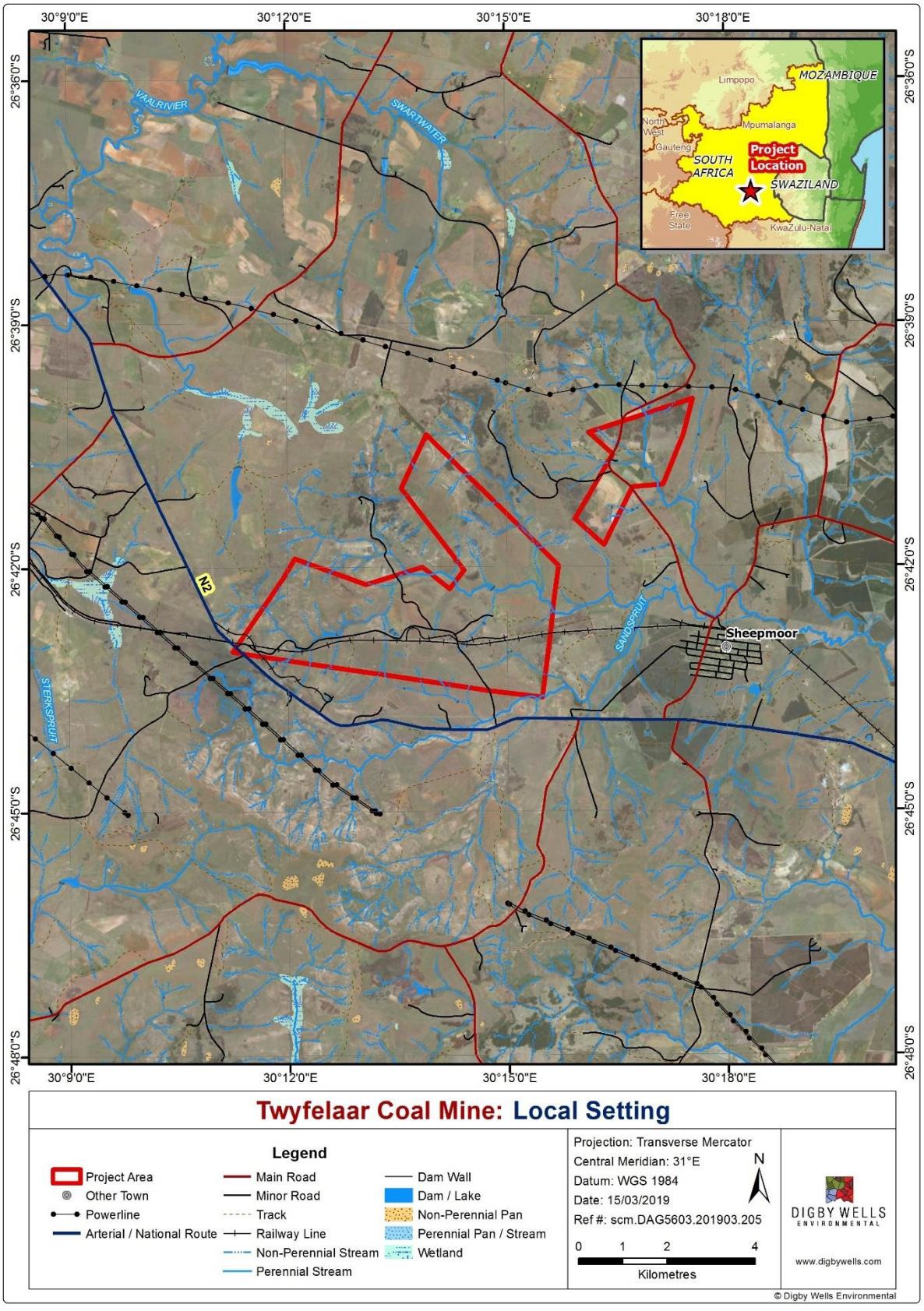


Figure 5-1: Local Setting of the Proposed Twyfelaar Coal Mine

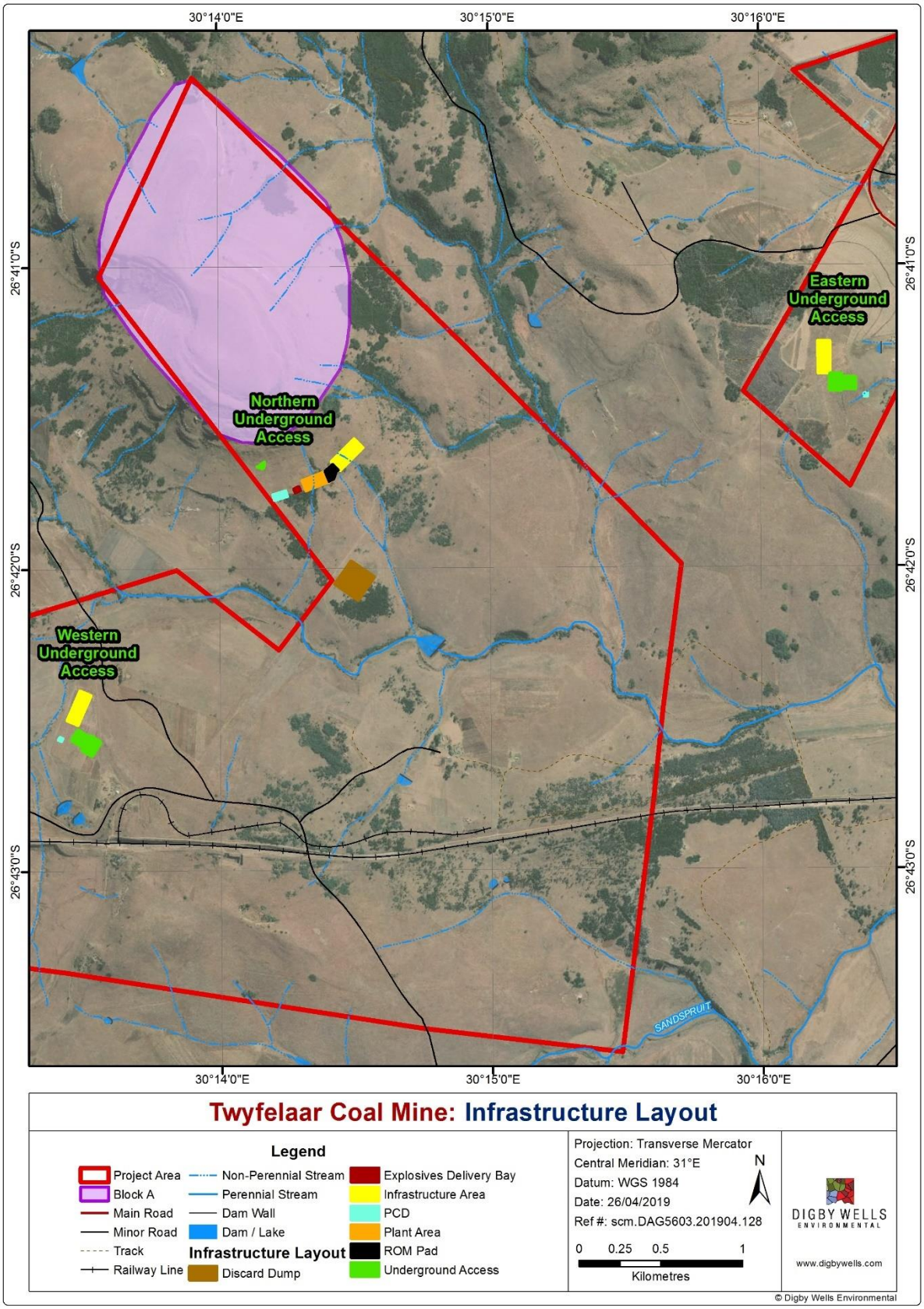


Figure 5-2: Preliminary Infrastructure Layout

5.1 Listed and specified activities

This section details the proposed project activities to be undertaken on site, as well as the Listed Activities in terms of the NEMA EIA Regulations (2014, as amended). Table 5-1 details the project activities per phase (Construction, Operational and Decommissioning Phases), and Table 5-2 provides the identified Listed Activities as provided by the NEMA EIA Regulations, 2014 (as amended).

Table 5-1: Project Activities per Phase

Project Phase	Project Activity
Construction Phase	■ Site/vegetation clearance; ■ Access and haul road construction; ■ Infrastructure construction; ■ Development of a box cut; ■ Power line construction; ■ Diesel storage and explosives magazine; and ■ Topsoil stockpiling.
Operational Phase	■ Removal of rock (blasting); ■ Stockpile (rock dumps, soils, ROM, discard dump) establishment and operation; ■ Diesel storage and explosives magazine; ■ Operation of the underground workings; ■ Operating processing plant; ■ Operating sewage treatment plant; ■ Water use and storage on-site – during the operation water will be required for various domestic and industrial uses. Dams will be constructed that capture water from the mining area which will be stored and used accordingly; ■ Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste; and ■ Maintenance activities – through the operations maintenance will need to be undertaken to ensure that all infrastructure in operating optimally and does not pose a threat to human or environmental health. Maintenance will include haul roads, pipelines, processing plant, machinery, water and stormwater management infrastructure, stockpile areas.

Project Phase	Project Activity
Decommissioning Phase	■ Demolition and removal of infrastructure – once mining activities have been concluded infrastructure will be demolished in preparation of the final land rehabilitation; ■ Rehabilitation – rehabilitation mainly consists of spreading of the preserved subsoil and topsoil, profiling of the land and re-vegetation; and ■ Post-closure monitoring and rehabilitation.

Table 5-2: Listed Activities in terms of the NEMA

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Listing Notice 1				
Site/vegetation clearance *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	Approximately 20 ha	X- 27	GN R983, under NEMA	-
All infrastructure including ventilation fans, change houses, offices, ablutions, workshops, cable workshop, weighbridge, weighbridge control room and access control office. *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan*	Approximately 20 ha	X-27	GN R983 under NEMA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Construction of access and haulage road *The development of a road-* *(i) 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 Government Notice 545 of 2010; or* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* *but excluding a road-* *(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;* *(b) where the entire road falls within an urban area; or* *(c) which is 1 kilometre or shorter.*	The construction of an access and haul road with maximum width of 9.6 m and approximately 6 km long	X-24 *(ii)*	GN R983, under NEMA	-
Pollution control dam *The development 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 16 in Listing Notice 2 of 2014.*	Three PCDs totally about 1.5 ha	X- 13	GN R 983 under NEMA	-
Raw water pipeline	Approximate 1.49 km long and 6 cm in diameter	X-9 (i) and /or (ii)	GN R983 under NEMA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where-* *(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or* *(b) where such development will occur within an urban area.*				
Process water *The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where-*	This will be confirmed during the Scoping and EIA Process	X-10 (i) and or (ii)	GN R 983 under NEMA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or *(b) where such development will occur within an urban area.*				
Operating sewage treatment plant *The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-* *(i) with an internal diameter of 0,36 metres or more; or* *(ii) with a peak throughput of 120 litres per second or more;* *excluding where-* *(a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or* *(b) where such development will occur within an urban area.*	Approximately 1 ha	X-10	GN R 983	GN R 921 under NEM: WA Category B 4 (10)
Power line construction	22kV line, approximately 2.3 km long	X- 11	GN R983, under NEMA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
The development 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*				
Listing Notice 2				
Site/vegetation clearance *The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan*	This will be confirmed during the Scoping and EIA Process	X-15	GN 984, under NEMA	-
Mining of coal by underground mining *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including-* *(a) associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource; or*	To be confirmed once prospecting activities on the Farm Klipfontein have provided results.	X- 17	GN R 984 under NEMA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing.				
Infrastructure construction *Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including-* *(a) associated infrastructure, structures and earthworks directly related to the extraction of a mineral resource; or* *(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;* *but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.*	This will be confirmed during the Scoping and EIA Process	X- 17	GN R 984, under NEMA	-
Diesel storage and explosive magazine *The development of facilities or infrastructure, for the storage, or storage and handling of a*	Approximately 1 ha	X- 4	GN R 984 under NEMA	GN R 921 under NEM:WA Category B 4 (1) & Category B 4 (10)

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.				
Water Use Licence *The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent*	Inclusive of all water management infrastructure on site. To be determined.	X- 6	GN R 984 under NEMA	GN R 921 under NEM:WA Category B 4 (11)
Sewage treatment plant *The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15 000 cubic metres or more.*	Approximately 1 ha	X-25	GN R 984 under NEMA	
Waste Activities				
Diesel storage and explosive magazine *The storage of hazardous waste in lagoons*	Approximately 1 ha	Category B 4 (1)	GN R 921 under NEM: WA	-
Refuel bays *The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.*	Approximately 1 ha	Category B 4(1)	GN R 921 under NEM: WA	-
Sewage treatment plant, pollution control dam	Approximately 2 ha	Category B 4 (10)	GN R 921 under NEM: WA	-

Name of Activity	Areal extent of the activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
The construction of a facility for a waste management activity listed in Category B of this Schedule				
Stockpiling (rock dumps) *The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).*	Approximately 3 ha	Category B 4 (11)	GN R 921 under NEM: WA	-
Rock removal (blasting), Stockpiling (rock dumps, soils, ROM, discard dump, pipelines) *Mining, exploration or production operation, resulting in the development of residue stockpiles and residue deposits"* *Prospecting, mining, exploration or production operation, resulting in development of residue stockpiles and residue deposits. The management and control of these wastes must take place in accordance with the regulations for management and control of residue deposits and residue stockpiles or an integrated environmental authorization as provided for in terms of NEMA.*	Approximately 6 ha	Category B; Listing 7, 10, 11	GN R 921 under NEM: WA	-

5.2 Description of the activities to be undertaken

The coal resource outcrops or sub-outcrops (comes close to surface) in several areas of the prospecting right (Twyfelaar North, Twyfelaar South and Klipfontein). There are numerous wetlands and hillside seepage areas around this hill (Twyfelaar North) and most of the potential opencast mineable resources here are not currently considered to be mined. The mine will therefore consist of three underground sections with infrastructure around the mine access area on the northern side of the Project Area on the Farm Twyfelaar 298 IT (Portion 2), southern side of the Farm Twyfelaar 298 IT (RE, portion 1, 2 and 7) and the western side of the farm Klipfontein 283 IT on the Remaining Extent.

The C- seam and, in particular, the C-Lower seam, is the only seam that occurs at mineable thickness over the Project Area. There is a sandstone and shale parting of more than 3 meters that separates the C-Upper and C-Lower seams and no opportunity exists for these seams to be mined together as per the case at other mines in the area. No faults or dykes were discovered during the exploration phase. Bord and pillar mining with continuous miners is the preferred mining option for this operation.

5.2.1 Reserves

In each mining section approximately 12% of the Mineable tonnes *in-situ* (MTIS) is lost due to layout losses which is primarily due to barrier pillars left between mining panels and the inability to mine up to the exact border of the pre-defined resource. Another 5% will be left behind during the mining process. The pillar sizes are determined based on the depth of cover, seam height and road width and the assumption was made that 60% of the pillars left behind will be mined during the stooping phase which gives more than 80% total extraction of the resource within the panels. The Run of Mine (RoM) reserve tonnes are determined as per the Life of Mine (LoM) Plan scheduled in Minex.

5.2.2 Resource Access

The position for the mine access points has been selected based on the most appropriate position for a mine access, together with the entire associated surface infrastructure positioned outside the wetlands, but with a practical view on the seam access, mine layout, ventilation considerations, terrace for product handling and access road from an unnamed tar road.

The resource will be accessed through boxcuts.. No detailed geotechnical analysis has been done on the strata formation stability where the boxcuts are planned and a typical safe excavation is planned for the purpose of this exercise.

Detailed designs will also reveal if the boxcuts must access the seam at a dip or if the floor of the boxcut will be an extension of the coal floor of the C-Lower seam. The current design (Portion 2 of the farm Twyfelaar) accesses the seam at seven degrees which allows for the smallest and lowest cost excavation. The resource will be accessed with at least three roads from the boxcut high wall; one road for men and material, one for the RoM conveyor and one

the return airway which will be connected to the ventilation fans on the side “high wall” of the boxcut.

Although layouts have been prepared detailed design of the boxcuts on Twyfelaar South and Klipfontein will be designed taking cognisance of the environment.

5.2.3 Production and Scheduling

The coal reserves are scheduled to be mined with continuous miners and/or conventional drill and blast sections.. Each production section will be mined at a rate of about 240 kilo-tonnes per annum (ktpa) or 20ktpm, which is the industry benchmark due to the low seam height to be mined. Stooping production rates may increase up to 30 ktpm due to less support requirements.

The total production for this mine is planned to be 480 ktpa or slightly higher during stooping operations with two continuous miner sections.

The stooping operations will be at 50 ktpm due to less support requirements and because the geological challenges would already be overcome during the development phaseThis LoM schedule allows a LoM of about 13 years

6 Item 2(e): Policy and legislative context

This section aims to provide a description of the policy and legislative context within which the project is being proposed. This section has been divided into national, provincial and policies, plans, guidelines and development planning frameworks and tools. Table 6-1 provides a description of the national legislation and guidelines that is considered applicable to the Project and its activities.

Table 6-1: Policy and Legislative Context

Applicable legislation and guidelines used to compile the report	Reference where applied
The Constitution of the Republic of South Africa, 1996 Under Section 24 of the Constitution of the Republic of South Africa, 1996 (the Constitution) it is clearly stated that: *Everyone has the right to* *(a) an environment that is not harmful to their health or well-being; and* *(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -* *(i) Prevent pollution and ecological degradation;* *(ii) Promote conservation; and* *(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*	Dagsoom is undertaking an EIA process to identify and determine the potential impacts associated with the Project. Mitigation measures recommended will aim to ensure that the potential impacts are managed to acceptable levels to support the rights as enshrined in the Constitution.
National Environmental Management Act, 1998 (Act No 107 of 1998) and EIA Regulations (as amended in 2017) The Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), as amended was set in place in accordance with Section 24 of the Constitution. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that: *The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.*	Activities associated with the proposed mine are identified as Listed Activities in the Listing Notices (as amended) and therefore require environmental authorisation prior to being undertaken. This Scoping Report and proceeding EIA Report will be informed by the requirements of the NEMA and Regulations thereunder.

Applicable legislation and guidelines used to compile the report	Reference where applied
The EIA Regulation, 2014 was published under GN R 982 on 4 December 2014 (EIA Regulations) and came into operation on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R 983 (Listing Notice No. 1), GN 984 (Listing Notice No. 2) and GN R 985 (Listing Notice No. 3) in terms of Sections 24(2) and 24D of the NEMA, as amended. The EIA Regulations have been made applicable to prospecting and mining activities.	
Mineral and Petroleum Resource Development Act. 2002 (Act No. 28 of 2002) The MPRDA sets out the requirements relating to the development of the nation's mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. The MPRDA requires that mining companies assess the socio-economic impacts of their activities from start to closure and beyond. Companies must develop and implement a comprehensive Social and Labour Plan (SLP) to promote socio-economic development in their host communities and to prevent or lessen negative social impacts.	The Applicant is the holder of a Prospecting Right and has applied for a Mining Right to mine underground on the Farm Twyfelaar 298IT and the Farm Klipspruit 283IT near Ermelo. The EIA process will be undertaken to meet the requirements of the MPRDA read with the EIA Regulations, 2014 (as amended). Financial Provisioning and Closure Costs will be included in the EIA.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) On 29 November 2013, the list of waste management activities published under GN R718 of 3 July 2009 (GN R718) was repealed and replaced with a new list of waste management activities under GN R921 of 29 November 2013. Included in the new list are activities listed under Category A, B and C. These activities include inter alia the following: Category A describes waste management activities requiring a Basic Assessment process to be carried out in accordance with the EIA Regulations supporting an application for a waste management licence; Category B describes waste management activities requiring an Environmental Impact Assessment process to be conducted in accordance with the EIA Regulations supporting a waste management licence application; and	A Waste Management Licence (WML) has been applied for due to the nature of mining activities.

Applicable legislation and guidelines used to compile the report	Reference where applied
Category C describes waste management activities that do not require a WML but these activities will have to comply with the prescribed requirements and standards as prescribed by the Minister, which includes the Norms and Standards for Storage of Waste, 2013. These activities include the storage of general waste at a facility with a capacity to store in excess of 100 m^3 and storage of hazardous waste in excess of 80 m^3. The Waste Classification and Management Regulations published under GN R 634 of November 2013 require that all wastes be classified according to SANS10234 and managed according to its classification.	
National Water Act, 1998 (Act No. 36 of 1998) (NWA) The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. GN R 704 was published in June 1999 and aims to regulate the use of water for mining and related activities for the protection of water resources and states the following: ▪ Regulation 4: No residue deposit, reservoir or dam may be located within the 1:100 year flood line, or less than a horizontal distance of 100 m from the nearest watercourse. Furthermore, person(s) may not dispose of any substance that may cause water pollution; ▪ Regulation 5: No person(s) may use substances for the construction of a dam or impoundment if that substance will cause water pollution; ▪ Regulation 6 is concerned with the capacity requirements of clean and dirty water systems, and ▪ Regulation 7 details the requirements necessary for the protection of water resources.	An IWULA and an associated IWWMP are required in terms of Section 21 of the NWA for the Project. The IWULA and IWWMP will be compiled and submitted to the DWS as the decision-making authority. The water uses under Section 21 of the NWA which may be relevant to this Project are listed below: ▪ S21(a) – Taking water from a water resource; ▪ S21(b) – Storing water; ▪ S21(c) – Impeding or diverting the flow of water in a watercourse; ▪ S21(i) – Altering the bed, banks, course or characteristics of a watercourse; ▪ S21(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and ▪ S21(g) – Disposing of waste in a manner which may detrimentally impact on a water resource.

Applicable legislation and guidelines used to compile the report	Reference where applied
DWS[1] Best Practice Guideline – G1: Storm Water Management Plan (SWMP) These are guidelines provided by the DWS for the development of a SWMP. The following will be undertaken to develop the conceptual SWMP: ▪ Delineate the clean and dirty area contributing to runoff (based on the final layout plans) and site specific hydrological assessments to determine volumes that require to be handled. The SWMP should ensure that temporary drainage installations should be designed, constructed, and maintained for recurrence periods of at least a 25-year, 24-hour event, while permanent drainage installations should be designed for a 50-year, 24-hour recurrence period; and ▪ Site specific assessments to establish the appropriate mitigation measures and surface water monitoring programme.	All water management infrastructure will be designed for a 1:100 year, 24 hour rainfall event.
DWS Best Practice Guideline – G4: Impact Prediction The impacts of mine activities on the groundwater environment must be assessed as part of the MRA, as well as for the IWULA. The baseline conditions must be assessed to define the current aquifer systems, groundwater use and groundwater conditions before mine commencement and to determine the extent of possible future impacts on the groundwater resources.	An IWULA and an associated IWWMP are required in terms of Section 21 of the NWA. The IWULA and IWWMP will be compiled and submitted to the DWS as the decision-making authority. The EIA as part of the MRA will assess potential impacts on groundwater resources as a result of the Project.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) The NEM:BA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management	A Fauna and Flora Impact Assessment will be conducted as part of the EIA Phase which will include the characterisation of the natural habitat and provide mitigation measures that must be applied to sensitive habitats (if any are identified). Infrastructure associated with the project has been placed on

[1] Previously the Department of Water Affairs (DWA)

Applicable legislation and guidelines used to compile the report	Reference where applied
of alien and invasive species. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance: ▪ Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014); ▪ National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; and ▪ National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011).	already disturbed land as far as possible to reduce disturbance of natural vegetation
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) The prevailing legislation in the Republic of South Africa with regards to the Air Quality field is the National Environment Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA). According to the Act, the DEA, the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured. The NEM: AQA provides for the identification of priority pollutants and the setting of ambient standards with respect to these pollutants.	An Air Quality Impact Assessment will be undertaken as part of the EIA Phase. The Project's activities will set out to abide by the NEM:AQA and standards set out in the NAAQS. The required mitigation will be included in the EMP as part of the EIA Phase.
National Dust Control Regulation 2013 The Minister of Water and Environmental Affairs, released on the 01 November 2013 the National Dust Control Regulation, in terms of Section 53, read with Section 32 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)(NEM:AQA). In the published National Dust Control Regulations, terms like target, action and alert thresholds were	An Air Quality Impact Assessment will be undertaken as part of the EIA Phase. The Project's activities will set out to abide by the NEM:AQA and standards set out in the National Ambient Air Quality Standards (NAAQS). The required

Applicable legislation and guidelines used to compile the report	Reference where applied
omitted. Another notable observation was the reduction of the permissible frequency of exceedance from three to two incidences within a year. The standard actually adopted a more stringent approach than previously, and would require dedicated mitigation plans now that it is in force.	mitigation will be included in the EMP as part of the EIA Phase.
National Noise Control Regulations, R.154 of 1992 (the Noise Regulations) promulgated in terms of Section 25 of the Environmental Conservation Act, 1989 (Act 73 of 1989) The National Noise-Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCRs) form part of the Environmental Conservation Act and these Regulations apply to external noise. The NCRs differentiates between Disturbing Noise levels (which is objective and scientifically measurable which are generally compared to existing ambient noise level) and Noise Nuisance (which is a subjective measure and is defined as noise that "*disturbs or impairs or may disturb or impair the convenience or peace of any person*"). Local Authorities use Controlled Areas to identify areas with high noise levels. Restrictions have been set out for development that occurs in these Controlled Areas. These regulations make provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication. As such, a Noise Impact Assessment in accordance with the NCRs must be undertaken for submission to determine the potential disturbing and nuisance noise levels associated with a particular development.	A Noise Impact Assessment, including modelling, impacts and proposed mitigation measures will be undertaken for the EIA Phase. Over and above the requirements set out in the NCR, a Blast Impact Assessment will also be undertaken.
The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa.	For the Scoping Phase, a Notice of Intent to Develop (NID) has been submitted to SAHRA. A Heritage Impact Assessment will form part of the EIA Phase.

Applicable legislation and guidelines used to compile the report	Reference where applied
The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority of Gauteng (PHRA-G), be notified as early as possible of any developments that may exceed certain minimum thresholds. This act is enforced through the National Heritage Regulations GN R 548 (2000).	
GN R 1147 (Financial Provisioning Regulations), 2015 The Financial Provisioning Regulations prescribe methods for determining the quantum of financial provision for rehabilitation and mechanisms for providing for it. Section 41 (1) of the MPRDA has been repealed and Section 24P of the NEMA, as amended, which provides that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision must guarantee the availability of sufficient funds.	The Financial Provisioning Regulations are applicable to rehabilitation and closure plans as they prescribe the minimum content of an annual rehabilitation plan and the minimum content of a final rehabilitation, decommissioning and mine closure plan. This will be finalised and included in the EIR.
GN R 527 (MPRDA Regulations), 2004 Regulation 527 (GN R. 527) specifies that the EMP must include environmental objectives and specific goals for mine closure. The applicant for a mining right must make prescribed financial provision for the rehabilitation or management of negative environmental impacts, which must be reviewed annually. R527 provides specific principles for mine closure including safety and health, residual and latent environmental impacts etc.	A preliminary EMP is provided in Section 10.9 of this report.

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

There is a national requirement for coal to meet the demand for electricity supply. This proposed Project will supply coal to the local markets, thereby assisting with the alleviation of the shortage of supply. The National Development Framework includes, in summary, the need to produce energy to support industry at competitive prices. Furthermore, the proposed Project will contribute to the local economy through job creation and procurement. Increased employment will lead to increased expenditure, tax base and royalties.

The Gert Sibande Municipality and Wards influenced by this project, experience unemployment rates between 18% and 43%, respectively and the Project could assist in alleviating some of these unemployment rates. The Social and Labour Plan (SLP) stipulates that the Applicant should firstly employ people from the directly affected wards. The Applicant will also provide skills development to employees thereby advancing the future employability of these individuals. The SLP further identifies community development projects from which the surrounding communities will benefit as a result of the project.

As stated in the MPRDA, the Government's objective is to maximise the benefit of the nation's mineral resources for the benefit of all South Africans. By establishing a new mining operation, this objective can be accomplished, particularly through job creation.

From an environmental perspective, the Applicant is willing to pursue underground mining on a shallow coal reserve in an effort to reduce the environmental impact of open pit mining, due to the environmental sensitivity on the site.

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

The proposed Project will have a LOM of 13 Years to complete mining and rehabilitation.

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

The areas of mining which have been or are currently being prospected determine the areas of mining. However, these areas will be investigated during the EIA Phase of the Project and should any area within the Prospecting Right be unsuitable for underground mining, this will be stated in the EIA.

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

This section describes the alternatives investigated during the preliminary phase of the project. This includes the mining method, resource access, mining equipment, employment and the No-Go alternative.

9.1.1 Mining Method Selection

No faults or dykes were discovered during the exploration phase, but the existence of these structures must not be completely ignored. The mining method must be able to take the occasional occurrence of these structures into account.

A mining method must therefore be selected that exploits the C-Lower seam resource to the maximum. The seam thickness for the identified mining area is on average about 1.5 m with a maximum of 1.63 m. The suite of equipment to be selected must be able to mine a coal seam of between 1.3 m and 1.75 m based on the seam thickness and including an additional 10 cm contamination to be cut in the floor and the roof.

Bord-and-pillar mining with continuous miners and/or conventional drill and blast sections are therefore the only practical mining methods that have been considered.

The mining methods selected also has the ability to negotiate minor faults and dykes in conjunction with an ad hoc drill and blast crew and the geological structure risk is therefore mitigated.

The safety factor (1.8 - 2) applied in the mine layout and design is sufficient to allow a stable roof, but with the vision in mind to do stooping (extraction of pillars) to fully utilise the coal resource.

The C-lower seam varies between 30 m (to be confirmed for geotechnical stability) and 215 m in depth, primarily due to the topography and has an average seam thickness of approximatelt 1.5 m.

9.1.2 Resource Access

The position for the mine access is selected based on the most appropriate position for a mine access, together with the entire associated surface infrastructure positioned outside the wetlands, but with a practical view on the seam access, mine layout, ventilation considerations, terrace for product handling and access road from the unnamed tar road.

The resource will be accessed through boxcuts and the C-lower seam will be accessed directly. No detailed geotechnical analysis has been done on the strata formation stability where the boxcut is planned and a typical safe excavation is planned for the purpose of this exercise. Detailed designs will also reveal if the boxcut must access the seam at a dip or if the floor of the boxcut will be an extension of the coal floor of the C-Lower seam. The access will then be called an adit.

The resources will be accessed with at least three roads from the boxcut high wall; one road for men and material, one for the RoM conveyor and one the return airway which will be connected to the ventilation fans on the side “high wall” of the boxcut. More detail will be provided in the ventilation section. Based on available information, the best sites have been selected based on the following factors:

- Depth to coal seam to have the smallest possible boxcut;

- Coal properties – good bituminous coal with a thick seam;
- Not in or too close to environmentally sensitive areas;
- Within a geologically and geotechnically stable area;
- Enough area for surface infrastructure; and
- Accessibility from existing roads.

The site selected for Twyfalaar North is at the southern side of the prominent hill on Twyfalaar. where the seam outcrops. It will not sterilise any coal and is the shortest access to the underground mineable coal seam. The boxcut will be 10 m deep to ensure the coal access commences in solid rock below the initial weathered overburden.. The boxcut floor dips at 7º and the total length of the sloped boxcut floor will be approximately 18 m. A water sump can be excavated in this area to store any rain water or the entire boxcut can be covered with a roof structure due to the small size.

The site selected for Twyfalaar South is based on the location of the shallowest coal and also environmental considerations such as wetlands and distances from streams. The site selected for Klipfontein is based on the location of the shallowest coal and the expected dip and optimal exploitation. For both these sites geotechnical holes must be drilled and high wall stability analysis will have to be conducted for the final designs. Further analysis of environmental considerations will also be required.

9.1.3 Mining Equipment Selection

The Project will most probably be a contractor operation since the size of the resource doesn't justify the capital outlay for a new suite of mining equipment. Typical low seam mechanised equipment for bord and pillar mining will be used in combination with conventional drill-and-blast sections The equipment must be carefully selected to mine 1.5 to 1.75 m

9.1.4 Production and Scheduling

Each production section will be mined at a rate of about 240 ktpa or 20 ktpm, which is the industry benchmark due to the low seam height to be mined. Stooping production rates may increase up to 30 ktpm due to less support requirements. During the LOM it is expected that maximum production could be 480Kt/year nd the minimum is expected at 240Kt/year.

This LoM schedule allows a LoM of 13 Production is scheduled to start one year after the commencement of the construction with a build-up in the first year of production.

All developments will have nine roads, 6.5 m wide and developments will be separated with a barrier pillar equal to the size of the panel pillars. It is common practice to have sections mined from a secondary development, however; the mining blocks are too constrained in size. Each section will be mined, and pillars will be immediately stooped on retreat and the section will then be sealed off. One row of pillars will be left to protect the main development which will be stooped at the end of the mine's life. The assumption is made that 60% of the pillars will be stooped.

A mining loss of 5% is expected and 10 cm contamination is planned, especially where the seam is less than 1.6 m thick. It is assumed that all contamination will be washed out in the processing plant. It is important to remember that there is about one year's construction period ahead of the first production year.

9.1.5 Employment

The majority of mining design aspects were benchmarked against similar mines that are in operation in South Africa. The personnel complement of a similar mine was reviewed and adopted for the Project. This mine is planned to be contractor operated and only key individuals will be employed by the Applicant. The total number of employees on site is expected to approximately 170 people.

9.1.6 The No-Go Alternative

Should this Project not proceed ("no-go"), the status quo shall remain. Although the staff compliment will not be large, the surrounding communities would benefit from the potential employment opportunities, and potential community projects associated with the SLP. The no-go alternative also means that all potential negative impacts associated with the proposed mine and its associated infrastructure would not occur. Hence, the EIA process will determine if the project would result in any environmental or social fatal flaws that may result in the project the no-go alternative being the preferred alternative.

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

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

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

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

A Comments and Response Report (CRR) will be compiled capturing all stakeholder comments during the Scoping Phase public comment period. The CRR will be included in this section of the Final Scoping Report and submitted to the DMR for consideration.

9.4 Item 2(h)(iv): The environmental attributes associated with the sites

The section provides a summary of the baseline environment affected by the proposed activity, type of current land uses, environmental features, and current land use, based on desktop assessments undertaken by the relevant specialists.

9.4.1 Climate

The area typically experiences warm summer temperatures, whilst winters are generally cold with a high incidence of frost (Mucina & Rutherford, 2012). Frost is fairly common during the cold winter months of June to August, commonly associated with early morning mist. The climate of the study area is similar to that of the close by town of Ermelo. Sheepmoor receives an average of 75 mm of rain a year, with most rainfall occurring during summertime. The study area is situated within the Cold Interior Climatic Zone of the country. The average daily maximum temperature in January (the hottest month) is 25ºC, and in July (the coldest month) is 16 ºC. Due to its position near the escarpment, the area is somewhat windier than is typical for the South-Eastern Mpumalanga Highveld, although the majority of winds are still light and their direction is controlled by topography (Msukaligwa LM Spatial Development Framework, 2010).

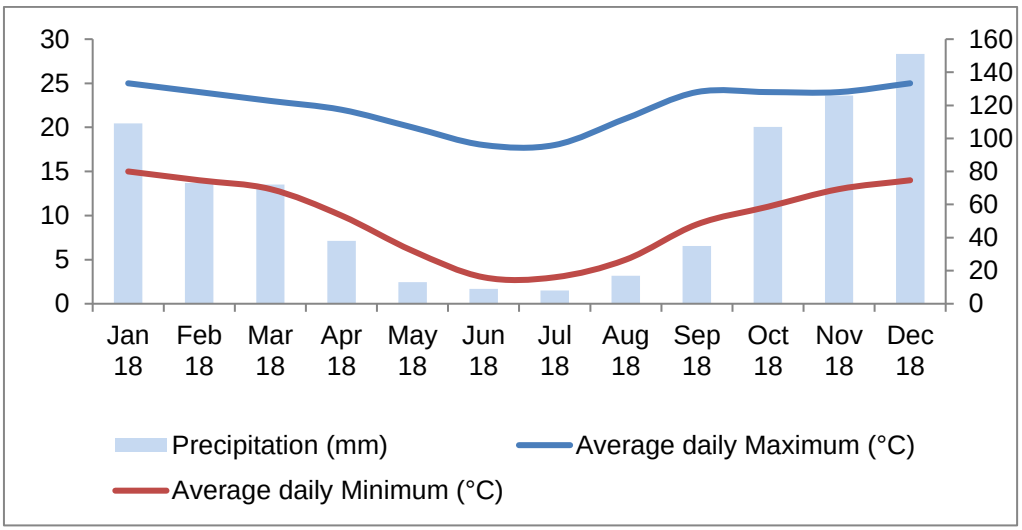


Figure 9-1: Average temperatures and precipitation for the proposed Project (Ermelo Weather Station)

9.4.2 Topography

The topography is that of slight to moderately undulating plains, with some low hills and pan depressions scattered throughout the landscape. Altitude typically varies from 1500 m to 1800 m as depicted in Figure 9-2. Drainage occurs in the North easterly direction. Non-perennial drainage lines are located to the East and West. The majority of the project area has

steep slopes with the higher-lying areas have steeper slopes of between 10° and 45°, whereas low lying areas have gentle slopes that range from 0° and 10°.

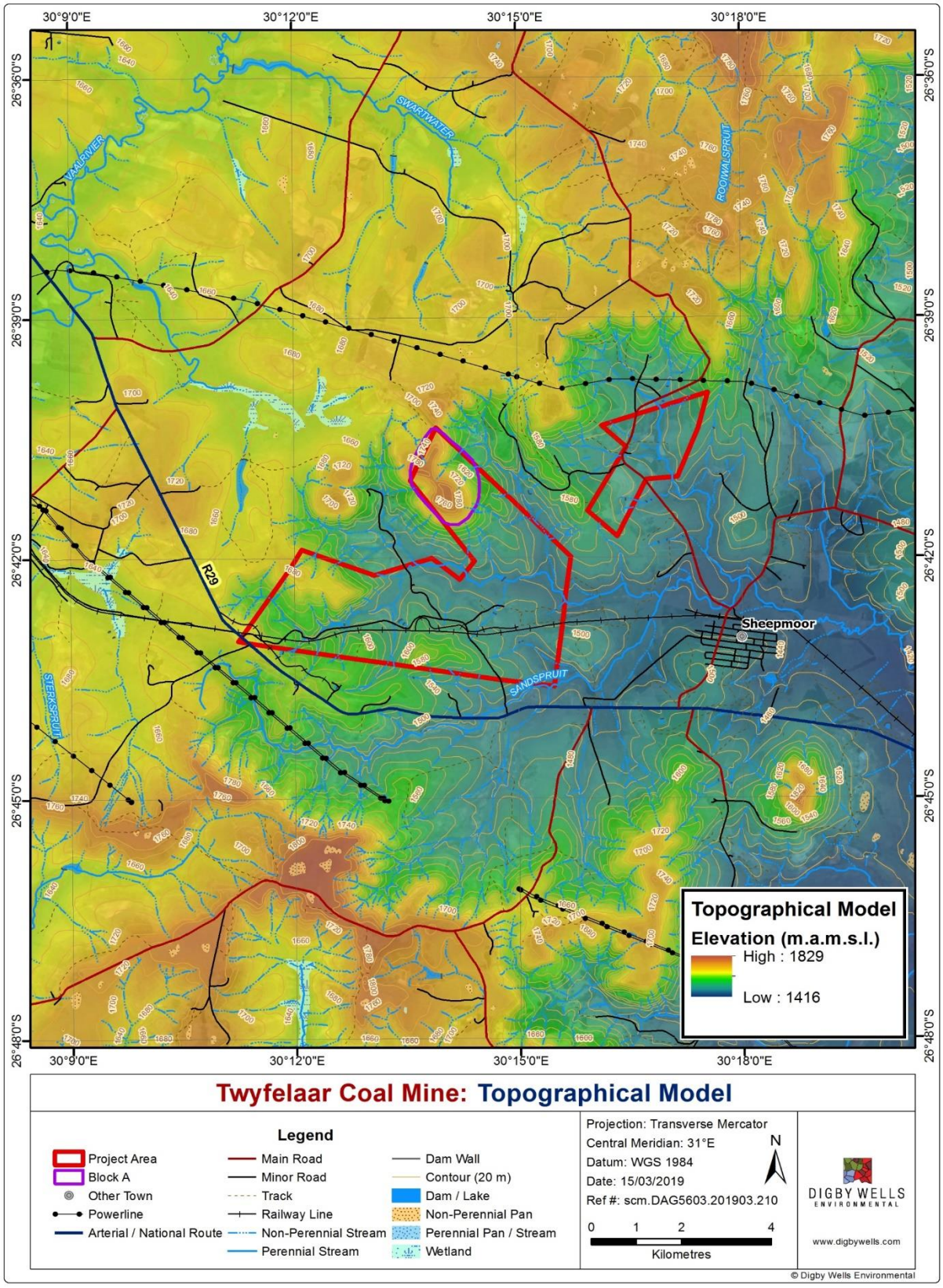


Figure 9-2: Topography of the Twyfelaar Project

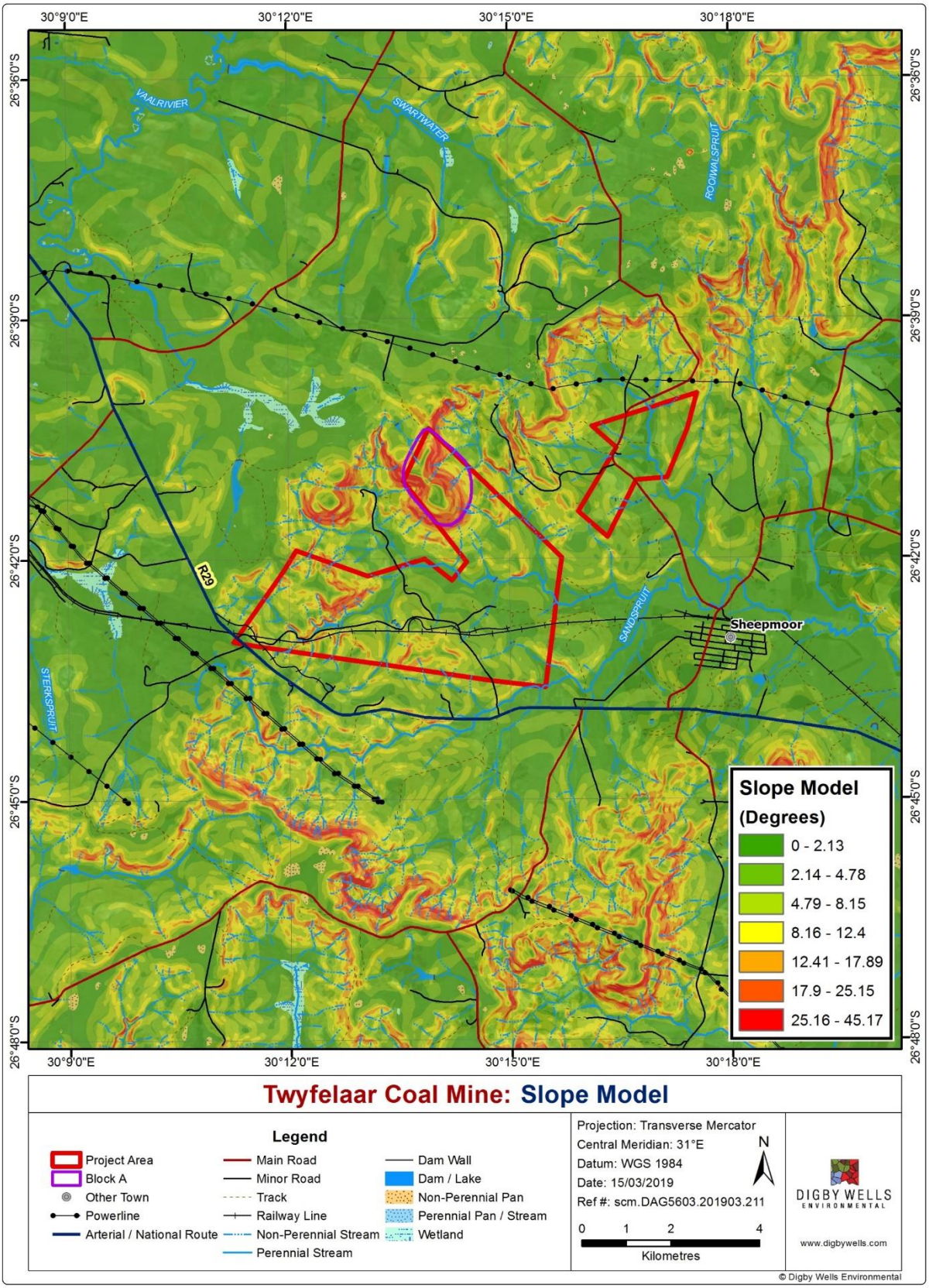


Figure 9-3: Slope Aspect for the Proposed Project Area

9.4.3 Geology

The proposed Twyfelaar Coal Mining Project is in the eastern escarpment of the Mpumalanga Highveld in the Ermelo coalfield. The geology of the project area is dominated by the Madzaringwe Formation of the Karoo Supergroup and Karoo Dolerite Sui, as depicted in Figure 9-4. These are comprised of mudstone, shale and siltstone.

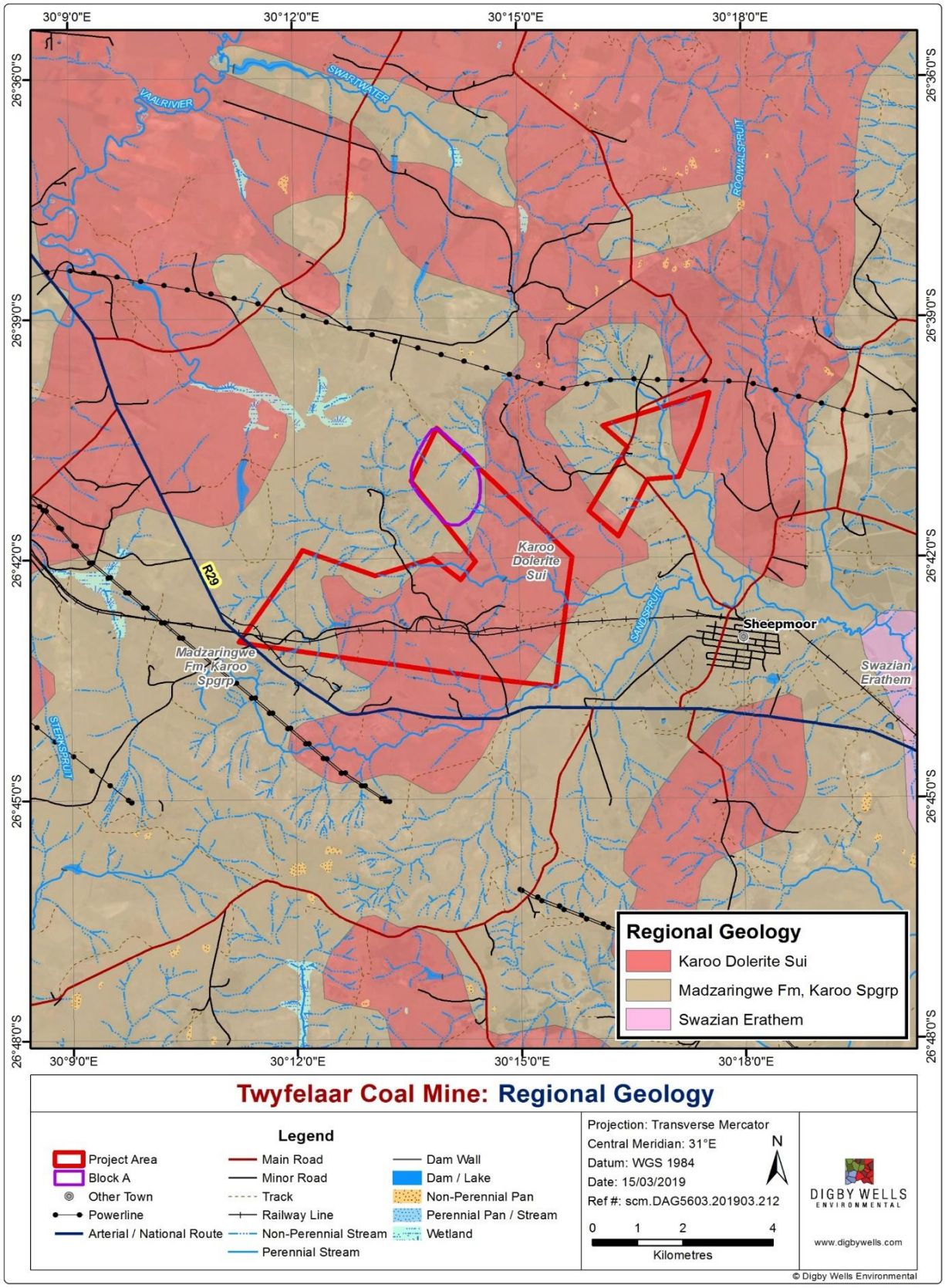


Figure 9-4: Regional Geology

9.4.4 Groundwater

This section provides details regarding the hydrogeological setting of the site, results from the hydrocensus undertaken, groundwater quality and quantity in and around the proposed site. It must be noted that study was limited to the initial five years of mining(Twyfelaar North), and the remainder of the proposed mining area will be assessed during the EIA Phase. This baseline will therefore be updated.

9.4.4.1 Hydrogeology

The conceptual hydrogeological model of the area is based on the generally accepted model for the Mpumalanga coal fields. In this model three principal aquifers are identified: the weathered aquifer; the fractured Karoo aquifer; and the fractured pre-Karoo aquifer (Hodgson & Krantz, 1998).

The Karoo rocks are not known for large scale development of aquifers, but occasional high-yielding boreholes can be present. The aquifers that occur in the area can therefore be classified as minor aquifers (low yielding), but of high importance (Parsons, 1995) and are understood to have a low to medium development potential, mostly used for small-scale domestic purposes or occasionally for large-scale irrigation.

Three distinct superimposed groundwater systems are present within the area (Hodgson and Krantz, 1998, Woodford and Chevallier, 2002) and can be classified as:

- The upper weathered Ecca aquifer (shallow, intergranular type aquifer formed in the weathered zone of the Karoo sediments; can locally form a perched aquifer on top of fresh bedrock);
- The fractured aquifers within the unweathered, fractured Ecca sediments; and
- The aquifer below the Ecca sediments (deeper aquifer formed by fracturing of older Karoo sediments and dolerite intrusions).

These types of groundwater systems are common to the groundwater regime in the Karoo environment. The systems do not necessarily occur in isolation and often form a composite groundwater regime that is comprised of one, some, or all of the systems.

Good hydraulic connectivity often exists between the two top aquifers and these have consequently been treated as a single unit in the modelling of groundwater flow-related systems.

In general, the shallow aquifer depth ranges between five to 20 m overlying the fractured rock formations throughout the region. The shallow primary aquifer is understood to be highly susceptible to pollution due to coal mining in the area as the pollutants travel shorter distance to reach the aquifer system (Hodgson and Krantz, 1998).

9.4.4.2 Hydrocensus Survey

Refer to Figure 9-5 for the borehole sampling localities. A hydrocensus was conducted in March 2019, during which 12 boreholes, springs or dug wells where identified and sampled, where possible. The following conclusions were drawn from the hydrocensus:

- The main source of drinking water supply in and around the proposed mining area is community hand pumps supplemented by a number of springs which are mainly used for domestic use and livestock watering (Table 9-1);
- The pH values (Field parameters) measured during the survey varied from 5.93 at Zwartwater spring (ZW-Spring) to 9.81 at BABH1 with an average pH of 7.2. A pH between 5.9 and 9.8 is indicative of a slightly acidic to alkaline waters. Conductivity values varied from 44.1 µS/m at ZW-Spring to 1219 µS/m at BABH1 and thus, indicative of moderate low to slightly high conductivity (saline water) values (Table 9-2); and
- Groundwater level elevation was measured at only three boreholes as most of the boreholes were equipped with hand pumps. The groundwater level elevation varies from 1662.6 metres above mean sea level (mamsl) at WBH1 and 1591.2 mamsl at EBH1. Groundwater level elevation seems to be high in the west and low south-east of the project area. This seems to suggest that the flow direction resembles the surface topography (Table 9-3).

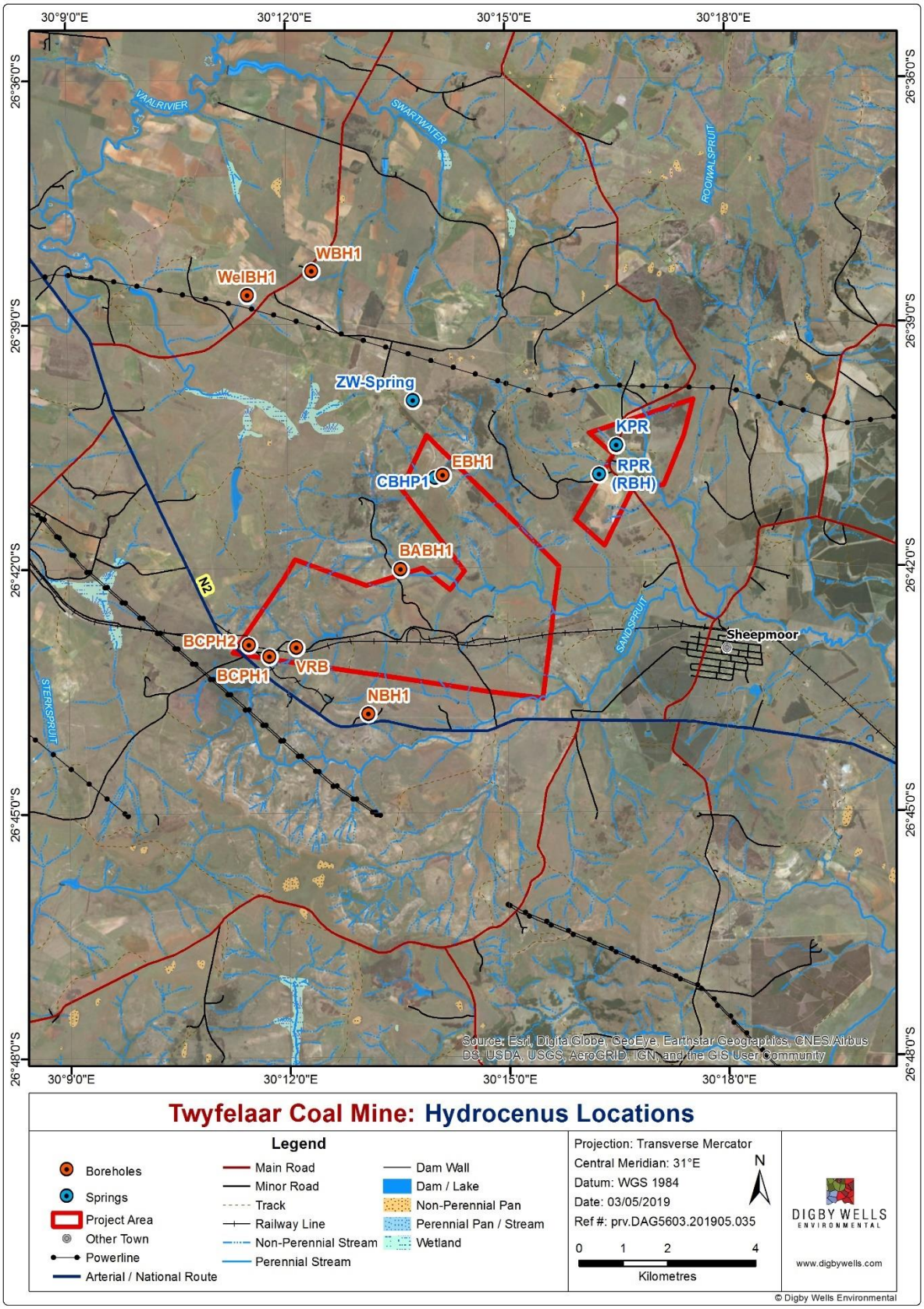


Figure 9-5: Hydrocencus Sample Locations

Table 9-1: Identified Boreholes, Spring and Dug Wells

Borehole	X	Y	Status	Comment
BABH1	30.225787	-26.70028	Sampled	Artesian well at Bambanani II in Masina farm. The borehole was drilled as part of exploration. According to the residents the water is salty and despite being salty it is still being used for domestic purpose.
BCPH1	30.195737	-26.718042	Sampled	Water supply borehole at Bambanani CPA (communal farm). The borehole has a hand pump installed. According to the residents the water level is deep since they have to pump for longer periods before water comes out of the borehole. This borehole may either be drying up due to surrounding water uses.
BCPH2	30.191087	-26.715635	Sampled	Dysfunctional water supply borehole. The wind mill is broken and prior to being broken the borehole ran dry after Transnet drilled a water supply borehole a couple of meters from this borehole.
CBP1	30.233784	-26.681652	Sampled	Spring from the proposed mining area (Phakamani, Twyfelaar)
EBH1	30.235469	-26.681075	Sampled	Exploration borehole at Twyfelaar. The water is slightly brown
KPR	30.275106	-26.675079	Sampled	A drinking water supply spring at Nick Vorster and Seuns farm.
NBH1	30.218195	-26.729878	Sampled	Water supply borehole at Nhlapho`s farm. The borehole has a hand pump installed.
RPR (RBH)	30.271108	-26.681063	Sampled	A Spring used for domestic uses.
VRB	30.201895	-26.716252	Sampled	River fed by a spring which couldn't be sampled, entering the project area.
WelBH1	30.191154	-26.644074	Sampled	A wind pump at Weltevreden farm. The pump water into the nearby dam.
WBH1	30.205812	-26.639166	Sampled	Livestock and possible irrigation (gardening) borehole at Weltevreden farm. The borehole has a pump installed.
ZW-Spring	30.228773	-26.665794	Sampled	A Spring used for domestic and livestock watering purposes at Manzimnyama

Borehole	X	Y	Status	Comment
				(Thandukhanya CPA (previously Zwartwater)).

Table 9-2: Field parameters

Sample ID	pH	EC µS/m	TDS mg/l	Temperature ◦C
BABH1	9.81	1219	851	21
BCBH1	6.89	176.5	121.3	21.2
BCBH2	6.34	164.2	111.9	24.3
CBP1	9.5	176.4	122.7	27
EBH1	7.05	268	184	25
KPR	6.21	841	585	21.4
NBH1	6.84	283	189	21.9
RBH (RPR))	6.6	871	608	20.3
WelBH1	6.84	254	175	19.6
WBH1	7.26	169.3	116.9	20.5
ZW-Spring	5.93	44.1	32.9	20.8

Table 9-3: Groundwater level elevation

Name	Elevation (mamsl)	Water level depth (mbgl)	Water level elevation (mamsl)
BCPH2	1651	10.6	1640.4
EBH1	1603	11.78	1591.2
WBH1	1682	19.4	1662.6

9.4.4.3 Groundwater Quality

The water quality results for the tested sites are shown in Table 6-1. The results form the baseline water quality data for the groundwater assessment within the study area. A total of four samples (BABH1, CBP1, EBH1, and ZW-Spring) were sent for lab analysis. Based on the water quality results presented in Table 9-4, the following summary can be made for the baseline water quality:

- The groundwater types found were a mixture of Ca-Mg-HCO_3 and Na-HCO_3;
- The sample taken from the artesian borehole BABH1 showed a very strong Na-HCO_3 characteristic, which is the of which residents noted the water was salty in taste. The sample from ZW-Spring also has a Na-HCO3 signature;
- Spring CPB1 and exploration hole EHB1 are in close proximity to each other and show a similar, Ca-Mg-HCO3-type groundwater;

- The dominant sodium cation could indicate deeper groundwater in which ion exchange between host rock and water has taken place. Bicarbonate being the dominant cation could indicate flowing as opposed to stagnant water.
- The four (4) water samples taken showed the groundwater in the area to be of good quality, with no parameters exceeding any of the limits as per the SANS and WHO guidelines.

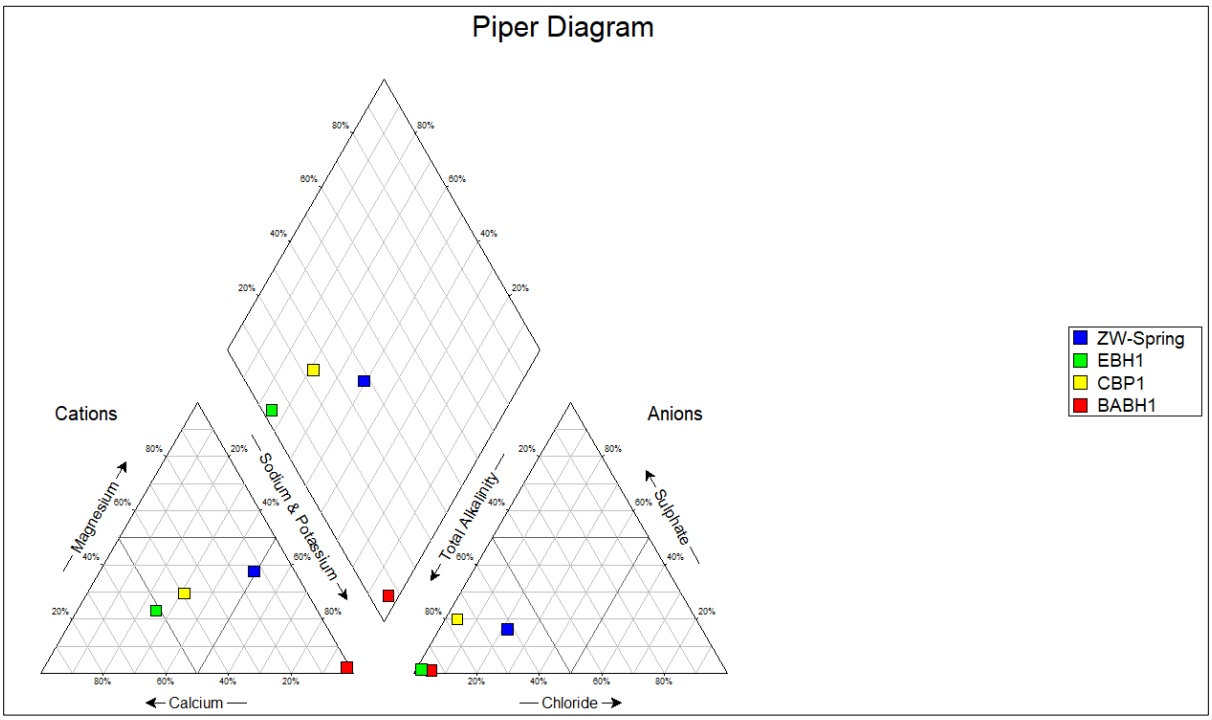


Figure 9-6: Piper Diagram

Table 9-4: Baseline groundwater quality analysis

Parameter	SANS 241-1 2015 Drinking Water	WHO Drinking Water (2017)	BABH1	CPB1	EBH1	ZW-Spring
			Mar-19	Mar-19	Mar-19	Mar-19
pH in water at 25ºC	5-9.7	NS	9.7	8.8	7.1	6
Total Alkalinity as CaCO3	1200	NS	200	52	152	8
Conductivity in mS/m @ 25ºC	170	NS	40	14	29	2
Calcium	NS	NS	0.77	10.80	31.15	0.57
Magnesium	NS	NS	<1	4.892	8.375	<1
Sodium	200	200	89.2	9.4	16.0	1.8
Potassium	NS	NS	0.67	0.91	2.92	1.21
Iron	2	0.3	< 0.025	< 0.025	< 0.025	0.031
Phosphorus	NS	NS	0.04	0.03	0.04	0.02
Aluminium	0.3	0.1	< 0.100	< 0.100	< 0.100	< 0.100
Arsenic	0.01	0.01	< 0.010	< 0.010	< 0.010	< 0.010
Boron	2.4	2.4	0.082	< 0.010	0.025	< 0.010
Barium	0.7	0.7	< 0.010	0.019	0.180	< 0.010
Beryllium	NS	0.012	< 0.010	< 0.010	< 0.010	< 0.010
Cadmium	0.003	0.003	< 0.010	< 0.010	< 0.010	< 0.010
Cobalt	NS	NS	< 0.010	< 0.010	< 0.010	< 0.010
Chromium	0.05	0.05	< 0.010	< 0.010	< 0.010	< 0.010
Copper	2	2	< 0.010	< 0.010	< 0.010	< 0.010
Manganese	0.4	0.4	< 0.025	< 0.025	< 0.025	< 0.025
Molybdenum	NS	NS	< 0.010	< 0.010	< 0.010	< 0.010
Nickel	0.07	0.07	< 0.010	< 0.010	< 0.010	< 0.010
Lead	0.01	0.01	< 0.010	< 0.010	< 0.010	< 0.010
Antimony	NS	NS	< 0.010	< 0.010	< 0.010	< 0.010
Selenium	0.04	0.04	< 0.010	< 0.010	< 0.010	< 0.010
Tin	NS	NS	< 0.010	< 0.010	< 0.010	< 0.010
Vanadium	NS	NS	< 0.010	< 0.010	< 0.010	< 0.010
Zinc	5	4	0.022	0.025	0.025	0.026
Chloride	300	250	8	<2	2	2
Fluoride	1.5	1.5	1.2	0.2	0.3	<0.2
Nitrite as N	0.9	3	<0.05	<0.05	0.08	<0.05
Nitrate as N	11	NS	<0.1	<0.1	0.7	0.4
Sulphate	500	250	<2	13	2	<2
Mercury	0.006	0.006	< 0.010	< 0.010	< 0.010	< 0.010
Ammonia as N	1.5	35	0.2	0.5	0.4	0.8

9.4.5 Hydrology (Surface Water)

The baseline regional hydrological setting is summarised in this section.

9.4.5.1 Drainage and Quaternary Catchment

The water resources of South Africa are divided into quaternary catchments, which are regarded as the principal water management units in the country (DWAF, 2011). A quaternary catchment is a fourth order catchment in a hierarchical classification system in which the primary catchments are the major units. The primary drainages are further grouped into or fall under Water Management Areas (WMA) and Catchment Management Agencies (CMA).

The Department of Water and Sanitation (DWS) has established nine WMAs and nine CMAs as contained in the National Water Resource Strategy 2 (2013) in terms of Section 5 subsection 5(1) of the National Water Act, 1998 (Act No. 36 of 1998). The establishment of these WMAs and CMAs is to improve water governance in different regions of the country, to ensure a fair and equal distribution of the Nation's water resources, while making sure that the resource quality is sustained.

Figure 9-7 indicates the water resource management classification associated with the Project Area. The Project Area falls within the Inkomati-Usuthu WMA (WMA3), and it is associated with primary drainage region X. The quaternary catchment is W53A. The major watercourse associated with the Project Area is the Sandspruit (i.e. Sub-Quaternary Reach/SQR W53A-01757) (DWS, 2014).

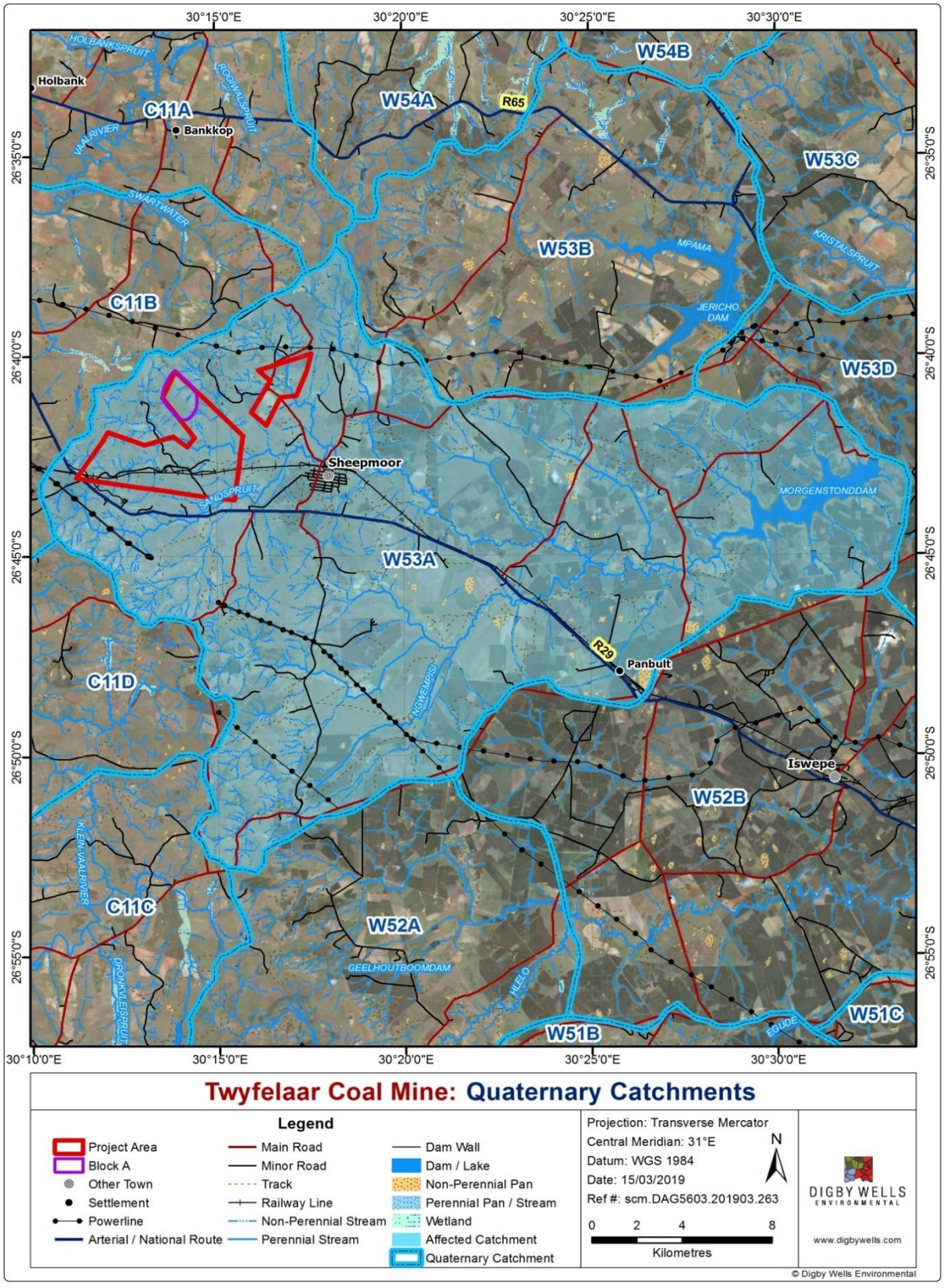


Figure 9-7: Quaternary Catchments

9.4.5.2 Sensitive Assessment

The Project area is drained by the Sandspruit and its tributaries on the south and eastern boundaries. The Swartwater river (tributary of the Vaal River) and its tributaries drain the project site on the north and western fringes. Approximately four dams, two pans and wetlands are found within and around the project site as indicated in Figure 9-8.

These watercourses are sensitive to developmental impacts and due care should be taken to ensure that they are protected from degradation. Mechanisms and management measures should be put in place to ensure no water quality deterioration occurs as a result of mine effluents and that no degradation will result from mining and related activities.

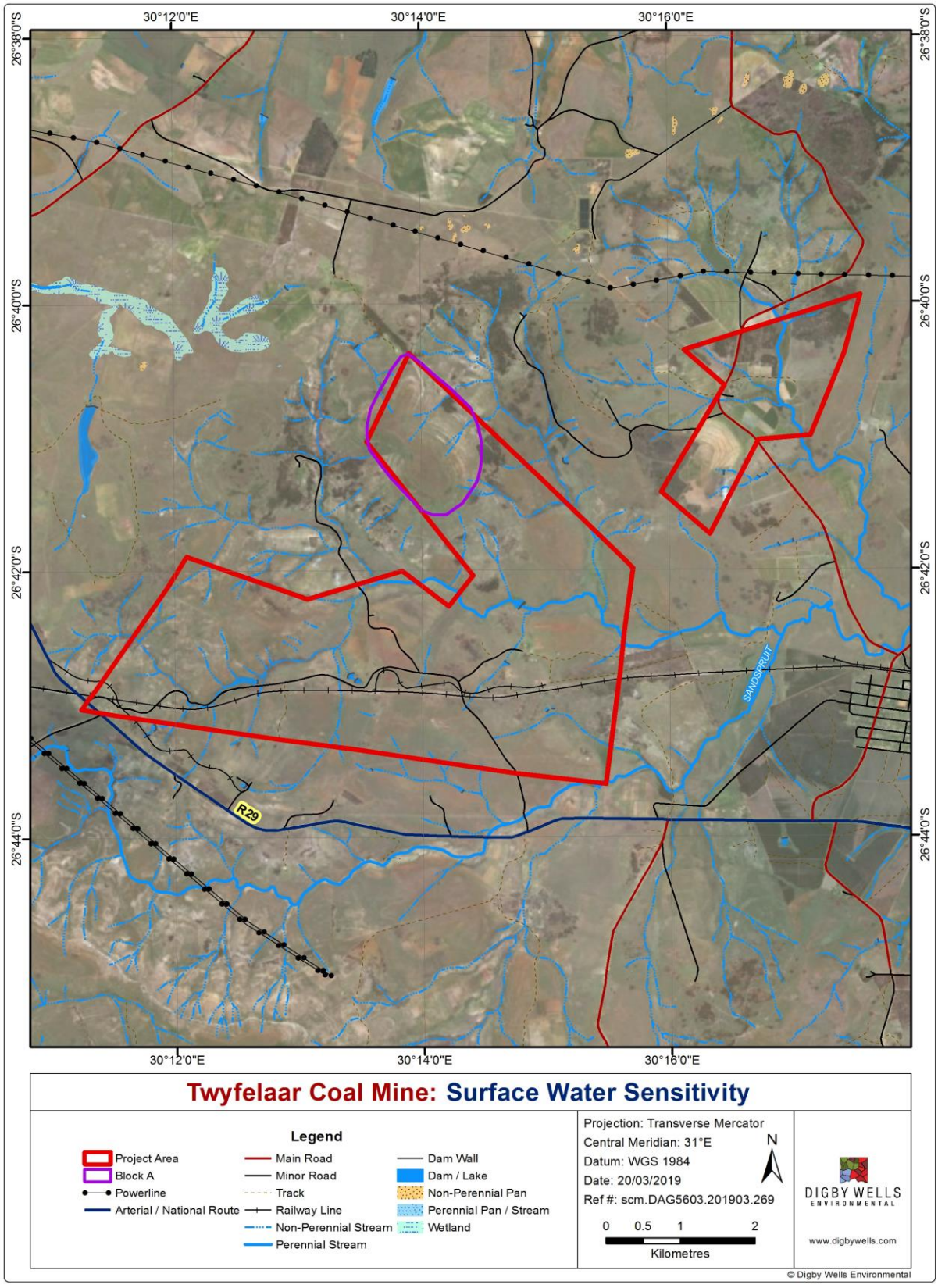


Figure 9-8: Surface Water Sensitivities

9.4.6 Soil, Land Use and Land Capability

This section provides the baseline environment regarding soils, land use and land capability associated with the proposed Project.

9.4.6.1 Land Type

A total of three Land Type units occur within the project area, namely: Fa162 (Shallow soils, no lime); Bb35 (Yellow, highly weathered structureless soils with plinthic subsoils) and Ba51 (red, highly weathered structureless soils with plinthic subsoils) as depicted in Figure 9-9. Table 9-5 gives a brief description of the dominant Land Types within the project area.

Table 9-5-Dominant land types

Land Type	Description
Fc	Shallow Soils Lime Abundant- Indicates land where lime occurs throughout the whole landscape. The Land Type is dominated by Glenrosa and Mispah soil forms. Glenrosa soils are identified by an orthic topsoil horizon directly overlying fractured rock or where tilting or weathering of the underlying rock has taken place with weathered to the extent that clay illuviation into this material has taken place. These partly weathered materials provide a medium for plant growth and facilitate water flows
Ba	Red, highly weathered structureless soils This Land Types represents areas where dystrophic red soils are widespread,
Bb	Yellow, highly weathered structureless soils. This Land Types represents areas where dystrophic yellow-brown and grey soils are widespread. The soils in this class are dystrophic and/or mesotrophic and red soils are not widespread. Plinthic soils must cover more than 10% of the area. Red soils occupy more than a third of the area. Duplex (Escourt, Sterkspruit, Swartland, Valsrivier and Kroonstad forms) and margalitic soils (Arcadia, Bonheim Mayo or Milkwood) are absent or occupy less than 10% of the soils present in the area

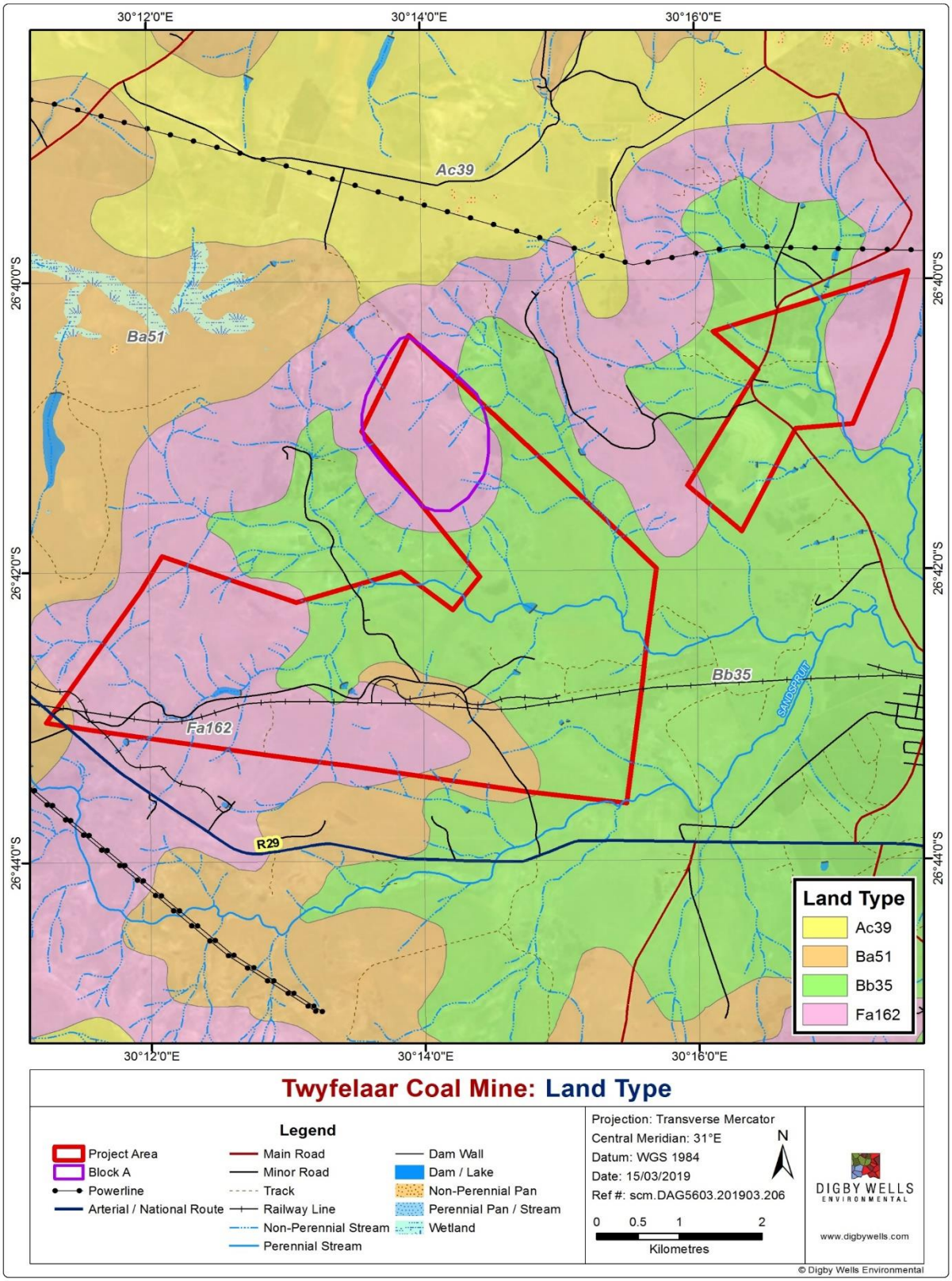


Figure 9-9: Land Type Units

9.4.6.2 Land Use

The current land use in the project area is dominated by natural vegetation in the form of grassland. Other land use types identified include water bodies, wetland, cultivated land, forestry plantations, and indigenous forest or thicket/dense bush (GeoTerra Image, 2013/14). These are visually depicted in Figure 9-10.

9.4.6.3 Land Capability

The defined land capability shows the most intensive long-term use of land for rain-fed agriculture amd at the same time indicates the permanent limitations associated with different land use classes. The classification system is made up of land capability classes and land capability groups. The land capability was determined by assessing a combination of soil, terrain and climate features. According to the land type data (Land Type Survey Staff, 1972 – 2006); the current land capability identified within the proposed project are Class II (Intensive cultivation), Class III (Moderate cultivation/intensive grazing) and Class VII (Wildlife), being the dominant land capability as depicted in Figure 9-11. Site surveys will confirm details in this regard.

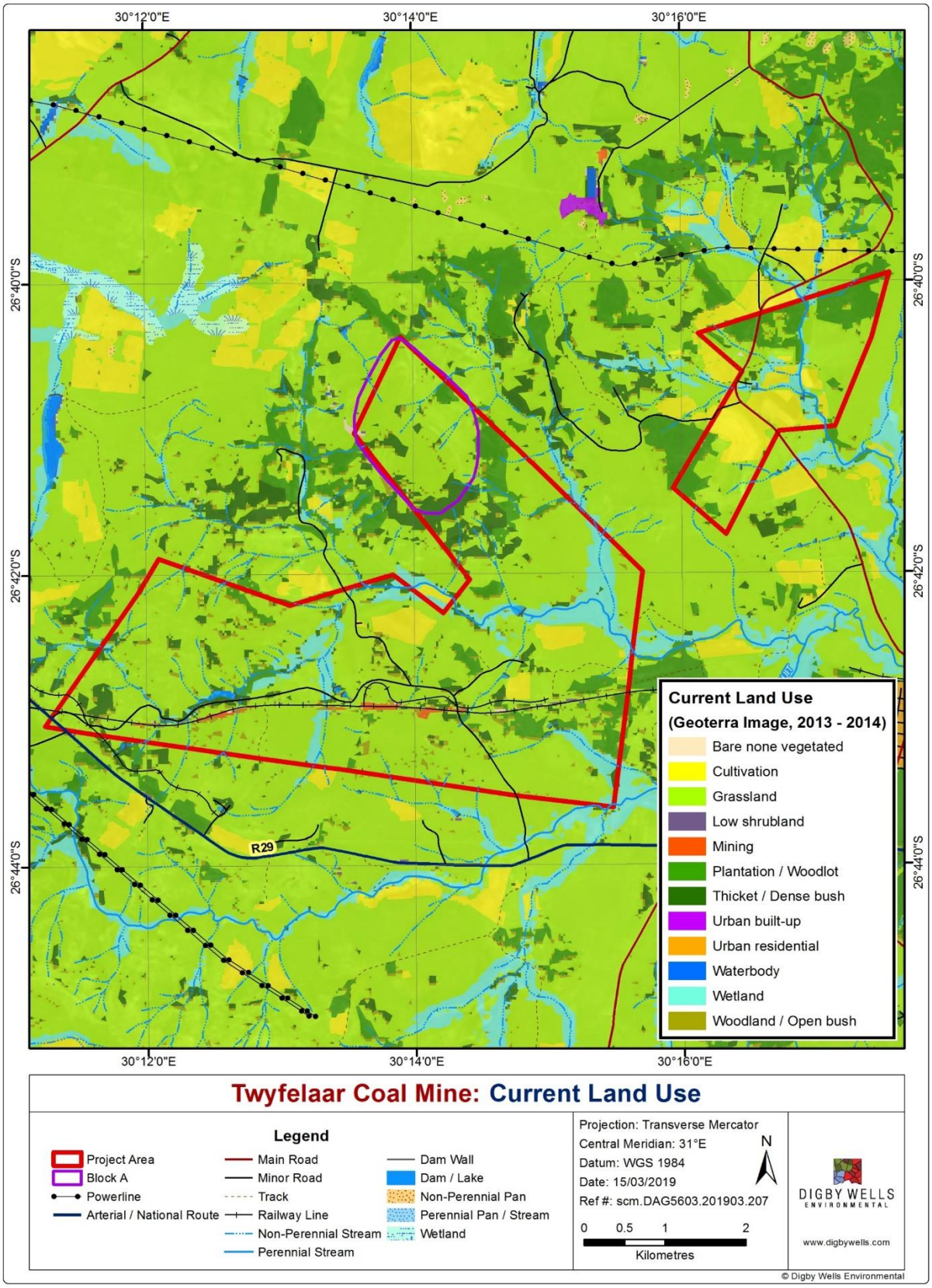


Figure 9-10: Current Land Use

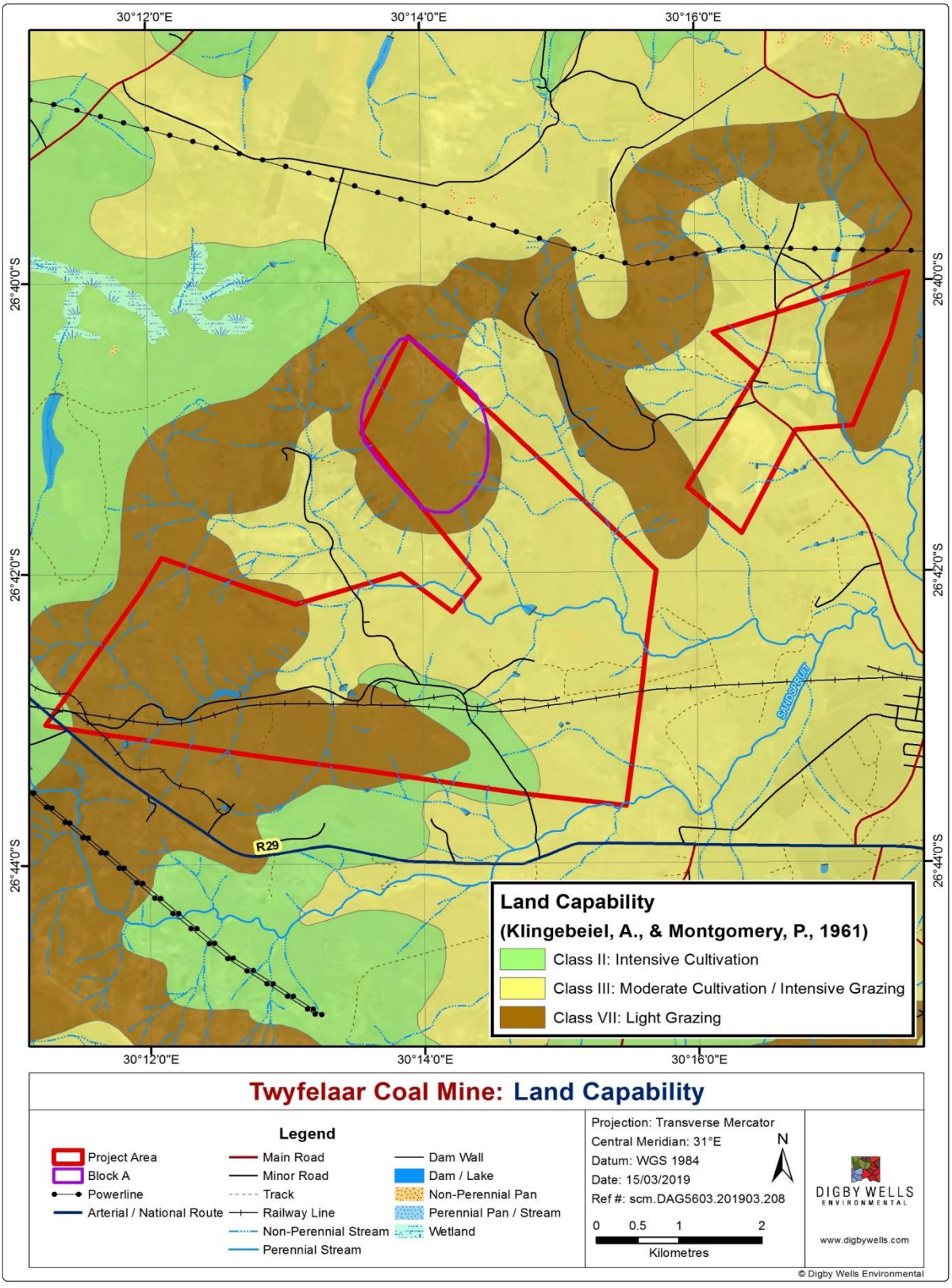


Figure 9-11: Land capability at proposed Dagsoom Coal Mine project area

9.4.7 Fauna and Flora

The Fauna and Flora baseline has been compiled based on desktop research; however, the baseline will be updated as part of the EIA Phase. A site visit will be conducted to complete the EIA component.

9.4.7.1 Fauna

The study area is located in the areas classified as Eastern Highveld Grassland (Gm 12) and Wakkerstroom Montane Grassland (Gm 14) (Figure 9-12).

9.4.7.1.1 Eastern Highveld Grassland (Mapping Unit Gm12)

The Eastern Highveld Grassland is recorded on the plains between Belfast in the east and the eastern side of Johannesburg in the west, extending southwards to Bethal, Ermelo and west of Piet Retief within the Mpumalanga and Gauteng Provinces of South Africa (Mucina & Rutherford; 2006). The altitude varies between 1,520 and 1,780 m, but also as low as 1,300 m.

The Eastern Highveld Grassland is found on slightly to moderately undulating plains, including some low hills and pan depressions and consist of short, dense grassland, dominated by the usual Highveld grass composition (*Aristida, Digitaria, Eragrostis, Themeda, Tristachya,* etc.) with small, scattered rocky outcrops with wiry, sour grasses and some woody species (Mucina & Rutherford; 2006). Woody species include *Acacia caffra, Celtis africana, Diospyros lycioides subsp. lycioides, Parinari capensis, Protea caffra* and *Rhus magalismontana*.

The soils of this Eastern Highveld Grassland consist of yellow sandy soils of the Ba (30%) and Bb (65%) land types found on shale and sandstone of the Karroo Supergroup.

The Eastern Highveld grassland is classified as an endangered vegetation type (Rouget *et al*., 2004; Mucina & Rutherford, 2012, Ferrar & Lötter, 2007) due to mining activities within the provinces with a conservation target of 24% (NSBAR, 2004). Approximately 44% of the Eastern Highveld Grassland has been transformed, primarily by cultivation, plantations, mining, urbanization and building of dams (Mucina & Rutherford; 2006). Erosion is very low and no serious alien infestation is reported, although species such as *Acacia mearnsii* can become dominant in disturbed places.

9.4.7.1.2 Wakkerstroom Montane Grassland (Gm 14)

The Wakkerstroom Montane Grassland (Gm 14) occurs in the KwaZulu-Natal and Mpumalanga Provinces. It is found on the escarpment just north of Sheepmoor (north) to the southeast of Utrecht, and then from the vicinity of Volksrust in the west to Madlangempisi Mountain.

This vegetation unit is a less obvious continuation of the escarpment that links the southern and northern Drakensberg escarpments. It straddles this divide and is comprised of low mountains and undulating plains.

The vegetation in this unit comprises predominantly short montane grasslands on the plateaus and the relatively flat area, with short forest and *Leucosidea* thickets occurring along steep,

mainly east facing slopes and drainage areas. *L.Sericea* is the dominant woody pioneer species that invades areas as a result of grazing mismanagement.

Wakkerstroom Montane Grassland is listed as Less Threatened, with a conservation target of 27%, however, less than 1% is statutorily protected in the Paardeplaats Nature Reserve. There are 10 South African Natural Heritage Sites in this unit, although very little of it is formally protected.

Land use pressures from agriculture are low (5% cultivated) probably owing to the colder climate and shallower soils. The area is also suited to afforestation, with more than 1% under *Acacia mearnsii* and Eucalyptus plantations. The black wattle (*Acacia mearnsii*) is an aggressive invader of riparian areas and the erosion potential is very low.

Table 9-6: Vegetation Types Under the Most Pressure from Mining (Adapted from Riuget et al., (2004))

Vegetation Type	% High	% Medium
Namib Seashore Vegetation	100	0
Subtropical Seashore Vegetation	96	0
Richtersveld Coastal Duneveld	87	0
Subtropical Dune Thicket	87	0
Northern Escarpment Dolomite Grassland	67	0
Namaqualand Seashore Vegetation	58	0
Wakkerstroom Montane Grassland	0.5	89
Nwambyia-Pumbe Sandy Bushveld	0	83
Eastern Highveld Grassland	0.2	72
Springbokvlakte Thornveld	0.3	66
Soweto Highveld Grassland	46	61
Delagoa Lowveld	0	53

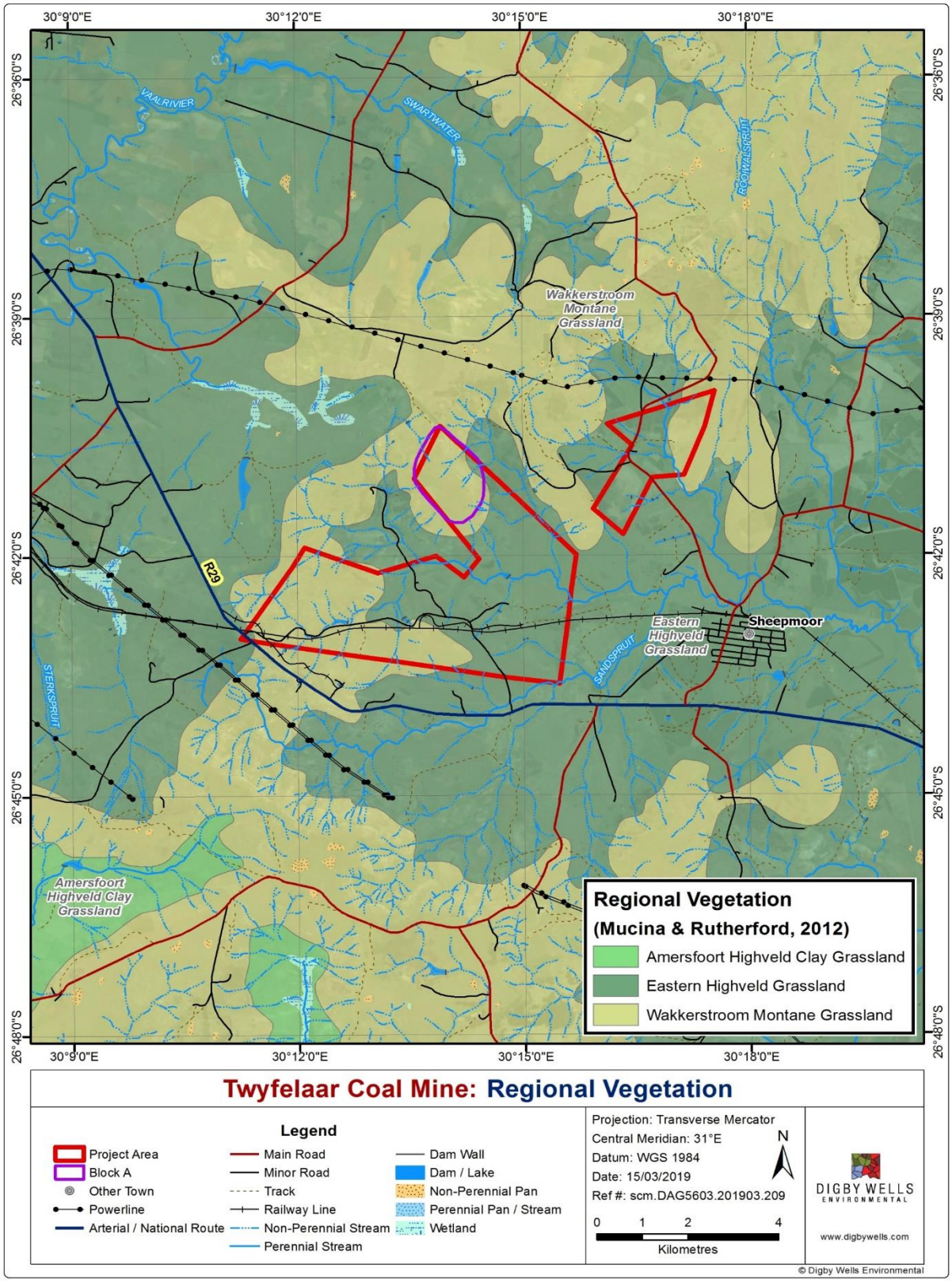


Figure 9-12: Regional Vegetation Types

9.4.7.2 Flora

9.4.7.2.1 Mammals

The following mammals may occur in the project area based on the search results on the Animal Demographic Unit (ADU) database, a total of 15 mammal species are listed for the project area and could occur on sire based on records for the immediate region of the Project area (Table 9-7). Three of these species are listed as Red Data species.

Table 9-7: Potentially Occurring Mammal Species

Family	Scientific Name	Common Name	Regional status
Erinaceidae	*Atelerix frontalis*	Southern African Hedgehog	Near Threatened (2016)
Felidae	*Leptailurus serval*	Serval	Near Threatened (2016)
Herpestidae	*Cynictis penicillata*	Yellow Mongoose	Least Concern (2016)
Mustelidae	*Ictonyx striatus*	Striped Polecat	Least Concern (2016)
Mustelidae	*Poecilogale albinucha*	African Striped Weasel	Near Threatened (2016)
Bovidae	*Ourebia ourebi*	Oribi	Endangered
Bovidae	*Redunca arundinum*	Southern Reedbuck	Least Concern (2016)
Bovidae	*Taurotragus oryx*	Common Eland	Least Concern (2016)
Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)
Canidae	*Otocyon megalotis*	Bat-eared Fox	Least Concern (2016)
Felidae	*Caracal caracal*	Caracal	Least Concern (2016)
Felidae	*Leptailurus serval*	Serval	Near Threatened (2016)
Hyaenidae	*Hyaena brunnea*	Brown Hyena	Near Threatened (2015)
Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern (2016)
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern (2016)

9.4.7.2.2 Herpetofauna

Based on the results of the ADU database search the following amphibians may occur in the project area (Table 9-8), a total of nine frog species; and seven reptile species. None of these species are listed as Red Data species.

Table 9-8: Potentially Occurring Herpetofauna

Family	Scientific Name	Common Name	Regional status
Bufonidae	*Sclerophrys gutturalis*	Guttural Toad	Least Concern
Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina	Least Concern
Hyperoliidae	*Semnodactylus wealii*	Rattling Frog	Least Concern

Family	Scientific Name	Common Name	Regional status
Pipidae	*Xenopus laevis*	Common Platanna	Least Concern
Ptychadenidae	*Ptychadena porosissima*	Striped Grass Frog	Least Concern
Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	Least Concern (2017)
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern (2017)
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern (2013)
Pyxicephalidae	*Tomopterna natalensis*	Natal Sand Frog	Least Concern
Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)
Cordylidae	*Cordylus vittifer*	Common Girdled Lizard	Least Concern (SARCA 2014)
Gekkonidae	*Pachydactylus vansoni*	Van Son's Gecko	Least Concern (SARCA 2014)
Lamprophiidae	*Lycodonomorphus rufulus*	Brown Water Snake	Least Concern (SARCA 2014)
Lamprophiidae	*Psammophylax rhombeatus*	Spotted Grass Snake	Least Concern (SARCA 2014)
Leptotyphlopidae	*Leptotyphlops scutifrons conjunctus*	Eastern Thread Snake	Least Concern (SARCA 2014)
Scincidae	*Trachylepis punctatissima*	Speckled Rock Skink	Least Concern (SARCA 2014)

9.4.7.2.3 Birds (Avifauna)

Recently acquired data (according to SABAP2) of the project area for the quarter degree squares (QDS) 2630CA and 2630CB as well as old records from SABAP1 indicate that approximately 261 bird species are expected to occur in the study area. This includes a number of Red Data species and species that are endemic to southern Africa.

Table 9-9: Potentially Occurring Red Data and Endemic Avifauna

Common Name	Scientific Name	SA Red Data Status	Endemism Status
Black Stork	*Ciconia nigra*	Near Threatened	-
Southern Bald Ibis	*Geronticus calvus*	Vulnerable	-
Greater Flamingo	*Phoenicopterus roseus*	Near Threatened	-
Maccoa Duck	*Oxyura maccoa*	Least Concern	-
Secretarybird	*Sagittarius serpentarius*	Near Threatened	-

Common Name	Scientific Name	SA Red Data Status	Endemism Status
Cape Vulture	*Gyps coprotheres*	Vulnerable	-
African Marsh-Harrier	*Circus ranivorus*	Vulnerable	-
Lanner Falcon	*Falco biarmicus*	Least Concern	-
Red-footed Falcon	*Falco vespertinus*	Least Concern	-
Lesser Kestrel	*Falco naumanni*	Vulnerable	-
Wattled Crane	*Bugeranus carunculatus*	Critically Endangered	-
Blue Crane	*Anthropoides paradiseus*	Vulnerable	-
Grey Crowned Crane	*Balearica regulorum*	Vulnerable	-
Denham's Bustard	*Neotis denhami*	Vulnerable	-
White-bellied Korhaan	*Eupodotis senegalensis*	Vulnerable	-
Blue Korhaan	*Eupodotis caerulescens*	Near Threatened	-
Black-bellied Bustard	*Lissotis melanogaster*	Near Threatened	-
Black-winged Lapwing	*Vanellus melanopterus*	Least Concern	-
Black-winged Pratincole	*Glareola nordmanni*	Near Threatened	-
African Grass-Owl	*Tyto capensis*	Vulnerable	-
Giant Kingfisher	*Megaceryle maxima*	Least Concern	-
Rudd's Lark	*Heteromirafra ruddi*	Critically Endangered	-
Yellow-breasted Pipit	*Anthus chloris*	Vulnerable	-
Southern Bald Ibis	*Geronticus calvus*	Vulnerable	Endemic
South African Shelduck	*Tadorna cana*	-	Endemic
Cape Shoveler	*Anas smithii*	-	Endemic
Cape Vulture	*Gyps coprotheres*	Vulnerable	Endemic
Jackal Buzzard	*Buteo rufofuscus*	-	Endemic
Grey-winged francolin	*Scleroptila africana*	-	Endemic
Blue Crane	*Anthropoides paradiseus*	Vulnerable	Endemic
Blue Korhaan	*Eupodotis caerulescens*	Near Threatened	Endemic
Acacia Pied Barbet	*Tricholaema leucomelas*	-	Near Endemic
Eastern Clapper Lark	*Mirafra fasciolata*	-	Near Endemic

Common Name	Scientific Name	SA Red Data Status	Endemism Status
Rudd's Lark	*Heteromirafra ruddi*	Critically Endangered	Endemic
Eastern Long-billed Lark	*Certhilauda semitorquata*	-	Endemic
South African Cliff-Swallow	*Petrochelidon spilodera*	-	Breeding Endemic
Karoo Thrush	*Turdus smithi*	-	Endemic
Mountain Wheatear	*Oenanthe monticola*	-	Near-Endemic
Ant-eating Chat	*Myrmecocichla formicivora*	-	Endemic
Cape Grassbird	*Sphenoeacus afer*	-	Endemic
Cloud Cisticola	*Cisticola textrix*	-	Near Endemic
Drakensberg Prinia	*Prinia hypoxantha*	-	Endemic
Fiscal Flycatcher	*Sigelus silens*	-	Endemic
Cape Batis	*Batis capensis*	-	Endemic
Yellow-breasted Pipit	*Anthus chloris*	Vulnerable	Endemic
Cape Longclaw	*Macronyx capensis*	-	Endemic
Southern Boubou	*Laniarius ferrugineus*	-	Endemic
Bokmakierie	*Telophorus zeylonus*	-	Near Endemic
Olive Bush-Shrike	*Chlorophoneus olivaceus*	-	Near-Endemic
Pied Starling	*Lamprotornis bicolor*	-	Endemic
Cape White-eye	*Zosterops capensis*	-	Endemic
Cape Sparrow	*Passer melanurus*	-	Near Endemic
Cape Weaver	*Ploceus capensis*	-	Endemic
Red-headed Finch	*Amadina erythrocephala*	-	Near Endemic
Cape Canary	*Serinus canicollis*	-	Endemic
Cape Bunting	*Emberiza capensis*	-	Near Endemic

9.4.7.2.4 Invertebrates

A total of 14 invertebrate species may potentially occur in the project area. These are listed in Table 9-10 below.

Table 9-10: Potentially Occurring Invertebrate Species

Family	Scientific Name	Common Name	Regional status	Family
Diptera	Muscidae	*Musca domestica*	House flies	Not Assessed
Diptera	Calliphoridae	*Chrysomya sp.*	Blow flies	Not Assessed
Hymenoptera	Vespidae	*Vespula sp.*	Social wasps	Not Assessed
Isoptera	Termitae	*Termite sp.*	Social termites	Not Assessed
Hymenoptera	Apidae	*Apis mellifera*	Social Bees	Not Assessed
Hymenoptera	Formicidae	*Anoplolepis custodiens*	Ants	Not Assessed
Orthoptera	Acrididae	*Orthoctha dasycnemis*	Grasshopper	Not Assessed
Odonata	Libellulidae	*Sp.1*	Dragon flies	Not assessed
Odonata	Coenagrionidae	*Sp.1*	Damselflies	Not assessed
Coleoptera	Tenebronidae	*Psammodes sp.*	Tok-tokkies	Not Assessed
Lepidoptera	Nymphalidae	*Danaus chrysippus subsp.orientis*	African monarch butterfly	Least Concern
Lepidoptera	Lycaenidae	*Chilades trochylus*	Grass jewel	Least Concern
Lepidoptera	Pieridae	*Eurema brigitta*	Grass yellow	Least Concern
Lepidoptera	Pieridae	*Eronia leda*	Autumn leaf vagrant	Least Concern

9.4.8 Wetlands

The pre-feasibility studies done for the proposed Project identified wetlands on site. The baseline has been conducted at a desktop level and a site visit to delineate wetlands will be conducted during the EIA investigation.

9.4.8.1 Climate and Ecoregion

The project area is located within the Highveld ecoregion (predominantly within Level I Ecoregion 11.05). The Highveld ecoregion is characterised by plains with a moderate to low relief and various types of grassland vegetation, with an altitude ranging from 1100 – 2100 m above mean sea level (a.m.s.l.). Relative to the country's average Mean Annual Precipitation (MAP) of 490 mm, this ecoregion experiences moderate rainfall of 400 – 1000 mm. The mean annual temperature of the Highveld ecoregion is hot in the west and moderate in the east (Kleynhans et al., 2005).

9.4.8.2 National Freshwater Ecosystem Priority Areas (NFEPA)

The NFEPA Project provides information of wetland and river ecosystems for integrating into freshwater ecosystem and biodiversity planning and decision-making processes. The assessor considered the strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources contained therein to evaluate the importance of the wetland areas (Nel *et al.* 2011).

Figure 9-13 demonstrates the distribution of NFEPA wetlands within the Project Area. The wetland types that dominate the landscape are Valley Floor wetlands, particularly channelled valley-bottom wetlands, un-channelled valley-bottom wetlands and bench wetlands.

The NFEPA wetlands have been ranked in terms of importance in the conservation of biodiversity. The wetlands within and in the vicinity of the Project Area are of Rank 2, 5 and 6. Rank 2 wetlands are important wetlands that fall within 500 m of an IUCN threatened frog point locality or threatened water-bird point locality. Alternatively they fall mostly within a sub-quaternary catchment that has sightings or breeding areas for threatened Wattled Cranes, Grey Crowned Cranes and Blue Cranes or has been identified by experts at the regional review workshops as containing wetlands of exceptional Biodiversity importance, with valid reasons documented or as containing wetlands that are good, intact examples from which to choose.

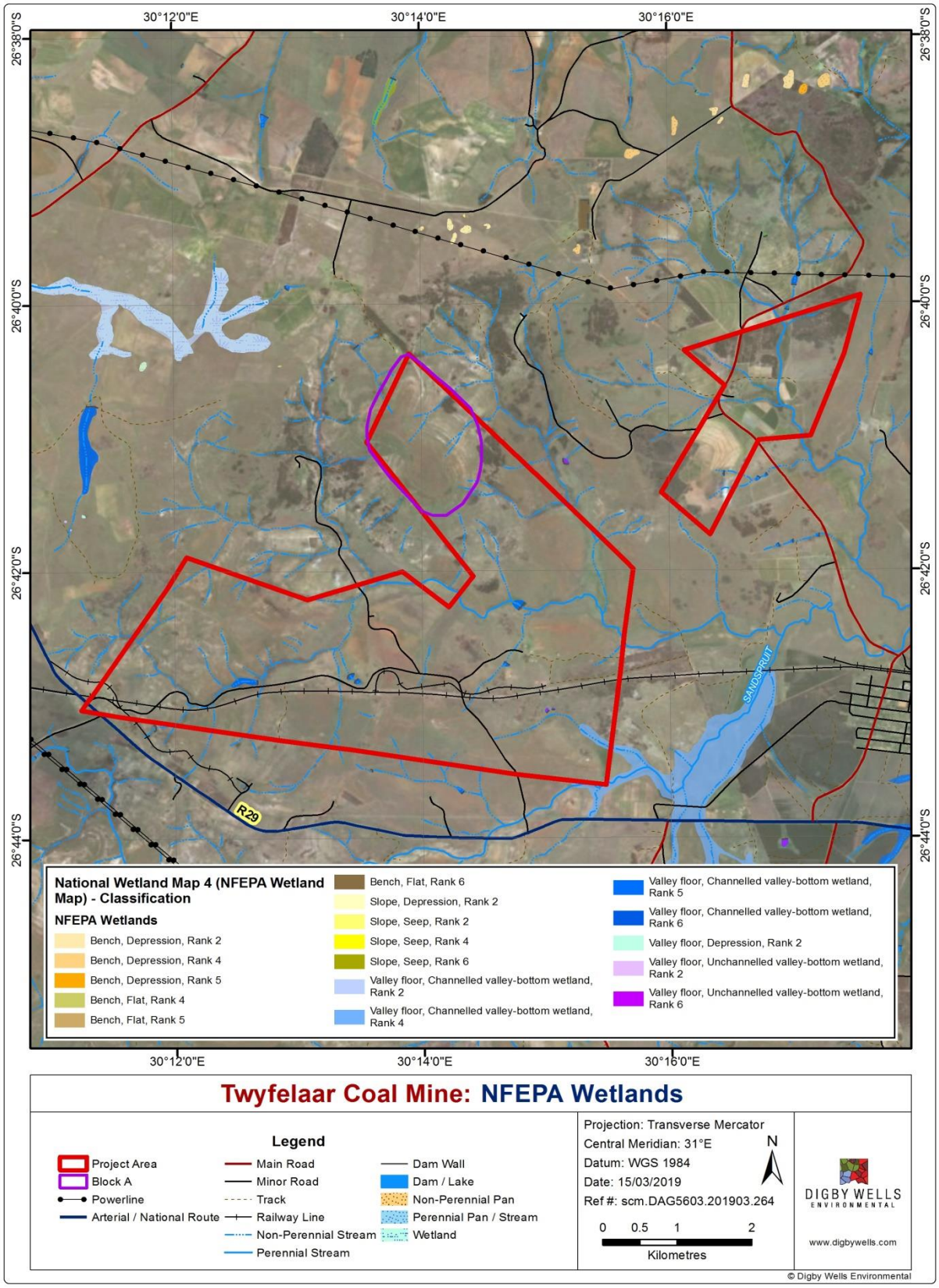


Figure 9-13: NFEPA Wetlands

9.4.8.3 Mining and Biodiversity Guidelines

The Mining and Biodiversity Guideline (2013) can be seen as a cumulative finding of all available biodiversity and ecological related information with a final mapped area. The assessment looks at NFEPA and regional biodiversity plans such as the MBSP. This is shown in Figure 9-14 below.

The Project Area is predominantly designated as ‘Highest Biodiversity Importance: Highest Risk for Mining’, with some areas designated as ‘Moderate Biodiversity Importance: Moderate Risk for Mining’.

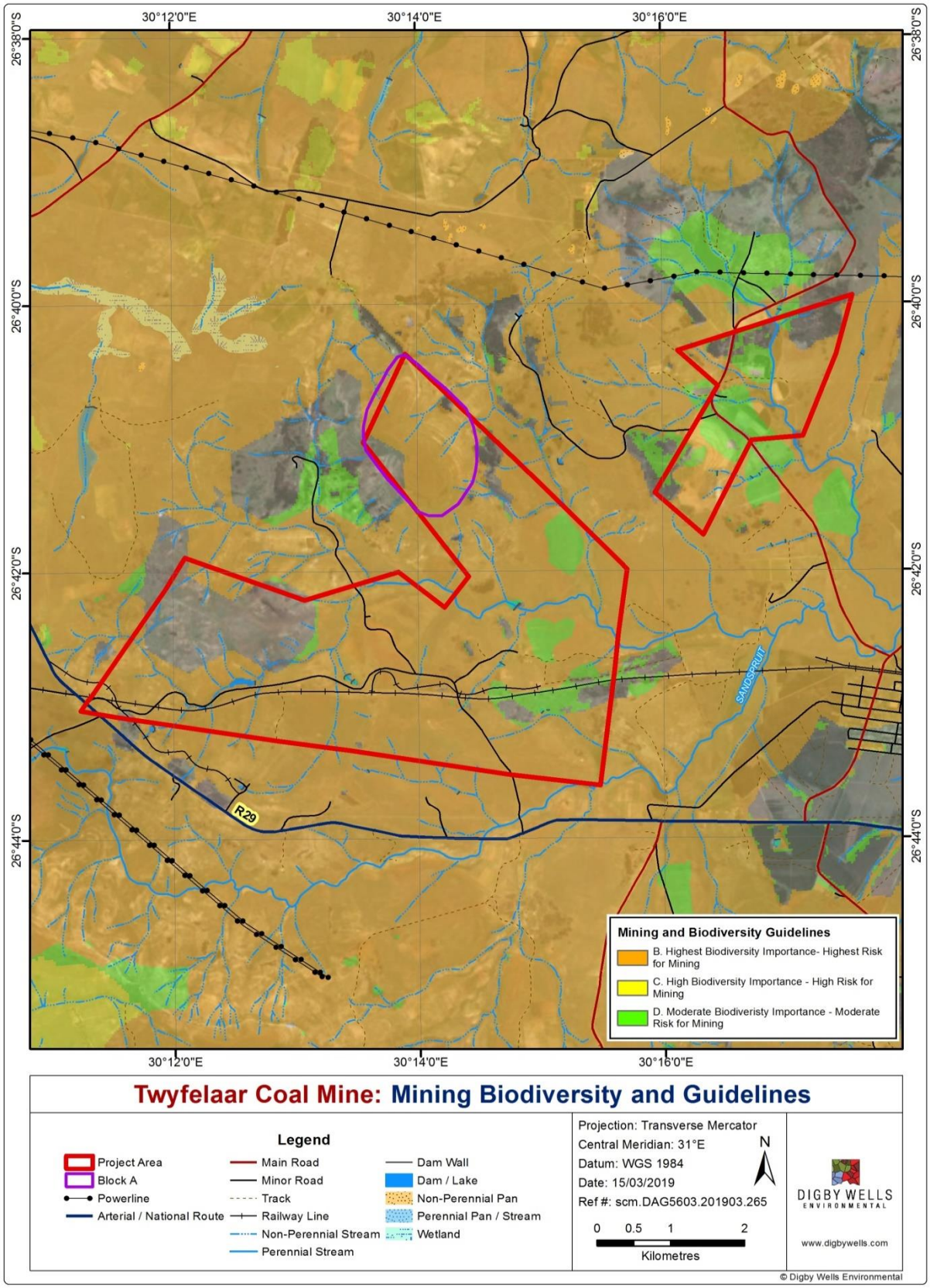


Figure 9-14: Mining and Biodiversity Guideline

9.4.8.4 Mpumalanga Biodiversity Sector Plan

The MBSP (2014) is a spatial tool that forms part of the national biodiversity planning. The proposed mine falls largely within 'CBA Irreplaceable', with some 'CBA Optimal' areas, 'Other Natural Areas', 'Moderately modified' and 'Heavily modified' areas as shown in Figure 9-15 below. According to the guidelines from the MSBP, CBAs must be kept in a natural state with no further loss of habitat; where only low-impact, biodiversity-sensitive land-uses are appropriate.

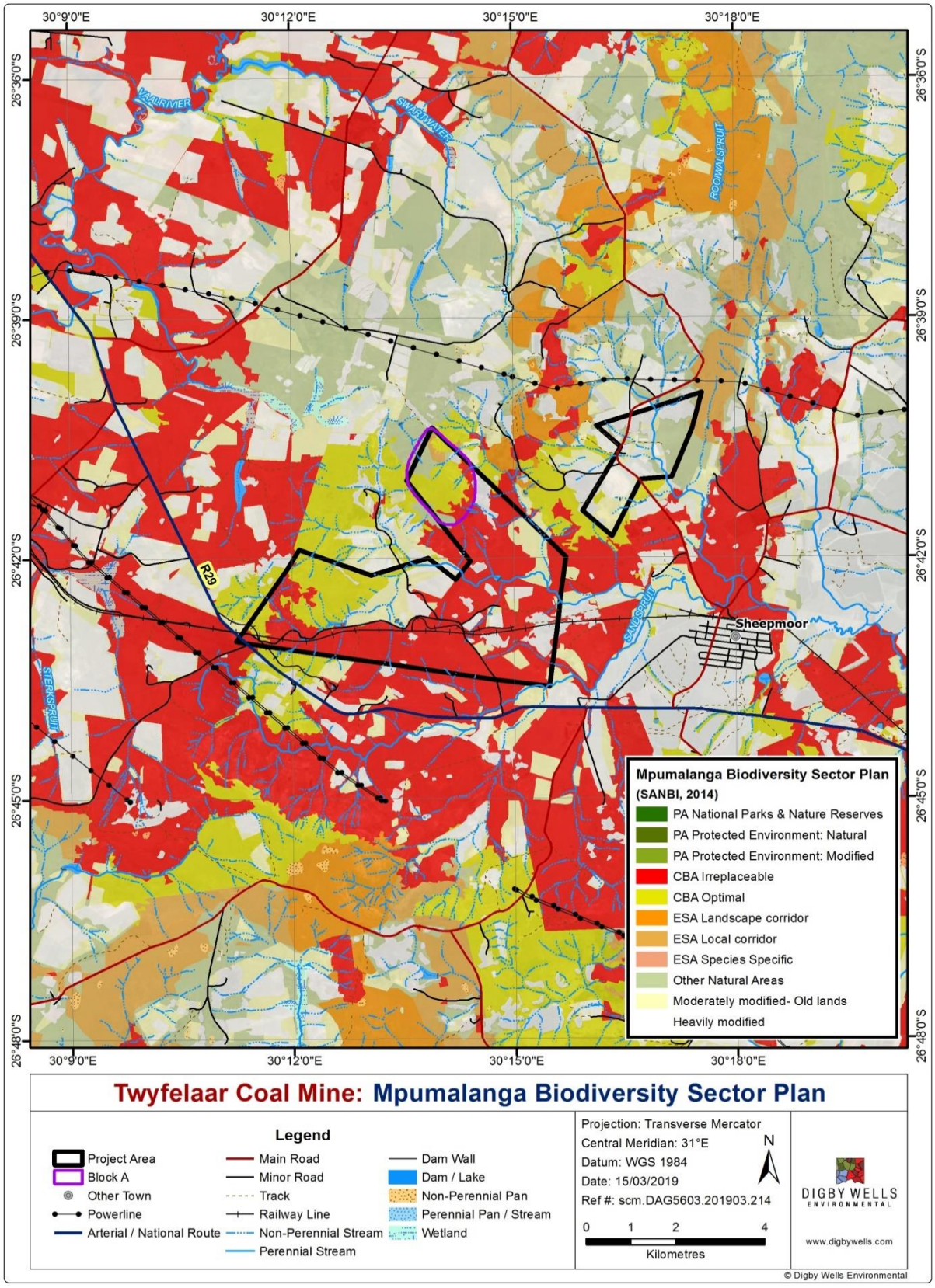


Figure 9-15: Mpumulanga Biodiversity Sector Plan

9.4.8.5 Wetland delineation and classification

Multiple wetland systems totalling 754.99 ha fall within the 500 m zone of regulation of the proposed Project Area. It appears that the Project Area is dominated by channelled valley-bottom wetlands and hillslope seeps, however, it is highly recommended that these wetland systems be field-verified as a number of hillslope seeps and wetland flats are likely to have been overlooked. Figure 9-16 illustrates the desktop delineation of the wetlands and other

freshwater resources identified within and in the vicinity of for the proposed Project Area.

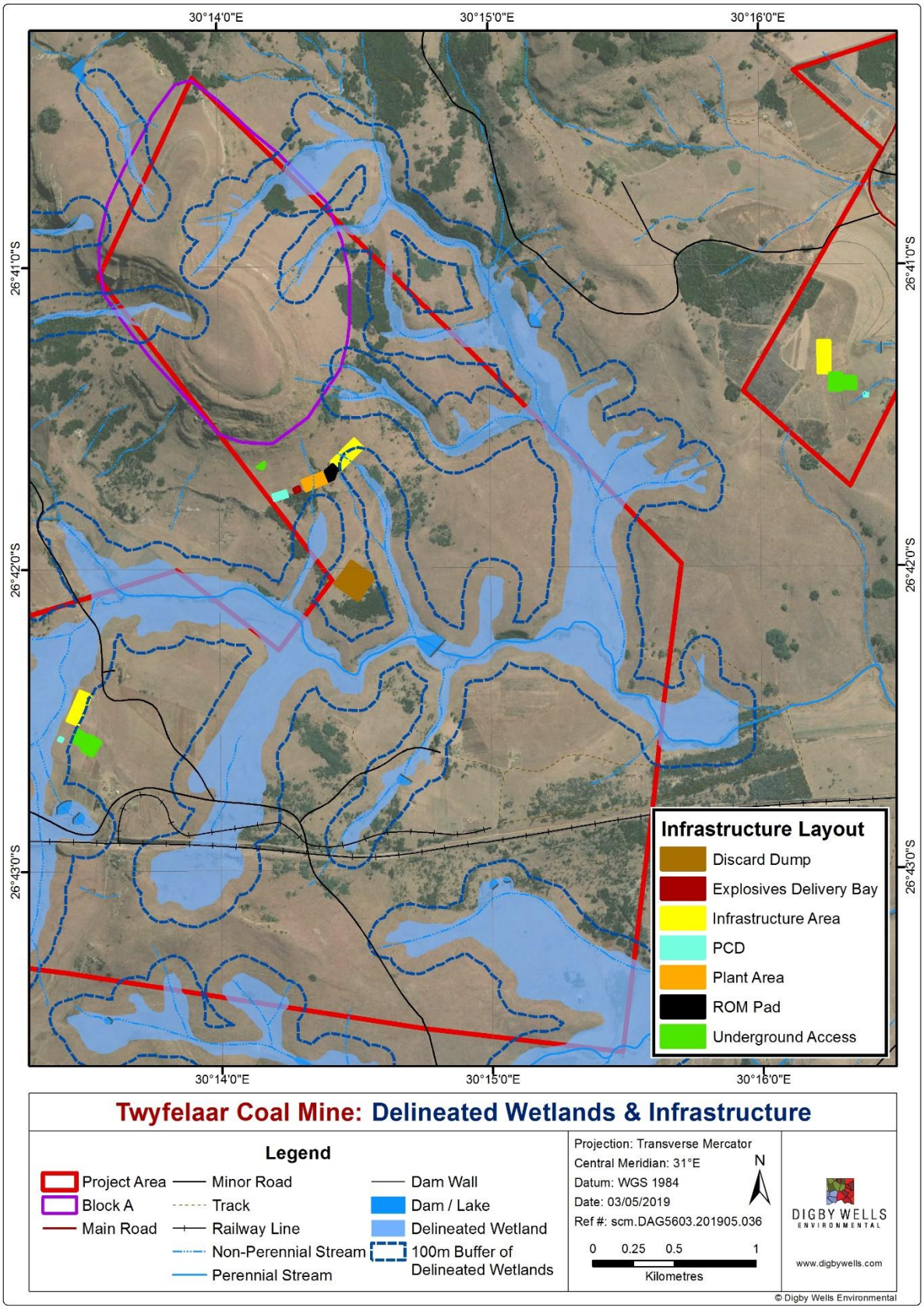


Figure 9-17 illustrates the desktop delineation of the wetlands and the proposed infrastructure blocks for the proposed Project area.

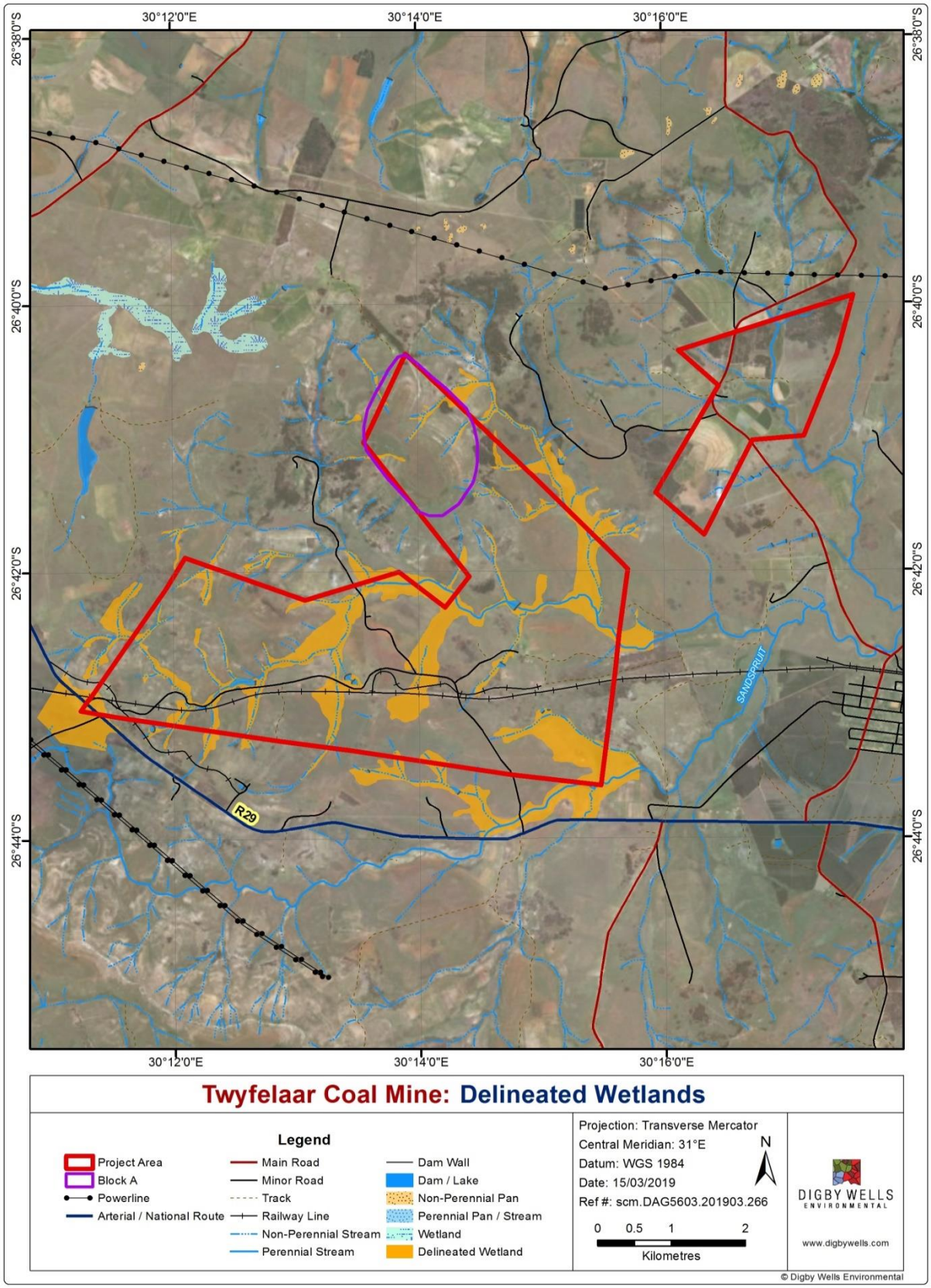


Figure 9-16: Delineated Wetlands (Desktop)

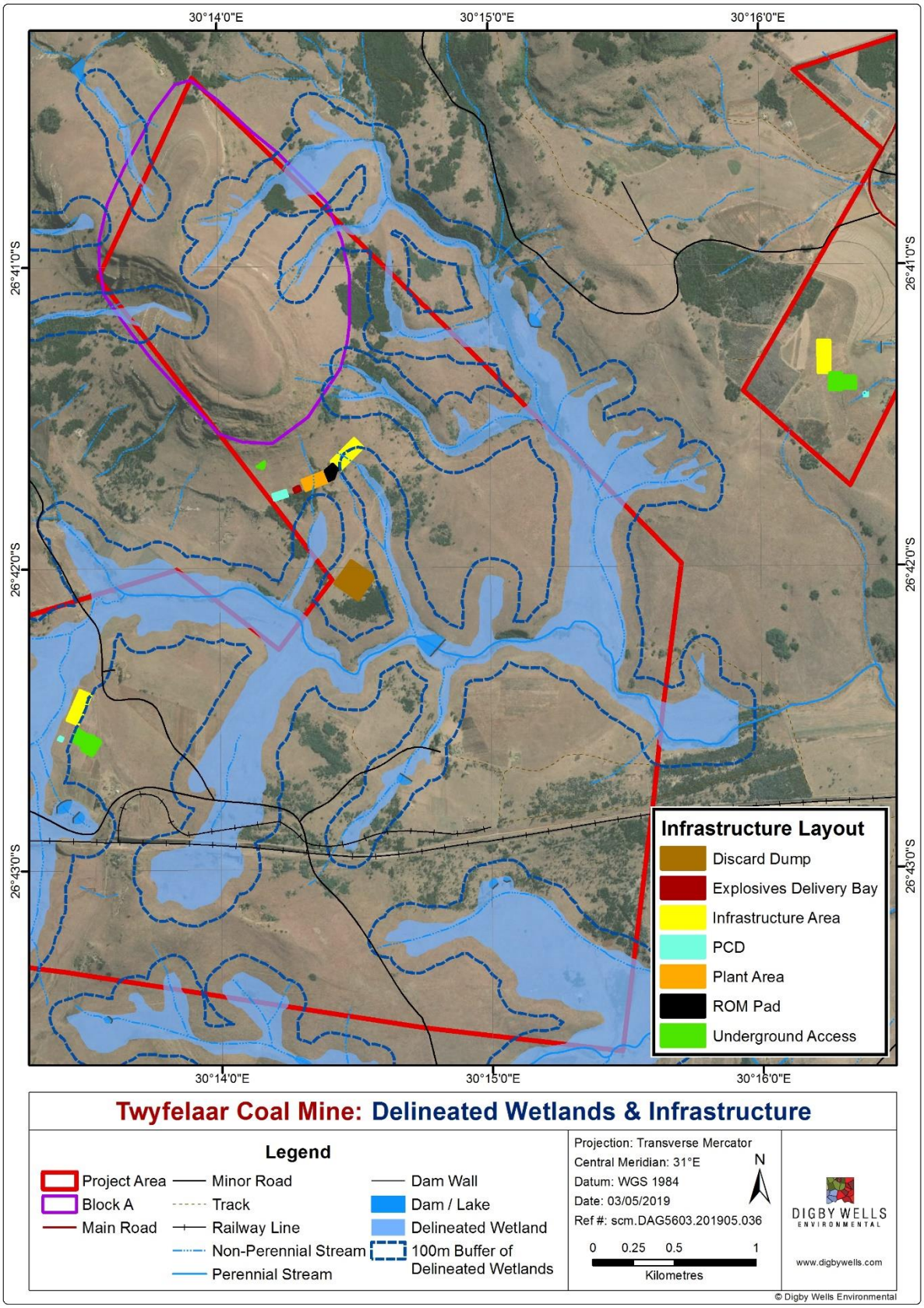


Figure 9-17: Wetland Delineation and Infrastructure

9.4.9 Aquatic Ecology

The proposed Project Area is situated within the W53A quaternary catchment in the Inkomati-Usuthu WMA (WMA 3). According to DWS (2014), the major watercourse associated with the Project area appears to be the Sandspruit (i.e. Sub-Quaternary Reach [SQR] W53A-01757). This watercourse is a first order stream, approximately 33.08 km in length, which drains from west to east along the southern boundary of the Project Area. The Project Area also includes numerous non-perennial drainage lines, included a number located above the targeted coal footprint, which report to the Sandspruit before the town of Sheepmoor. Additionally, there is a large unclassified drainage line (DWS, 2014) which intersects the Project Area south of the proposed adit location. This watercourse also reports to the Sandspruit further downstream. Therefore, aquatic related data recorded in the Sandpruit should be of main focus in the determination of the aquatic baseline.

9.4.9.1 Desktop Present Ecological Status, Importance and Sensitivity

Table 9-11 outlines the desktop aquatic related data obtained for the Sandspruit W53A-01757 SQR (DWS, 2014). Figure 9-18 displays the potentially affected watercourses and Sandspruit.

Table 9-11: Desktop aquatic data pertaining to the Sandspruit

SQR Code/Aquatic Component	W53A-01757
Ecological Category	B
Category Description	Largely natural
Ecological Importance (EI)	High
Ecological Sensitivity (ES)	Very high

According to the desktop data obtained for the Sandspruit W53A-01757 SQR (DWS, 2014), the reach appears to be in a largely natural state (i.e. Ecological Category B). Limited land use appears to be present in the upper reaches of the Sandspruit associated with the Project Area. However, impacts such as road crossings; instream dam construction; alien invasive plant species; urban encroachment; extensive forestry (i.e. lower reaches) and the draining of wetlands appear to be affecting the current aquatic ecology associated with the Sandspruit (DWS, 2014).

The Ecological Importance of the Sandspruit SQR has been classified as “High”. It is expected to contain a total of 61 macroinvertebrate taxa as well as a total of 11 indigenous fish species, two of which are of conservation importance. Additionally, the quaternary catchment is expected to inhabit the endemic and vulnerable plant species *Eugenia simii* (River Myrtle) which is mainly found in the KwaZulu-Natal Province of South Africa (Victor *et. al*., 2005). The Ecological Sensitivity for the SQR has been classified as “Very high”. This, from an instream perspective, is mainly due to the large number of highly sensitive macroinvertebrate and fish species expected in the Sandspruit.

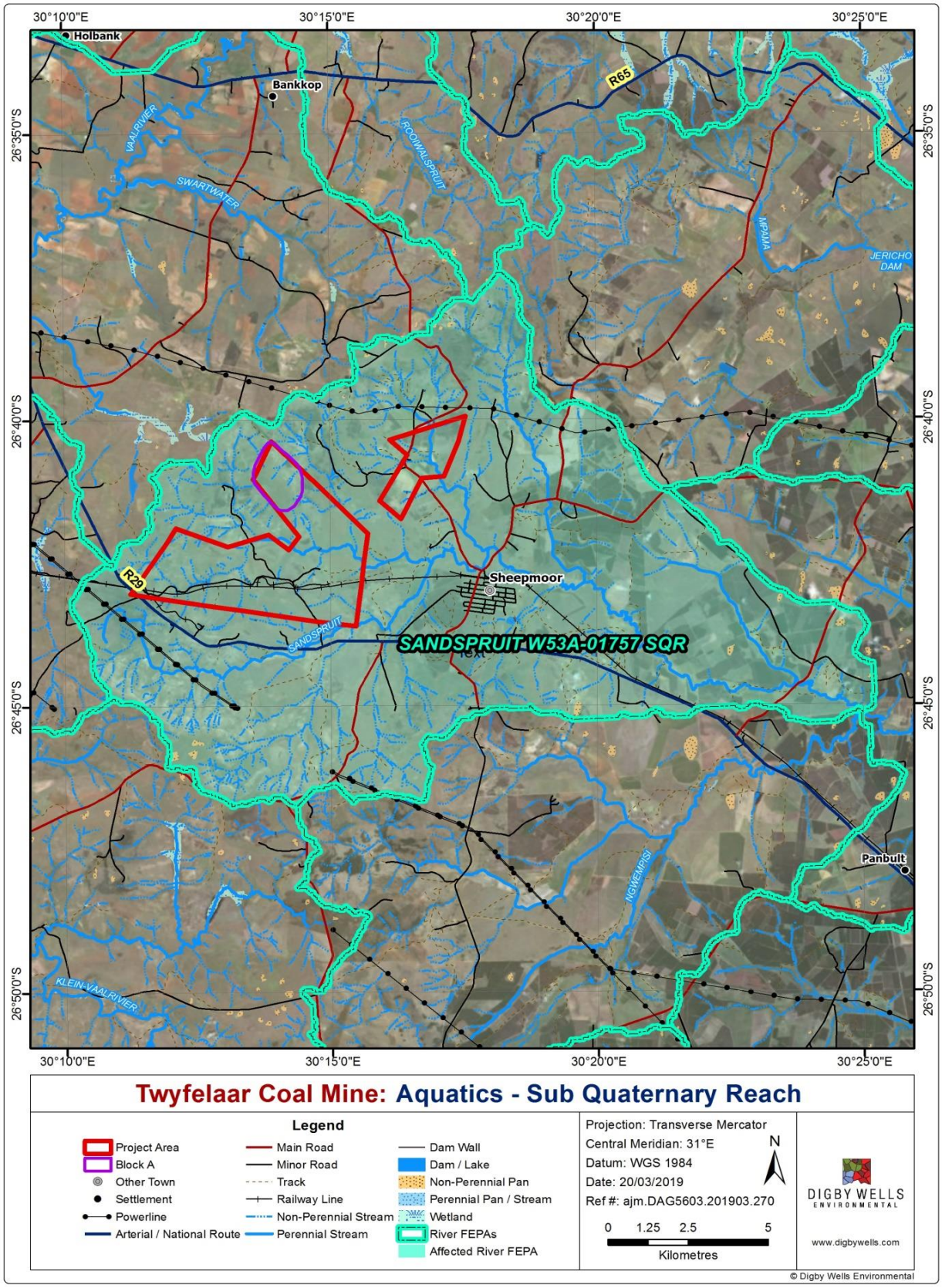


Figure 9-18: Watercourses Associated with the Project Area

9.4.10 Expected Macroinvertebrates

The expected macroinvertebrate taxa for the Sandspruit SQR of concern are presented in Table 9-12.

Table 9-12: Expected macroinvertebrate taxa in the Sandspruit

Family names		
Porifera	Belostomatidae	Hydrophilidae
Turbellaria	Corixidae	Psephenidae
Oligochaeta	Gerridae	Athericidae
Potamonautidae	Hydrometridae	Blephariceridae
Atyidae	Naucoridae	Ceratopogonidae
Hydracarina	Nepidae	Chironomidae
Baetidae	Notonectidae	Culicidae
Caenidae	Pleidae	Dixidae
Heptageniidae	Veliidae	Muscidae
Oligoneuridae	Ecnomidae	Simuliidae
Leptophlebiidae	Hydropsychidae	Tabanidae
Polymitarcyidae	Philopotamidae	Tipulidae
Prosopistomatidae	Polycentropodidae	Ancylidae
Tricorythidae	Hydroptilidae	Bulininae
Chlorocyphidae	Leptoceridae	Lymnaeidae
Ceonagrionidae	Dytiscidae	Planorbinae
Lestidae	Elmidae	Corbiculidae
Aeshnidae	Gyrinidae	Sphaeriidae
Gomphidae	Haliplidae	Unionidae
Libellulidae	Helodidae	
Crambidae	Hydraenidae	

Green shading indicates high physio-chemical sensitivity; Blue indicates high velocity dependence; Orange indicates both high physio-chemical sensitivity and velocity dependence.

Of the 61 expected macroinvertebrate taxa, 13 have been classified as highly sensitive with regards to water quality and velocity/flow dependence (DWS, 2014). Of the 13 highly sensitive taxa, two are regarded as sensitive towards water quality changes, five to a lack of flow sensitivity and six being sensitive towards both physio-chemical changes and no flow conditions.

Based on the lack of land use in the adjacent land areas associated with the Project area, the water in the associated aquatic ecosystems is expected to be of natural/good quality (DWS, 2014; Wolmarans, 2014). As a result of this deduction it is suspected that the watercourses associated with the Project area will be able to inhabit macroinvertebrate taxa sensitive towards water quality, such as Helodidae and numerous Baetidae species. However, due to the number of non-perennial watercourses in the Project area, the flow dependant macroinvertebrate taxa are expected to be restricted to the Sandspruit alone and potentially limited in its adjoining tributaries when flow permits.

9.4.10.1 Expected Fish Species

The fish species expected in the Sandspruit SQR have been provided for in Table 9-13 (DWS, 2014). Additionally, each species sensitivity ratings towards physio-chemical and no-flow conditions (DWS, 2014) have been provided together with their conservation status according to the IUCN Red List of Threatened Species (2018).

Table 9-13: Expected fish species in the Sandspruit

Fish Species	Common Name	Tolerance (1-2=tolerant; >4-5=intolerant)		Conservation Status
		Physio-chemical	No-flow	
Anguilla mossambica	African Longfin Eel	2.5	2.8	LC
Amphilius uranoscopus	Common Mountain Catfish	**4.8**	**4.8**	LC
Chiloglanis anoterus	Pennant-tailed Suckermouth	**4.7**	**4.8**	LC
Chiloglanis emarginatus	Phongolo Suckermouth	**5.0**	**5.0**	V
Clarias gariepinus	African Catfish	1.0	1.7	LC
Enteromius anoplus	Chubbyhead Barb	2.6	2.3	LC
Enteromius argenteus	Rosefin Barb	**4.1**	**4.6**	LC
Enteromius brevipinnis	Shortfin Barb	**4.1**	**4.1**	NT
Labeobarbus polylepis	Kwazulu-natal Yellowfish	2.9	3.3	LC
Pseudocrenilabrus philander	Southern Mouthbrooder	1.4	1.0	LC
Tilapia sparmanii	Banded Tilapia	1.4	0.9	NA
LC=Least Concern; NT=Near Threatened; V=Vulnerable; NA=Not Assessed				

Five of the 11 expected fish species are regarded as highly sensitive towards water quality and no-flow conditions. Three of these species are catfishes, one belonging to the Amphilidae family (i.e. *Amphilius uranoscopus*) and the other two to the Mochokidae family (i.e. *Chiloglanis anoterus* and *Chiloglanis emarginatus*). These small catfish species are rheophilic species which live in fast flowing streams and rivers with cobbles acting as the substrate. Satellite imagery of the Project area and its associated watercourses however do not reflect the availability of such habitat. Therefore, it is of low confidence that these species are present in the Sandspruit and more likely occur in the lower reaches. The remaining two sensitive fish species belong to the Cyprinidae family (i.e. *Enteromius argenteus* and *Enteromius brevipinnis*). Both these species also inhabit fast flowing waters where *E. brevipinnis* requires vegetation types such as undercut banks, root stocks and marginal vegetation rather than cobbles. According to DWS (2014), it is highly likely that these two species are present in the Sandspruit SQR of concern.

9.4.10.2 Fish species of conservation importance

As mentioned, two of the expected fish species are of conservation importance. A summary of the major impacts associated with these species has been outlined below.

9.4.10.2.1 Chiloglanis emarginatus:

C. emarginatus has been listed as Vulnerable (IUCN, 2018). A major impact resulting in the decline of this species includes coal mining and associated pollution and increased sedimentation in aquatic ecosystems (Roux and Hoffman, 2018). Additionally, habitat degradation caused by over abstraction and sedimentation from agro-forestry activities are also contributing to this species decline (Roux and Hoffman, 2018).

9.4.10.2.2 Enteromius brevipinnis:

E. brevipinnis has been listed as Near Threatened (IUCN, 2018). This species is on the decline mainly as a result of habitat deterioration, especially due to upstream activities such as sedimentation caused by forestry activities (Engelbrecht *et. al*., 2017). Predation by alien fish species like trout and bass (i.e. Salmonidae spp. and *Micropterus* spp.) and the effects from dams and water abstraction are also contributing to the decline of the *E. brevipinnis* population in Southern Africa (Engelbrecht *et. al*., 2017).

9.4.11 Heritage

The site-specific Project area is underlain by geological features within the Karoo Supergroup. The Karoo Supergroup is well known for terrestrial vertebrate fossils, distinctive fossil plant assemblages, thick glacial deposits and extensive dolerite dykes and sills among the sediments (Johnson, Anhauesser, & Thomas, 2006). Two geological features of the Karoo Supergroup specifically underlie the Project area. The first are the Karoo dolerites, which are

intrusive diatremes[2] classified as plutonic igneous rocks (Rubidge B. , 2008; Palaeontological Scoping Report: Sasol Shondoni Conveyor, 2013a; Palaeontological Scoping Report: Dolerite burrow pits (Sasol Mining [Pty] Ltd), 2013b). These features are considered to have negligible palaeontological sensitivity as they contain no fossiliferous material (Rubidge B. , Palaeontological Scoping Report: Sasol Shondoni Conveyor, 2013a; Palaeontological Scoping Report: Dolerite burrow pits (Sasol Mining [Pty] Ltd), 2013b; SAHRA, 2013; Groenewald & Groenewald, 2014). The Karoo dolerite suite is therefore not considered in the impact assessment.

9.4.11.1 Vryheid Formation

The *Vryheid Formation* is the second significant geological formation underlying the study area. The formation constitutes the basal layer of the Ecca Group within the Karoo Supergroup and was deposited in a deltaic[3] environment (Bamford, Environmental Authorisation for the proposed Imvula Mine: Palaeontological Impact Assessment addendum to the Heritage Impact Assessment, 2016). This occurred approximately 280 million years ago. The *Vryheid Formation* includes shales, mudstones, sandstones and coals. This layer is the primary fossil-bearing layer in the regional study area and is considered of very-high palaeontological sensitivity (SAHRA, 2013; Groenewald & Groenewald, 2014).

Fossil plants are usually preserved in the shales between the coal horizons and, to a lesser extent, within the sandstone surface outcrops (Bamford, Palaeontological Impact Assessment for Majuba Underground Coal Gasification Project, 2012; Best Practice for Palaeotontological Chance Finds: Proposed Extention into adjacent Block 4 reserve of Syferfontein Mine (Sasol), Mpumalanga, 2014; Environmental Authorisation for the proposed Imvula Mine: Palaeontological Impact Assessment addendum to the Heritage Impact Assessment, 2016). Common fossil plants within the *Vryheid Formation* include *Glossopteris* leaves, roots and inflorescences; and *Calamites* stems. Coal deposits can potentially also include fossils of mammal-like reptiles and amphibians. These are however, rarely, if ever, preserved with plant fossils.

Table 9-14 provides a general breakdown of the timeframes within the archaeological and cultural past of Mpumalanga. Figure 9-19 below provides a breakdown of the previously-identified heritage resources representing each of these periods (Van Schalkwyk, 1998; 2002; 2003a; 2003b; Van Schalkwyk & Moifatswane, 2003; Fourie & van der Walt, 2007; Pistorius, 2011; du Piesanie, et al., 2013; Karodia, et al., 2013; Pelser, 2013a; 2013b; Higgit & Karodia Khan, 2014; du Piesanie & Nel, 2016; 2018).

[2] Formations which are created when rising magma comes into contact with groundwater. This contact potentially results in gaseous explosions and a volcanic pipe (the diatreme).

[3] When lithologies are deposited onto an alluvial plain through river action.

Table 9-14: Archaeological periods in Mpumalanga

The Stone Age	Early Stone Age (ESA)	2 mya to 250 thousand years ago (kya)
	Middle Stone Age (MSA)	250 kya to 20 kya
	Later Stone Age (LSA)	20 kya to 500 CE (Common Era[4])
There appears to be a gap in the record in Mpumalanga between approximately 7000 and 2000 BCE.		
Farming Communities	Early Farming communities (EFC)	500 to 1400 CE
	Late Farming Communities (LFC)	1100 to 1800 CE
Historical Period	-	1500 CE to 1994 (Behrens & Swanepoel, 2008)

Adapted from Esterhuysen & Smith (Stories in Stone, 2007)

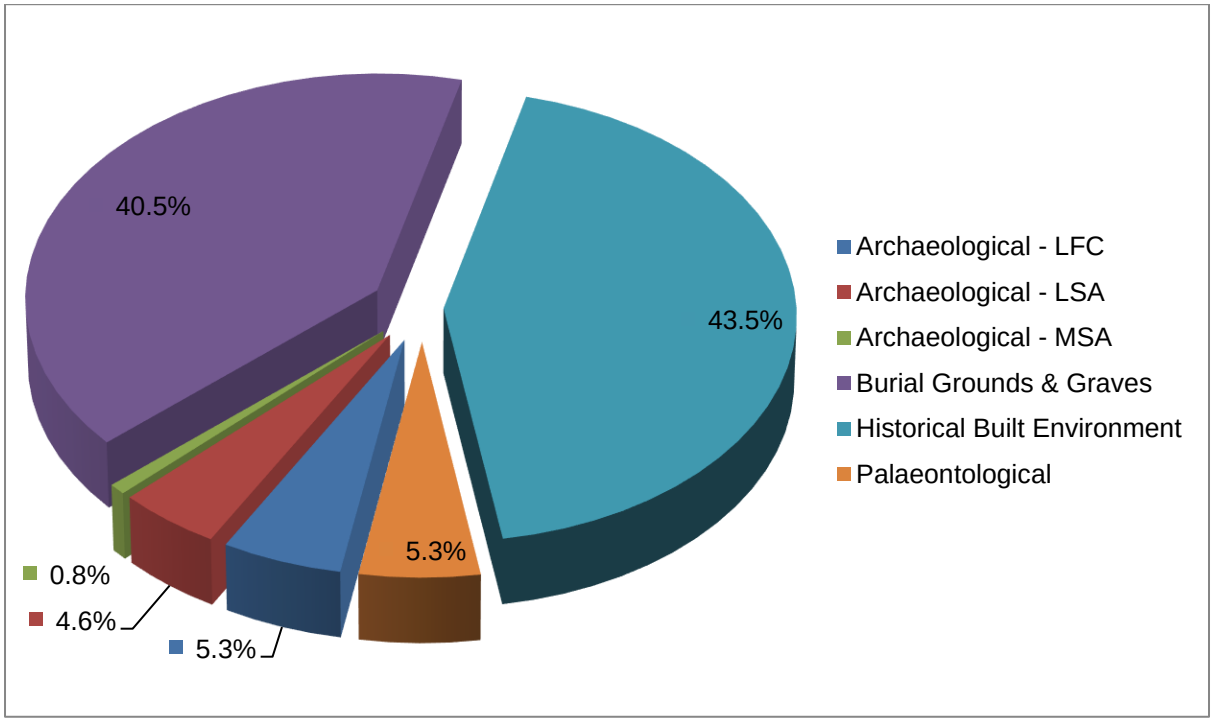


Figure 9-19: Heritage resources identified within the regional study area

The cultural heritage landscape is dominated by the historical built environment and burial grounds and graves, although there are expressions of the MSA and LSA and LFC periods.

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

The section that follows will present a brief overview of the historical period within the regional study area as the most dominant period in the past of the site-specific study area. Heritage resources representing this period include:

- Burial grounds and graves, which range in size from single graves to approximately one hundred graves (Van Schalkwyk, 1998; 2002; 2003a; 2003b, 2016; Van Schalkwyk & Moifatswane, 2003; Fourie & van der Walt, 2007; Pistorius, 2011; du Piesanie, et al., 2013; Karodia, et al., 2013; Pelser, 2013a; 2013b; Higgit & Karodia Khan, 2014; du Piesanie & Nel, 2016; 2018); and
- Historical buildings which include structural remains, remains of functional structures and the remains of *werwe* (farmsteads) (Van Schalkwyk, 1998, 2016; Van Schalkwyk & Moifatswane, 2003; Fourie & van der Walt, 2007; Pistorius, 2011; du Piesanie, et al., 2013; Karodia, et al., 2013; Pelser, 2013a; 2013b; Higgit & Karodia Khan, 2014; du Piesanie & Nel 2016, 2018).

The historical period[5] is commonly regarded as the period characterised by contact between Europeans and Bantu-speaking African groups and the written records associated with this interaction. However, the division between the LFC and historical period is artificial, as there is a large amount of overlap between the two.

Throughout the transitions between the LFC and the historical period (and through the historical period itself), migration, population growth, climatic variation and trade to the east significantly impacted the Pedi, Koni and other groups already on the Mpumalanga Highveld. The rise of power blocs, including violent displacement and political centralisation, characterised this time (Makhura, 2007). The period of approximately 1817 to 1826 AD is generally seen as period of violence and unrest referred to as the Mfecane or, north of the Orange River, the Difaqane (Landau, 2010). The Ndwandwe, the Swazi and the Ndebele (led by Mzilikazi) were seen as the dominant forces on the landscape, although smaller groups of invaders and raiders contributed to these events (Delius, Maggs, & Schoeman, 2014)

Many aspects of the Mfecane/Difaqane have been debated and challenged (Landau, 2010). The traditional understanding of the period is that Mzilikazi and his Ndebele group were pushed out of their territory by the Zulu group led by Shaka. This displacement had a knock-on effect, as multiple groups were subsequently displaced to the north and the west. A drought during this time exacerbated the instability and increased the pressure on food supplies, which were already running low. European settlers, traders, missionaries and travellers moving into the interior further added to instability and resulting power struggles. The Mfecane/Difaqane was characterised by unprecedented (at least within the records of the Europeans travelling

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

within southern Africa) social and political mobilisation and violence across the Highveld as individuals sought personal and food security.

As a result of social and political upheaval, the Mpumalanga Highveld was vulnerable to intrusive groups including the Swazi and the *Voortrekkers*. Groups of Afrikaners initiated a move from the Cape to the interior to establish an independent state in approximately 1835. The migration of these *Voortrekkers* is commonly referred to as the Great Trek (or *Groot Trek*). The first permanent settlement that was established as a result of this movement was Ohrigstad (approximately 200 km north-east from the Project area) in 1845 (Delius & Cope, 2007; Voortrekkers, 2014).

Soon after settling in the Mpumalanga Highveld area, the Trekboers (now farmers) discovered and exploited the Highveld Coalfields. The coal was initially used by the Boers as a domestic resource; however the discovery of gold in the Witwatersrand in 1886 created an enormous demand for coal (Brodie, 2008; Pistorious, 2008a; Phase 1 Heritage Impact Assessment (HIA) Study for Sasols proposed new shaft complex on Strybult 542 and for the North Block on the Eastern Highveld in the Mpumalanga Province of South Africa,, 2008b). This increase in the demand for coal drove the commercial exploitation of the coal, until the industry was put on hold by the outbreak of war.

The South African War of 1899-1902 (previously referred to as the Second Anglo-Boer War) officially started on October 9th, 1899. The war was the result of building tensions and conflicting political agendas between the Trekboers and the British. There are two notable battles associated with the South African War within the regional study area: the Battles of Lake Chrissie (February 6th, 1901) and Bakenlaagte (October 30th, 1901).

9.4.12 Socio-Economic

This section provides the socio-economic baseline of the communities, wards and municipal area associated with the proposed Project.

9.4.12.1 Geographical Location of the Site

The proposed Project will be located within the Gert Sibande District Municipality (GSDM), one of three district municipalities in the Mpumalanga Province. The Project site is specifically in Ward 11 of the Msukaligwa Local Municipality in this district.

The nearest town to the site is Sheepmoor, which lies to the south-west and is less than 25 minutes away on the N2. The town of Ermelo is north east of the site and is approximately 40 minutes away on the N2. The district and local municipal government offices as well as the Gert Sibande Land Reform Office of the National Department of Rural Development and Land Reform (DRDLR) are located in Ermelo.

9.4.12.2 Study Areas

Primary and secondary study areas for this socio-economic baseline are described below.

9.4.12.2.1 Primary Study Area

Table 9-15 indicates the primary study area. The families and communities owning or residing on the properties for the Mining Right application are in the primary study area. A Windeed searches undertaken by Digby Wells and a letter from the Department of Rural Development and Land Reform (DRDLR) allowing the Phakami community to use portions of the land in the Prospecting Right area was used to generate status of land ownership and use within the proposed Mining Right area.

As mining will be mainly undertaken by contractors, it is unknown at this time where the main labour-sending areas will be. However, the mine is committed to sourcing the required skills from communities nearest to the operations first. The SLP provides more details on labour related matters.

Table 9-15: Status of land ownership and use in the Mining Right area

Farm	Portion	Status
Twyfelaar 298IT	Remaining Extent	Title Deed held by Bambanani Sakhisizwe Community Property Association (CPA)
	1, 2 and 5	Owned by National Government of the Republic of South Africa; Phakamani Community Property Association has a signed letter from the DRDLR allowing them to use these portions of land for agricultural purposes The number of hectares for community was to be determined, as per letter from DRDLR in 2014.
	7	Privately owned by Alton Mpethi
	8 and 9	Transnet servitudes
Klipfontein 283 IT	Remaining Extent	Privately owned by Vorster Nicolaas Wilhelmus Jacobus

The primary study area is rural in nature with Phakamani and Bambanani Sakhisizwe households sparsely located within the dominant natural grassland vegetation and some agricultural parcels. The families grow maize, soya beans and “dry beans”, and raise cattle, sheep, goats and chickens as their livelihoods (**Error! Reference source not found.**). Building structures on the primary study area include brick buildings that belonged to the previous farmer, newly-built brick structures, and buildings constructed with mud and thatch. A railway line traverses the site near its southern border and trains were seen using the track during the site visit.

The owner of Portion 7 of Twyfelaar does not live on the property but is planning to undertake agricultural activities in the near future. He reported that a stranger is currently informally living on his land. The Farm Klipfontein is owned and occupied by the Vorster family.

9.4.12.2.2 Secondary Study Area

The secondary study area comprises of Ward 11 of the Msukaligwa Local Municipality as well as the local and district municipalities it is located in (Table 9-16**Error! Not a valid bookmark self-reference.**).

Table 9-16: Secondary study areas

Ward	Local Municipality	District Municipality	Province
11	Msukaligwa	Gert Sibande	Mpumalanga

Land owners and occupiers of farm portions adjacent to the primary study area are within the Msukaligwa Local Municipal area. They will be consulted during the PPP for the EIA.

Relevant socio-economic baseline information at the ward, the local and district municipalities and the provincial levels of administration is provided in this report, within the national context where pertinent.

9.4.12.3 Economic Profiles

The economic profiles for the Mpumalanga Province, the Gert Sibande District and Msukaligwa Local municipalities, and Ward 11 in which the project is located, are discussed in this section.

9.4.12.3.1 Mpumalanga Province

The development of the Strategic Plan of the Mpumalanga Department of Economic Development and Tourism (MDEDT) for the period 2015 to 2020 is based on new priorities for the Mpumalanga administration and aims to fast track growth, support priority sectors, create jobs and promote economic participation by all its people. The Department's vision is for a "*an inclusive, global competitive economy*" and its mission is "*to drive economic growth that creates decent employment and promote sustainable development through partnership*"

The implementation of the plan is founded on Outcome 4 of national government's Medium Term Strategic Framework (MTSF) for 2015 to 2010, which is, "*Decent employment through inclusive growth*".

According to the strategy, the province has at least 80% of the coal reserves in South Africa. There is also a large forestry sector and a strong agricultural sector with the potential to absorb lower skilled labour. The active mining, agricultural and forestry sectors also provide possibilities for beneficiation. The province is strategically located with access to inland provinces and proximity to Swaziland and Mozambique, including the Maputo port. Although infrastructure, that is, roads, transport and logistics, electricity, water, telecommunications and medical care, is regarded as generally good there is also an acknowledgement that rural infrastructure is poor. The natural landscape in the province is ideal to stimulate tourism. The Department has developed good working relations with its stakeholders. It however recognises the need for improving alignment amongst stakeholders in the province.

Mpumalanga Premier Mtshweni in her State of the Province Address on 22 February 2019 (Mpumalanga Provincial Government, 2019) stated that the provincial economy grew at 3% in 2014 but last year recorded a rate of less than 1%. The Mpumalanga Strategy identifies five prioritised economic sectors in the province, namely, agriculture for the promotion of agro-processing, mining for value addition through beneficiation and energy generation, manufacturing, Information Communication Technology, and tourism and cultural industries for job creation and growth of Small, Medium and Micro Enterprises (SMMEs). The department is promoting collaboration amongst departments in all spheres of government and with the private sector, to put together a comprehensive support package for SMMEs and co-operatives.

9.4.12.3.2 Gert Sibande District Municipality

Gross Value Added (GVA) is a measure of the contribution of an individual producer, industry, sector or region to an economy. In 2012, GSDM led the contribution amongst district municipalities in the province for Mpumalanga's manufacturing industry (57.4%) and agriculture (41.4%) compared with Nkangala and Ehlanzeni District Municipalities. Within the district, manufacturing contributed the most (57.4%), followed by mining (14.1%) and community services (12.3%). Construction was the lowest at 2.1%. Overall, GSDM was the second largest contributor to GVA in Mpumalanga in 2012 after Nkangala.

The manufacturing sector which was the major contributor to both the district and provincial GVA was dominated by mining products, electricity generation and petrochemicals. Mining particularly in the Govan Mbeki Local Municipality (Secunda) was a major contributor to the Province's GVA. Coal and gold are the most important mining products, and coal was consumed locally largely for electricity generation, petrochemical and metallurgical production, and industrial and domestic uses. Four of the 10 coal-fired stations in Mpumalanga are in the GSDM. Most mining operations are located along the N17 highway from the vicinity of Secunda to Ermelo. Large collieries include Sasol's Syferfontein and Twistdraai and Seriti's New Denmark; there are also smaller mining operations like Driefontein.

GSDM also accommodates the largest agricultural sector in the province, supported by strong service centres such as Standerton, Ermelo, Bethal and Piet Retief. Almost 23% of the district land is under cultivation, 80% of which is under commercial dry land cultivation producing grains. Crops grown in the province include maize, sunflower, sorghum and wheat. Most of the sheep and wool in South Africa is produced in the Carolina-Bethal- Ermelo area. Standerton is a major dairy and maize growing centre. However, most cattle farming occurs in the Dr Pixley ka Isaka Seme and Mkhondo Local Municipalities. Other significant economic sectors in the GSDM are commercial forestry and tourism.

The objectives of the District Local Economic Development Strategy, which are aligned to the National and Provincial economic growth plans and programmes, are as follows:

- Partnerships towards progressively responding to the skills need by the growing Regional Economy.
- Visible promotion and support of SMMEs (Financial and Non-Financial).

- Visible promotion of the Tourism Sector.
- Increasing local beneficiation and shared Economic Growth across the District.
- Promoting and supporting sustainability of the existing businesses within the District.
- Identification and implementation of high impact LED projects/programmes like Bio-Fuel Plant as part of rural economic development in response to Land Reform Programmes.
- Providing support services, mentorship and investment towards ensuring sustainability and effective utilisation of farms attained through Land Reform Programme.
- Development and Training of Co-operatives and SMMEs and establish database thereof.
- Promotion of Trade and Investments through Regional Development Agency.
- Informal Sector development and Second economy interventions (i.e. skills development).
- Promotion of the usage of alternative sources of energy.

9.4.12.3.3 Msukaligwa Local Municipality

The dominant economic sectors in the Msukaligwa Local Municipality are coal mining, agriculture, forestry and timber processing. Eskom's Camden power station located in the Msukaligwa Local Municipality receives coal from coal mines as far as Albert Luthuli Local Municipality. Transportation and haulage of coal has created jobs and stimulated local business. Tourism attractions such as the Lake Chrissie wetlands, the bushman paintings in the Breyten area and game lodges also contribute towards economic growth (MLM, 2017).

The Msukaligwa LED Strategy seeks to champion both issues of economic growth and development (Msukaligwa Local Municipality, 2009). The Local Economic Development aims of the municipality are to identify and provide an enabling environment for the Economic Development of the Municipality. Its focus will be on job creation, promoting and supporting SMME's, sustaining existing business, promotion tourism, and increasing local beneficiation and shared growth. The municipality stresses the need for local stakeholders to drive local initiatives for the development of the municipal area as a whole.

The municipality has identified the municipal and private sector projects under its two LED programmes. Examples of projects are provided below:

- Programme 1: SMME and Community Development and Support:
  - Municipal Project: Municipality to assist communities to organise themselves into co-operatives for opportunity to uptake and capacitate them.
  - Private sector Project: Mines and other ventures to avail procurement opportunities to SMMEs; and mines to identify and capacitate selected community members on economic opportunities as part of their social spend.

- Programme 2: Branding, Marketing and Promotion of Investment Initiatives
  - Municipal Project: Conduct LED summits and investment promotion conferences.
  - Private sector Project: Private sector to finance and participate in LED summits and conference

9.4.12.4 Population Profiles

9.4.12.4.1 Population and Density

Population at the provincial, municipal and ward levels is provided in Table 9-17. This represents decreasing population densities of 56.6, 35.4, 27.3 and 7.3 persons per km^2 as one goes from provincial to ward levels.

Table 9-17: Population and Density

Profile	Population
Mpumalanga Province	4 039 939
District municipality	1 135 409
Local municipality	164 608
Ward	5 924

9.4.12.4.2 Age & Gender

Forty eight percent (48%) of the population in the ward is in the age category 18 to 64, representing the generally employable population. This is lower than in the local municipality (59% of the population). There was a larger proportion of females at ward level (52%) than at local municipality level (50%). It is possible that job seekers in the ward, including men, may have moved out of the ward looking for work.

9.4.12.4.3 Language

The predominant language as one moved from district municipality to local municipality and then ward level was increasingly isiZulu, that is, 60%, 71%, 91% of households respectively. At provincial level, the dominant language was Siswati (27%), followed by isiZulu (24%).

9.4.12.4.4 Migration

Approximately 95% of the provincial and district municipal populations were born in South Africa; this figure was slightly higher at local municipal and ward levels (approximately 98%). The latter percentage was also estimated at the Community Survey 2016 for the local municipality. No ward level data was available for the Community Survey 2016.

9.4.12.4.5 Women and child headed households

Forty seven percent (47%) of households in the ward were headed by women and 32 (about 2.5%) household heads were younger than 18 years old. At the local municipal level, these figures were lower, at 37.7% and 297 household heads (less than 1%) respectively.

9.4.12.5 Education levels

At ward level, about 18% of people 20 years and older (503 people) had completed matric and 1% had completed undergraduate studies. Thirty two percent (32%) had some secondary education and 7% had completed primary school. Twenty five percent of the population had had no schooling. Formal education levels were therefore low at ward level.

At the local municipal level, about 38% of individuals 20 years and older (33 290 people) had completed matric. This was greater than the percentage in the district municipality (36%) and the same as in the province. Sixty-three point four percent of individuals in this age group had completed Grade 9 or higher in the local municipality, which was higher than in the GSDM and the same as the province. Twelve percent (12%) of this age group had no schooling at local municipal level.

9.4.12.6 Employment and Unemployment

At ward level, 28% of the population were employed and 18% are unemployed. A further 9% are discouraged work seekers, whilst 44% were not economically active. There was therefore a high level of dependency in households.

At the local municipal level, there was 43% employment and 16% unemployment, and a further 5% discouraged workers. A lower percentage of the population (36%) was economically not active compared with the ward level. Employment at the local municipality level was also higher than in the district and provincial levels by approximately 10%.

9.4.12.7 Income Profiles

At local municipal level, large proportions of the households recorded annual earnings in the categories R10 000 to R20 000 (18%), R20 000 to R40 000 (21%), and R40 000 to R 75 000 (15%). Thirteen percent did not have any income and 11% received less than R10 000 per annum, that is, almost a quarter (24%) of the households were living on less than R835 per month.

At ward level, 27% of the households lived on an income of less than R835 a month and 45% of the population earned between R10 000 and R40 000 per annum. Another 16% earned between R40 000 to R 75 000. More households at the ward level (72%) were therefore earning an income in the lower brackets, that is less than R 40 000 annually.

9.4.12.8 Service delivery

9.4.12.8.1 Water

At ward level, approximately 28% of the population were getting water from a regional or local service provider, representing about one-third the rate in the district (77%) and about two-fifths of the rate in Mpumalanga (74%). A further 15% of the ward population accessed their water from a borehole. Seventy eight percent (78%) of the population in the local municipality accessed water from a regional or local service provider, which was about the same as the rate in Gert Sibande: (77%) and about 10 percent higher than the rate in Mpumalanga (74%).

Three percent (3%) of the population in the local municipality drew water from a river. At ward level, about 37% of people were dependent on sourcing water from a river and 7% from a dam, in both cases more than double the rate in the district and the province.

9.4.12.8.2 Sanitation and toilet facilities

Seventy three percent (73%) of the local municipal population had access to flush or chemical toilets, which was about 10 percent higher than the rate in Gert Sibande (67%) and more than 1.5 times the rate in Mpumalanga (45%). At ward level, 10.5% of the population had access to flush or chemical toilets.

Twelve percent (12%) of the population had pit latrines without ventilation and 5% did not have any toilet facility. Whilst the former status was better than the district (14%) and province (33%), the latter was about the same as the other two levels (district 5% and province 6%). Twenty four percent (24%) of the population did not have access to toilets in Ward 11.

9.4.12.8.3 Electricity

At ward level, only 25% of households were using electricity for cooking. Most (69%) were using wood. At the local municipal level, about half (49%) of households cooked with electricity; and about 44% used either wood or coal. In GSDM, 63% and 19% of households used electricity and wood respectively. At the provincial level, this was 69% and 17% respectively. Electricity therefore was increasingly used for cooking as one moved from ward to local level, then district and provincial levels.

Similarly, electricity usage for heating increased as one moved from ward to provincial levels – from 17% (ward) to 43% (local), then 50% (district) and 57.40% (provincial). Wood was used less as one progressed along these levels - 73% (ward) to 21% (local), then 20% (district) and 15% (provincial).

For lighting there was a similar trend. At ward level, electricity and candles were used in the ratio 57%:41%; at the local level this changed to 74%:24% and at the district level it was 82%:15%. At provincial level, it was 86%:12%.

9.4.12.8.4 Refuse Disposal

Only 0.2% of the population in Ward 11 were getting refuse disposal from a local authority or private company. Seventy five percent (75%) created their own dumps and 20% had no dumps. In contrast, 64% in the local municipality were getting refuse disposal from a local authority or private company. This difference was probably because of the rural nature of Ward 11. Lower percentages of the population at local municipal level made up their own dumps (23%) and had no dumps (9%). This former level represented a lower percentage and the latter the same percentage when compared with the GSDM (28% and 9% respectively).

9.4.12.9 Housing

There were 1 236 households in the ward, representing a mere 3% of the total in the local municipality (42 477 households). The GSDM had 281 518 households and there were 1 102 205 households recorded in Mpumalanga.

Between 2011 and 2016, there was a slight decrease in the proportion of formal homes (77% to 75%) and a small increase in informal households (10.6% to 10.9%) in the province. Traditional households decreased from 4% to 3% in the province during this period. Notably, the Community Survey also estimated that 6% were backyard dwellings in the province in 2016, a type of dwelling not differentiated in 2011.

In the local municipality, 67% of households were formal homes and 14% were informal dwellings. Approximately 42% of homes were owned and either fully or partly paid off; whilst 34% of homes were rented. At ward level, 49% of households were formal and 6% were informal. Notably, 40% of households were traditional. Home ownership was approximately 45%, 39% of homes were occupied rent-free and 12% were rented.

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

Refer to Table 10-1 for the preliminarily identified impacts per project activity and the proposed mitigation measures.

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

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

9.6.1 Impact Assessment Methodology

To clarify the purpose and limitations of the impact assessment methodology, it is necessary to address the issue of subjectivity in the assessment of the significance of environmental impacts. Even though Digby Wells, and the majority of EIA practitioners, propose a numerical methodology for impact assessments, one has to accept that the process of environmental significance determination is inherently subjective.

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

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

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

9.6.2 Impact Rating

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

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

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

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

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

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

Significance = CONSEQUENCE X PROBABILITY X NATURE

Where

Consequence = intensity + extent + duration

And

Probability = likelihood of an impact occurring

And

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

The matrix calculates the rating out of 147, whereby intensity, extent, duration and probability are each rated out of seven as indicated in Table 9-19. The weight assigned to the various parameters is then multiplied by +1 for positive and -1 for negative impacts.

Impacts are rated prior to mitigation and again after consideration of the mitigation has been applied; post-mitigation is referred to as the residual impact. The significance of an impact is determined and categorised into one of seven categories (The descriptions of the significance ratings are presented in Table 9-20).

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

Table 9-18: Impact assessment parameter ratings

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

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

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
3	Moderate loss and/or damage to biological or physical resources of **low to moderately** sensitive environments and, limiting ecosystem function. On-going social issues. Damage to items of cultural significance.	Average, on-going positive benefits, not widespread but felt by some elements of the baseline.	Local Local extending only as far as the development site area.	Medium term: 1-5 years and impact can be reversed with minimal management.	Unlikely: Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.

Rating	Intensity/Replacability		Extent	Duration/Reversibility	Probability
	Negative Impacts (Nature = -1)	**Positive Impacts (Nature = +1)**			
2	**Minor loss and/or effects** to biological or physical resources or low sensitive environments, not affecting ecosystem functioning. Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.	Low positive impacts experience by a small percentage of the baseline.	Limited Limited to the site and its immediate surroundings.	Short term: Less than 1 year and is reversible.	Rare / improbable: Conceivable, but only in extreme circumstances. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures. <10% probability.

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

Table 9-19: Probability/consequence matrix

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

Table 9-20: Significance rating description

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

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

Table 9-21 provides a basic summary of the negative and positive impacts expected to occur. This summary is based on unmitigated impacts.

Table 9-21: Potential Negative or Positive Impacts per Project Activity

Project Activity	Aspect	Preliminary Impact Rating
Site/vegetation clearance	Groundwater	Neutral
	Surface Water	Negative
	Soils	Negative
	Fauna and Flora	Negative
	Wetlands	Negative
	Air Quality	Negative
	Noise	Negative
	Heritage	Negative
Access and haul road construction	Surface Water	Negative
	Soils	Negative
	Wetlands	Negative
Infrastructure construction	Surface Water	Negative
	Soils	Negative
	Fauna and Flora	Negative
	Wetlands	Negative

Project Activity	Aspect	Preliminary Impact Rating
	Air Quality	Negative
	Noise	Negative
	Heritage	Negative
	Socio-Economic	Positive
Power line construction	Wetlands	Negative
Diesel storage and explosives magazine	Groundwater	Negative
	Surface Water	Negative
	Soils	Negative
Topsoil stockpiling	Surface Water	Negative
	Soils	Negative
	Wetlands	Negative
Removal of rock (blasting)	Groundwater	Negative
	Wetlands	Negative
Stockpiling (rock dumps, soils, ROM, discard dump) establishment and operation	Groundwater	Negative
	Surface Water	Negative

Project Activity	Aspect	Preliminary Impact Rating
	Soils	Negative
	Wetlands	Negative
Operation of the underground workings (potential subsidence)	Groundwater	Negative
	Wetlands	Negative
	Heritage	Negative
Operating processing plant	Soils	Negative
	Fauna and Flora	Negative
	Wetlands	Negative
	Air Quality	Negative
Operating sewage treatment plant	Surface Water	Negative
	Fauna and Flora	Negative
Water use and storage on-site – during the operation water will be required for various domestic and industrial uses. Dams will be constructed that capture water from the mining area which will be stored and used accordingly	Surface Water	Negative
	Wetlands	Negative
Maintenance activities – through the operations maintenance will need to be undertaken to ensure that all infrastructure in operating optimally and does not pose a threat to human or environmental health. Maintenance will include haul roads, pipelines, processing plant, machinery, water and stormwater management infrastructure, stockpile areas	Surface Water	Negative / Positive Dependent on how maintenance is carried out and failures of infrastructure
	Wetlands	

Project Activity	Aspect	Preliminary Impact Rating
Demolition and removal of infrastructure – once mining activities have been concluded infrastructure will be demolished in preparation of the final land rehabilitation.	Groundwater	Positive
	Soils	Negative
	Fauna and Flora	Negative
	Wetlands	Negative
	Socio-Economic	Negative
Rehabilitation – rehabilitation mainly consists of spreading of the preserved subsoil and topsoil, profiling of the land and re-vegetation	Groundwater	Positive
	Soils	Positive
	Fauna and Flora	Positive
	Wetlands	Negative
Post-closure monitoring and rehabilitation	Groundwater	Positive
	Surface Water	Positive
	Soils	Positive
	Fauna and Flora	Positive
	Wetlands	Positive

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

Possible mitigation measures that could be applied to risks regarding the site layout will be considered and discussed as part of the EIA Phase. The infrastructure layout plan will be designed to limit, prevent and avoid potential environmental and social impacts. The layout plan will also take into consideration the comments received form I&APs once the PPP has been initiated as well as the findings of the specialist investigations as part of the EIA Phase. The proposed mitigation measures for the assumed risks (to be confirmed during the EIA Phase) are also listed in Table 10-1 below.

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

The final layout plan will be confirmed during the EIA Phase and included in the EIA Report however, the site selection is based on the position of the coal resource and therefore only infrastructure layout will be finalised during the EIA Phase.

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

The preliminary alternatives considered for the Project include the infrastructure layout, the method of mining, the transportation of coal off site and the “No-Go” alternative. Refer to section 9.1 above.

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

The preferred site locations are mostly determined by the location of the coal resource (and the optimal extraction thereof) and the financial viability to access the resource through underground mining methods. Although current layouts for mine access and related infrastructure have taken the depth of the coal seam as a major technical consideration (<20M), other factors such as the location of land occupiers and environmental factors were also taken into account. Each mine access area and mining area will be further assessed in the EIA Phase to determine the viability of mining each area in relation to the surface occupiers and their activities.

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

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

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

10.1 Item 2(i)(i): Description of alternatives to be considered including the option of not going ahead with the activity

The alternatives assessed are presented in Section 9.1, above, including the “No-Go” alternatives.

10.2 Item 2(i)(ii): Description of the aspects to be assessed as part of the environmental impact assessment process

The EIA Phase will assess the overall aspects affected by the proposed Project in relation to Listed and non-listed Project activities. The identified Listed and specified Activities for the Project are included in section **Error! Reference source not found.**, above, and the specifically affected environmental aspects which will also form part of the EIA Phase are contained in section 10.3 below.

10.3 Item 2(i)(iii): Description of aspects to be assessed by specialists

The following Specialist Impact Assessments will be undertaken as part of the EIA Phase:

- Groundwater Impact Assessment;
- Surface Water Impact Assessment;
- Land Use, Land Capability and Soil Impact Assessment;
- Fauna Impact Assessment;
- Flora Impact Assessment;
- Wetland Delineation and Impact Assessment;
- Aquatic Ecology Impact Assessment;
- Air Quality Impact Assessment;

- Noise Impact Assessment;
- Heritage Impact Assessment;
- Social Impact Assessment;
- Traffic Impact Assessment;
- Blasting and Vibrations Impact Assessment;
- Rehabilitation; and
- Closure (Financial Provisioning).

10.4 Item 2(i)(iv): Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

The full Impact Assessment methodology is included in Section 9.6.1 above and the methodology to be used by the relevant Specialists is described in this section. The methodology used for the assessment of alternatives during the EIA Phase is described below.

10.5 Item 2(i)(v): The proposed method of assessing duration significance

The Impact Assessment methodology is contained in Table 9-20, above. For cumulative analysis, the following will be considered:

- Existing operations in the areas that could contribute, inter alia, to air pollution, groundwater contamination, surface water contamination, noise and wetland health;
- Potential of blast impacts on surrounding historical resources, communities and mining operations;
- Acid Mine Drainage (AMD) is considered a factor in the general Project Area, and will further considered in the EIA phase;
- Other contributions to surface water pollution; and
- Loss of heritage resources.

10.6 Item 2(i)(vi): The stages at which the competent authority will be consulted

The relevant authority for this Project is the DMR who will be informed throughout the MRA process. The DMR has also been identified as a Key Stakeholder and will be provided all notifications provided to I&APS, throughout the process. The DMR will also be invited to attend a site inspection and the public meetings. The following project dates apply to the Project Schedule:

- Submission of the Application Form: 30 April 2019;
- Submission of the Draft Scoping Report for Public Review: 09 May to 07 June 2019;

- Expected submission of Updated Scoping Report:14 June 2019;
- Expected submission of the Draft EIA: September 2019; and
- Expected submission of Updated EIA: November 2019.

10.7 Item 2(i)(vii): Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

Stakeholder comments gathered during the Scoping Phase and outcomes from the public meetings will be closely considered for further Public Participation activities and inclusion for specialist studies (where applicable). The main emphasis of stakeholder meetings as part of this phase will be to share results of the specialist impact studies completed and the associated suggested mitigation measures and recommendations.

It is anticipated that the Stakeholder Engagement process to be implemented for the EIA phase will be similar to the process undertaken for the Scoping phase. The premise of activities is to adhere to various legislative requirements for Public Participation and that a single, integrated process is followed. This will limit stakeholder fatigue and ensure that stakeholders are presented with a single view of the Project. A public meeting will be held during the EIA Phase to present the findings of the EIA process.

10.8 Item 2(i)(viii): Description of the tasks that will be undertaken during the environmental impact assessment process

The following tasks will be undertaken during the EIA phase:

- Further define the project activities;
- Further assess the project alternatives based on technical, economic, social and environmental criteria;
- Supplement the legal review of the project;
- Undertake detailed specialist investigations;
- Confirm sewage generation volume, treatment technology;
- Confirm water requirements for the different phases of the mine and water resource;
- Identification of possible fatal flaws;
- Assess potential impacts using the methodology provided herein;
- Provide detailed and feasible mitigation and management measures in an EMP; and
- Public participation activities, including public and key stakeholder meetings.

10.9 Item 2(i)(ix): Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

Table 10-1 provides the proposed project activities, potential impact associated with each activity and proposed preliminary mitigation and residual risk, per environmental aspect.

Table 10-1: Environmental Aspects, Preliminary Impacts and Mitigation

Aspect	Potential impacts	Mitigation type	Potential for residual risk
Groundwater	▪ No impact on the groundwater is expected, as the site clearance is expected to take place above the water table	▪ The said project activity has to cover minimal area (at the hill) and it has to be managed efficiently and be carried in dry season where there less chances of or no recharge into the aquifer.	Low
	▪ Temporary storage and handling of hazardous products is considered to have minimal or no impact on the groundwater resource however, if these are not managed and/ or handled with care they may pose risk to groundwater contamination.	▪ The hazardous products should be stored in low sensitivity areas and also to be handled with caution.	Low
	▪ Impact on groundwater quality and quantity as the generated runoffs might contain impurities from leaks of vehicles or hazardous storage facilities and also reduce recharge while at the same time increasing recharge downstream.	▪ Minimise introduction of hard surface while also maintaining the natural vegetation conditions.	Low
	Groundwater quality	▪ Removal of source of pollution ▪ Monitoring of groundwater quality especially downstream from the potential contaminant facilities or sources.	Moderate
Surface Water	▪ Sedimentation and siltation of nearby watercourses; ▪ Alteration of stream flow regimes; ▪ Increase of paved surfaces and subsequent increase in potential flooding.	▪ Limit clearance and soil disturbance to the development footprint; ▪ Stormwater control including installation of drains, berms and storage structures	Moderate
	▪ Contamination of surface water resources leading to deteriorated water quality.	▪ Handling hydrocarbon storage facilities; ▪ Use of spill kits and accredited vendors for waste disposal; training of personnel in proper hydrocarbon and chemical handling.	High
Soils	▪ Disturbance of naturally occurring soil profiles consisting of layers or soil horizons; ▪ A change in land capability may then force a change in post-mining land use should rehabilitation not be planned and implemented properly.	▪ Ensure proper storm water management designs are in place; ▪ Compacted areas are to be ripped to loosen the soil; ▪ Soil to be stripped when it is dry; ▪ Implement site clearing procedures; ▪ Control through stripping procedure; and ▪ Stripped soil should not be mixed.	High
	▪ The movement of heavy machinery and maintenance on site can result in compaction and possible contamination of soils.	▪ Compacted areas are to be ripped to loosen the soil; ▪ Contamination procedure must be in place before construction commences and designated personnel must be trained to manage spills and soil contamination.	Low
	▪ Storage of fuel, lubricants and explosives can impact on soil quality while hydrocarbon spills can occur when heavy mining machinery is used because big machines	▪ Contamination procedure must be in place before construction commences and designated personnel must be trained to manage spills and soil contamination;	Low

Aspect	Potential impacts	Mitigation type	Potential for residual risk
	contain large volumes of oils and diesel. There is a chance of the machines breaking down and/or leaking during mining and removal of topsoil.	▪ All vehicle maintenance must be carried out in the workshop area, with sufficient dirty water diversions in place and drip trays must be used.	
	▪ When soil is stripped due to mining activities the physical properties are changed and this impacts on the health of the soil. When the soil is stockpiled, the soils chemical properties will deteriorate unless properly managed. This may lead to the loss of topsoil if stockpiling is not done properly.	▪ Storm water management plan; ▪ Rehabilitation plan ▪ Monitored erosion and fertility of stockpiles	High
Fauna and Flora	Disturbance to degraded Vulnerable Eastern Highveld Grassland.	▪ Vegetation clearing must be kept to a minimum, and this must only occur where it is absolutely necessary; ▪ Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed.	High
	Loss of floral habitat including sensitive habitat types, fragmentation of habitat.	▪ Include Biodiversity conservation in staff training & inductions; ▪ Prohibit disturbance of Biodiversity beyond the construction & operation footprints; ▪ Care must be taken to avoid indiscriminate destruction of habitat; and where possible the rehabilitation of transformed areas.	High
	Loss of floral diversity, floral SCC and RDL species	▪ Locate, transplant & monitor SCC plant species the necessary permits for relocations of protected species must be obtained from the relevant government department; ▪ The relocation strategy must be approved by relevant authorities prior to relocation to a safe place to avoid destruction.	High
	Loss of sensitive habitats and impacts on biodiversity especially since the adit will be located on a hill which is a highly sensitive biodiversity area. Biodiversity congregation areas are normally close to hills and ridges	▪ Avoid all Very High & Highly Sensitive areas; ▪ Amend the infrastructure layout to avoid such sensitive areas; ▪ The footprint area should be re-investigated by a qualified ecologist with appropriate field experience so that the locations of all sensitive areas and SCC (e.g. *Eucomis autumnalis*) can be recorded and visually marked; ▪ Mapping of sensitive areas should be done at a ground level.	High

Aspect	Potential impacts	Mitigation type	Potential for residual risk
	Sensory Disturbance of Fauna	▪ Construction activities must be restricted to the project footprint; ▪ During construction, areas must be clearly demarcated, and no equipment or personnel will be allowed outside of the demarcated construction servitude unless unavoidable and essential for construction phase; ▪ Prohibit driving off the main access road & implement a fining system for any unauthorized disturbance; ▪ Best management practices of noise control must be applied to minims noise during construction.	Moderate
	Damage to natural vegetation through off-road movement of vehicles and maintenance activities.	▪ Access roads and access to the site operational areas in general should be strictly controlled; ▪ Staff present during the operational phase should receive environmental education so as to ensure that no damage to vegetation and harvesting of plants occurs.	Low
	Alien Species Invasion & Resultant Impacts on Biodiversity.	▪ Alien invasive plants must be monitored regularly and controlled through the use of an alien invasive management plan.	High
Aquatics	The removal of vegetation and the physical disturbance of topsoil have the potential to increase erosion and subsequent runoff into associated watercourses.	The main objective for mitigation would be to limit the areas proposed for disturbance/vegetation clearance combined with remaining as far as possible from the banks of associated watercourses by creating a buffer zone. Construction activities should be restricted to the immediate footprint associated with the proposed infrastructure where applicable. Additional mitigation measures that should be implemented include the following: ▪ Removed or damaged vegetation areas not associated with the footprint area should be revegetated as soon as possible; ▪ Bare land surfaces between land clearing activities and aquatic ecosystems should be vegetated; ▪ Environmentally friendly barrier systems, such as silt nets or in severe cases the use of trenches, can be used if severe runoff/erosion is expected; and ▪ High rainfall periods should be avoided during land clearing activities.	Moderate
	Depending on the construction activity and type of infrastructure (i.e. river crossing or building), the construction of infrastructure has the potential to increase erosion and runoff in nearby aquatic ecosystems as well as alter the water chemistry of affected systems.	▪ Erosion and runoff mitigations stipulated above may be implemented as mitigation measure for infrastructure construction. However, construction activities over watercourses need special attention. Specific details of any infrastructure proposed to cross watercourses needs to be provided as mitigation measures may vary depending on the type of infrastructure (e.g. pipeline or road crossing). The overall goal should be to reduce or completely avoid the activity within the immediate pathway of the watercourse of concern. Additionally, eroded material or sediment as a result of the construction should not be allowed to enter the aquatic ecosystems. Furthermore, the construction should not be allowed to alter the hydrology of the watercourse (e.g.	High

Aspect	Potential impacts	Mitigation type	Potential for residual risk
		damming of the watercourse) and where applicable, suspension of the infrastructure (i.e. only being in contact with the banks of the watercourse) should be considered. ▪ Chemicals used during construction should be utilised and stored as intended as per each chemical specific. To limit runoff of construction chemicals into the associated aquatic ecosystems the following mitigations measures should be implemented: ▪ Storm water must be diverted from construction activities and not allowed to flow through areas where chemicals will be used; ▪ Water used for construction should be kept at the construction sites and not be allowed to freely flow into nearby watercourses; and ▪ Staff involved in construction should be trained to cope with chemical spills as well as use spill kits which should be on site.	
	Storm water and water used on site has the potential to contaminate natural water sources if allowed to flow freely from the Project. This activity is focused solely on surface activities. It is predicted that the underground workings will have limited surface water quality related impacts (see groundwater related impacts for additional information).	Water should not be allowed to flow freely from the mining activities and associated infrastructure (including stockpiles of any type). A storm water management plan should be developed taking into account all drainage lines in association with the Project which should divert water away and to silt traps before entering natural aquatic ecosystems. As proposed, dirty water or water runoff from mine related infrastructure should be stored in PCD's and utilised as intended. All proposed PCD's should also be lined to avoid the chances of seepage into associated watercourses.	Low
	Disturbance, through the use of heavy machinery, will most likely result in erosion and increased runoff in areas associated with aquatic ecosystems. Water runoff during these activities may also be of poor quality which will also result in the deterioration of the water of the affected ecosystems.	Similarly, to the aforementioned runoff and erosion related impacts, the goal of mitigation should be to limit erosion and runoff from the footprint of the areas/infrastructure proposed for decommissioning. The following measures may be utilised in attempt to reduce the decommissioning impacts: ▪ High rainfall periods should be avoided during decommissioning; ▪ Removed or damaged vegetation areas should be revegetated; ▪ Storm water must be diverted from decommissioning activities; ▪ Water used during decommissioning should be kept at the onsite and not be allowed to freely flow into nearby watercourses; and ▪ Stored dirty water should be treated before decommissioning of PCD's.	Low
Heritage	Damage to or destruction of heritage resources generally protected under Section 35 and 36 of the NHRA (i.e. previously-unidentified archaeological and fossiliferous material or burial grounds and graves respectively).	A Chance Finds Procedure (CFP) and Fossil Finds Procedure (FFP) must be developed, approved and implemented prior to the commencement of construction activities, including surface clearing. This procedure will outline the roles and responsibilities of responsible persons and the procedure to follow should a chance find be encountered.	▪ Low risk of potential damage to previously-unidentified heritage resources. ▪ Potential disruptions to the Project schedule in the event of identifying a chance find, especially if the chance find necessitates the undertaking of permitted activities. ▪ Negative Record of Decision (RoD) and/or development restrictions issued by the HRAs in terms of Section 38(8) of the NHRA. ▪ Loss of access to burial grounds and graves for Next of Kin (NoK).

Aspect	Potential impacts	Mitigation type	Potential for residual risk
	High-extraction underground methodologies may result in subsidence which may affect heritage resources afforded general protection under Sections 34, 35 and 36 of the NHRA (i.e. historical buildings, archaeological and palaeontological material and burial grounds and graves respectively)	Change in infrastructure design to avoid significant heritage resources and include no-go buffer zones around identified heritage resources where required. Should this not be possible, heritage resources may require detailed recording, so-called Phase 2 Mitigations and/or relocation. These are considered permitted activities and permits must be acquired for each heritage resource prior to the commencement of these activities.	▪ Potential damage to previously-unidentified heritage resources through surface subsidence. ▪ Loss of access to burial grounds and graves for Next of Kin (NoK). ▪ Potential disruptions to the Project schedule should permit application processes be required. ▪ Negative Record of Decision (RoD) and/or development restrictions issued by the HRAs in terms of Section 38(8) of the NHRA.
Socio-Economic	Employment	The operation is expected to be carried out by contractors. However, the mine will encourage contractors to employ people living closest to the mine first, then away from the mine, as per the skills required. Construction and decommissioning are specialised skills are will require a specialist team to lead and carry out a large proportion of the work. Contractors will be encouraged to employ local labour as far as possible.	Moderate
	Skills development	Skills development amongst employees and community members will be detailed in the mine's Social Labour Plan.	High
	Community health and safety	Planning of mine infrastructure and activities must consider the host community's activities such as the presence of children, pedestrian routes and livestock grazing. A risk assessment must be done to prioritise controlling significant hazards.	Moderate
	Change in sense of place	An underground mine is planned, and surface infrastructure will be restricted, to limit the impact.	Moderate
	Cracking of walls of homes	The blasting expert will provide mitigation measures, for example, blasting schedule will be shared with community well in advance.	Moderate
	Potential for negative social interactions	Employees must be required to abide by a code of conduct, including responsible interaction with local communities.	Moderate

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

In accordance with the provisions of Regulation 23(3) of the EIA 2014 Regulations the EIA should include all information required as set out in Appendix 3 and in terms of Regulation 23(4) the EMP should contain all information required as set out in Appendix4. The Competent Authority has not requested any other information. The EIA report must include the following:

- Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae;
- A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale;
- A description of the scope of the proposed activity;
- A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;
- A full public participation process including a CRR in the EIR;
- Impact Assessment, including methodology, of the necessary environmental aspects, including the nature, significance, extent, duration and probability of the impacts occurring, positive and negative impacts, including mitigation and monitoring measures;
- An assessment of the proposed alternatives;
- A complete EMPr;
- An impact statement from the EAP, specific information the Competent Authority may require, and conditions for approval; and
- An EAP oath regarding the correctness of information provided in the report.

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

Potential negative and positive impacts may arise as a result of the proposed Project. The negative impacts are associated with population influx as job seekers move into the area. The population influx may result in increased demand on health and emergency services, conflict and xenophobia between local residents and job seekers, increase in crime and social issues. The local communities may have unrealistic expectations for employment.

Positive impacts include the recruitment of local residents for employment, the increase in GDP for the region, skills transfer and upliftment of the local communities, and income generation.

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

A full Heritage Impact Assessment will be undertaken during the EIA Phase in compliance with Section 38 of the NHRA. Any resources identified on site will be recorded, labelled and the appropriate mitigations applied.

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

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

13 Undertaking regarding correctness of information

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

Signature of the EAP:	
Date:	May 2019

14 Undertaking regarding level of agreement

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

Signature of the EAP:	
Date:	May 2019

Appendix 1: EAP CV and Qualifications

Ms Xanthe Taylor

Environmental Consultant

Environmental and Legal Services

Digby Wells Environmental

1 Education

2013: BA Honours Environmental Management - UNISA.

2009: BA English and Psychology – UNISA.

2 Employment

July 2015 – present: Digby Wells Environmental – Environmental Consultant.

2012 – June 2015: Clean Stream Environmental Consultants (Pty) Ltd. – Junior Environmental Scientist.

3 Experience

Xanthe Taylor started working in the industry whilst completing her Honours degree, in 2012. Xanthe joined Digby Wells Environmental in 2015 and has almost six years' experience and has been involved in a project in the proposed Gruisfontein Project area as recently as 2016. The majority of Xanthe's experience is in the mining sector applying for applications governed NEMA, and both the 2010 and 2014 Regulations thereunder, as well as the MPRDA.

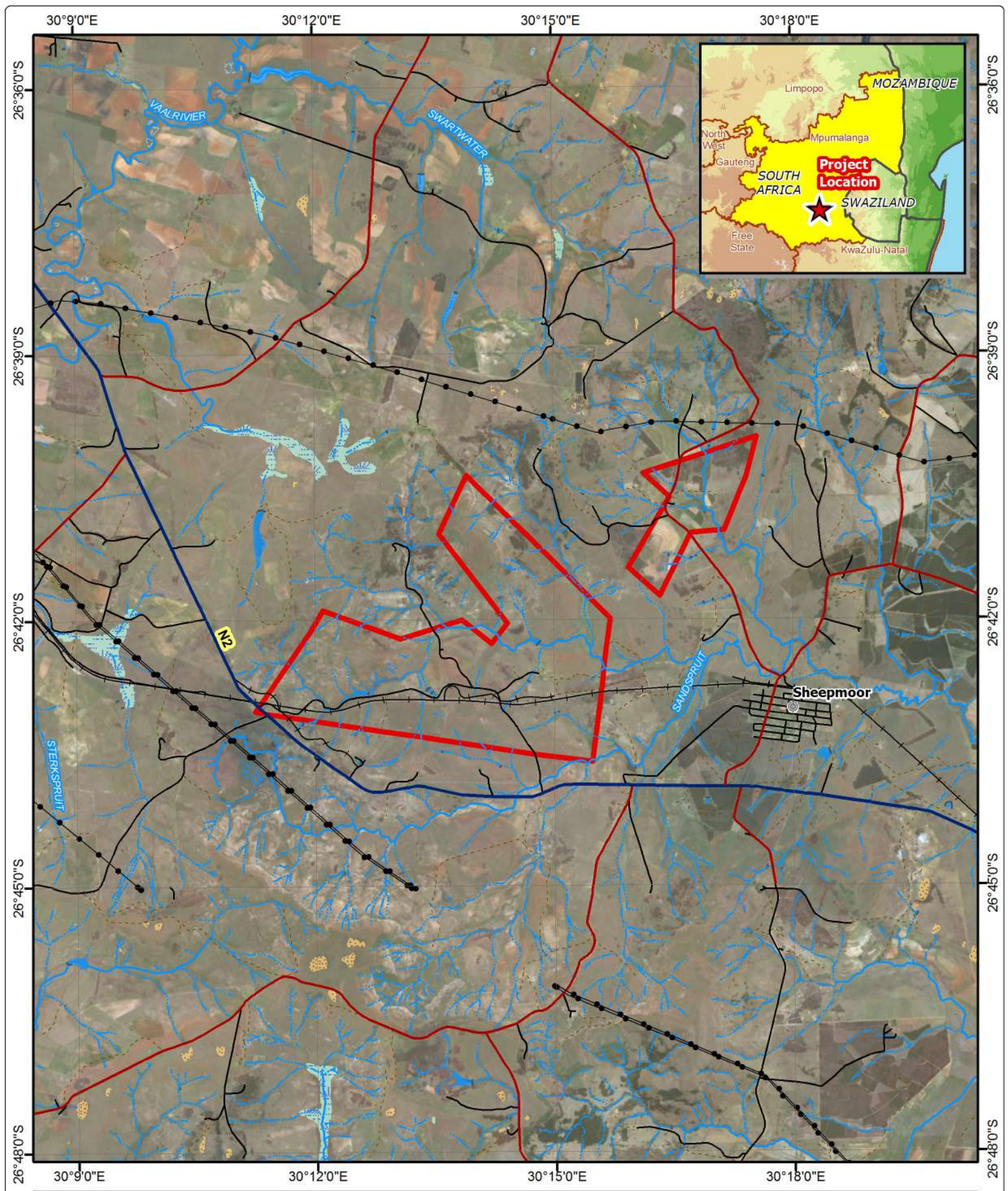
Her experience comprises managing integrated mining applications: compiling application forms, Basic Assessment reports, Scoping reports, Environmental Impact Assessment reports, Environmental Management Programmes, Section 29 and Section 31 Amendment reports, Section 102 Amendment reports, exemption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

4 Project Experience

- Barplats Mines Limited – Eastplats Crocodile River Mine Basic Assessment and EMP Amendment;
- Anglo Thermal Coal Landau Colliery EIA and EMP;
- Botterkloof Holiday Resort Water Use Licence Legal Assessment;
- DRA Legal Gap Analysis for Tshipi Borwa Mine;

- Eskom Group Capital – Lambda Substation and Transmission Line EMP / IWULA process;
- Exxaro Grootegleuk Section 29 Amendment;
- Msobo Coal (Pty) Ltd. – Verkeerdepan Extension Project;
- Glencore Tweefontein Road Realignment Project;
- Mawetse Mining Corporation Mining Right Application;
- Namane Resources (Pty) Ltd IPP and Transmission Line Project;
- RSV ENCO – Fatal Flaw Analysis;
- South32 Coal Holdings (Pty) Ltd – Currently managing Regulation 31 Amendment Application;
- Stuart Coal (Pty) Ltd. – South Block Colliery, Weltevreden and Est Collieries; and
- Stuart Coal (Pty) Ltd. East, South and Weltevreden Colliery Water Use Licence Audit; 2012, 2013, 2014;
- Stuart Coal East, South and Weltevreden EMP Performance Assessment Audit, 2014; and
- Stuart Coal (Pty) Ltd. Weltevreden Colliery Water Treatment Plant Project.

Appendix 2: Plans



Twyfelaar Coal Mine: Local Setting

Legend

- Project Area
- Other Town
- Powerline
- Arterial / National Route
- Main Road
- Minor Road
- Track
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake
- Non-Perennial Pan
- Perennial Pan / Stream
- Wetland

Projection: Transverse Mercator
Central Meridian: 31°E
Datum: WGS 1984
Date: 15/03/2019
Ref #: scm.DAG5603.201903.205

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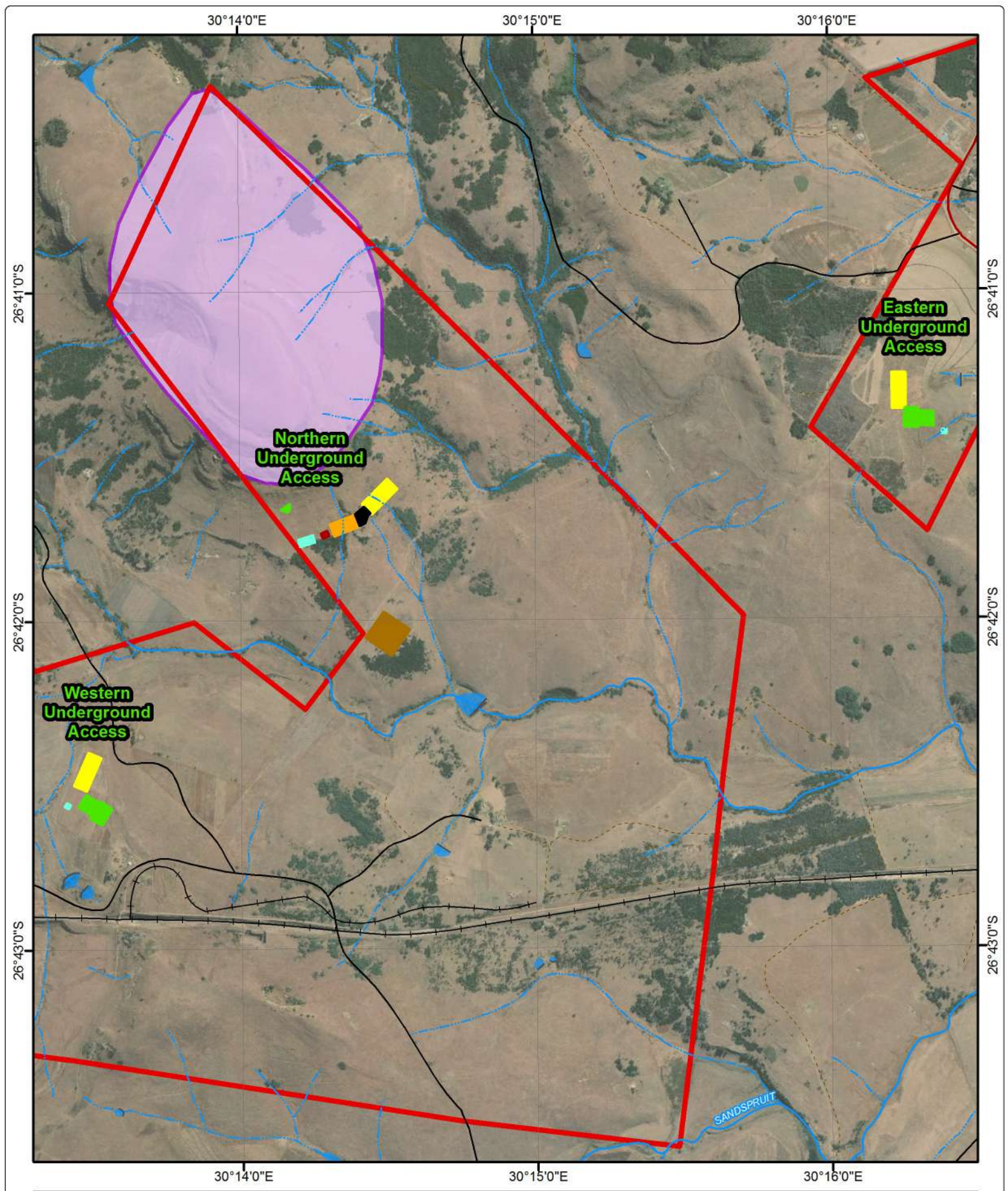

Twyfelaar Coal Mine: Infrastructure Layout

Legend

- Project Area
- Block A
- Main Road
- Minor Road
- Track
- Railway Line
- Non-Perennial Stream
- Perennial Stream
- Dam Wall
- Dam / Lake

Infrastructure Layout

- Discard Dump
- Explosives Delivery Bay
- Infrastructure Area
- PCD
- Plant Area
- ROM Pad
- Underground Access

Projection: Transverse Mercator
Central Meridian: 31°E
Datum: WGS 1984
Date: 26/04/2019
Ref #: scm.DAG5603.201904.128

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