PART 1

NAME OF APPLICANT: Breyten Coal Farms (Pty) Ltd (A subsidiary of Xstrata South Africa (Pty) Ltd)

REFERENCE NUMBER: MP/30/5/1/2/2/10060 MR

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

AS REQUIRED IN TERMS OF REGULATION 49 OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 OF 2002), AND IN ACCORDANCE WITH THE STANDARD DIRECTIVE FOR THE COMPILATION THEREOF AS PUBLISHED ON THE OFFICIAL WEBSITE OF THE DEPARTMENT OF MINERAL RESOURCES.

FEBRUARY 2013

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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This document has been prepared by **Digby Wells Environmental**.

Report Title:	**Scoping report in terms of the Mineral and Petroleum Resources Development Act, 2002, for the Proposed Consbrey Colliery**
Project Number:	**MSO1805**

Name	Responsibility	Signature	Date
Degrecia Zwane	Project Administrator		22 February 2013
Marcelle Radyn	Project Manager		25 February 2013
Michael Hennessy	Legal Reviewer		26 February 2013

EXECUTIVE SUMMARY

Xstrata Coal South Africa (Pty) Limited (Xstrata Coal) is, through its subsidiary Breyten Coal Farms (Pty) Limited (Breyten Coal), currently the holder of two prospecting rights over various portions of the farms Opgoedenhoop 205 IS, Morgenster 204 IS, De Wittekrans 218 IS, Bosmanskrans 217 IS, Dwarstrek 216 IS, Hartbeesfontein 259 IS, Bankfontein 215 IS and Smutsoog 214 IS, in the Magisterial District of Ermelo (the Prospecting Rights). These rights relate to different coal seams within the area covered by the Prospecting Rights. Xstrata Coal has entered into an agreement with Msobo Coal (Pty) Limited (Msobo) in terms of which the Prospecting Rights have been sold to Msobo, but subject to the consent of the Minister of Mineral Resources in terms of Section 11 of the Mineral and Petroleum Resources Development Act, 2002 (MPRDA). The process of effecting cession has not yet been finalised. The proposed Consbrey Colliery is located within the boundaries of the Albert Luthuli and Msukaligwa local municipalities, under the jurisdiction of the Gert Sibande district municipality, Mpumalanga Province.

Msobo wishes to apply for a mineral right in respect of the farms that are the subject of the Prospecting Right, but since no cession of the Prospecting Rights has been effected, Breyten Coal has the sole and exclusive right to apply for a mining right. Breyten Coal has lodged applications for mining rights in respect of Portion 5 and the Remaining Extent of the farm Morgenster 204 IS and Portion 3 of the farm Dwarstrek 216 IS, under Reference Number MP 30/5/1/1/2/10060 MR, and in respect of the farms that are the subject of the Prospecting Rights, under Reference Number MP 30/5/1/1/2/10062 MR. The two mining projects are referred to as Consbrey A (MP 10060 MR) and Consbrey (MP 10062 MR).

The Mining Right Application (MRA) was lodged with the DMR in November 2012 and the acknowledgement letter (with reference number MP 30/5/1/1/2/10060 MR) dated 30 January 2013 was received on 4 February 2013, permitting Breyten Coal Farms to proceed with the necessary environmental process. Breyten Coal has been directed to lodge a Scoping Report as contemplated in Regulation 48 and 49 of the MPRDA Regulations, by 28 February 2013. Although this directive has been addressed to Breyten Coal, in view of the intention of Xstrata Coal, Breyten Coal (a subsidiary of Xstrata Coal and the current holder of the prospecting rights) and Msobo, that Msobo will ultimately become the holder of the mining right, this Scoping Report has been prepared under the name of Msobo Coal (Pty) Limited.

Digby Wells Environmental, independent environmental consultants, were appointed on the 19th of February 2013 to undertake the necessary processes. The EIA process will be aligned with the requirements of Section 39 (1) and Regulation 49 of the MPRDA in support of the MRA for the proposed coal mining activities on the Consbrey Colliery in order to obtain environmental authorisation from the DMR.

Although the timeframes did not permit Digby Wells to undertake a detailed Public Participation Process (PPP) during the scoping phase, PPP has been initiated. An in depth PPP will be conducted during the EIA phase so that I&APs are afforded the opportunity to raise any concerns and comments.

It should further be noted that an earlier mining right application was undertaken in 2008 for a number of new areas, including the proposed Consbrey project area. This process underwent a comprehensive consultation process at the time; however the application was withdrawn and the prospecting right renewed. The consultation process is still required and will be undertaken, however previous comments received do have value in guiding the scoping report.

The proposed project site covers predominately a greenfield area characterised by agricultural activities, towards the east it encroaches on the historical Consolidated Breyten Mine (with the associated Consbrey dump which was part of JCI Mine). The mineral to be mined is bituminous coal located within the Ermelo coal field. The coal seams will be mined with the use of both open pit (truck and shovel) and underground (bord and pillar) methods.

Access to the sites will be via existing roads, where possible and if necessary, new roads will be constructed. The coal from Consbrey will be transported to the Spitzkop Colliery by truck or by a conveyor belt system. The coal will be washed at Spitzkop Colliery's beneficiation facility.

The **key potential negative** environmental and socio-economic impacts identified during the scoping phase for the proposed project (determined according to the significant potential impacts caused on the receiving environment), and that may require mitigation are described below. Again, these were determined on a desktop level due to time constraints.

Construction Phase

During the construction phase, materials in the overburden may give rise to deterioration in water quality caused by the pyritic bioturbated sandstones and shales and black carbonaceous shales that are associated with the coal seams and occur close to the coal seams, this material may cause Acid Mine Drainage (AMD) if oxidation occurs. The land affected by surface and underground infrastructure will be converted to mining land for the duration of mining activities. Construction activities may lead to the increased pressure on local services and resources, partially attributable to the proposed project's water and electricity requirements, and partially attributable to an influx of job-seekers who will require housing and other basic services, and who may make use of local health and educational facilities, amongst other services.

Operational Phase

During operations, open pit mining will take place, resulting in a progressive impact on the natural topography. There will be overburden stockpiles, soil stockpiles and open pits which will also increase the secondary impacts such as disturbance to catchment area and erosion. The changes induced by mining may lead to a dewatering cone in the immediate vicinity of the mine, resulting in an increase in recharge, storage capacity (open pit workings) and deterioration in water quality. The mining activities will open the areas to oxidation and the possible formation of AMD that will have to be contained. Open pit mining results in a constant removal of soil and overburden, which could increase erosion and loss of soil fertility. Soil erosion is a major problem in South Africa as soil takes a long time to

regenerate. The open pit workings will receive run-off, precipitation and seepage. This will result in surface water coming into contact with potentially contaminating material. The open pit workings will also reduce the local catchment size. During the operational phase, impacts resulting from open pit operations on archaeological sites could be high, depending on the nature and location of sites identified in the Archaeological Impact Assessment (AIA). The De Wittekrans iron age complex is known to exist directly next to the proposed mining operation. The temporary loss of agricultural land in the area may cause a negative impact, and some local farmers may have to be relocated to other areas during operation. Increased dust, noise, and traffic levels may also cause a negative impact for surrounding landowners and nearby residents.

Decommissioning Phase

A significant negative impact will be experienced in the area due to the large number of job losses. An important source of income will be lost for many families in the area and people may start to move out of the town, if other jobs in the vicinity are not available.

Post Closure Phase

The potential for AMD is of significant concern due to the long time frame associated with it and the large financial expenditure associated with the handling of water contaminated in this fashion. Underground mining has the potential to impact on surface water quality if there is a decant point or if water is discharged. This decant water will make its way to the closest stream. If subsidence occurs, this could impact on surface drainage and result in a negative impact on the catchment.

The **key potential positive** environmental and socio-economic impacts identified during the scoping phase (determined according to the potential significant impacts caused on the receiving environment) are described below:

Construction Phase

The proposed Consbrey Colliery will result in the creation of temporary job opportunities for local and regional labourers and contractors. Multiplier effects on the local economy as a result of increased spending power of employees and services providers of the mine, rates and taxes payable by Xstrata Coal to the municipality, as well as Local Economic Development (LED) and Human Resource Development (HRD) spent by Xstrata Coal.

Operational phase

Employment opportunities will be created, and will positively influence the lives of households.

Prior to the EIA/ EMP report being compiled and submitted, several specialist investigations are to be conducted in order to close any knowledge gaps identified during the scoping phase. The studies which are proposed to be conducted during the EIA phase include:

- Topography and Visual Impact Assessment;
- Soil, Land Use and Land Capability Impact Assessment;
- Flora and Fauna Impact Assessment;

- Surface Water Impact Assessment;
- Wetland Impact Assessment;
- Aquatic Environment Impact Assessment;
- Groundwater Impact Assessment;
- Air Quality Impact Assessment;
- Noise Impact Assessment;
- Heritage Impact Assessment (this depends on the outcome of the South African Heritage Resources Agency (SAHRA) and/ or the relevant Provincial Heritage Resources Authorities (PHRA) for the need for further investigations); and
- Social Impact Assessment.

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A. SCOPING REPORT

1. METHODOLOGY APPLIED TO CONDUCT SCOPING

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

The proposed Consbrey Colliery is located in the Albert Luthuli and Msukaligwa Local Municipalities, under the jurisdiction of the Gert Sibande district municipality, Mpumalanga Province. The regional setting and local setting is depicted in Plan 1 and Plan 2 below, respectively.

The majority of the information contained within the scoping report was based on desktop studies as well as experience in the project area. Due to the timeframes imposed by the DMR and Xstrata Coal not being able to obtain any extensions to them, detailed scoping investigations and public participation could not be undertaken. Xstrata Coal does however, recognise the importance of these activities and has committed to conducting them with the sufficient levels of detailed (during the EIA phases), as legislation requires.

The following communities were identified as Interested and Affected Parties (I&APs):

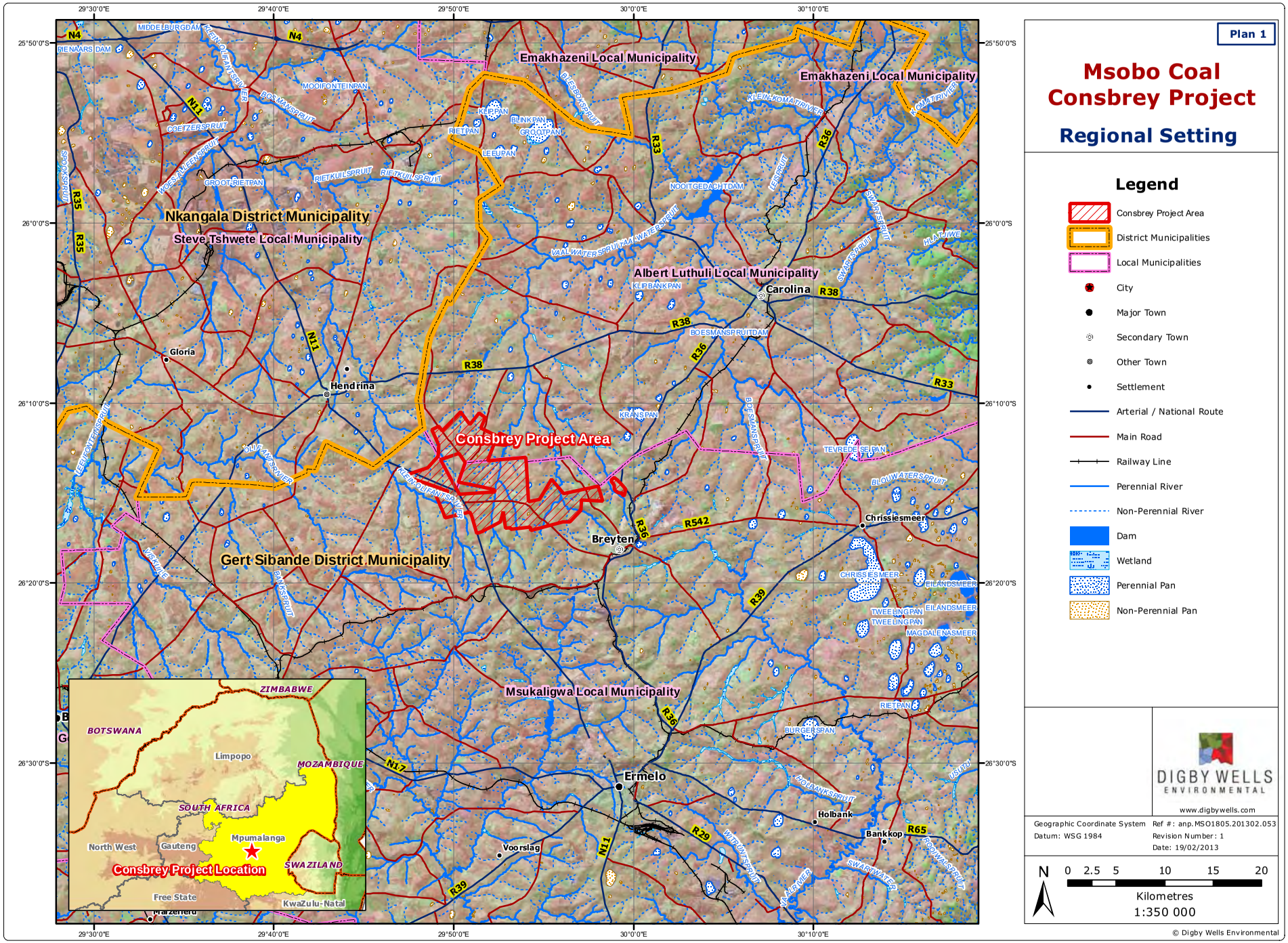
- Kwa-Zanele (near Breyten); and
- Chrissiesmeer Settlement.

This information will be confirmed during the public review period of the Scoping Report and has been gathered using existing meeting minutes, existing stakeholder databases and by means of consultation with the Albert Luthuli and Msukaligwa Local Municipalities.

During the public review period of the scoping report, this community will be consulted in order to:

- Introduce the proposed project and its processes;
- Identify additional stakeholders and/or communities which need to be included in the PPP;
- Make suggestions for enhanced project benefits and reasonable alternatives;
- Raise issues of concern, suggestions and comments about the proposed project, the Scoping Report and the draft Terms of Reference for the EIA specialist studies to be undertaken; and
- Invite stakeholders to register as I&APs.

Plan 1: Consbrey Colliery Regional Setting


Plan 1
Msobo Coal
Consbrey Project
Regional Setting
Legend
Consbrey Project Area
District Municipalities
Local Municipalities
City
Major Town
Secondary Town
Other Town
Settlement
Arterial / National Route
Main Road
Railway Line
Perennial River
Non-Perennial River
Dam
Wetland
Perennial Pan
Non-Perennial Pan
Emakhazeni Local Municipality
Nkangala District Municipality
Steve Tshwete Local Municipality
Albert Luthuli Local Municipality
Gert Sibande District Municipality
Msukaligwa Local Municipality
Consbrey Project Area
Carolina
Gloria
Hendrina
Breyten
Chrissiesmeer
Ermelo
Holbank
Bankkop
Voorslag
Marzeneld
ZIMBABWE
BOTSWANA
MOZAMBIQUE
SOUTH AFRICA
Limpopo
Mpumalanga
North West
Gauteng
Free State
KwaZulu-Natal
SWAZILAND
Consbrey Project Location
DIGBY WELLS ENVIRONMENTAL
www.digbywells.com
Geographic Coordinate System
Datum: WSG 1984
Ref #: anp.MSO1805.201302.053
Revision Number: 1
Date: 19/02/2013
N
0 2.5 5 10 15 20
Kilometres
1:350 000
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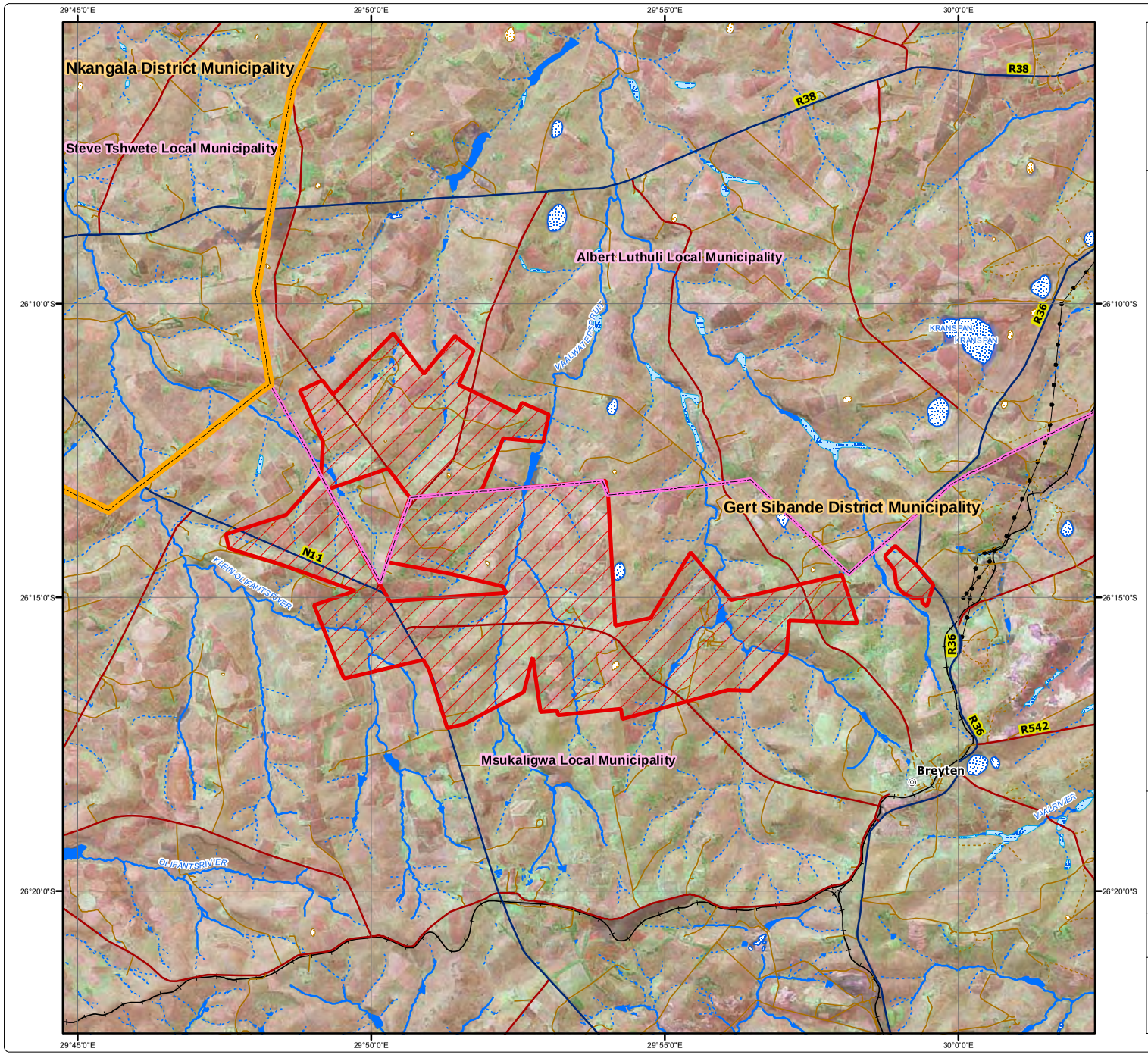
Plan 2: Consbrey Colliery Local Setting



Plan 2

Msobo Coal Consbrey Project

Local Setting

Legend

- Consbrey Project Area
- District Municipalities
- Local Municipalities
- Secondary Town
- Arterial / National Route
- Main Road
- Other Access Road
- Street
- Track & Footpaths
- Railway Line
- Power Line
- Perennial River
- Non-Perennial River
- Dam
- Wetland
- Perennial Pan
- Non-Perennial Pan

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Geographic Coordinate System
Datum: WSG 1984

Ref #: anp.MSO1805.201302.054
Revision Number: 1
Date: 19/02/2013

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0 1 2 4 6

Kilometres

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1.2. State whether or not the Community is also the landowner.

The desktop review indicates that the following Community Associations are landowners of properties located within the mining rights area:

- Mrbheli Communal Property Association (Hartbeesfontein 239 IS Re Ptn 6)
- Mgudlwa Communal Property Association (Hartbeesfontein 239 IS Ptn 9/5)

The information gathered from the desktop review will be verified during the PPP.

1.3. State whether or not the Department of Land Affairs have been identified as an interested and affected party.

The Department of Land Affairs (DLA) has been identified as an I&AP and included in the stakeholder database. The Government of the Republic of South Africa has been identified as the owner of the following properties:

- Brakfontein 215 IS - Ptn 2 and Ptn 6/4;
- Dwarstrek 216 IS – Ptn 2;
- Klipfontein 241 IS – Ptn 6/1; and
- Smutsoog 214 IS – Re of Ptn 3 (Area 1 and 2).

This is in anticipation of any potential land claims on properties included in the MRA (see Section 1.4) and also considering the environmental sensitivities of the proposed project.

1.4. State specifically whether or not a land claim is involved.

A request to identify and provide the required information on any land claims associated with the Mining Right Application and proposed project has been submitted to the DLA on 28 February 2013 and is currently pending feedback. It is noted that records available, dated at December 2011, indicate that no land claims exist on the on the proposed project area. Updated information for land claims will be included in the Draft EIA Report and will also be available to stakeholders, if so requested.

1.5. Name the Traditional Authority identified by the applicant.

The Traditional authorities associated with Chrissiesmeer and Kwa-Zanele will be identified during the public review period of the Scoping Report.

1.6. List the landowners identified by the applicant (Traditional and Title Deeds owners).

The affected properties and land owners are depicted on Plan 3.

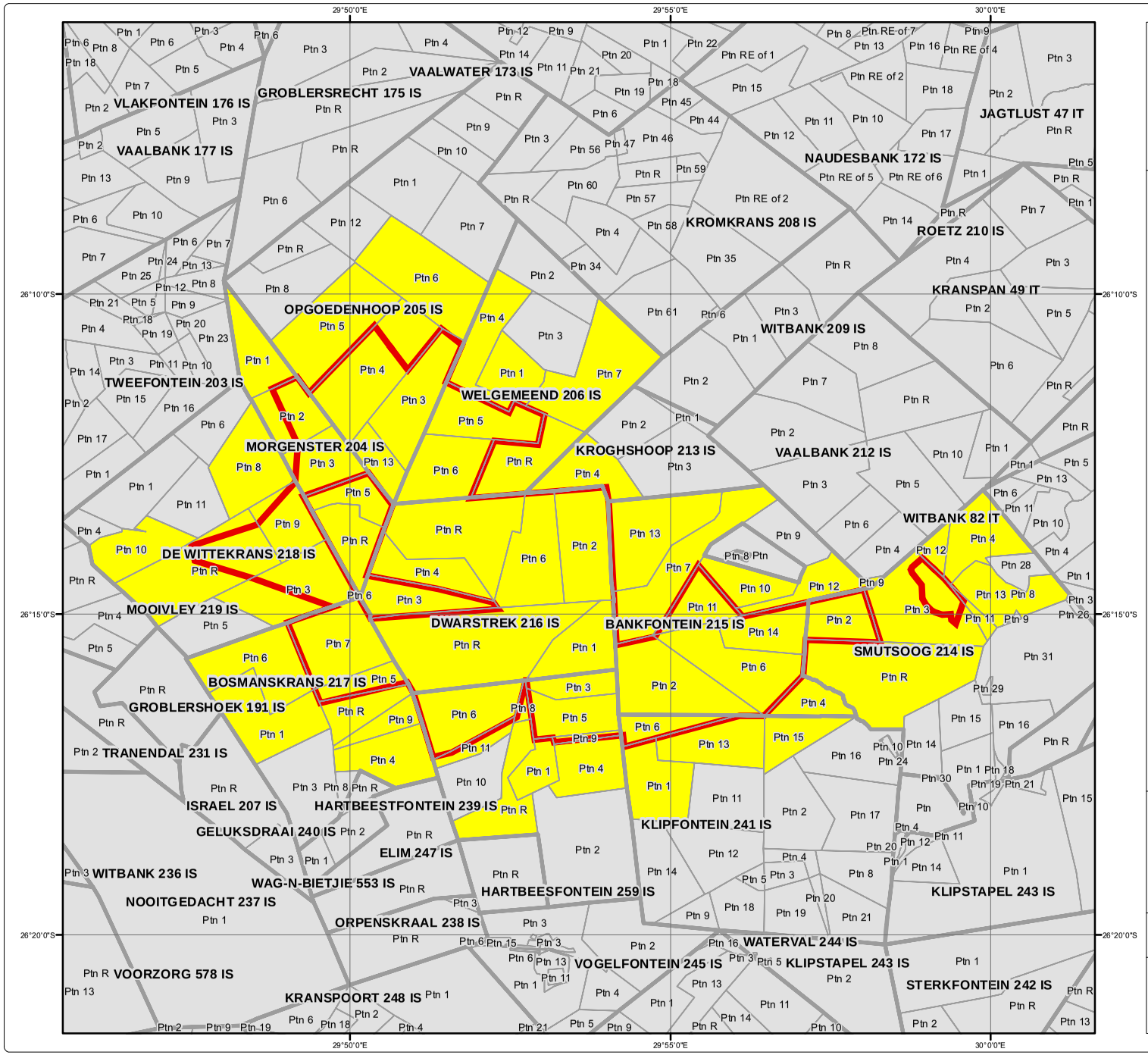
A list of the directly affected farm portions which will be directly affected by the proposed project are indicated in Table 1-1 below. Any other lawful occupiers will be identified during the EIA phase.

Table 1-1: List of Landowners Directly Affected

Farm Name	Portion	Landowner
Bankfontein 215 IS	Ptn 2 Ptn 6/4 Ptn 11/1 Ptn 14/6	National Government of South Africa National Government of South Africa Dyndre Prop Bank Appels Boerdery
Bosmanskrans 217 IS	Re Ptn 5 Ptn 7/1 MA1 on Ptn 7/1	Catharina Alettha Roux Catharina Alettha Roux Catharina Alettha Roux
De Wittekrans 218 IS	MA4 of MA1 on Re Ptn 1 MA2 on Re Ptn 3 MA3 on Ptn 9	Anvin Beleggings Trust Anvin Beleggings Trust Jacobus Samuel Landman
Dwarstrek 216 IS	Re Farm Re Ptn 1 Ptn 2 Ptn 4/3 Ptn 6	Dirk Steyn Testamentere Trust Dirk Steyn Testamentere Trust National Government of South Africa Adam van Niekerk Trust National Government of South Africa
Hartbeesfontein 239 IS	Ptn 3/1 Re Ptn 5/1 Re Ptn 6 Ptn 9/5	Coko Trust Coko Trust Mrbheli Communal Property Association Mgudlwa Communal Property Association
Klipfontein 241 IS	Ptn 6/1	National Government of South Africa
Morgenster 204 IS	MA1 on Ptn 2 MA2 on Ptn 3	Pieter Karel Landman Daniel George Lambrechts
Op Goedenhoop 205 IS	Ptn 3 MA2 of MA 1 on Ptn 4 Ptn 13/3	Landownership to be confirmed

Farm Name	Portion	Landowner
Smutsoog 214 IS	Re Ptn 3 (Area 1) Re Ptn 3 (Area 2)	National Government of South Africa National Government of South Africa
Welgemeend 206 IS	Ptn 5 Ptn 6	Libomvu Mkhweli Pondwe-Trustee Hannelie Botha

Plan 3: Consbrey Colliery Land Tenure



Plan 3

Msobo Coal Consbrey Project

Land Tenure

Legend

- Consbrey Project Area
- Farm Boundaries
- Farm Portions
- Farm Portions Affected within 100m

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Geographic Coordinate System
Datum: WSG 1984

Ref #: anp.MSO1805.201302.056
Revision Number: 1
Date: 19/02/2013

N

0 1 2 4 6

Kilometres

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1.7. List the lawful occupiers of the land concerned.

A list of lawful occupiers on the directly affected farm portions will be confirmed during the PPP (see Section 5.1) and included in the Draft EIA Report. This information will be available to stakeholders if so requested once confirmed.

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

Stakeholders will be consulted by means of public, focus group and one-on-one meetings, where required, during the public review period of the Scoping Report. In the interim, in order to gain more insight of stakeholder sentiments a summary of the comments, issues of concern and suggestions raised during the EIA/EMP conducted for the Tselentis Colliery in 2008 has been provided below. This will form a foundation for the proposed project's PPP which will be conducted.

- The importance to consider cumulative impact studies during specialist studies;
- Ensuring that mining houses accepts responsibility for rehabilitation and that it is considered during and after the EIA process;
- Considering the potential of surface and groundwater pollution during and after mining operations together with implications of AMD;
- Concerns of potential impacts on biodiversity and wetlands and the vital importance that specialist studies be conducted in order to inform mitigation measures;
- Heritage and archaeological studies needs to consider sensitive areas and ensure that the Terms of Reference of such studies be well defined;
- The concern of cumulative impact of increased traffic on the roads and indirectly on safety, the environment and road access;
- How communities will benefit from new mine developments, especially by means of the creation of employment opportunities;
- The importance of following applicable legislation for the EIA, thereby ensuring that information will be made available to stakeholders timeously; and
- The PPP should remain transparent and allow for stakeholders to contribute meaningfully to the EIA process.

1.9. Name the Local Municipality identified by the applicant.

The proposed Consbrey Colliery is located in the Msukaligwa and Albert Luthuli Local Municipalities.

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

The relevant Government Departments, agencies and institutions have been identified from a review of existing stakeholder databases and drawing on professional experience from projects undertaken within the same proposed project area. The I&AP database (see

Appendix 4) provides more detail on the various stakeholder groups listed below and will be updated throughout the PPP.

The following Government entities were identified:

- Department of Mineral Resources;
- Department of Water Affairs;
- Department of Agriculture, Rural Development and Land Administration;
- Department of Environmental Affairs;
- Department of Agriculture;
- Department of Rural Development and Land Reform;
- Mpumalanga Department of Economic Development, Environment and Tourism;
- Mpumalanga Department of Public Works, Roads and Transport;
- Traditional Authorities;
- Gert Sibande District Municipality;
- Albert Luthuli Local Municipality;
- Msukaligwa Local Municipality; and
- Department of Land Affairs.

The following Agencies and/or Institutions were identified:

- South African Heritage Resource Agency;
- Mpumalanga Tourism and Parks Agency;
- Mpumalanga Heritage Resource Authority;
- Various environmental NGOs;
- Various CBOs;
- Farmers Unions; and
- Business.

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

Announcement of the proposed project will be done on Friday, 1 March 2013. Proof of the formal announcement of the proposed project, which includes the distribution of a Background Information Document (BID) accompanied by an announcement letter and registration and comment sheet, will be provided to the DMR. This will be done by means of email and post to all stakeholders on the database (see Section 5.1*).*

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

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

Due to the legally binding timeframes with which the project must comply, the document could not be placed in the public domain for review prior to its submission to the DMR. However, the scoping report has been placed in the public domain since the submission to the DMR and all comments received on the proposed project will be submitted. The public consultation process will continue and all comments received will be submitted to the competent authority.

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

The National Heritage Resources, 1999 (Act 25 of 1999) (NHRA) emphasises the importance of cultural heritage resources and provides criteria by which such resources must be evaluated and managed.

Based on relevant previous impact assessment reports, literature reviews and historical sources, the cultural landscape of the project area can be described as a primarily agrarian landscape with deep time depth. The cultural landscape therefore comprises natural and cultural heritage such as historical, archaeological and rock art sites. Significantly, the topography as described in section Table 2-6 below is conducive to providing suitable shelters for archaeological and historical groups that have occupied the landscape in the past. Evidence of one such shelter is found on the western boundary of the project area and is discussed in more detail in section 2.3 below.

The cultural landscape may further be defined as a relic landscape. Most notably, in relation to important episodes in South African history, evidence is given of such events such as the Mfecane and Anglo-Boer Wars. Another aspect of the relic landscape that must be considered is the historically known presence of San/ Bushman in the Mpumalanga Lakes District, especially surrounding Chrissiesmeer where descendant populations of these early inhabitants still reside.

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

The baseline description of the heritage baseline has been summarised. A heritage statement will be submitted to SAHRA detailing the De Wittekrans Complex and other heritage information.

Fossil plants are the predominant palaeontological resource found in this region of South Africa. Around Ermelo, in particular, there are exposures of Permian rocks of the Vryheid Formation which contain fossil plants of the *Glossopteris* flora but no vertebrates (Bamford, 2011).

Tool producing hominids have occupied southern Africa for approximately 2 million years. This is primarily evident in the stone tools that have remained, not only indicating their presence in the landscape, but also attesting to the technological development of our *Homo*

genus. Based on the criteria for classification, it is evident that the initial model[1] of Earlier (ESA), Middle (MSA), and Later Stone Age (LSA) (with variants) developed by Goodwin and Van Riet Lowe (1929) is appropriate. Evidence of the Stone Age in Mpumalanga is not well documented and is limited to a few well-known sites. Previous impact studies surrounding the project area yielded no Stone Age finds. The aforesaid baseline description of the heritage in and around the project area has been summarised.

LSA and rock art sites may occur together as these were typically associated with shelters in sandstone cliffs or outcrops, which are prominent in the project area. The economy of the LSA people is associated with hunter-gatherer or herder societies. A prominent site located 650 m to the west of the Consbrey project boundary is the De Wittekrans Complex. In the report completed by Ouzman (2009) he describes the complex as consisting of four individual sites all with archaeological deposit, including stone tools and pottery. The rock art within the complex consist of fine-line, brush painted made by hunter-gatherers and finger painted rock paintings associated with herder people. A study conducted by van Schalkwyk (2003) in the surrounding area also identified a rock art site (2630AA3) some 13 km from Consbrey, indicating that there is a high probability that rock art sites occur within the wider region surrounding the project. Additionally, the Chrissiesmeer Lake District has been occupied by San/Bushmen for many generations. According to Potgieter (1955) they lived on reed platforms on the lakes or in rock shelters. There is an existing small group of Bushmen who still call the lakes their home and act as guides for tourists (Anonymous, 2011).

The Stone Age is followed by the Iron Age in southern Africa. This period is also divided into Early, Middle and Late Iron Age and as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. One of the identifiers of Iron Age Sites are stonewalled settlements. According to Maggs (1976), Type V and Type N walling are present within Mpumalanga and may be found on the slopes of hills. Type V consists of the standard core of cattle enclosures surrounding beehive houses and grain bins. Corbelled huts may be present with this type of walling. Type N walling consists of a few cattle kraals in the centre of the settlement, linked by other stone walling and a perimeter wall that encloses the entire settlement (Huffman, Handbook to the Iron Age: The Archaeology of the Pre-Colonial Farming Societies in Southern Africa, 2007).

Another form of identification is through the remains of material culture, specifically ceramics. Murimbika (2007) states that the region was predominantly occupied by Ndebele Nguni speaking groups during this period and that the predominant ceramic facies identified are Blackburn (1050 CE - 1500 CE), Moor Park (1350 CE - 1700 CE) and Nqabeni (1700 CE - 1850 CE). Only one site possibly dating to the Late Iron Age was documented in previous studies conducted in the surrounding area. The site comprised remnants of a stonewalled enclosure, but no diagnostic ceramics were noted and thus could not be associated with a specific group (Murimbika, 2007).

[1] This model has been reassessed and modified through time (Clark, 1959; Clark et al, 1966; Sampson, 1974)

The Historical Period is generally accepted to date from approximately the mid-19th century, and is generally associated with the movement and contact with Europeans. It should be noted that some, most notably the Five Hundred Year initiative, suggest that Historical Period be recognised as occurring earlier, especially in Mpumalanga. Mpumalanga served as a conduit for many travellers moving north through the country. Some of the first to settle in the region were Boers who left the former Natal (now KwaZulu-Natal) after the Boer Republic of Natalia was annexed by the British. It is also during this period that Mfecane events took place in the region. Mfecane, referring to the period during the 18th and 19th centuries in which transformation in southern Africa occurred primarily through conflicts associated with the Zulu. Mfecane battlefields occur within region. According to Huffman and van der Merwe (1993), local traditions state that the capital of a Swazi chief, Mandla-angangawempisi (Mandlangampisi), was situated on Kafferkraal 98 HT between 1780 and 1840 (Huffman & van der Merwe, Archaeological survey for Savemore Colliery, 1993). Mandlangampisi is reputed to have fought and been victorious in two battles against Zulu warriors during the Mfecane period. One specific battle took place in or near a cave known as Mhlogamvula in the KwaMandlangampisi mountain range 110 km southeast of the project area.

In addition to Swazi and Zulu, Pedi and smaller groups of Ndzundza Ndebele and Kopa also occupied the region during the mid-19th century. While the larger Swazi and Pedi groups were able to successfully assert their own authority over their respective lands, Ndzundza and Kopa often came into direct conflict with the *Zuid Afrikaansche Republiek* (ZAR) (Delius & Cope, 2007). Tensions came to a head in the late 1840s when the Kopa were accused of raiding horses from the Boers. A retaliatory raid was organised, and the Kopa chief was captured and flogged with the result that Kopa raids increased. The Boers requested the Swazi to assist who besieged and destroyed the Kopa stronghold Thaba Ntsho in 1864. The Swazi/ Boer alliance subsequently focussed on the Ndzundza Ndebele, but were unsuccessful at defeating them. A tribute system was implemented as a compromise where the Boers ostensibly leased land from the Ndzundza chief.

The Anglo-Boer Wars are arguably the next most notable historical events to take place within the region in which Chrissiesmeer played a central role. The British, under the command of Gen. H.L. Smith-Doriens were encamped around Lake Chrissie on 6 February 1901. The Boers, under the command of Gen. Louis Botha, intended to conduct a surprise attack on the British forces. The Boers enlisted the help of the local San community who were monitoring the British movements in the area. With the San's knowledge of the terrain, the Boers were able to launch the surprise attack at repel the British. The battle continued until the 9th of February 1901 when adverse weather caused the Boers to lose their advantage and were eventually forced to retreat (Jones, 1999; Delius & Cope, 2007; Anonymous, San Involvement in the Battle of Chrissiesmeer, 2013).

After the war, the farm Bothasrus was given to Lukas Potgieter as compensation for losing a leg during the first Anglo-Boer War. He later sold the farm to field-cornet Nicolaas Breytenbach who formed the town Breyten in his own name. In 1905, the KwaMadala Native

Location, situated about 30 km from Ermelo, was established as a freehold township on Portion 7 and Portion 5 of Smutsoog 241 IS in the project area. The claimants were some of the Native Location residents and had permission to occupy stands owned by the Town Council of Breyten (Land Claims Commission, 2003). Based on the 1913 Land Act, blacks were segregated which resulted in the majority of the land surrounding the project area being owned by whites who practiced farming (Schirmer, 2007).

An agricultural census conducted in 1918 and again in 1993, showed that agriculture was the main form of livelihood across many of the districts in Mpumalanga. The general landscape may therefore be characterised as a large-scale agricultural landscape. This is confirmed through a review of historical cartographic sources. Black farmers in the region were forced into at least five categories of livelihood patterns:

- Labour trade in exchange for permission to plough on white-owned land;
- Black farmers would rent land from companies who owned large tracts of land;
- Some black farmers were able to farm on white-owned land and on their own sections of the property;
- Some black farmers could farm on mission-owned land; and
- Few black farmers legally owned their land.

Previous studies within the surrounding area (Huffman & Calabrese, 1997; Van Schalkwyk, 2003; Van Schalkwyk, 2003; Fourie, 2007; Murimbika, 2007) primarily identified sites associated with these types of settlements from the early 20th century. Heritage resources mainly include homesteads and burial grounds and graves. Historical layering (i.e. a chronological review of available historical maps) indicated that infrastructure associated with the agricultural economy within the project area was well established and present during the 1950s.

The struggle for land and the poor working conditions under which black farmers were expected to operate led to numerous political struggles in the region during the 1940s to 1990s. Farm worker's associations were formed in towns such as Ermelo, even the youth gathered to discuss political issues (Holden & Mathabatha, 2007). During the apartheid era, many people were forcibly removed from their homes and relocated to other areas to facilitate the national policy of separate development. In 1958, for example, coloured people in Ermelo were forcibly removed from their homes and relocated to an area 'zoned' as a coloured township (Christopher, 1991). In 1968, claimants from the KwaMadala location were removed to the KwaZanele Township, about 10 km from Breyten. Four-roomed houses were allocated to the claimants, for which rent was levied. On 6 February 2003, 245 households from the KwaZanele Township received financial compensation which will be used to improve their present housing and infrastructure (Land Claims Commission, 2003).

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

The proposed Consbrey Colliery is situated in the Mpumalanga Province, which is made up of three district municipalities, namely Ehlanzeni, Gert Sibande (formerly East Vaal) and

Nkangala. The Project falls within the Gert Sibande District Municipality, which is the smallest district municipality in the Province. The project area falls within two municipalities with the northern portion of Consbrey falling within the boundaries of the Albert Luthuli Local Municipality and the southern portion of Consbrey falling within the boundaries of the Msukaligwa Local Municipality (refer to Plan 1 depicting the regional setting).

2.4.1. Albert Luthuli Local Municipality

According to the 2011 Census, the Albert Luthuli Local Municipality has a population of just more than 186 000 individuals, 98% of whom are Black Africans and 2% White. Educational levels are low, with only 17% of the population above the age of 5 years having completed secondary school, and just more than a tenth not having received any formal education (refer to Figure 2-1). Of the economically active individuals (those between the ages of 15 and 64), only 27% are employed (Statistics South Africa, 2011).

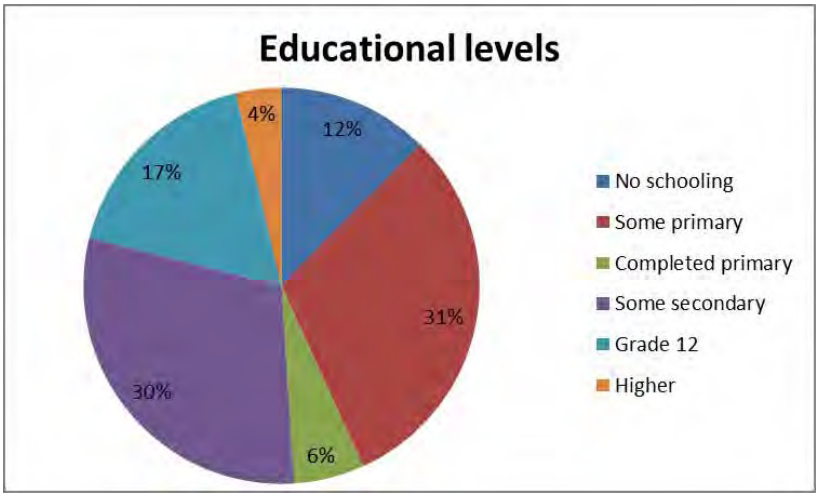


Figure 2-1: Educational levels for individuals aged 5 and above

The Albert Luthuli Local Municipality's economy is based on manufacturing, mining, trade, catering / tourism, transport, communication, finance, real estate, and social (mostly government) and personal services. Recently there has been a sharp growth in the number of retail and service establishments, specifically in the town of Ermelo. According to the 2011 Census data, 58% of the population falls within the economically active age group (between the ages of 15 and 64). The agriculture, forestry, and fishing sectors provide a large number of employment opportunities in the area, as does the retail and services sectors. One of the primary economic development objectives for the Albert Luthuli Municipal Council is to create an environment which is conducive to investment and which will focus on capacitating communities to sustain themselves.

2.4.2. Msukaligwa Local Municipality

According to the 2011 Census, the Msukaligwa Local Municipality has a population of just less than 150 000 individuals, 88% of whom are Black Africans and 10% White. Educational levels are low, with only a fifth of the population above the age of 5 years having completed secondary school, and a tenth not having received any formal education (refer to Figure 2-2). Of the economically active individuals (those between the ages of 15 and 64), only 44% are employed (Statistics South Africa, 2011).

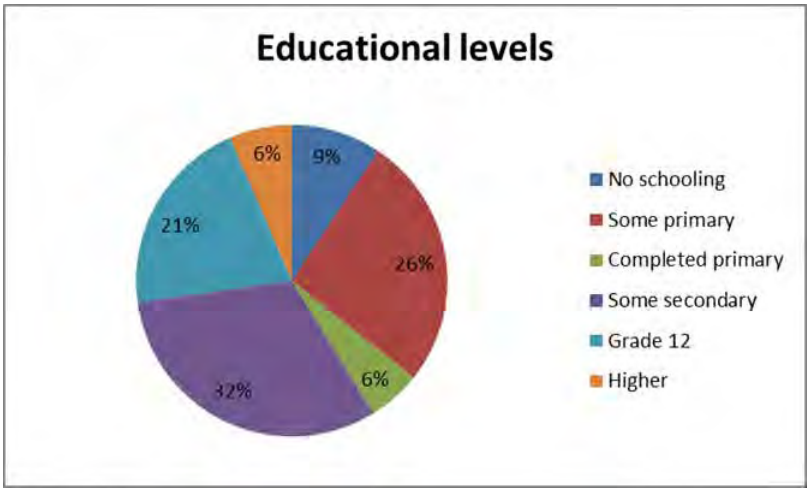


Figure 2-2: Educational levels for individuals aged 5 and above

The Msukaligwa Local Municipality's economy is based on manufacturing, mining, trade, catering/ tourism, transport, communication, finance, real estate, and social (mostly government) and personal services. Recently there has been a sharp growth in the number of retail and service establishments, specifically in the town of Ermelo. According to the 2011 Census data, 64% of the population falls within the economically active age group (between the ages of 15 and 64). The agriculture, forestry, and fishing sectors provide just more than a quarter of all employment opportunities in the municipality, with wholesale and retail making up a further 13%, community, social and personal work 14%, and manufacturing and mining contributing another 15%. One of the primary economic development objectives for the Msukaligwa Municipal Council is to create an environment which is conducive to investment and which will focus on capacitating communities to sustain themselves.

2.4.3. Gert Sibande District Municipality

In terms of agriculture, maize, sunflower, wheat, soya beans, beans and potatoes are produced in the surrounding areas. The Nooitgedacht Agricultural research station offers an extensive agricultural support service. Ermelo is also South Africa's largest wool producing area per hoof. The annual Merino Wool Festival and Agricultural Show in March attract thousands of tourists each year, thus contributing to the economy of the area. Agriculture is therefore an established and significant sector of the economy into which other development initiatives could be directed.

Coal mining is a major economic contributor in the area, as is electric power generation from coal fired power stations and associated industries supporting mining and power generation.

The contribution of the Consbrey project to the local economy could be substantial. The proposed Consbrey Colliery will supply the Spitzkop operation with coal for processing, thereby allowing the operation to extend its productive period and enhance its contributions toward the socio-economic well-being of the area by, inter alia, providing additional job opportunities and extending the timeframe of existing opportunities. Mining activities are of strategic importance to the functioning and existence of towns like Breyten, Hendrina and Ermelo. Economic and business activities have developed in the areas surrounding local mines (a multiplier effect of mines), thus a very large portion of the local population is either directly or indirectly dependent on mines for the generation of income. Once mining activities come to an end, the livelihoods of people living in and around the towns will be adversely affected as its sustainability will be jeopardised.

Finally, the rates and taxes payable to the Msukaligwa and Albert Luthuli Local Municipalities as a result of the Spitzkop operation constitutes an important source of income for the municipality, who requires such funds for the development of local infrastructure and the upgrading of facilities for the surrounding communities.

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

2.5.1. Roads, Railway and Powerlines

There are access roads to some of the farms of the proposed Consbrey Mine area. There are no major power lines or railway lines that traverse the potentially affected area. The N11 provincial road traverses the south westerly portion of the project area and other farm roads traverse the area. The R38 runs about 5 km from the southern portion of the project area and the R36 runs about 500 m from the eastern portion of the project area.

Once the EIA phase commences all infrastructure in the area will be identified through site visits to the area.

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

2.6.1. Climate

Ambient air quality in this region of South Africa is strongly influenced by regional atmospheric movements, together with local climatic and meteorological conditions. The most important of these atmospheric movement routes are the direct transport towards the Indian Ocean and the recirculation over the sub-continents.

Mpumalanga Province experiences a wide range of both natural and anthropogenic sources of air pollution ranging from power generation to veld fires, mining activities, industrial processes, agriculture, paper and pulp processing, vehicle use and domestic use of fossil fuels. Different pollutants are associated with each of the above activities, ranging from

volatile organic compounds to heavy metals to particulate matter, dust and odours. Mpumalanga experiences distinct weather patterns in summer and winter that affect the dispersal of pollutants in the atmosphere. In summer, unstable atmospheric conditions result in mixing of the atmosphere and rapid dispersion of pollutants. In contrast, winter is characterised by atmospheric stability caused by a persistent high pressure system over South Africa. This dominant high pressure system results in subsidence, causing clear skies and a pronounced temperature inversion over the Highveld central plateau area. This inversion layer traps the pollutants in the lower atmosphere, which results in reduced dispersion and a poorer ambient air quality. Preston-Whyte and Tyson (1988) describe the atmospheric conditions in the winter months as highly unfavourable for the dispersion of atmospheric pollutants.

2.6.1.1. Wind Direction and Wind Speed

The spatial and annual variability in the wind field for the Ermelo modelled data is clearly evident in Figure 2-3. The predominant wind direction is from the east, east northeast and north northeast, with frequent winds also occurring from the east south east and west south west. Over the three year period, frequency of occurrence was 15.6% from the east, 11.6% from the east northeast sector and 10.6% from the north northeast sector. Less frequent winds (under 2% of the time) were coming from the south southeast and south. Calm conditions (wind speeds < 0.5 m/s) occurred for 3.2% of the time. Wind class frequency distribution per sector is given in Figure 2-6.

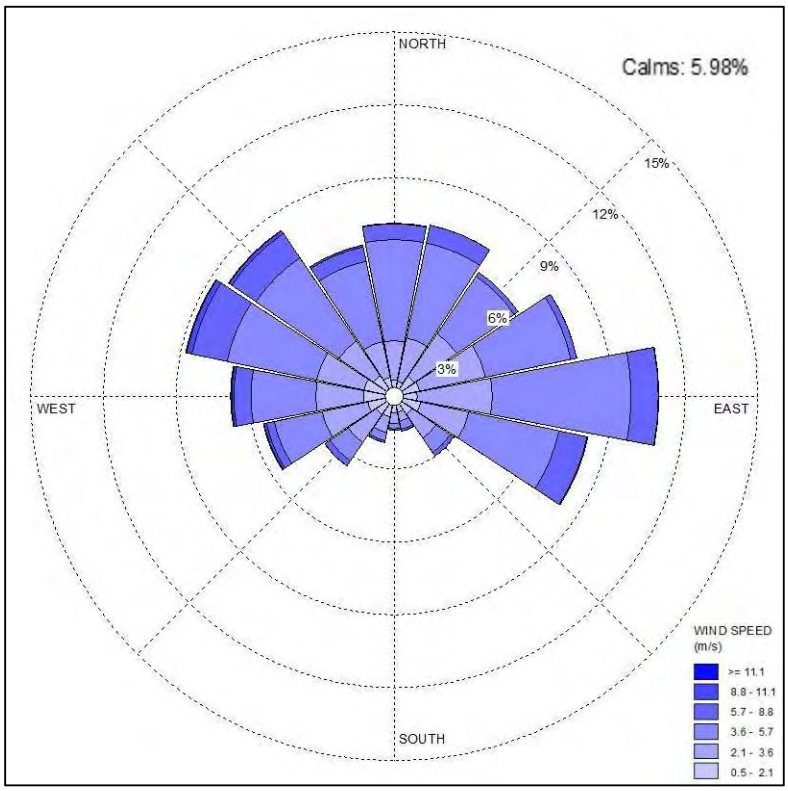


Figure 2-3: Period Surface Wind Rose for Ermelo Modelled Data, 01 January 2008 – 31 December 2010

There are variations in the wind direction throughout the day as seen in Figure 2-4. During the night time predominant wind direction is from the north, north northwest, north northeast, east and east north east sectors. In the morning, the main wind direction is from the northwest, north northwest and west northwest with some from the east and east southeast. Throughout the afternoon period, the main wind direction is from west northwest, west, east and east southeast. Throughout the evening the predominant wind direction is east, north northeast, north east and east southeast. Less frequent winds (under 2% of the time) were coming from the south. More calm (wind speeds < 0.5 m/s) winds were experienced during the afternoon and least calm period was during the evening.

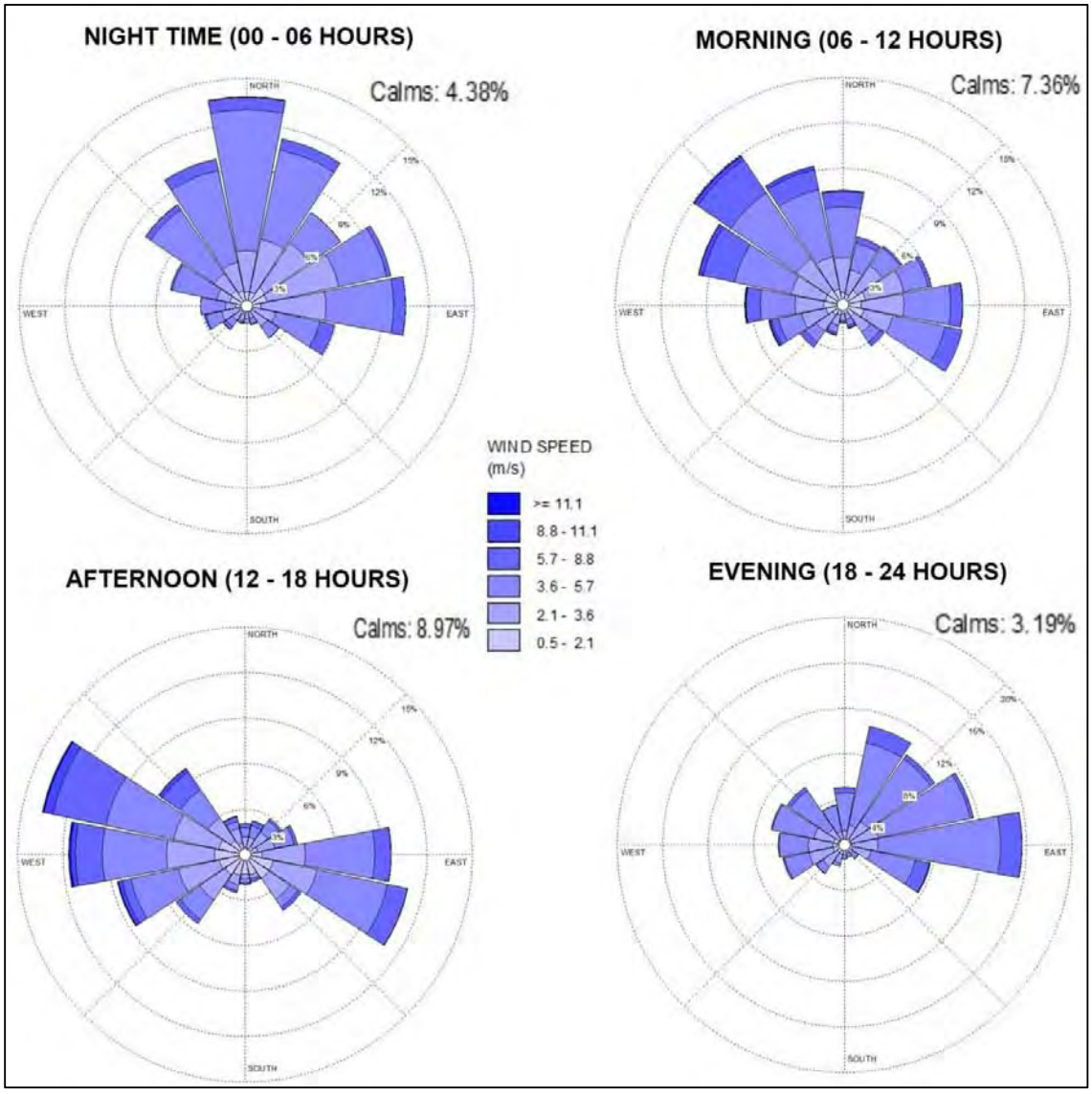


Figure 2-4: Diurnal Variation of Winds between Night time 00:00 – 06:00 (top left), Morning 06:00 – 12:00 (top right), Afternoon 12:00 – 18:00 (bottom left) and Evening 18:00 – 24:00 (bottom right) (Modelled Data 01 January 2008 – 31 December 2010)

As seen in Figure 2-5, seasonal changes bring about changes in wind direction and speed. In spring, maximum wind speed is between 8.8 - 11 m/s. Predominant wind direction was from the northwest, west northwest, north and north northeast. In summer, the main wind direction was from the east with the main wind speed between 3.6 - 5.7 m/s and highest wind speed experienced was 5.7 – 8.8 m/s. In autumn, predominant wind direction was from the east and west north west. Highest calm winds (wind speeds < 0.5 m/s) were experienced in autumn. In winter, predominant wind direction was west and east. Highest wind speeds exceeding 11 m/s were experienced during this season. Less frequent winds (under 2% of the time) were coming from the south.

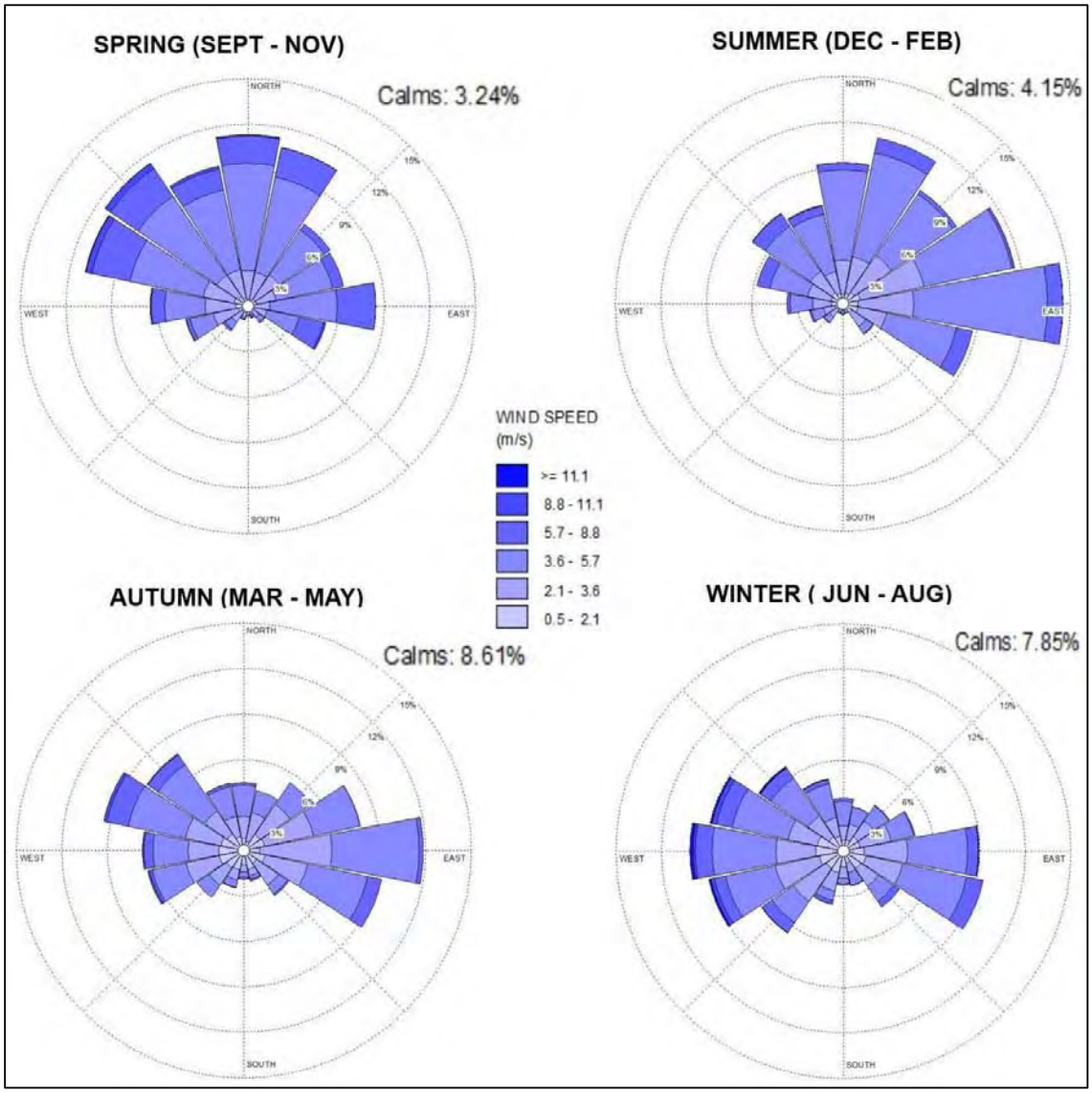


Figure 2-5: Seasonal Variation of Winds in Spring (September – November) (top left), Summer (December - February) (top right), autumn (March – May) (bottom left) and Winter (June – August) (bottom right) (Modelled Data 01 January 2008 – 31 December 2010)

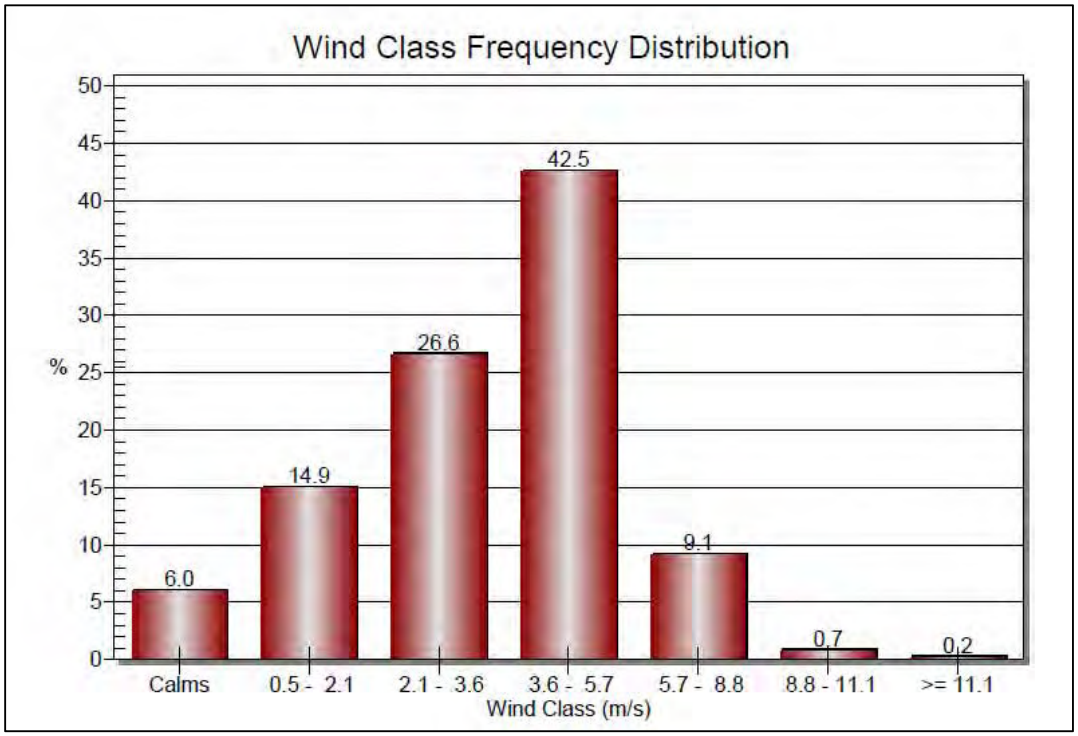


Figure 2-6: Wind Class Frequency Distribution for Ermelo Modelled Data, 1 January 2008 – 31 December 2010

2.6.1.2. Temperature

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume is able to rise), and determining the development of the mixing and inversion layers.

South African Weather Service does not have an Automatic Weather Station (AWS) within the reasonable distance from the proposed Consbrey coal mine site that would give representative and accurate climate data, so the use was made of modelled data and trends were observed analysing the three years available (2008-2010).

The average monthly maximum temperatures range from 20.3°C in January to 8.6°C in July, with monthly minima ranging from 18.7 C in December to 6.5°C in July. Annual mean temperature for Consbrey is given as 14.0°C (Figure 2-7).

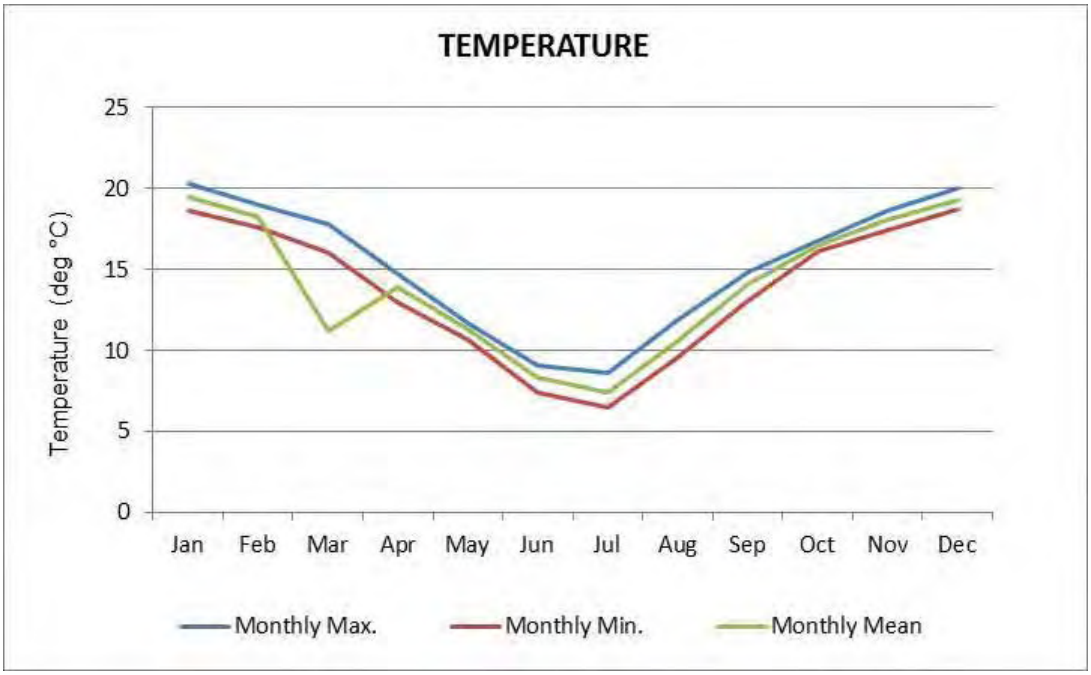


Figure 2-7: Average Monthly Temperature derived from the Ermelo Modelled Data (2008-2010)

2.6.1.3. Relative Humidity

As depicted in Figure 2-8, the monthly minimum relative humidity on the other hand is from 68% in December, with the highest minimum (74%) occurring in January. The monthly maximum relative humidity is from 83% in July, with the highest minimum (87%) occurring in May.

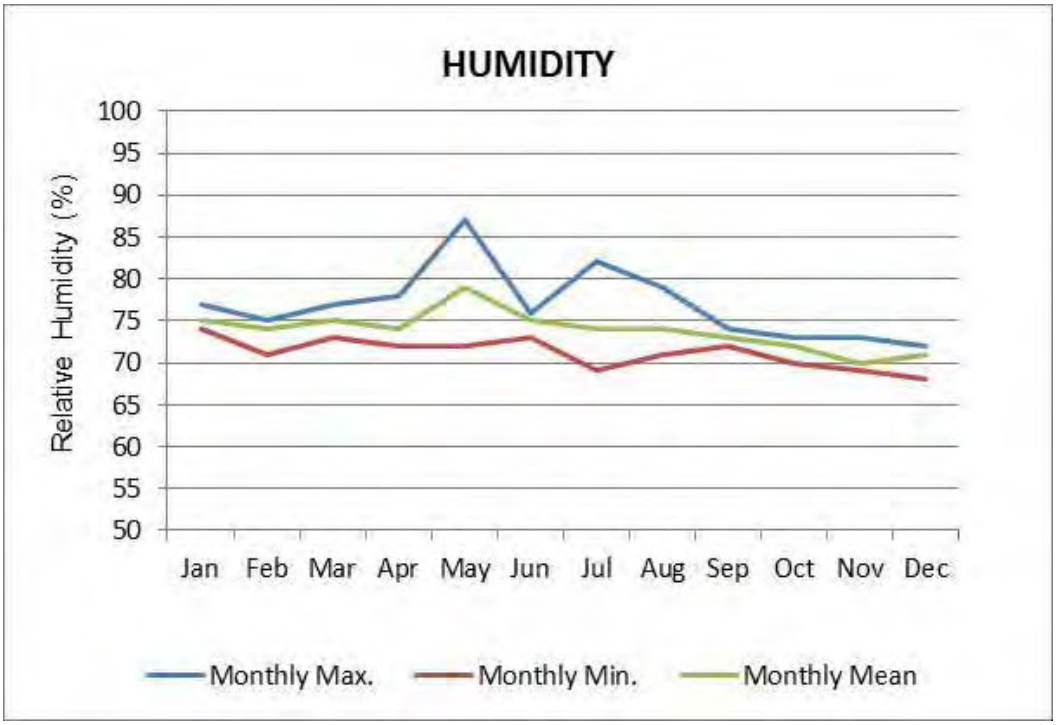


Figure 2-8: Average Monthly Relative Humidity derived from the Ermelo Modelled Data (2008-2010)

The data in Table 2-1 is representative of the relative humidity for the Ermelo area. The annual maximum, minimum and mean relative humidity is given as 77%, 71% and 74% respectively.

Table 2-1: Average Monthly Relative Humidity derived from the Ermelo Modelled Data (2008-2010)

Relative Humidity (%)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Max.	77	75	77	78	87	76	82	79	74	73	73	72	77
Monthly Min.	74	71	73	72	72	73	69	71	72	70	69	68	71
Monthly Mean	75	74	75	74	79	75	74	74	73	72	70	71	74

2.6.1.4. Precipitation

As depicted in Figure 2-9, the highest monthly maximum precipitation (358 mm) occurs for January. The rate decreases down to 5 mm in June. The monthly minimum precipitation ranges between 166 mm in December and no precipitation in June and July.

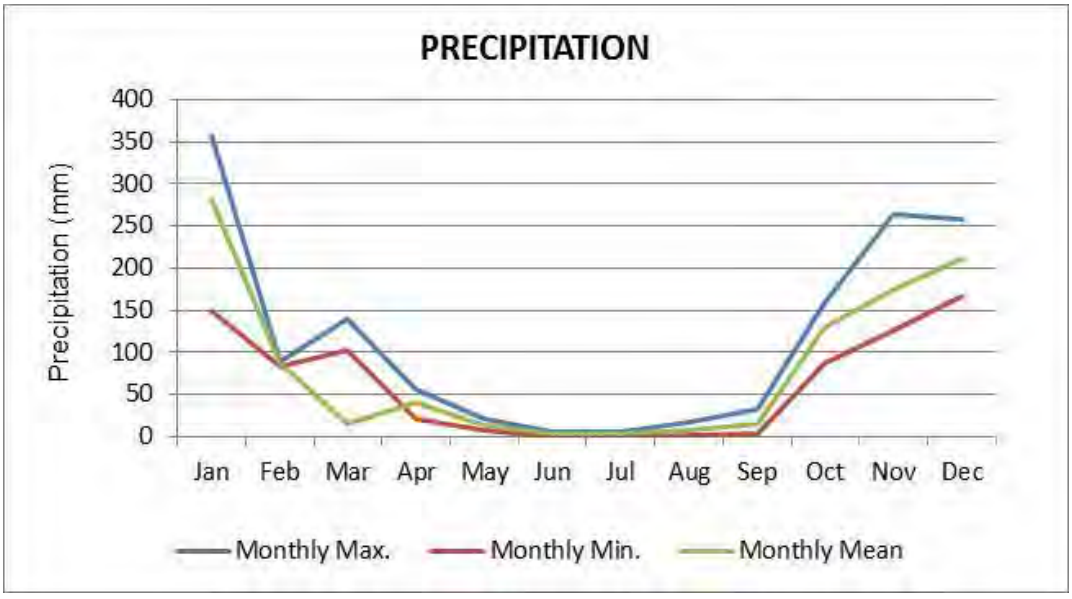


Figure 2-9: Average Monthly Precipitation derived from the Ermelo Modelled Data (2008-2010)

As shown in Table 2-2, the three year annual maximum, minimum and mean monthly precipitation rates for the Consbrey site are 117 mm, 63 mm and 82 mm, respectively.

Table 2-2: Average Monthly Precipitation derived from the Ermelo Modelled Data (2008-2010)

Precipitation (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Max.	358	90	140	56	22	5	5	18	32	160	264	258	117
Monthly Min.	149	84	102	21	8	0	0	2	4	88	127	166	63
Monthly Mean	282	88	15	40	14	3	3	8	16	130	175	212	82

2.6.1.5. Evaporation

The Carolina Weather Station is the only station with evaporation data in the surrounding area. Mean monthly S-pan evaporation data shows that the evaporation exceeds precipitation. Owing to the similar altitudes of Carolina and Consbrey project area (1703 mamsl and between 1610 m and 1825 m with an average of 1717 mamsl, respectively), it is believed that the evaporation figures for the proposed mine should be similar to those of the Carolina Weather Station.

As depicted in Figure 2-10, the monthly minimum evaporation ranges between 136 mm in December and 52 mm in April.

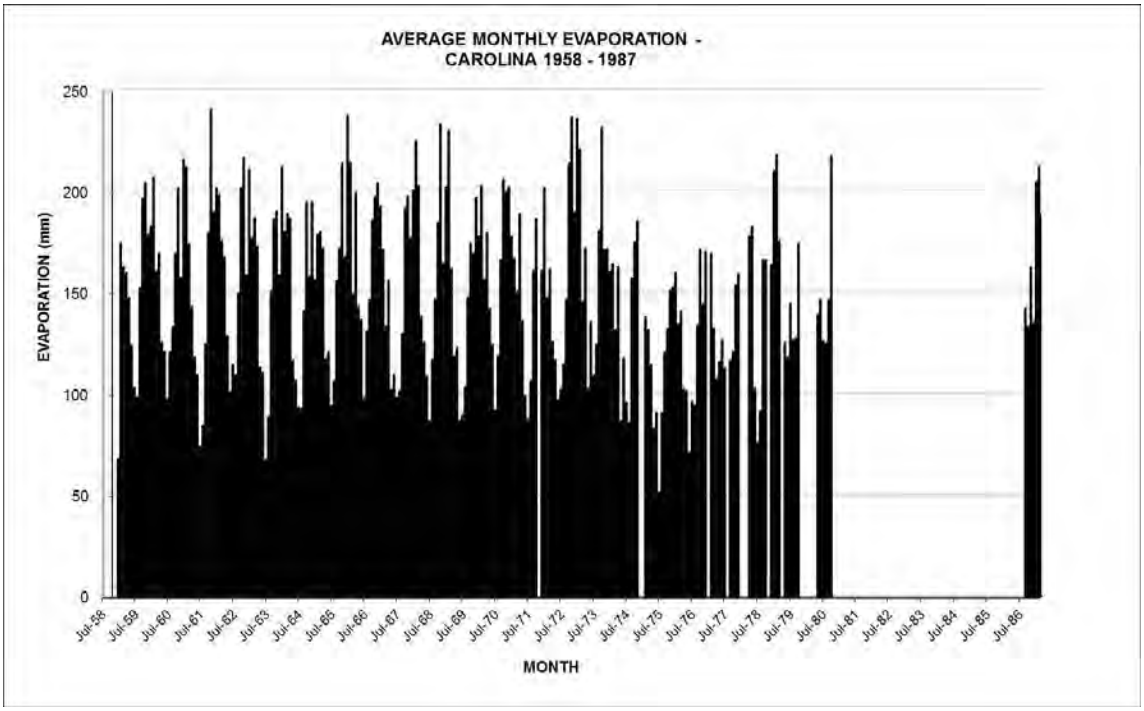


Figure 2-10: Average Monthly Evaporation for Carolina S-Pan Evaporation Station (1958 – 1987) (Source: South African Weather Service)

As shown in Table 2-3, the annual maximum, minimum and mean monthly evaporation rates for the Carolina area for the period 1958 - 1987 are 195 mm, 104 mm and 152 mm, respectively. The highest monthly maximum evaporation (195 mm) occurs for December. The rate decreases significantly down to 96 mm in June.

Table 2-3: Maximum, Minimum and Mean Monthly Evaporation Rates for the Carolina Area Evaporation Station for 1958 - 1987 Period (South African Weather Service)

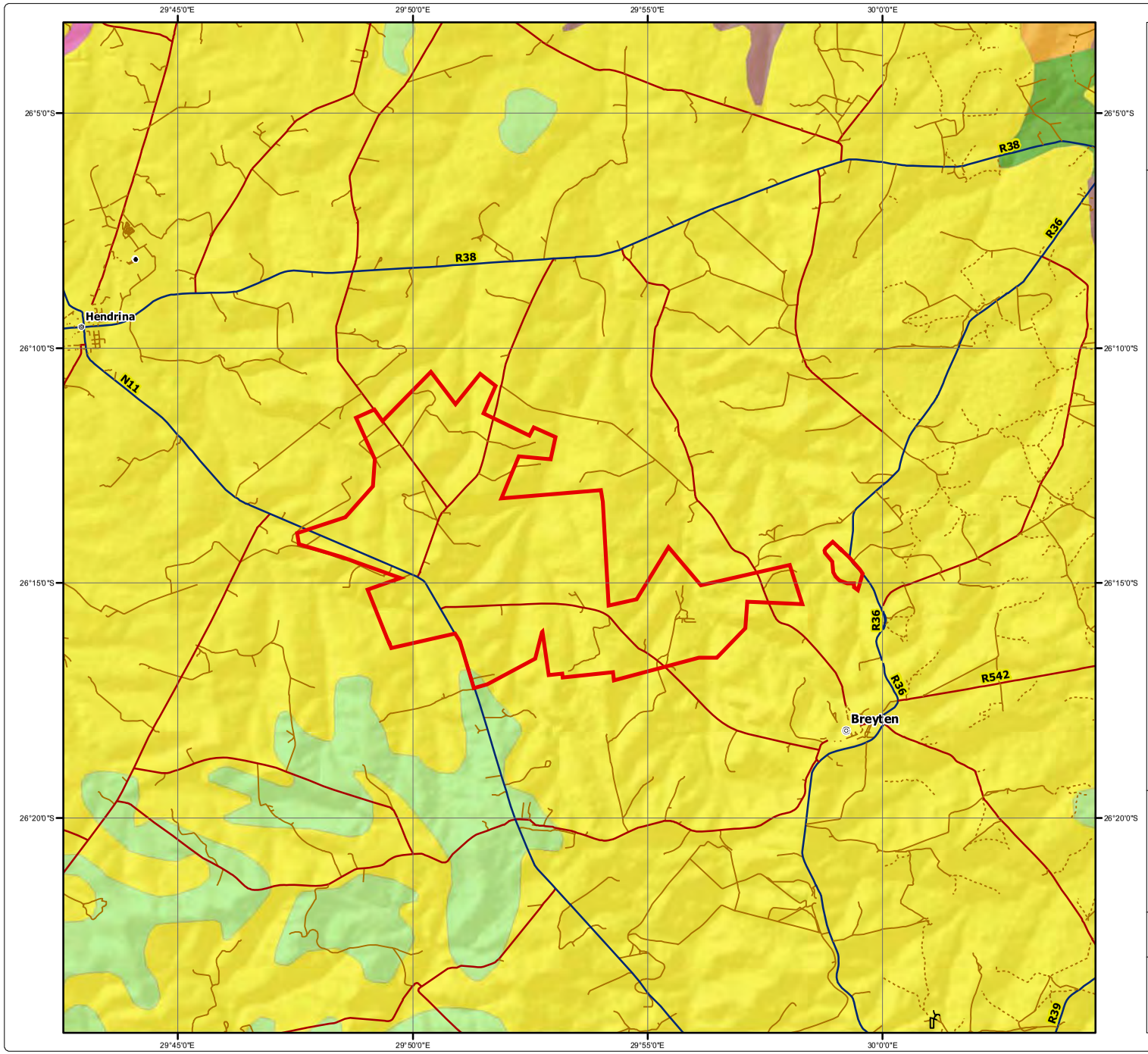
Evap. (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Monthly Max.	230.2	203.1	199.6	182.9	146.8	145	131.3	181	231.8	241	204.2	237.7	194.6
Monthly Min.	134.6	131.7	102.7	83.2	71.4	51.8	84.8	116.6	120.8	144.4	135.6	68.1	103.8
Monthly Mean	188	160.5	155.1	122.8	113	95.5	106.6	144.5	179.6	190.4	174.8	195.1	152.2

2.6.2. Geology

The stratigraphy and depositional environment at the proposed Consbrey Colliery is the same as the rest of the Ermelo coal field. Formations are near horizontal with dips of

between 1 to 2 degrees to the west. The predominant rocks are sedimentary rocks of the Ecca Group that contains the arenaceous strata of the coal-bearing Vryheid formation, which was laid down during the Carboniferous age (300 million years ago). The Ecca Group rests unconformably on tillite of the Dwyka Group, over most of the area, which in turn is underlain by pre-Karoo rocks. The tillite was deposited on a very uneven surface and is therefore not laterally persistent. The tillite is overlain on average by 90 m of shale and sandstone before the coal zone is found (DWA, 2005). The geology of the area is depicted on Plan 4 below.

Plan 4: Consbrey Colliery Regional Geology



Plan 4

Msobo Coal Consbrey Project

Regional Geology

Legend

- Consbrey Project Area
- City
- Major Town
- Secondary Town
- Other Town
- Settlement
- Arterial / National Route
- Main Road
- Other Access Road
- Street
- Track & Footpaths

Regional Geology

- Dwyka Grp, Karoo Spgrp
- Karoo Dolerite Sui
- Madzaringwe Fm, Karoo Spgrp
- Pretoria Grp, Transvaal Spgrp
- Rooiberg Grp, Transvaal Spgrp
- Silverton Fm, Pretoria Grp

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Geographic Coordinate System
Datum: WSG 1984

Ref #: anp.MSO1805.201302.060
Revision Number: 1
Date: 19/02/2013

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Kilometres
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Erosion over the millennia has removed much of the upper seams and other strata, leaving behind an undulating topography with varying depths of overburden covering the remaining coal seams. The overburden material that will be disturbed consists mainly of sandstones and sandstone/ shale laminations. The geology can be stratigraphically classified as indicated in Table 2-4(DWA, 2008).

Table 2-4: Stratigraphic Classification of the Regional Geology (DWA, 2008)

	Subgroup	Lithology	Formation
Karoo Supergroup	Upper Ecca	Sandstones	Volksrust
	Middle Ecca	Sandstones	Vryheid
		Shales	
		Coal	
	Lower Ecca	Shale	Pietermaritzburg

The Vryheid formation consists of feldspathic sandstone, shale, mudstone and coal (Wilson & Anhauesser, 1998). The formation contains five bituminous coal seams, named E, D, C, B. These coal seams are separated by mainly arenaceous sediments. The coal seams are generally flat with a regional shallow south-westerly dip. The C and B seams commonly comprise several coal horizons with shale partings; hence they have been termed seam groups. A series of shale and sandstone overlie the coal zone with the uppermost layer invariably being sandstone. Soils, weathered sandstone and ferricrete overlie this uppermost layer. The proposed project targets the C and B seams.

The C seam, which averages 1.8 m in thickness, is usually composed of a C Upper (CU), C interburden (CUCLIB) and C Lower (CL) seam, separated by a parting of variable lithological composition. Locally the CU seam may split into two recognisable leaves. It is overlain by a sandstone layer of variable thickness and in some instances a thin band of carbonaceous shale is present above the C upper seam.

The B seam group, which is also an average of 1.8 m thick in total, is generally represented by two seams, termed the B and the BL1, separated by a sandstone parting. Locally the B seam may include the thin BX seam lying above the B seam. The B seam is overlain by sandstone which in turn is overlain by a persistent shale member. Thereafter there is an alternating sequence of sandstone and shale developments. The Beaufort group sediments do not occur in this area, since they have been removed by erosion.

2.6.2.1. Structural Controls

The major coal deposits of South Africa resulted from post-glacial deposit formation. The Dwyka tillite cut elongated valleys in the softer rock and the direction of the moving ice was responsible for the shape and orientation of the coal fields today. In the Ermelo area these coal fields are elongated in a north-south direction and the lateral extent and thickness of coal deposits was controlled by the shape of the valley floors (Lurie, 1994).

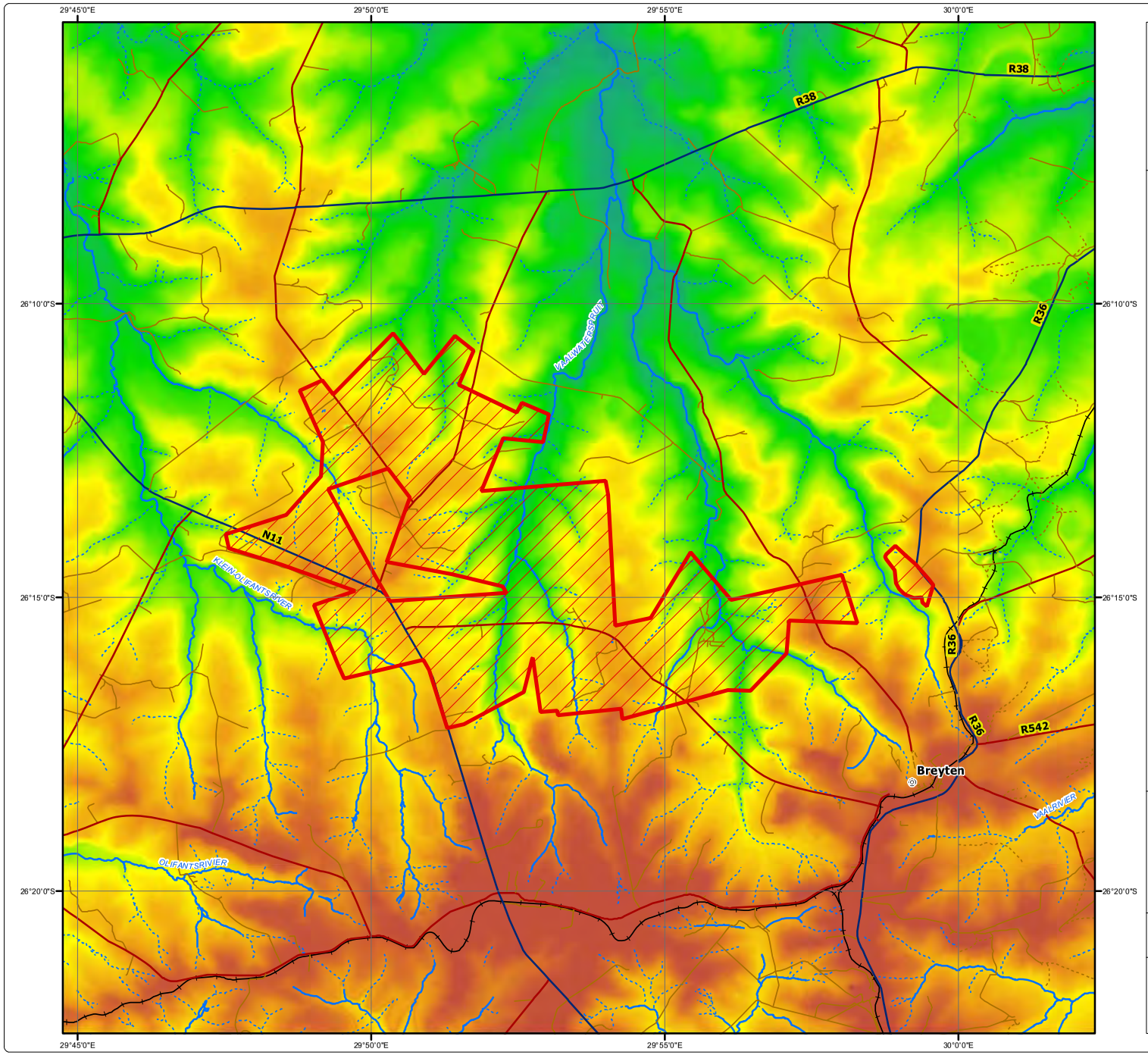
After deposition, the Ecca sediments were subjected to faulting and intrusion by dolerite sills and dykes. Some areas of Tselentis have been extensively faulted with associated dolerite intrusions along the fault planes. The numerous faults and dykes that occur can complicate mining and water pollution control (DWA, 2008).

These dykes and sills have caused coal deposits to either become *pseudo - anthracite*, where restricted burning has taken place, or to be rendered useless, where heat from the structures has destroyed the coal.

2.6.3. Topography

The gently undulating highland topography of this region is typical of central Mpumalanga province, with fairly broad to narrowly incised valleys of the headwater drainages. It is characteristic of the post-African erosion surface back-working into the African surface, which remains preserved in places on the higher lying interfluves (Partridge and Maud, 1987). The proposed project site is situated north of the intercontinental watershed between the Upper Vaal and Olifants and Inkomati Water Management Areas. The project area is drained in a northerly direction, valley side-slopes are generally gentle with gradients ranging from 1 in 20 to 1 in 100, but outcropping resistant sandstone and dolerite ridges occasionally flank the flat, marshy valley floors which have gentle downstream gradients. In contrast, the north-easterly flowing Komati head-streams display narrower valleys with steeper flank and channel gradients which indicate a more virile erosional regime. The proposed project area is undulating and includes valleys and hills which act as drainage areas for the local streams. The maximum height is about 1,800 metres above sea level (masl). The topography of the area is depicted in Plan 5 below.

Plan 5: Consbrey Topography



Plan 5

Msobo Coal Consbrey Project

Topography

Legend

- Consbrey Project Area
- Secondary Town
- Arterial / National Route
- Main Road
- Other Access Road
- Street
- Track & Footpaths
- Railway Line
- Perennial River
- Non-Perennial River

Digital Elevation Model (DEM)

m.a.m.s.l

High : 1931.92

Low : 1257.72

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Geographic Coordinate System
Datum: WSG 1984

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N

0 1 2 4 6

Kilometres

1:120 000

2.6.4. Visual

The project area and immediate surrounds is predominantly characterised by grassland areas and agricultural activities, interlaced by a number of rivers, wetlands, perennial and non-perennial pans. There are also mining activities in the immediate vicinity of the project area such the Spitzkop and Tselentis Collieries. These collieries are located approximately 5 km east of the proposed Consbrey Colliery. The general sense of place is expected to be typically that of a Highveld maize farming region, with small towns serving the farming community. However, it is expected that many of the residents in the nearby towns are employees of the coal mines in the region. Coal mining in the Breyten area commenced in the late 1800s.

The proposed Consbrey Colliery is located approximately 6.2 km northwest of Breyten, 29 km southwest of Carolina, 27 km north of Ermelo, and 12 km southeast of Hendrina. In terms of roads, the N11 national route traverses the south westerly project boundary, R542 traverses the southerly portion of the project area, the R36 briefly passes the far eastern boundary and the R38 between Hendrina and Carolina is located 4 km to the north and the. Furthermore, there are a number of main and other access roads which pass through the project area. There are also a number of houses that occur within and adjacent to the project area. Depending on discard dump and surface infrastructure heights, it is possible that the proposed Consbrey Colliery will be visible from the town of Breyten, however, it is less likely to be visible from other settlements located further away. It should be noted that there are old umps present in and around the town of Breyten. The proposed project is likely to be seen by motorists travelling along the N11, R36 and main and secondary roads within the project area. Houses within and directly adjacent to the project area are likely to be visually affected by the proposed development.

Chrissiesmeer is a biodiversity sensitive area and is located approximately 30 km towards the east of the proposed project area. This area is known as a place of lakes and legends, and is further known to be culturally significant.

2.6.5. Soil

A detailed soil survey in the vicinity of the project areas showed that the following catenary sequences of soils occurred (Loxton, Hunting and Associates, 1981). The land types are depicted in Plan 6 below.

2.6.5.1. 2.6.5.1. Upland Soils

Wide hill crests and upper slopes tend to be occupied by shallow Klipfontein series soils which consist of very shallow topsoil underlain by hard ferricrete. Occasionally and associated only with dolerite dykes, deep, friable, free draining, red soils of the Hutton Form occur. Where the dolerite influence is strong, the clay content tends to be above 35% and the Doveton series is dominant. Where the influence of dolerite drops, so too does the clay content and soils of the Msinga soil series (rarely the Hutton series) dominate.

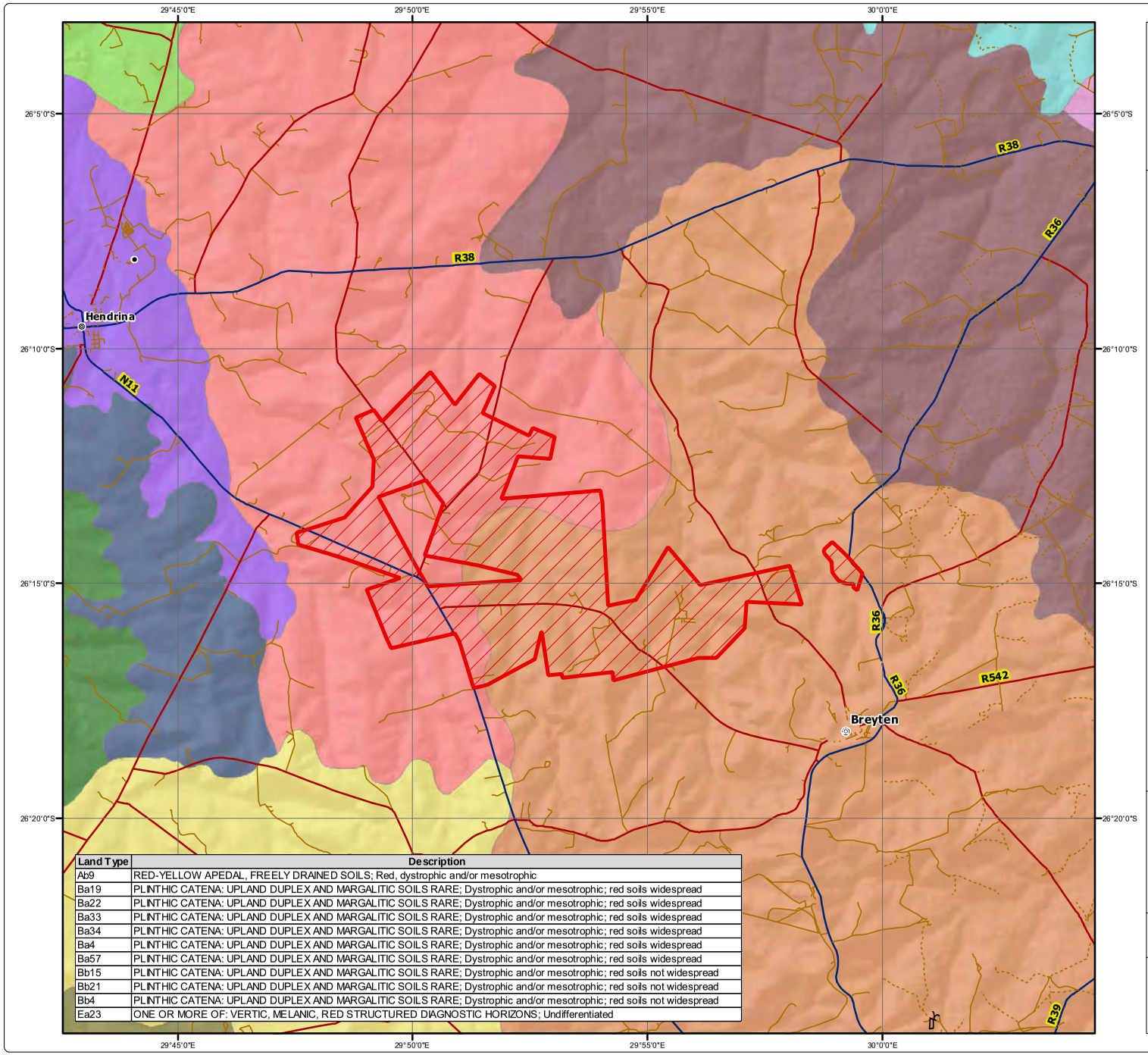
2.6.5.2. 2.6.5.2. Midslope Soils

The upper to lower middle slope positions are occupied by yellow brown, apedal, moderately to highly leached, medium textured soils of the Clovelly Form. Clay content is commonly between 15 and 25% which means that most of the soils belong to the Southwold and Oatsdale soils series with the Oatsdale series being the most leached. Occasionally, where drainage is somewhat restricted on these midslope positions, soils of the Avalon series occur (yellow brown, medium textured, and mesotrophic subsoil over soft plinthite). In the lower part of the midslope, where iron and manganese oxides have accumulated to form an indurated zone of hard ferricrete, soils of the Glencoe series are found (yellow brown, medium textured, mesotrophic, moderately deep to shallow subsoil over ferricrete or hard Ecca sediments).

2.6.5.3. 2.6.5.3. Soils of pans, depressions, drainage lines and seepage areas

A significant portion of this landscape consists of soils which, owing to their position in the landscape, are seasonally or permanently wet. They commonly possess pale-coloured, leached, upper horizons which overlie gleyed, mottled or indurated subsoil horizons. The soil pattern is quite complicated due to these soils being formed as a result of alluvial, eluvial or illuvial processes or a combination of these. Where the leached upper horizons overlie mottled subsoil, they belong to the Longlands Form. Occasionally, (e.g. around pan fringes) the leached horizon is very thick (Fernwood Form soils) or absent altogether with the topsoil directly overlying gleyed clay (Katspruit Form).

Plan 6: Consbrey Land Types



Land Type	Description
Ab9	RED-YELLOW APEDAL, FREELY DRAINED SOILS; Red, dystrophic and/or mesotrophic
Ba19	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
Ba22	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
Ba33	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
Ba34	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
Ba4	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
Ba57	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils widespread
Bb15	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils not widespread
Bb21	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils not widespread
Bb4	PLINTHIC CATENA: UPLAND DUPLEX AND MARGALITIC SOILS RARE; Dystrophic and/or mesotrophic; red soils not widespread
Ea23	ONE OR MORE OF: VERTIC, MELANIC, RED STRUCTURED DIAGNOSTIC HORIZONS; Undifferentiated

Plan 6

Msobo Coal Consbrey Project

Land Types

Legend

- Consbrey Project Area
- City
- Major Town
- Secondary Town
- Other Town
- Settlement
- Arterial / National Route
- Main Road
- Other Access Road
- Street
- Track & Footpaths

Land Types

- Ab9
- Ba19
- Ba22
- Ba33
- Ba34
- Ba4
- Ba57
- Bb15
- Bb21
- Bb4
- Ea23

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N

0 1.5 3 6 9

Kilometres

1:150 000

2.6.6. Land Capability

Land capability is classified as arable. Hydromorphic soils dominate the proposed open pit area. These soils are classified as Kroonstad and Fernwood soils which have special cultivation needs due to the moderately sloping landscape, sandy and imperfectly drained nature of many soils. The sandy nature causes natural soil fertility to be low while soil pH tends to be acidic.

Agricultural potential on hydromorphic soil is determined by wet or dry average seasonal conditions. Agricultural potential is high when dry seasons prevail and low when wet seasons prevail due to the imperfect internal drainage of hydromorphic soils.

2.6.7. Land Use

The current land use is agriculture, specifically grazing. There is clear evidence that some areas were previously used as arable dry-land farming due to the presence of many contours on the property.

Present land use is grazing. The influence of relatively small areas of arable high potential soil on land capability is small. The influence is small because evidence exist that land use was spontaneously changed by farmers from arable to grazing. This change probably occurred because many of the soils found on the property are classified as hydromorphic and difficult to manage or shallow and unsuitable to use as arable soil.

2.6.8. Flora

The Mpumalanga C-Plan is depicted in Plan 7 below and the protected biodiversity areas are depicted on Plan 8, respectively. This means that the ecosystem has undergone degradation of ecological structure, function or composition as a result of human intervention, although it is not critically endangered. As such the fauna and flora study will be integral to the EIA/ EMP report in terms of sustainable development. The proposed Consbrey Colliery site is located about 30 km from the Chrissiesmeer Biodiversity site.

The Grassland Biome is found mainly on the high central plateau of South Africa, and the inland areas of KwaZulu Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Grasslands are dominated by a single layer of grasses and the amount of cover depends on rainfall and the degree of grazing. Trees are absent, except in a few localised habitats and geophytes are often abundant (Low & Rebelo, 1996).

According to Acocks (1988) the area of interest falls within the Pure Grassveld vegetation biome and the veld type is known as the North-eastern Sandy Highveld (type no. 57). Two variations are recognised, namely: the Near-Bankenveld Variation and the Near-Highveld Sourveld Variation. The area of interest falls within the Near-Highveld Sourveld Variation (type no. 57b) which occurs mainly on the top and eastern side of the watershed.

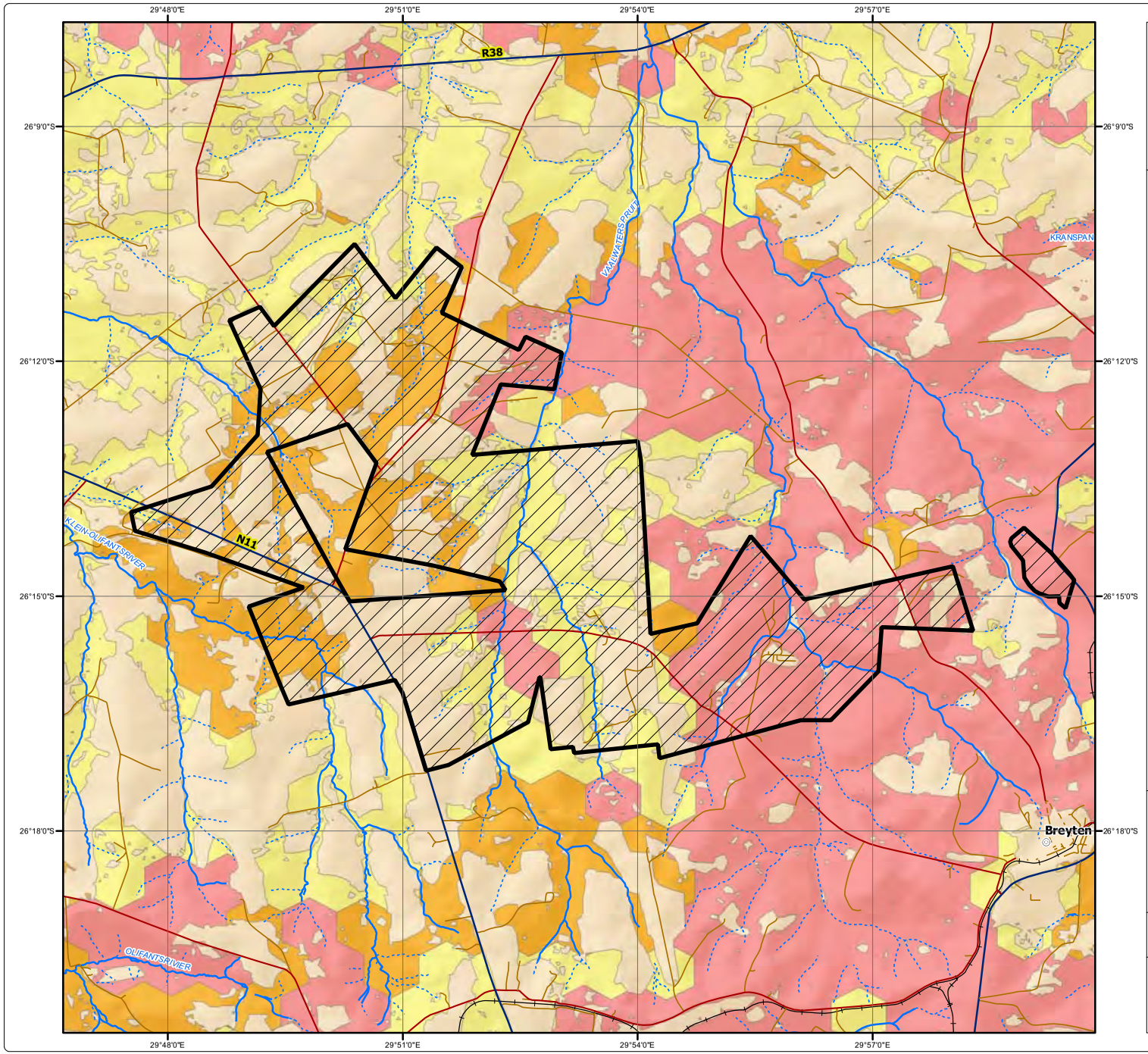
A more recent classification of the vegetation types of South Africa by Low and Rebelo (1996) calls this the "Moist Sandy Highveld Grassland" (type no. 38) and lists "North-eastern

Sandy Highveld" (A57) and "Eastern Bankenveld" (A61c) as synonyms. The Nooitgedacht Dam Nature Reserve is the only official conservation area for this veld type, but the Ermelo Game Park represents a good example of this vegetation type (Mucina and Rutherford, 2006).

The dominant grasses of this veld type are *Themeda triandra, Tristachya leucothrix*, *Digitaria tricholaenoides, Heteropogon contortus* and *Eragrostis racemosa* with *Trachypogon spicatus* and *Microchloa caffra* and others of lesser importance (Acocks, 1988) also present. However, Low and Rebelo (1996) recorded that the dominant grasses in this vegetation type are *Eragrostis plana, E. curvula, Heteropogon contortus, Trachypogon spicatus* and *Themeda triandra*. This difference may be indicative of a considerable change in species composition and community structure of these grasslands as a result of past and present land uses.

The grassland on the higher lying, rocky areas with shallow soils is dominated by *Tristachya leucothrix* (hairy trident grass) and *Themeda triandra* (rooigras); these grasslands also include fairly high proportions of *Loudetia simplex* (russet grass) and *Microchloa caffra* (pincushion grass).

Plan 7: Consbrey Mpumalanga C-Plan



Plan 7

Msobo Coal Consbrey Project

Mpumalanga C-Plan

Legend

- Consbrey Project Area
- Secondary Town
- Arterial / National Route
- Main Road
- Other Access Road
- Railway Line
- Perennial River
- Non-Perennial River

Mpumalanga C-Plan

- Highly Significant
- Important & Necessary
- Least Concern
- No Natural Habitat Remaining

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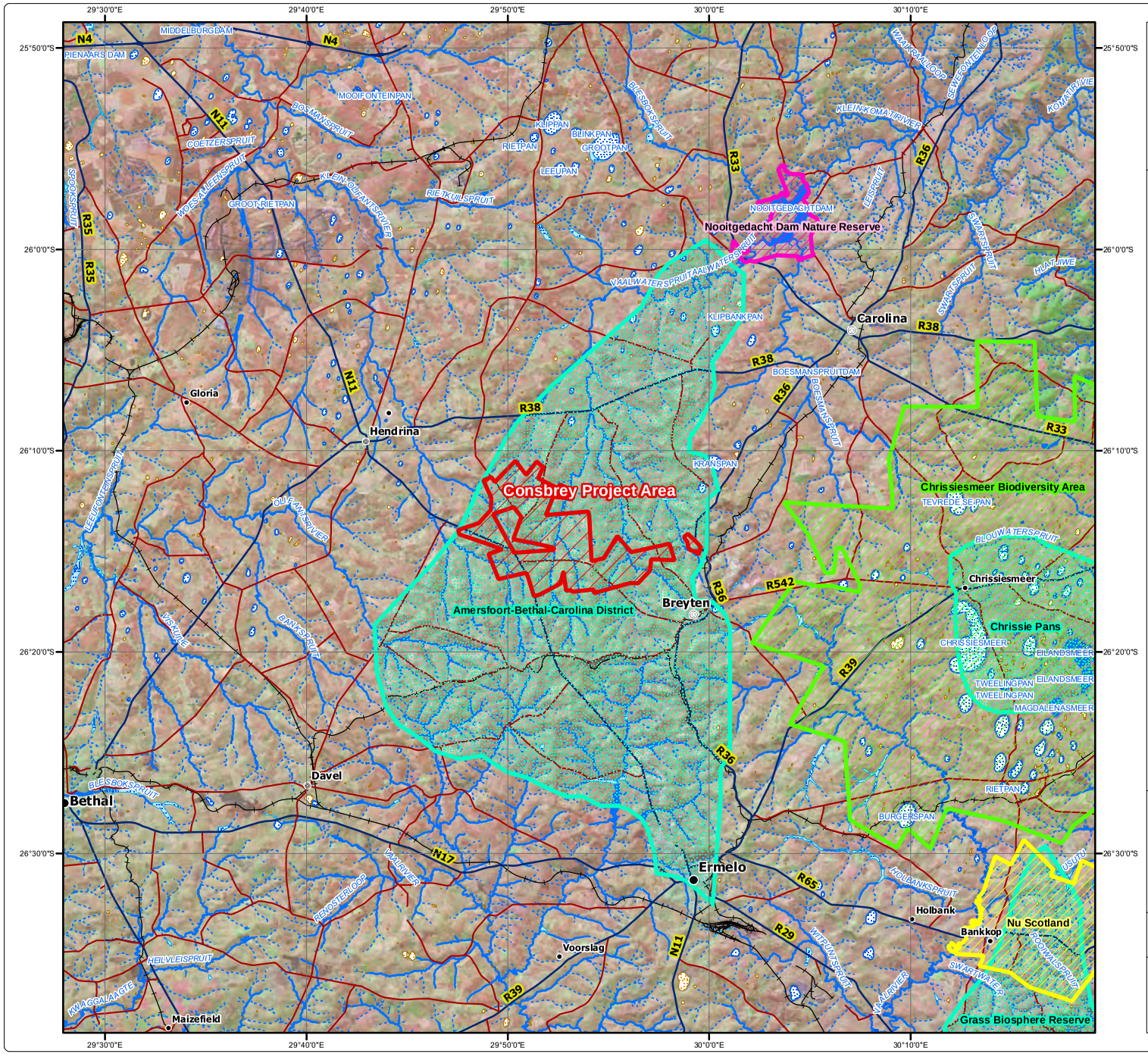
N

0 0.5 1 2 3 4

Kilometres

1:90 000

Plan 8: Consbrey Biodiversity Areas



Plan 8

Msobo Coal Consbrey Project

Biodiversity Areas

Legend

- Consbrey Project Area
- Protected Areas
- Conservancies
- Chrissiesmeer Biodiversity Area
- Important Birding Areas
- Major Town
- Secondary Town
- Other Town
- Settlement
- Arterial / National Route
- Main Road
- Railway Line
- Perennial River
- Non-Perennial River
- Dam
- Wetland
- Perennial Pan
- Non-Perennial Pan

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N

0 2.5 5 10 15 20

Kilometres

1:350 000