Palaeontological Impact Assessment for the proposed Mining Rights application on Dunbar 189, west of Hendrina, Mpumalanga Province

Site Visit/Phase 2 Study

For

Heritage Contracts and Archaeological Consulting (HCAC)

17 August 2019

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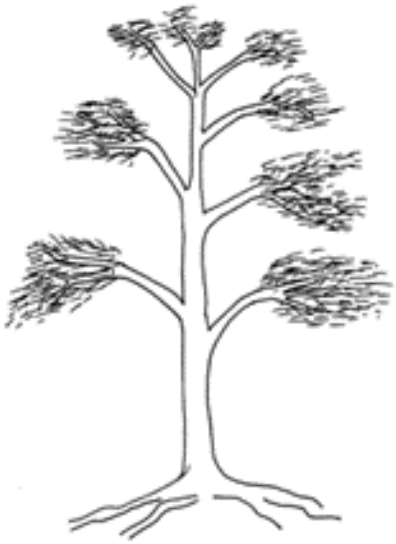

Expertise of Specialist

The Palaeontologist Consultant is: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, ASSAf
Experience: 30 years research; 22 years PIA studies

Declaration of Independence

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Heritage Contracts and Archaeological Consulting, Modimolle, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the Project.

Specialist: Prof Marion Bamford

Signature: 

EXECUTIVE SUMMARY

A palaeontological Impact Assessment was requested for the proposed mining Rights Applications for farm Dunbar 189, south of Meerlus and west of Hendrina, Mpumalanga Province. A site visit was conducted on 5-7 August and is presented here.

To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a site visit (phase 2) Palaeontological Impact Assessment (PIA) was completed for the proposed application.

The proposed site lies on the shales, mudstones, sandstones and coals of the Vryheid Formation, lower Ecca Group, Karoo Supergroup. No fossils and no shales were observed throughout the site, only deep soils, ploughed fields and fallow fields. Around Hendrina the uppermost coal seam is about 18m below the surface and is overlain by sandstone, mudstone/siltstone and 14m of modern soils so until excavations and mining commence it is unlikely that any fossils would be observed. Since fossils plants of the *Glossopteris* flora will be associated with the shales close to the coal seams a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological site visits are required until fossils are found by the geologist or responsible person.

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1. BACKGROUND

A Phase 2 (or site visit) Palaeontological Impact Assessment was requested for the proposed Mining Rights Application for the Farm Dunbar 189, approximately 15-20 km west of Hendrina and 2km south of Meerlus, Mpumalanga Province (Figures 1, 2). This site lies in the Witbank coalfield where there are numerous active coal mines, and is indicated as very highly sensitive on the SAHRIS Palaeosensitivity map (Figure 3).

To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a site visit was made on 5-7 August 2019, and the results are reported herein.

Table 1. Specialist Report Requirements in terms of Appendix 6 of the EIA Regulations (2017)

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
ai	Details of the specialists who prepared the report	Appendix B
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Appendix B
b	A declaration that the person is independent in a form as may be specified by the competent authority	Page 1
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 1
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 5
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 4
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 4
k	Any mitigation measures for inclusion in the EMPr	Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	N/A
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	N/A
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies if any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A

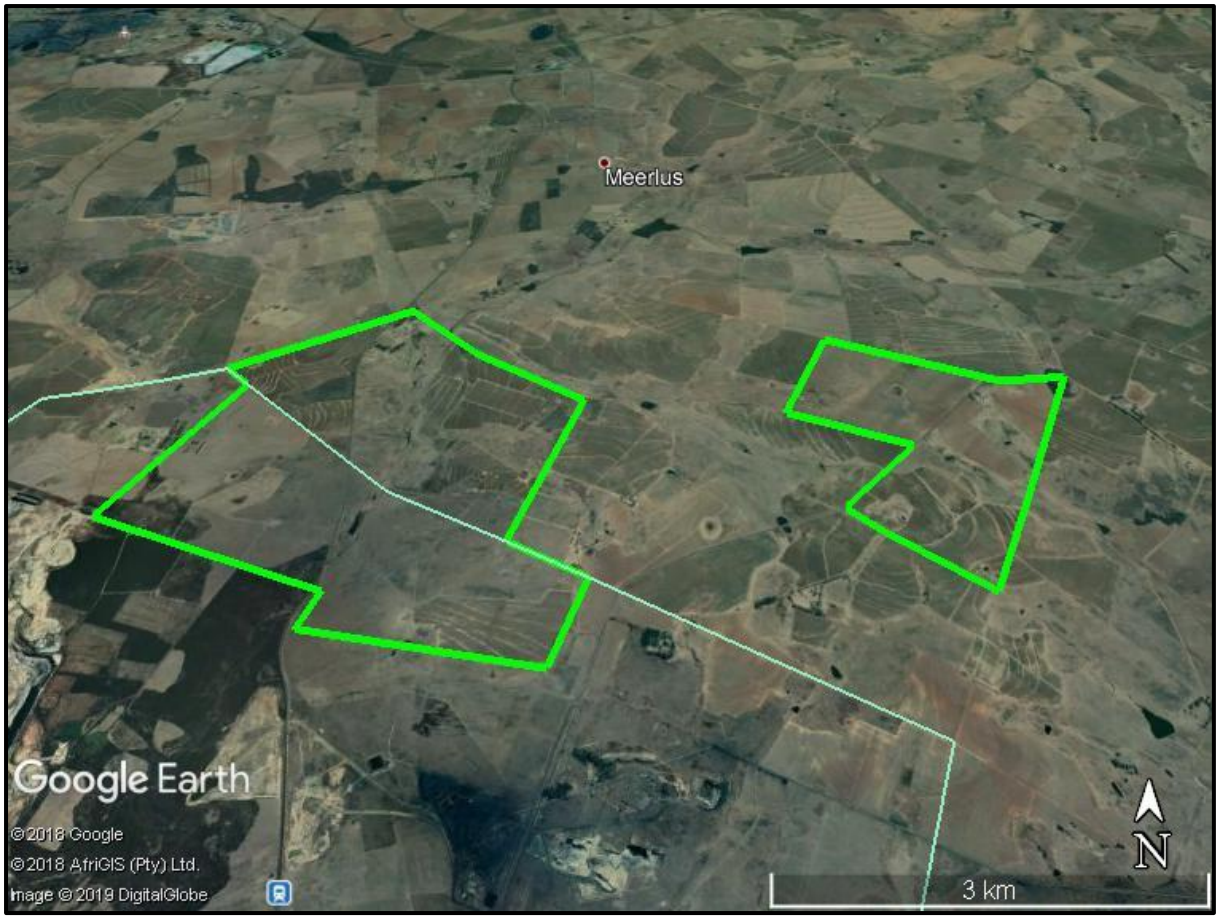

Figure 1. Google earth map of the proposed mining rights application areas on farm Dunbar 189, Mpumalanga Province, with the sections shown by the green outlines. Map supplied by HCAC.

2. METHODS AND TERMS OF REFERENCE

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.
The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases;
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*not applicable to this assessment*);
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representivity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

3. GEOLOGY AND PALAEONTOLOGY

i. Project location and geological context

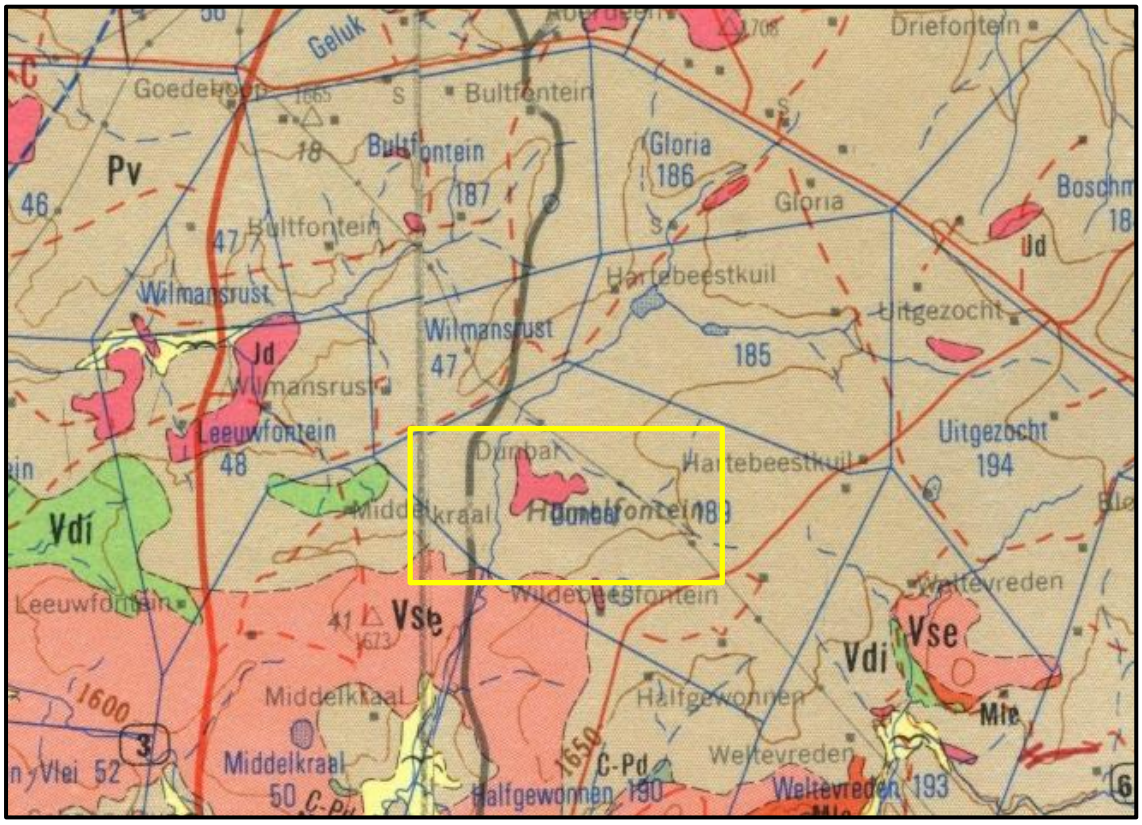

Figure 2. Geological map of the area around the farm Dunbar 189, west of Hendrina. The location of the proposed project is indicated within the yellow rectangle. Abbreviations of the rock types are explained in Table 2. Map enlarged from the geological survey 1: 250 000 map 2628 East Rand.

Table 2. Explanation Of Symbols For The Geological Map And Approximate Ages (Buchanan, 2006. Johnson Et Al.). Sg = Supergroup; Fm = Formation; Ma = Million Years; Grey Shading = Formations Impacted By The Project.

Symbol	Group/Formation	Lithology	Approximate Age
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, approx. 180 Ma
Pv	Vryheid Fm, Ecca Group, Karoo SG	Shales, sandstone, coal	Early Permian, Middle Ecca
Vdi	Diabase		
Vse	Selons River Fm, Rooiberg Group, Transvaal SG	Porphyritic rhyolite with interbedded mudstone and sandstone	Ca 2061-2052 Ma

The site, Farm Dunbar 189, lies in the heart of the Witbank coalfield that is in the north eastern part of the Main Karoo Basin. Mudstones, siltstones, sandstones and coal seams have filled in the uneven topography of the basin during the Permian and Triassic periods. Jurassic dolerite dykes have cut through these sediments, mostly to the south and west of this area, and are associated with the Drakensberg basalt outpourings. To the south of the site are several small exposures of the much older Selons River Formation that are part of the Rooiberg Group, Transvaal Supergroup. These porphyritic rhyolites (volcanic rocks) are now called the Kwaggasnek and Schrikkloof Formations (Rooiberg Group; Buchanan, 2006) and are dated between 2061 to 2052 Ma. Since they are ancient rocks and of volcanic origin so do not preserve fossils of any kind, they will not be considered further.

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 3. The site for mining is in the Vryheid Formation and it contains up to six coal seams. Although coal is formed from the extreme compression and heat alteration of peats and peats are formed from buried accumulations of plant material growing in swampy environments, coal itself does not contain any recognisable fossil plant material. The shales and mudstones associated with the coals, however, are likely to preserve impressions of plants from the *Glossopteris* flora, for example *Glossopteris* leaves, reproductive structures, lycopods, sphenophytes, ferns, cordaitaleans and early gymnosperms. A few terrestrial vertebrates had evolved by the early Permian but bones are very seldom preserved together with fossil plants because they require different conditions for preservation. No fossils vertebrates are likely to occur in the Vryheid Formation.

Geotechnical cores have been drilled throughout the coalfields and for the Hendrina area the uppermost coal seam is about 18m below the surface soils. The soils are 10-14m deep and they overlie shales and mudstones that overlie the coal (Snyman, 1998). Fossils will not occur in the soils or coal but can occur in the shales and mudstones.

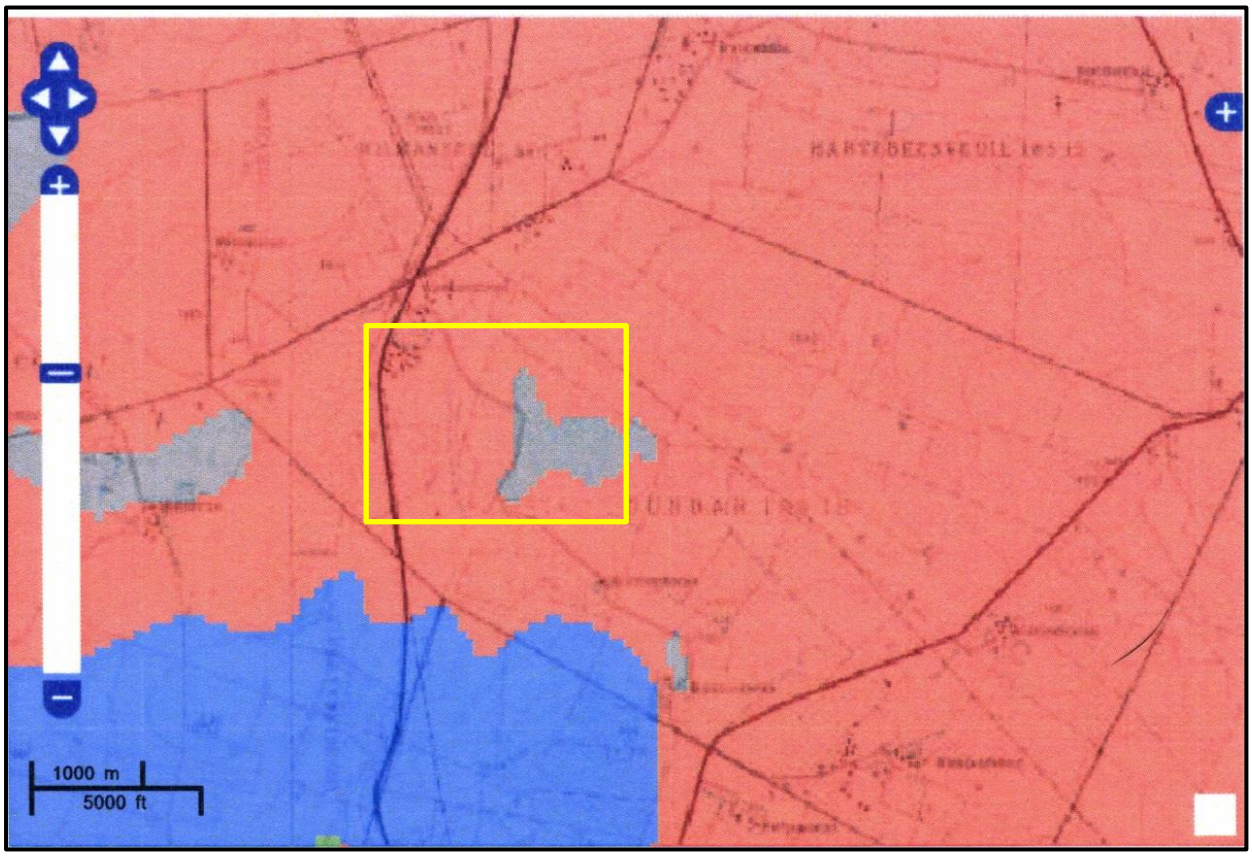

Figure 3. SAHRIS Palaeo sensitivity map for the site for the proposed coal mine on Farm Dunbar 189 shown within the yellow rectangle. Background colours indicate the following degrees of sensitivity: Red = Very Highly Sensitive; Orange/Yellow = High; Green = Moderate; Blue = Low; Grey = Insignificant/Zero.

From the SAHRIS map above the area is indicated as very highly sensitive (red) so a site visit was conducted and the observations are shown below (Table 3; Figures 4-11).

iii. Observations from site visit

Table 3: Observations at each site with GPS Coordinates and corresponding photograph taken at or near the point by Rick Tolchard, 5-7 August 2019.

Location	Observations	Figure
Point 1 S26°10.144' E29°30.847' 1387m	Abandoned field, deep soils and no rocks or shales exposed	4
Point 2 S26°10.272' E29°30.833' 1619m	Depression with some water and showing the deep, dark soils in the abandoned/fallow fields. No rocks or shales exposed	5
Point 3 - S26°11.015' E29°31.530' 1648m	Old farmhouse in the distance; deep soils and no rocks or shales exposed	6
Point 4 - S26°11.071' E29°31.538' 1657m	Example of the rare rocks with leaves and cobs of the maize crop; no fossils	7
Point 5 - S26°11.134' E29°31.322' 1639m	Rare rock, no fossils	8
Point 6 S26°10.948' E29°31.105' 1632m	Grasses on deep soils; no rocks or fossils	No photo
Point 7 - S26°10.702' E29°30.900' 1631m	Lateritic rock visible from fence, not in the farm area	9
Point 8 S26°10.053' E29°31.210' 1628m	Abandoned/fallow field; deep soils and no rocks or fossils	10
Point 9 S26°10.562' E29°31.679' 1641m	Recently ploughed field showing deep dark soils	11

Figure 4. Point 1 of site visit – Abandoned field and no rocks or shales visible.

Figure 5. Point 2 – depression with water showing deep soils.

Figure 6. Point 3 – Old farmhouse in the distance; abandoned or fallow field on deep soils

Figure 7. Point 4 – Only rock in the area.

Figure 8. Point 5 - sandstone with no fossil impressions.

Figure 9. Point 7 - lateritic rock seen on the other side of the fence; no fossils.

Figure 10. Point 8 – abandoned or fallow field on deep soil; no rocks or shales or fossils.

Figure 11. Point 9 – ploughed field showing deep soil; no rocks or fossils.

4. IMPACT ASSESSMENT

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in 4:

Table 4. Criteria for assessing impacts (A) and Impact assessment (B)

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	**L**	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	**H**	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Impact Assessment

PART B: ASSESSMENT		
SEVERITY/NATURE	H	-
	M	-
	L	Fossils of the *Glossopteris* flora are expected in the Vryheid Fm but none was observed in the widespread covering of modern soils. The impact would be very unlikely in the soils. Fossils may occur 10+ m below
	L+	-
	M+	-
	H+	-
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since only the possible fossils within the area would be fossil plants from the *Glossopteris* flora in the shales, 10+m below the surface soils, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	It is extremely unlikely that any fossils would be found in the soils but could be in the shales and mudstones associated with the coal seams. Therefore, a fossil chance find protocol should be added to the eventual EMPr.
	L	-

Based on the nature of the deep soils overlying the coal reserves, there are no fossils visible in the surface because they do not occur in the soils. Fossil plant impressions are likely to occur in the shales and mudstones associated with the coal seams BUT their occurrence is sporadic and unpredictable. Only once excavations and mining activities commence would there be a chance of finding fossils. Since there is a chance that fossils from the Vryheid Formation may be disturbed once excavations and mining commence, a Fossil Chance Find Protocol has been added to this report (Section 8; Appendix A). Taking account of the defined criteria, the potential impact to fossil heritage resources is low to moderate.

5. ASSUMPTIONS AND UNCERTAINTIES

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and do contain fossil plant, insect, invertebrate and vertebrate material. The soils do not preserve fossils, however they may be fossil plant impressions 10 or metre below the surface and this will only be revealed, if present at all, once excavations and mining commence.

6. RECOMMENDATION

Based on survey and observations during the site visit, it is clear that there are no fossils present in the soils. There is very small chance that fossils may occur in the shales and mudstones associated with the coal seams. In this area the soils are about 10-14m deep so the ria chance that fossils occur below this depth. Their occurrence in the Vryheid Formation (Ecca Group) is sporadic and unpredictable. A Fossil Find Protocol should be added to the EMPr: if fossils are found once mining has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

7. REFERENCES

Anderson, J.M., Anderson, H.M., 1985. Palaeoflora of Southern Africa: Prodromus of South African megafloras, Devonian to Lower Cretaceous. A.A. Balkema, Rotterdam. 423 pp.

Buchanan, B.C., 2006. The Rooiberg Group. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 283 – 289.

Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., Brandl, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.

Plumstead, E.P., 1969. Three thousand million years of plant life in Africa. Geological Society of southern Africa, Annexure to Volume LXXII. 72pp + 25 plates.

Snyman, C.P., 1998. Coal. In: Wilson, M.G.C., and Anhaeusser, C.P., (Eds), The Mineral Resources of South Africa: Handbook, Council for Geosciences 16, 136-205.

8. CHANCE FIND PROTOCOL

Monitoring Programme for Palaeontology – to commence once the excavations and mining activities begin.

1. The following procedure is only required if fossils are seen on the surface or below the surface when excavations/mining commence.
2. When excavations begin the rocks and must be given a cursory inspection by the geologist on site, environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the mining activities will not be interrupted.
3. Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones (for examples see Figure 12). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered then the site inspections by the palaeontologist will not be necessary.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

Appendix A – Lists of possible fossils and photographs

Plant group – Vryheid Fm	Genus and Species
Sphenophytes (horsetails)	*Sphenophyllum speciosum*
	Raniganjia kilburnensis
	Phyllotheca australis
	Phyllotheca lawleyensis
	Phyllotheca wetensis
	Schizoneura gondwanensis
Ferns	*Sphenopteris lobifolia*
Glossopterids	*Plumsteadia natalensis*
	Plumsteadia gibbosa
	Estcourtia vandijksii
	Estcourtia bergvillensis
	Rigbya arberioides
	Lidgettonia africana
	Lidgettonia mooiriverensis
	Lidgettonia inhluzanensis
	Lidgettonia lidgettonioides
	Lidgettonia elegans
	Glossopteris symmetrifolia
	Glossopteris loskopensis
	Ottokariaceae
	Lidgettoniaceae
Incertae sedis	*Noeggerathiopsis hislopi*
	Pagiophyllum vandijkii
	Taeniopteris estcourtiana
	Benlightfootia mooiensis

Figure 12. Selection of fossil plant impressions of the *Glossopteris* flora.

Appendix B – Details of specialist

Curriculum vitae (short) - Marion Bamford PhD
June 2019

I) Personal details

Surname	:	**Bamford**
First names	:	**Marion Kathleen**
Present employment	:	Professor; Director of the Evolutionary Studies Institute. Member Management Committee of the NRF/DST Centre of Excellence Palaeosciences, University of the Witwatersrand, Johannesburg, South Africa-
Telephone	:	+27 11 717 6690
Fax	:	+27 11 717 6694
Cell	:	082 555 6937
E-mail	:	marion.bamford@wits.ac.za ; marionbamford12@gmail.com

ii) Academic qualifications

Tertiary Education: All at the University of the Witwatersrand:
1980-1982: BSc, majors in Botany and Microbiology. Graduated April 1983.
1983: BSc Honours, Botany and Palaeobotany. Graduated April 1984.
1984-1986: MSc in Palaeobotany. Graduated with Distinction, November 1986.
1986-1989: PhD in Palaeobotany. Graduated in June 1990.

iii) Professional qualifications

Wood Anatomy Training (overseas as nothing was available in South Africa):
1994 - Service d'Anatomie des Bois, Musée Royal de l'Afrique Centrale, Tervuren, Belgium, by Roger Dechamps
1997 - Université Pierre et Marie Curie, Paris, France, by Dr Jean-Claude Koeniguer
1997 - Université Claude Bernard, Lyon, France by Prof Georges Barale, Dr Jean-Pierre Gros, and Dr Marc Philippe

iv) Membership of professional bodies/associations

Palaeontological Society of Southern Africa
Royal Society of Southern Africa - Fellow: 2006 onwards
Academy of Sciences of South Africa - Member: Oct 2014 onwards
International Association of Wood Anatomists - First enrolled: January 1991
International Organization of Palaeobotany – 1993+

Botanical Society of South Africa
South African Committee on Stratigraphy – Biostratigraphy - 1997 - 2016
SASQUA (South African Society for Quaternary Research) – 1997+
PAGES - 2008 –onwards: South African representative
ROCEEH / WAVE – 2008+
INQUA – PALCOMM – 2011+onwards

vii) Supervision of Higher Degrees

All at Wits University

Degree	Graduated/completed	Current
Honours	6	1
Masters	8	1
PhD	10	3
Postdoctoral fellows	9	3

viii) Undergraduate teaching
Geology II – Palaeobotany GEOL2008 – average 65 students per year
Biology III – Palaeobotany APES3029 – average 25 students per year
Honours – Evolution of Terrestrial Ecosystems; African Plio-Pleistocene Palaeoecology; Micropalaeontology – average 2-8 students per year.

ix) Editing and reviewing
Editor: Palaeontologia africana: 2003 to 2013; 2014 – Assistant editor
Guest Editor: Quaternary International: 2005 volume
Member of Board of Review: Review of Palaeobotany and Palynology: 2010 –
Cretaceous Research: 2014 -

Review of manuscripts for ISI-listed journals: 25 local and international journals

x) Palaeontological Impact Assessments
Selected – list not complete:

- Thukela Biosphere Conservancy 1996; 2002 for DWAF
- Vioolsdrift 2007 for Xibula Exploration
- Rietfontein 2009 for Zitholele Consulting
- Bloeddrift-Baken 2010 for TransHex
- New Kleinfontein Gold Mine 2012 for Prime Resources (Pty) Ltd.
- Thabazimbi Iron Cave 2012 for Professional Grave Solutions (Pty) Ltd
- Delmas 2013 for Jones and Wagener
- Klipfontein 2013 for Jones and Wagener
- Platinum mine 2013 for Lonmin
- Syferfontein 2014 for Digby Wells
- Canyon Springs 2014 for Prime Resources
- Kimberley Eskom 2014 for Landscape Dynamics
- Yzermyne 2014 for Digby Wells
- Matimba 2015 for Royal HaskoningDV

- Commissiekraal 2015 for SLR
- Harmony PV 2015 for Savannah Environmental
- Glencore-Tweefontein 2015 for Digby Wells
- Umkomazi 2015 for JLB Consulting
- Ixia coal 2016 for Digby Wells
- Lambda Eskom for Digby Wells
- Alexander Scoping for SLR
- Perseus-Kronos-Aries Eskom 2016 for NGT
- Mala Mala 2017 for Henwood
- Modimolle 2017 for Green Vision
- Klipoortjie and Finaalspan 2017 for Delta BEC
- Ledjadja borrow pits 2018 for Digby Wells
- Lungile poultry farm 2018 for CTS
- Olienhout Dam 2018 for JP Celliers
- Isondlo and Kwasobabili 2018 for GCS
- Kanakies Gypsum 2018 for Cabanga
- Nababeep Copper mine 2018
- Glencore-Mbali pipeline 2018 for Digby Wells
- Remhoogte PR 2019 for A&HAS
- Bospoort Agriculture 2019 for Kudzala
- Overlooked Quarry 2019 for Cabanga
- Richards Bay Powerline 2019 for NGT
- Eilandia dam 2019 for ACO

xi) Research Output

Publications by M K Bamford up to June 2019 peer-reviewed journals or scholarly books: over 130 articles published; 5 submitted/in press; 8 book chapters.
Scopus h index = 26; Google scholar h index = 30;
Conferences: numerous presentations at local and international conferences.

xii) NRF Rating

NRF Rating: B-2 (2016-2020)
NRF Rating: B-3 (2010-2015)
NRF Rating: B-3 (2005-2009)
NRF Rating: C-2 (1999-2004)

Mr Frederick Tolchard
Brief Curriculum Vitae – June 2019

Academic training
BA Archaeology – University of the Witwatersrand, graduated 2015
BSc (Honours) Palaeontology – University of the Witwatersrand, 2017 with distinction
MSc Palaeontology – University of the Witwatersrand, 2018 – 2019.

Field Experience
Honours Fieldtrip – Karoo biostratigraphy – April 2017
Research fieldwork – Elliot Formation with Prof Choiniere – April 2018, November 2018; April 2019

PIA fieldwork projects
2018 May – Williston area – SARAO project, Digby Wells
2018 September – Lichtenburg PVs – CTS Heritage
2018 November – Nomalanga farming – Digby Wells
2019 January – Thubelisha coal – Digby Wells
2019 March – Matla coal – Digby Wells
2019 March – Musina-Machado SEZ – Digby Wells
2019 June – Temo coal – Digby Wells