

**PROPOSED COAL PROSPECTING ACTIVITIES ON
PORTION 2 OF FARM ZALFLAGER 525-HU; PORTION
1 AND RE OF FARM ONGEMAAKT 301-HU AND ON
PORTIONS 2, 8 AND 13 OF FARM MADEMOISELLE
123-HU, NEAR VRYHEID, ZULULAND DISTRICT
MUNICIPALITY, KWAZULU-NATAL**

Phase 1 Heritage Impact Assessment

April 2022

Updated 30 June 2022

**FOR: Mielelani Consultancy
Khuliso V Ramulondi**

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EXECUTIVE SUMMARY

Coal Africa Mining (Pty) Ltd proposes to undertake prospecting activities for coal in Portion 2 of the Farm Zalfleger No. 525-HU; Portion 1 and RE of Farm Ongemaakt No. 301-HU and Portions 2, 8 and 13 of the Farm Mademoiselle No. 123-HU No 8548 GT within the jurisdiction of the Zululand District Municipality.

Prospecting is the search of clues that indicate that there are ore deposits beneath the surface. It is the search of coal seams to determine if they are mineable at a profit. Drilling is done using diamond-tipped, hollow drill bits which produce varying amounts of core depending on the extent of the drill program. Once core has been obtained, samples are sent to a laboratory to be 'assayed', which is essentially assessing the ore body's physical and chemical properties in the rock. Using this data, along with the records of where the assayed drill core came from, the data is re-interpreted to determine subsequent phases of follow-up drilling. If drilling continues, different drilling techniques are used to build confidence in the deposit by determining the size and grade of the 'strike' and 'dip'. This information is used to complete an 'official resource estimate'. The 'official resource estimate' will outline the categories of coal resource as well as the quantity and grade of each resource category.

The prospecting footprint is much larger than 5000m² hence the proposed prospecting triggers section 41 (1) (c)(i) and (ii) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No 5 of 2018) which lists developments or activities that require an HIA. The relevant sub-sections refer to: any development or other activity which will change the character of a site- (i) exceeding 5000 m², and (ii) involving three or more existing erven or subdivisions thereof.

The proposed site for the prospecting activities is located approximately 22km east of the town of Vryheid that falls within the jurisdiction of the Abaqulusi Local Municipality in KwaZulu-Natal.

A site inspection took place on 30 March 2022 and on 23 June 2022. Visibility was fair to good but the condition of access roads was very poor. Large sections of the farms are under eucalyptus tree plantations owned by NCT Forestry. Farm Ongemaakt is currently under a land claim. The specialist spoke to many residents of the area including the Induna of the northern section of the area proposed for prospecting.

Farm Ongemaakt was inspected first. The specialist met with Elphas Mtshali at his homestead. Several family graves were pointed out to the specialist near his homestead including the graves of his brother and grandfather which are located in a plantation of trees. He accompanied the specialist pointing out several grave sites that are listed in the main report.

He took the specialist to a homestead where Mr Mdladla showed the specialist several graves within his homestead and around the larger Ongemaakt farm. Close to Mdladla's homestead is a large game fence. The specialist was told that there were graves in the game farm. Mr Mdladla then took the specialist to the northern base of a mountain/cliff where Mr. Mdladla pointed out an area to the north east in a plantation of trees where graves are located. He then showed the specialist the site of a defunct mine where the remains of a structure and some foundations are still visible. It is unclear how old the remains are. The remains of the floor of a shop are still visible close to the defunct mine. The shop was probably linked to the mine.

The fenced off game farm that is Portion 1 of the Farm Ongemaakt was inspected and a number of heritage sites were found. These included the remains of homesteads, stone walling as well as a number of graves.

On the Farm Mademoiselle, a farmstead with several outbuildings was found near the Mqobhozi River. It appears as if labourers who work on the farm live in some of the outbuildings. The farmhouse and outbuildings do not appear to be older than 60 years. Some structures are recent additions however, the age of the main farmhouse and some of the older outbuildings would need to be assessed by a built heritage specialist if the buildings are to be altered or demolished.

The Farm Zalflager has many grave sites on it. The specialist spoke to the Induna of the area, Ernest Madide, who showed the specialist several grave sites. It appears as if there are graves associated with most of the homesteads on Zalflager. He indicated that he would be willing to advise and assist the Applicant if the proposed coal prospecting application is approved.

The fossil sensitivity map indicates that the project area is very highly sensitive for the Vryheid Formation (coal) on the western part of Farm Zalflager 525 and the north-western part of Farm Mademoiselle. It is moderately sensitive for the Dwyka Group on the western part of Ongemaakt 301 and most of Mademoiselle 123. The rest of the areas are on dolerite which does not preserve fossils. Although coal is formed from the accumulation of peat and dead plant matter the coal is so altered by temperature and pressure that no original plant material is recognisable. However, in the carbonaceous lenses associated with the coal seams, it is possible to find lenses of plant impressions. These plants belong to the *Glossopteris* flora and include leaves, lycopods, sphenophytes and ferns.

Surface activities may impact upon fossils if preserved in the development footprint. The geological structures suggest that except for the dolerite, the rocks are the correct type and age

to contain fossils. The overlying soils will not have fossils but there is a chance that fossils from the Vryheid Formation that occur below ground may be disturbed so it is recommended that a Fossil Chance Find Protocol be included in the EMP for the coal prospecting application. It was, however, assessed that the potential impact to fossil heritage resources during prospecting would be low.

On the Farm Mademoiselle a number of structures were found. They appear to be largely recently built structures but the farmhouse and one or two outbuildings may be older than 60 years and if they are to be impacted by coal prospecting activities, then it is recommended that a built heritage specialist assess the structures to determine their age. Structures older than 60 years are protected by section 37 (1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, 2018.

Many graves were found on Ongemaakt and Zalflager. Graves are protected terms of section 39 (1) of the KwaZulu-Natal Amafa and Research Institute Act, which states that graves or burial grounds older than 60 years or deemed to be of heritage significance by a heritage authority- (a) not otherwise protected by the above Act and (b) not located in a formal cemetery managed or administered by a local authority, may not be damaged, altered, exhumed, inundated, removed from its original position, or otherwise disturbed without the prior written approval of the Institute having been obtained on written application to the Institute.

The assessment of significance of the impact of prospecting on graves was assessed as having a moderate impact where the impact could influence the decision to develop in the area unless it is effectively mitigated. Mitigation measures recommended include that the graves are left *in-situ* and that they are fenced by a 15m buffer to avoid damage during coal prospecting. With these mitigation measures, the assessment of impact significance was reduced to a low impact.

The remains of homesteads, stone walling and foundations of structures were found during the site inspection. These sites are protected by section 40 (1) of the KwaZulu-Natal Amafa and Research Institute Act, 2018, which refers to the protection of archaeological sites (amongst others) and states that no person may destroy, damage, alter, write or draw upon or otherwise disturb without prior written approval of the Institute having been obtained. A buffer of 25m around these sites is recommended to avoid any destruction to the sites. The level of impact of coal prospecting activities on archaeological sites with the application of mitigation measures as recommended is a low impact.

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APPENDICES

Appendix 1: Desktop palaeontological study

I, Jean Beater, act as an independent specialist for this project and I do not have any vested interest either business, financial, personal or other, in the proposed activity other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014.

SPECIALIST DETAILS

Name	Qualification	Professional Registration
Jean Beater	MA (Heritage Studies) MSc (Environmental Management)	Member of Association of South African Professional Archaeologists (No. 349) Member of IAIAA (No. 1538)

1. INTRODUCTION

Coal Africa Mining (Pty) Ltd proposes to undertake prospecting activities for coal in Portion 02 of the Farm Zallager No. 525-HU; Portion 01 and RE of Farm Ongemaakt No. 301-HU and Portions 02, 08 and 13 of the Farm Mademoiselle No. 123-HU No 8548 GT within the jurisdiction of the Zululand District Municipality in KwaZulu-Natal (Mielelani Consultancy 2022:1).

Prospecting is the search of clues that indicate that there are ore deposits beneath the surface. It is generally the search of coal seams to determine if they are mineable at a profit. When the local geology is understood, siting for drilling can then be undertaken. Drilling is done with fairly large machinery that use diamond-tipped, hollow drill 'bits' which produce varying amounts of 'core' depending on the extent of the drill program. The details of each drill hole are recorded in detail, each meter of core is marked with the depth that it came from and which hole, if there's been multiple drilled. Once core has been obtained, samples are sent to a laboratory to be 'assayed', which is essentially assessing the ore body's physical and chemical properties in the rock. Using this data, along with the records of where the assayed drill core came from, the data is re-interpreted to determine subsequent phases of follow-up drilling. If drilling continues, different drilling techniques are used to build confidence in the deposit by determining the size and grade of the 'strike' and 'dip'. This information is used to complete an 'official resource estimate', which is a report that is required to have been compiled by a 'Qualified Person'. The 'official resource estimate' will outline the categories of coal resource (inferred, indicated, and measured) as well as the quantity and grade of each resource category. Other activities associated with the proposed prospecting include site access and drilling station establishment (Mielelani Consultancy 2022:3-4).

This Phase 1 Heritage Impact Assessment (HIA) was undertaken to establish if the proposed coal prospecting activities will impact heritage resources.

2. LEGISLATIVE REQUIREMENTS

The prospecting footprint is much larger than 5000m² hence the proposed prospecting triggers section 41 (1) (c)(i) and (ii) of the KwaZulu-Natal Amafa and Research Institute Act, 2018 (Act No 5 of 2018) which lists developments or activities that require an HIA. The relevant sub-sections refer to: any development or other activity which will change the character of a site- (i) exceeding 5000 m², and (ii) involving three or more existing erven or subdivisions thereof.

The development may also impact graves, protected structures, archaeological and palaeontological resources that are protected in terms of sections 37, 38, 39, and 40 of the KwaZulu-Natal Amafa and Research Institute Act, 2018.

In terms of section 3 of the NHRA, heritage resources are:

- (a) places, buildings, structures and equipment of cultural significance;
- (b) places to which oral traditions are attached or which are associated with living heritage;
- (c) historical settlements and townscapes;
- (d) landscapes and natural features of cultural significance;
- (e) geological sites of scientific or cultural importance;
- (f) archaeological and paleontological sites;
- (g) graves and burial grounds, including—
 - (i) ancestral graves;
 - (ii) royal graves and graves of traditional leaders;
 - (iii) graves of victims of conflict;
 - (iv) graves of individuals designated by the Minister by notice in the *Gazette*;
 - (v) historical graves and cemeteries; and
 - (vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- (h) of significance relating to the history of slavery in South Africa;
- (i) movable objects, including:
 - (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
 - (ii) objects to which oral traditions are attached or which are associated with living heritage;
 - (iii) ethnographic art and objects;
 - (iv) military objects;
 - (v) objects of decorative or fine art;
 - (vi) objects of scientific or technological interest; and
 - (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

3. LOCATION

The proposed site for the prospecting activities is located approximately 22km east of the town of Vryheid that falls within the jurisdiction of the Abaqulusi Local Municipality, Zululand District Municipality (see **Fig. 1**). A closer view of the areas proposed for coal prospecting activities that are outlined in white is shown in **Fig. 2** below.

4. TERMS OF REFERENCE

A Phase 1 HIA was undertaken in order to determine the possible existence of heritage resources that could be impacted by coal prospecting activities. In addition, provide mitigation measures to limit or avoid the impact of the proposed project on heritage resources.

Submit the HIA report to the provincial heritage resources authority, the KwaZulu-Natal Amafa and Research Institute (hereafter referred to as the Institute), for their assessment and comment.

5. METHODOLOGY AND CONSTRAINTS

A survey of literature, including other heritage impact assessment reports completed for the surrounding area, was undertaken in order to ascertain the history of the area and what type of heritage resources have or may be found in the area of development. Old aerial photographs and maps of the area were also inspected in order to see the historical land uses associated with the project area and wider area. These are obtained from the Department of Rural Development and Land Reform's National Geospatial Information website (<http://cdngiportal.co.za/cdngiportal/>).

A site inspection took place on 30 March 2022 and on 23 June 2022. Visibility was fair to good but the condition of access roads was very poor. Large sections of the farms are under mainly eucalyptus tree plantations owned by NCT Forestry. The farm Ongemaakt is currently under a land claim. The specialist spoke to several residents of the area including the Induna of the northern section of the area (Farm Zallflager) proposed for prospecting.

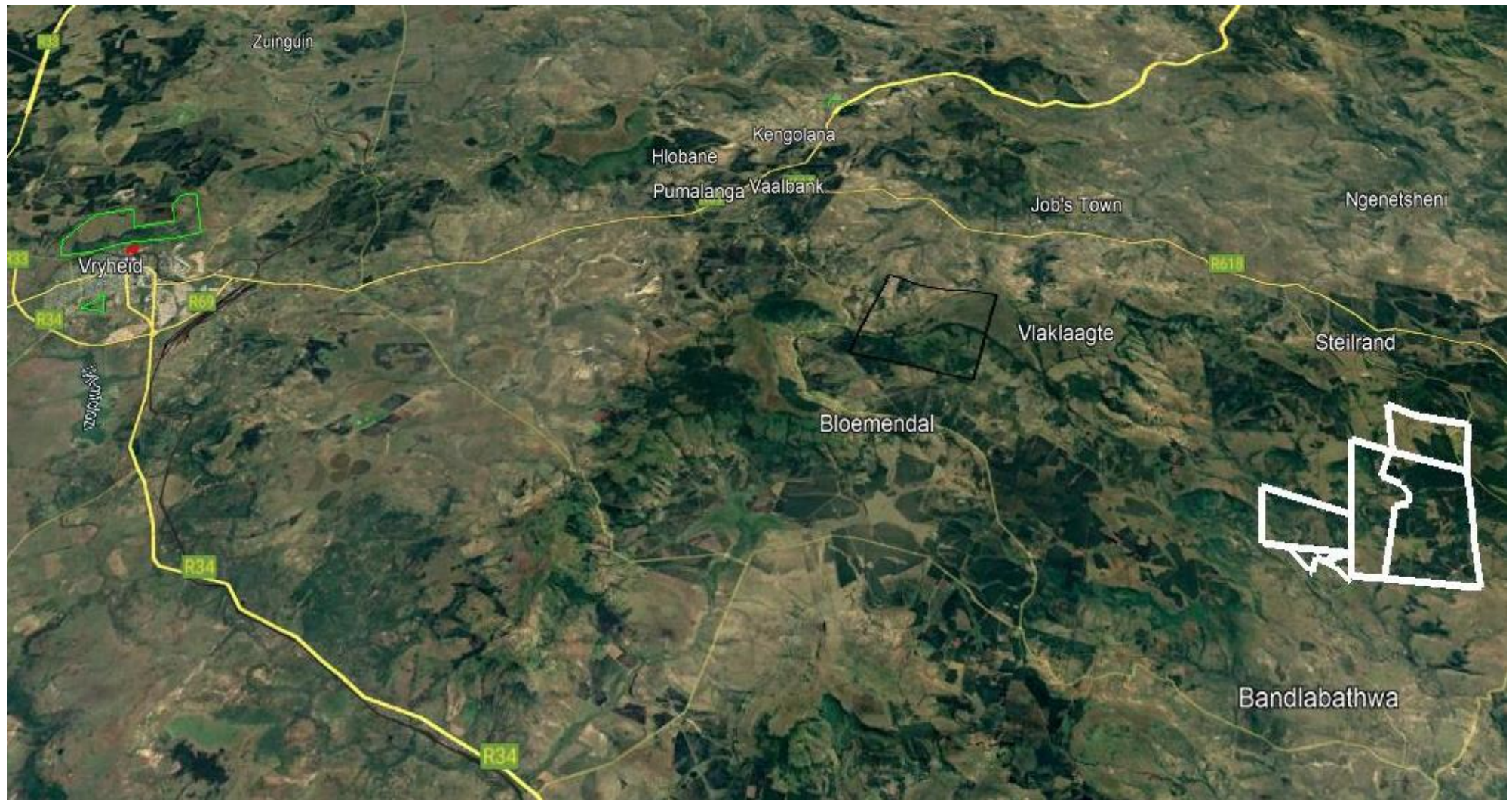


Figure 1: Coal prospecting farms outlined in white in relation to town of Vryheid



Figure 2: Closer view of coal prospecting areas

6. HISTORICAL BACKGROUND OF PROJECT & SURROUNDING AREA

According to van Schalkwyk (2020:11), not much research has been done on the prehistory (Stone Age and Iron Age) in the region. References are made to the occurrence of sites dating to all the phases of these two periods in the larger region. Significantly, Huffman (2007) in his work on the Iron Age of southern Africa do not indicate any Iron Age tradition to occur in the vicinity of the area, the closest being the Nqabeni facies and, a bit to the west, the Makgwareng facies, both belonging to the Urewe Tradition of the Late Iron Age. These sites have a date range of AD 1700 to 1820.

During the Anglo-Zulu War of 1879, the surrounding area saw action with the battle of Hlobane taking place on 28 March 1879 during which the British were defeated by the Zulu army. During the Anglo-Boer War of 1899-1902, the immediate project area saw action on Bhokwe mountain to the west of the project area. In March 1901, it was held by the Vryheid Boer commando and during the Boers' second invasion of Natal, Commandant-General Louis Botha concentrated his forces on the mountain in October 1901 and rested for there for three days before leaving on 5 October 1901 (Jones and Jones 1999:27).

Hancox and Gotz (2014:86) indicate that whilst never being the largest producers by tonnage, the coalfields of KwaZulu-Natal have historically played an important role in the coal industry of South Africa for the high quality of the coals produced. Historically the Vryheid coalfield was an important producer of high-quality coking coal and anthracite, producing the highest quality anthracite in South Africa. The coalfield has been extensively mined. The earliest recorded commercial exploitation in the Vryheid coalfield was in 1898, with coal being mined from the Hlobane and Zuinguin mountains. The railway line only reached Vryheid in 1906 and it took the creation of a branch line in 1908 to open up the development of the Hlobane coal mining sector. The expansion of the Vryheid coalfield received a boost in 1913 with the establishment of South Africa's first coke oven to the east of the town of Vryheid. In 1916 Natal Ammonium opened its anthracite mine in the Ngwibi Mountain area located roughly 15km north-west of the project area. Most of the coal mines (now defunct) are located to the west of the project including the Natal Anthracite Mine and Enyati Anthracite Mine.

The 1943 aerial image of the farm Zallflager (which is the northern section of the project area) shows a number of homesteads and plantations of trees and the existing road.



Figure 3: 1943 aerial photograph of Zalfleger portion of project area

The 1943 aerial image of the Farm Ongemaakt (**Fig. 4**) also shows a number of homesteads and large-scale cultivation of the area. The 1943 aerial photograph of Farm Mademoiselle (**Fig. 5**) shows a largely uninhabited area with a lot of cultivation taking place especially along the Mgobhozi River that runs through the farm.

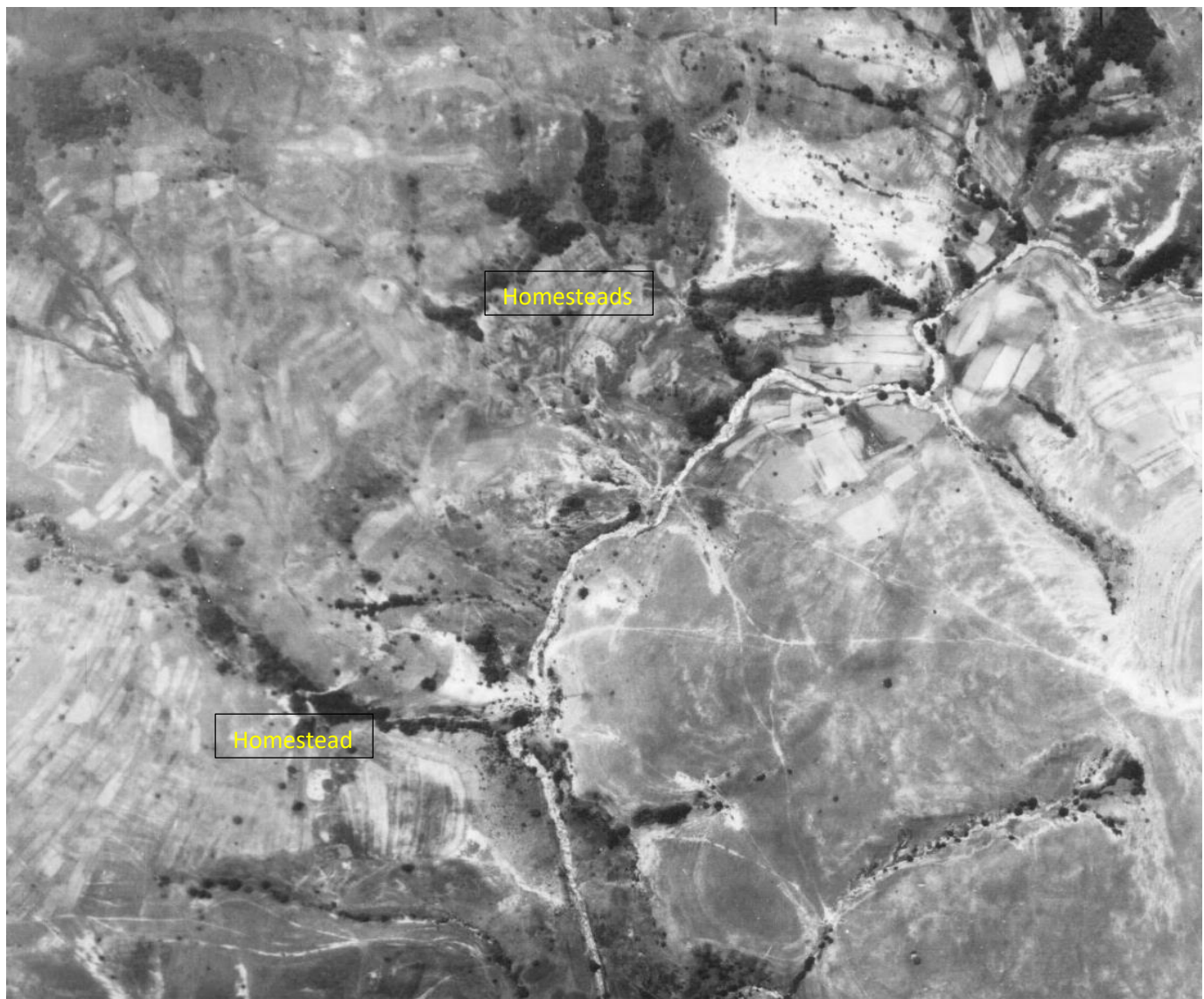


Figure 4: 1943 aerial photograph of Farm Ongemaakt



Figure 5: 1943 aerial photograph of Farm Mademoiselle

The 1969 topographic map (2731CC) of the three farms shows several residences/homesteads close to the boundary between Zafleger and Ongemaakt and on the western boundary of Ongemaakt and several dotted around Farm Mademoiselle.

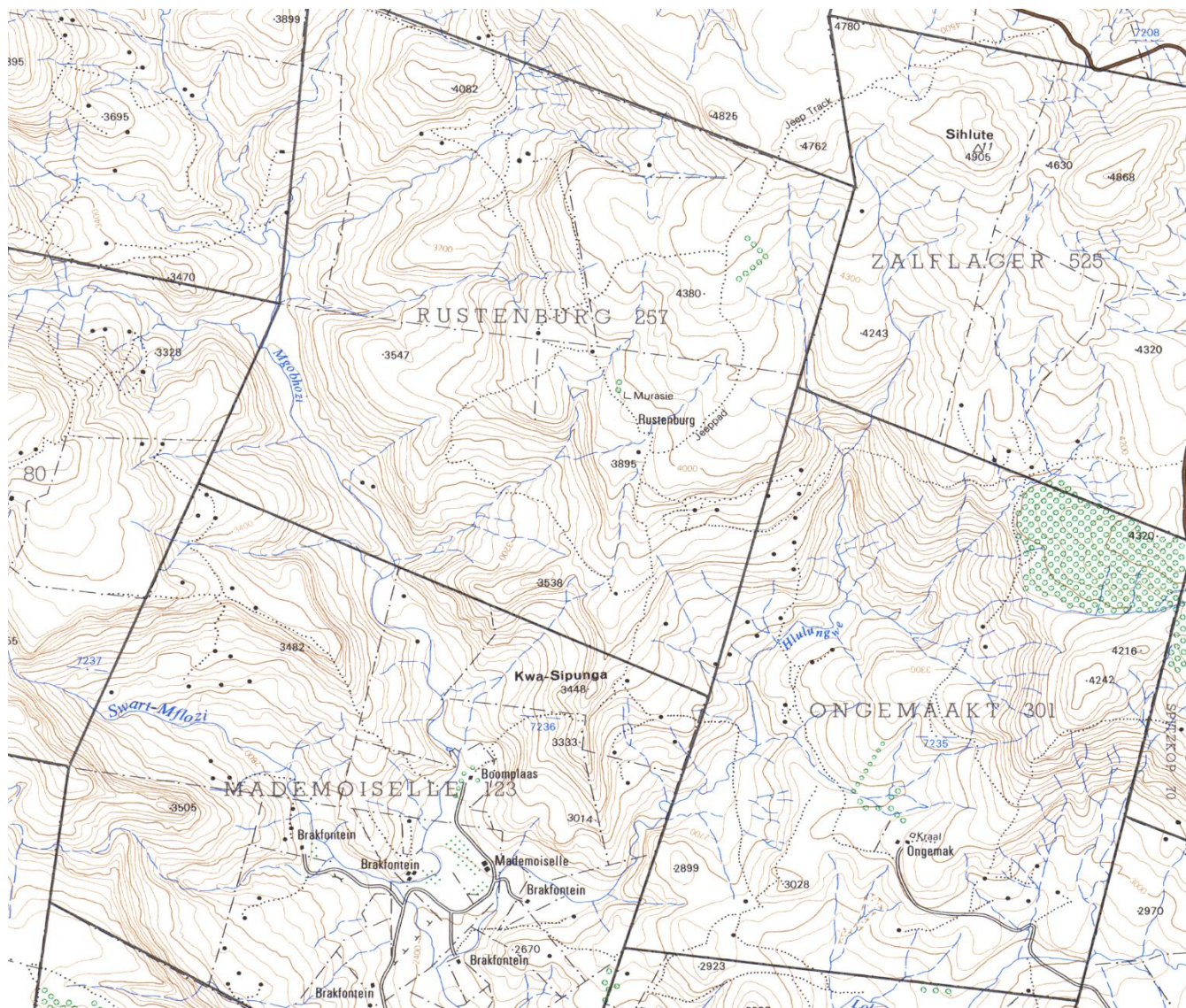


Figure 6: 1969 topographic map of Zalflager, Ongemaakt and Mademoiselle

7. RESULT OF SITE INSPECTION

Farm Ongemaakt was inspected first. The specialist met with Elphas Mtshali at his homestead located within Ongemaakt. Several family graves were pointed out to the specialist that are located between two homesteads. He also showed the graves of his brother and his grandfather which are located in a plantation of eucalyptus trees. The graves are barely visible as can be seen in **Fig. 7**. He then accompanied the specialist showing her various grave sites that are listed in **Table 1** below. He also pointed out a modern residence on the farm that is depicted in **Fig. 8**.



Figure 7: Mtshali graves



Figure 8: Grandfather's grave in plantation



Figure 9: Modern dwelling



Figure 10: View across Ongemaakt

He took the specialist to the Mdladla homestead. Mr Mdladla show the specialist several graves within the homestead and around the larger Ongemaakt farm including graves in a very overgrown area between two eucalyptus tree plantations. He did not want the specialist to take

photograph of the family graves. Close to Mdladla's homestead is a large game fence. Mr. Mdladla told the specialist that there were graves in the game farm.



Figure 11: Game fence west of Mdladla homestead

The specialist was then taken to the northern base of the mountain/cliff which is located along the boundary of the Farms Ongemaakt and Zalflager where Mr. Mdladla pointed out an area to the north east in the plantation where graves are located. A polygon of this area has been provided to the Environmental Assessment Practitioner for their information.



Figure 12: View towards plantations with graves

Mr. Mdladla then showed the specialist the site of a defunct mine where the remains of a structure and foundations are still visible as well as the remains of plumbing, either related to a toilet or wash basin. It is unclear how old the remains are.



Figure 13: Remains of mining structure



Figure 14: Remains of plumbing infrastructure

The remains of the floor of a shop are still visible. The shop is located just over 200m west of the defunct mine mentioned above and it was more than likely linked to the mine in providing supplies to the mine and mine workers.



Figure 15: Remains of shop



Figure 16: Mbatha's grave and graves of two children



Figure 17: Remains of recent structure to house workers

The specialist inspected a structure which, according to Mr. Mtshali, was used by the mines to store dynamite. It is unclear how old the structure is. It is overgrown with vegetation. There was disturbance around the site but no other structures or remains of structures could be found.



Figure 18: Structure used to house dynamite

The fenced off game farm that is Portion 1 of farm Ongemaakt was inspected and a number of heritage sites were found. These were the remains of homesteads and stone walling as well as a number of graves. Some of these heritage sites are depicted in **Figs. 19 - 22** and listed in **Table 1** below.



Figure 19: Remains of walls of a dwelling



Figure 20: Section of stonewalling



Figure 21: Graves



Figure 22: Grave in dense bush

The farm, Mademoiselle, was inspected. The site was accessed through the game reserve. The area is overgrown with vegetation and the access road runs along the Mgobhozi River valley. The Swart Mfolozi River runs west of the farm. A farmstead with several outbuildings was found near the river. No-one could be found during the time of the inspection but it appears as if labourers who work on the farm live in some of the outbuildings.



Figure 23: View across a section of Mademoiselle



Figure 24: View across farm looking west

The farmhouse and outbuildings do not look older than 60 years. Some structures are recent additions (see **Figs. 22 and 23**) however, the age of the main farmhouse and some of the older outbuildings would need to be assessed by a built heritage specialist if the buildings are to be altered or demolished.



Figure 25: Structures and caravan where workers may be residing



Figure 26: Modern outbuilding



Figure 27: Recent outbuilding

The farm house is no longer occupied and is neglected with part of the roof having collapsed. Immediately west, roughly 20 m from the farmhouse and in the river, the remnants of a wall which presumably was used to dam the river at that point were found.



Figure 28: Farmhouse



Figure 29: Eastern side of farmhouse



Figure 30: Remnants of wall in river

The specialist spoke to several workers who were walking through the farm. They were unaware of heritage sites on the farm. The area between the river and the access road has been cultivated in the past but these fields are currently lying fallow.

Farm Zalflager was inspected thereafter. The farm is more densely populated than the other two farms and there are many grave sites on it.



Figure 31: View across Zalflager farm looking southwards

The specialist spoke to Lindeni Madide who sent her son to show the specialist several grave sites that are listed in **Table 1** including a graveyard of at least 10 graves located below some eucalyptus trees.



Figure 32: Two graves



Figure 33: Burial site underneath eucalyptus trees

The specialist spoke to the Induna of the area, Ernest Madide, who showed the specialist additional grave sites. It appears as if there are graves associated with most of the homesteads on Zalflager. He indicated that he would be willing to advise and assist the Applicant if the proposed coal prospecting is approved.



Figure 34: Two graves - Gumede



Figure 35: Mhlongo graves

The heritage resources found during the site inspection are listed below.

Table 1: Heritage resources found during site inspection

Description	Coordinates	Significance	Mitigation
FARM ONGEMAAKT			
Mtshali's graves near homestead	27°52'36.70"S 31°14'1.10"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Grave of brother of Elphas Mtshali in plantation	27°52'44.20"S 31°13'34.80"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Grave of Elphas Mtshali's grandfather in plantation	27°52'45.10"S 31°13'34.60"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Two children's graves	27°52'35.64"S 31°13'40.26"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Mbatha's grave	27°52'35.30"S 31°13'40.30"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Graves	27°52'33.74"S 31°13'25.16"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Two graves within Mdladla homestead	27°52'43.60"S 31°12'56.20"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Graves in densely overgrown area	27°52'47.20"S 31°13'6.90"E	High heritage significance	15m buffer around graves; no prospecting within the buffer

Description	Coordinates	Significance	Mitigation
Many graves in plantation that are no longer visible	27°52'51.10"S 31°13'0.40"E	High heritage significance	5m buffer around plantation; no prospecting within the plantation nor in the buffer
Structure that reportedly housed dynamite	27°53'2.46"S 31°13'51.69"E	Low – medium significance especially if >60 years	Built heritage specialist to assess the structure to determine its age; site should be avoided by prospecting and 5m buffer placed around it if it is older than 60 years
Remains of mine	27°52'19.20"S 31°14'10.00"E	Low heritage significance; if mine is over 60 years then significance will remain low significance as there is only one intact structure	Built heritage specialist to assess remains to determine age if site is to be impacted by prospecting; if >60 years, then site should be avoided
Floor of shop that was possibly linked to mine	27°52'23.80"S 31°13'59.00"E	Low heritage significance	No mitigation necessary
Middle of area where community members have said there are graves within plantation	27°51'32.41"S 31°13'54.66"E	High heritage significance	Area outlined by polygon to be avoided by prospecting activities.
Two graves – Madide	27°51'05.20"S 31°14'10.10"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Single grave - Madide	27°51'05.10"S 31°14'10.70"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Single grave	27°50'48.40"S 31°14'02.60"E	High heritage significance	15m buffer around grave; no prospecting within the buffer
Three graves	27°50'48.20"S 31°14'04.10"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Seven graves	27°50'48.20"S 31°14'1.70"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
Two graves	27°50'45.80"S 31°14'07.10"E	High heritage significance	15m buffer around graves; no prospecting within the buffer
One grave	27°50'43.54"S 31°14'01.50"E	High heritage significance	15m buffer around grave; no prospecting within the buffer
Remains of stone walling & foundations	27°51'12.05"S 31°12'50.81"E	High heritage significance as high possibility of graves present	25m buffer around remains; no prospecting within the buffer
Remains of stone walling	27°51'24.10"S 31°13'00.50"E	Medium to high heritage significance as forms part of a larger homestead	25m buffer around remains; no prospecting within the buffer
Stone walling	27°51'24.40"S 31°13'00.00"E	Medium to high heritage significance as forms part of a larger homestead	25m buffer around walling; no prospecting within the buffer
Grave found alongside stone walling	27°51'24.60"S 31°12'59.90"E	High heritage significance	25m buffer around grave & walling; no prospecting within the buffer
Foundation of dwelling	27°51'24.60"S 31°12'59.20"E	Medium to high heritage significance as forms part of a larger homestead	25m buffer around foundation; no prospecting within the buffer
Single grave	27°51'25.10"S 31°12'59.60"E	High heritage significance	25m buffer around grave; no prospecting within the buffer

Description	Coordinates	Significance	Mitigation
Stone walling	27°51'25.90"S 31°12'59.60"E	Medium to high heritage significance as could form part of a larger homestead	25m buffer around walling; no prospecting within the buffer
Middle of area where the remains of a large homestead were found as well as several graves	27°51'37.87"S 31°12'45.40"E	High heritage significance	Area outlined by polygon to be avoided by prospecting activities.
FARM MADEMOISELLE			
Farmhouse	27°52'08.28"S 31°11'30.49"E	Low heritage significance	If structure is >60 years, then permission must be obtained for the demolition or alteration of farmhouse
Outbuildings	27°52'06.60"S 31°11'32.90"E	Low heritage significance	Most buildings appear to be recent; if buildings are to be demolished/alterd, then any buildings that could be >60 years must be assessed by a built heritage specialist prior to demolition/alteration
Structure/s	27°52'04.43"S 31°11'33.20"E	Low heritage significance	Could be older than 60 years; if building is to be demolished/alterd, then it must be assessed by a built heritage specialist prior to demolition/alteration
Structure	27°51'56.62"S 31°11'20.54"E	Low heritage significance	Could be older than 60 years; if building is to be demolished/alterd, then it must be assessed by a built heritage specialist prior to demolition/alteration
Structure	27°51'55.52"S 31°11'21.00"E	Low heritage significance	Could be older than 60 years; if building is to be demolished/alterd, then it must be assessed by a built heritage specialist prior to demolition/alteration
Remains of stone walling	27°51'52.14"S 31°12'30.78"E	Medium to high heritage significance as there may be associated graves	25m buffer around remains; no prospecting within the buffer
FARM ZALFLAGER			
Mtshali's grave	27°50'35.80"S 31°15'6.20"E	High heritage significance	15m buffer around grave; no prospecting within buffer
Two graves	27°50'30.40"S 31°15'0.40"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Burial site with over 10 graves	27°50'27.70"S 31°15'0.30"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Mdletshe's graves (2 graves)	27°50'24.90"S 31°15'1.90"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Mhlongo's grave	27°50'20.10"S 31°15'4.50"E	High heritage significance	15m buffer around grave; no prospecting within buffer

Description	Coordinates	Significance	Mitigation
2 graves - Gumede	27°50'19.00"S 31°15'5.50"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Mtshali's grave	27°50'18.60"S 31°15'8.40"E	High heritage significance	15m buffer around grave; no prospecting within buffer
Approximately 6 graves - Mhlongo	27°50'14.10"S 31°15'5.40"E	High heritage significance	15m buffer around graves; no prospecting within buffer
3 graves - Xulu	27°50'11.50"S 31°15'10.60"E	High heritage significance	15m buffer around graves; no prospecting within buffer
4 graves - Hlatshwayo	27°50'10.30"S 31°15'12.60"E	High heritage significance	15m buffer around graves; no prospecting within buffer
6 graves - Sangweni	27°50'17.80"S 31°15'16.10"E	High heritage significance	15m buffer around graves; no prospecting within buffer
5 graves - Mbatha	27°50'21.50"S 31°15'16.60"E	High heritage significance	15m buffer around graves; no prospecting within buffer
1 grave	27°50'07.90"S 31°15'9.10"E	High heritage significance	15m buffer around grave; no prospecting within buffer
7 graves - Mhlongo	27°50'10.90"S 31°14'55.90"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Graves	27°50'02.53"S 31°14'45.78"E	High heritage significance	15m buffer around graves; no prospecting within buffer
2 graves	27°49'59.54"S 31°14'48.17"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Graves	27°50'07.38"S 31°14'03.73"E	High heritage significance	15m buffer around graves; no prospecting within buffer
7 graves - Dakude	27°50'32.60"S 31°14'05.90"E	High heritage significance	15m buffer around graves; no prospecting within buffer
2 graves	27°50'42.87"S 31°14'11.36"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Single grave - Kunene	27°50'41.82"S 31°14'09.04"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Single grave - Kunene	27°50'41.50"S 31°14'00.90"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Single grave - Kunene	27°50'41.30"S 31°14'00.50"E	High heritage significance	15m buffer around graves; no prospecting within buffer
Single grave - Kunene	27°50'40.50"S 31°13'59.60"E	High heritage significance	15m buffer around graves; no prospecting within buffer

The fossil sensitivity map indicates that the project area is very highly sensitive for the Vryheid Formation on the western part of Farm Zalfleger 525 and the north-western part of Farm Mademoiselle. It is moderately sensitive for the Dwyka Group on the western part of Ongemaakt 301 and most of Mademoiselle 123. The rest of the areas are on dolerite which does not preserve fossils. The Dwyka Group diamictites and mudstones might have fragments of early *Glossopteris* flora and some invertebrates that were caught up by ice sheets, transported and later dropped as the ice melted. In this part of the main Karoo Basin, in the Vryheid Coalfield, there are about six recognised coal seams with Eland being the uppermost and Dundas the lowermost. Although coal is formed from the accumulation of peat and dead plant matter, the coal is so altered by temperature and pressure that no original plant material is recognisable. Coal is of economic rather than scientific importance, but in the carbonaceous lenses associated with the coal seams,

it is possible to find lenses of plant impressions. These plants belong to the *Glossopteris* flora and include leaves, lycopods, sphenophytes and ferns (Bamford 2022:11).

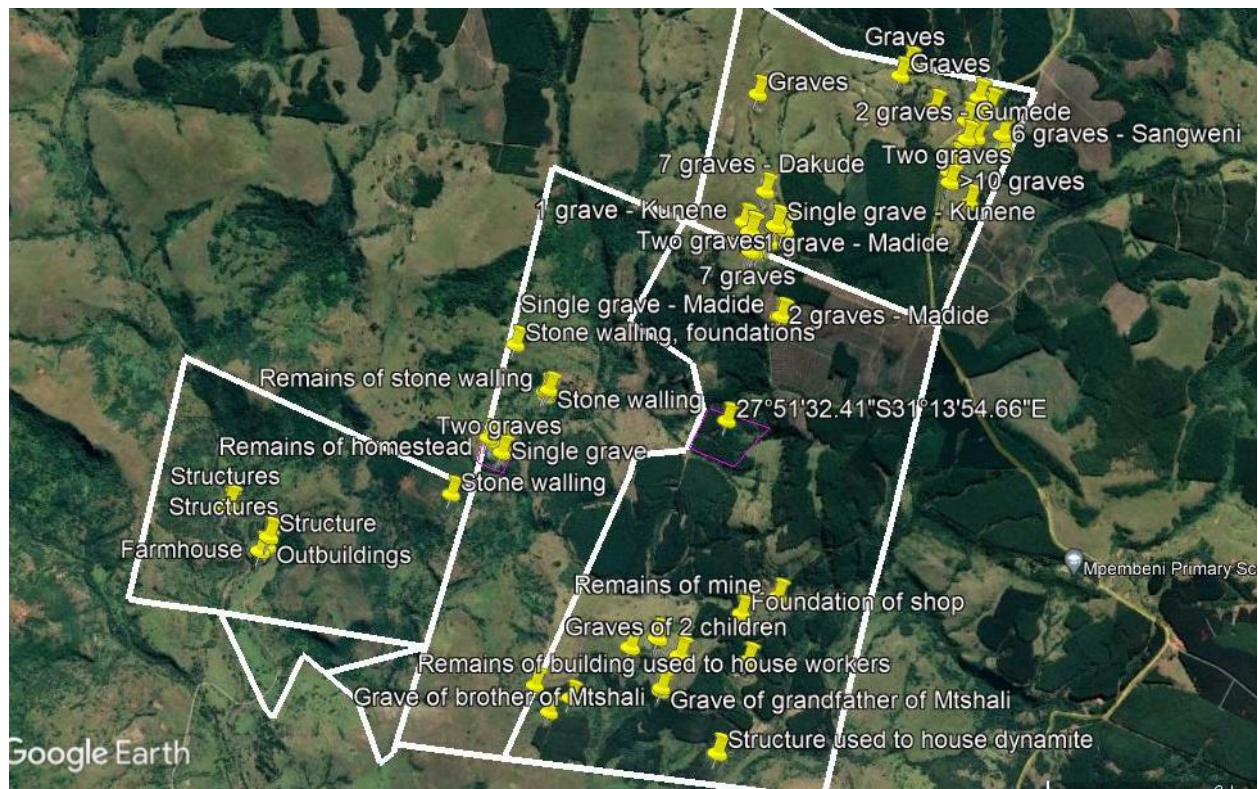


Figure 36: Heritage sites in project area

Surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that except for the dolerite, the rocks are the correct type and age to contain fossils. The overlying soils will not have fossils but there is a chance that fossils from the Vryheid Formation that occur below ground may be disturbed so it is recommended that a Fossil Chance Find Protocol be included in the Environmental Management Programme (EMPr) for the coal prospecting application. It is recommended that if fossils are found in cores by the contractor or other responsible person, they should be rescued and a palaeontologist called to assess and collect a representative sample. It was assessed that the potential impact to fossil heritage resources during prospecting would be low (Bamford 2022:13).

Prospecting activities are of short duration and are not considered an economic activity. The socio-economic input is very limited with the number of employment opportunities to be created for locals usually less than five and very little support is required from local businesses. It should, however, be noted that prospecting is a predecessor of mining which on its own have significant social and economic impacts. The project site is largely used for agricultural activities. Prospecting activities can be undertaken simultaneously with the site agricultural activities. Since prospecting activities are targeted on less sensitive areas and affect relatively smaller areas, the risk

associated with undertaking the prospecting activities have low – medium significance and are highly reversible (Mielelani Consultancy 2022:25).

According to Mielelani (2022:27-28), prospecting activities can, however, raise expectations of vulnerable and poor communities and should the prospecting activities be unsuccessful the local communities could be upset at the loss of potential employment opportunities. In addition, prospecting activities could result in dust, water contamination as well as soil erosion, loss of biodiversity, fires and the generation of waste (Mielelani 2022:85).

8. ASSESSMENT OF SIGNIFICANCE OF IMPACTS

The assessment of significance of impacts on heritage resources found during the site inspection of the proposed area for coal prospecting was undertaken in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be footprint (1) (limited to the immediate area), site of development (2), local (3), regional (4) or national (5).
- The **duration**, wherein it will be indicated whether:
 - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5;
- The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which shall describe the likelihood of the impact occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

- The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be mitigated.

The following formula was applied to calculate the impact significance after the factors were ranked for each impact: $SP = (\text{magnitude} + \text{duration} + \text{scale}) \times \text{probability}$.

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- >60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Table 2: Assessment of impacts on graves

Nature: Alteration, damage, destruction of graves		
	Without mitigation	With mitigation
Extent	Local (3)	Local (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	48 (Medium)	28 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	None	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation measures		
<ul style="list-style-type: none"> • 15m to 20m buffer around grave/s in which no prospecting activities may take place. • The buffer area must be clearly demarcated. • It is recommended that Induna Madide and Messrs Mtshali & Mdladla (if available) accompany the coal prospecting team to assist and advise as needed • If grave/s are damaged during prospecting, then work must stop immediately and the grave/s must be rehabilitated to its/their previous condition. If the grave/s is >60 years, then the Institute must be informed and the necessary permits obtained from the Institute for repair to the grave/s. • The relocation of graves is not recommended. 		
Cumulative impacts: Medium		

Table 3: Assessment of impacts on archaeological sites

Nature: Alteration, damage, destruction and removal of archaeological sites		
	Without mitigation	With mitigation
Extent	Site (2)	Site (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Improbable (2)
Significance	39 (Medium)	26 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	None	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation measures		
<ul style="list-style-type: none"> • 25m buffer around stone walling and remains of structures and homesteads in which no prospecting activities may take place. • The buffer area must be clearly demarcated and visible. • If stone walling, the remains of structures and homesteads are damaged during prospecting, then work must stop immediately and the Institute informed. Application must be made to the Institute for the necessary permits to restore and repair the damage. • As archaeological sites are protected by section 40 (1) of the KwaZulu-Natal Amafa and Research Institute Act, if it is decided that any stone walling, remains of stone walling, foundations, and remains of homesteads are to be impacted by the project, then application must be made to the Institute in terms of the procedure provided in Section 6 (1) – (8) of the KwaZulu-Natal Amafa & Research Institute Regulations, 2021 that refers to the destruction, damage, excavation, alteration of battlefield sites, archaeological sites, etc., 		
Cumulative impacts: Medium		

Table 4: Assessment of impact on protected structures

Nature: Alteration, damage, destruction of structures older than 60 years		
	Without mitigation	With mitigation
Extent	Local (3)	Site (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (4)
Probability	Improbable (2)	Improbable (2)
Significance	24 (Low)	22 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	None	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation measures

- *If any structures that could potentially be >60 years are to be impacted by coal prospecting activities, a built heritage specialist must assess the structure to confirm their age.*
- *If a structure is >60 years, it should be left intact. However, if this is not possible, then written application must be made to the Institute according to the procedure stipulated in section 3 of the Draft KwaZulu-Natal & Research Institute Regulations, 2021 or section 2 of the KwaZulu-Natal Heritage Regulations 2012 if the 2021 regulations have not been officially promulgated by the time an application is made.*
- *If a protected structure is damaged accidentally, then all work must stop in the immediate vicinity of the damage structure, the Institute informed and a qualified built heritage specialist / architect must be appointed to repair the building once all necessary permits have been obtained from the Institute.*

Cumulative impacts: Low

9. DISCUSSION AND CONCLUSION

A number of structures were found on the Farm Mademoiselle. They appear to mainly be recent structures but the farmhouse and one or two outbuildings may be older than 60 years and if they are to be impacted by coal prospecting activities, then it is recommended that a built heritage specialist assess the structures to determine their age. Structures older than 60 years are protected by section 37 (1)(a) of the KwaZulu-Natal Amafa and Research Institute Act, 2018, which refers to the protection of structures that are or that may reasonably be expected to be older than 60 years. The assessment of significance of the impact on protected structures by coal prospecting was assessed as low both before and after mitigation as the structures can be avoided by prospecting activities.

Many graves were found on Farms Ongemaakt and Zalflager. Graves are protected terms of section 39 (1) of the KwaZulu-Natal Amafa and Research Institute Act, which states that graves or burial grounds older than 60 years or deemed to be of heritage significance by a heritage authority- (a) not otherwise protected by the above Act and (b) not located in a formal cemetery managed or administered by a local authority, may not be damaged, altered, exhumed, inundated, removed from its original position, or otherwise disturbed without the prior written approval of the Institute having been obtained on written application to the Institute.

The assessment of significance of the impact of prospecting activities on graves was assessed as having a moderate impact which could influence the decision to develop in the area unless it is effectively mitigated. Mitigation measures recommended include that the graves are left *in-situ* and are fenced by a 15m buffer to avoid damage to them during coal prospecting. With these mitigation measures, the assessment of impact significance is reduced to a low impact.

The remains of homesteads, stone walling and foundations of structures were found during the site inspection. These sites are protected by section 40 (1) of the KwaZulu-Natal Amafa and Research Institute Act, 2018, which refers to the protection of archaeological sites (amongst others) and states that no person may destroy, damage, alter, write or draw upon or otherwise disturb without prior written approval of the Institute having been obtained. A buffer of 25m around these sites is recommended to avoid any destruction to the sites. The level of impact of coal prospecting activities on archaeological sites with the application of the mitigation measures as recommended in **Table 3** was a low impact.

10. MITIGATION MEASURES

- For any chance heritage finds, all work must cease in the area affected and the Applicant / Contractor must be immediately informed. A registered heritage specialist must be called to site to inspect the finding/s. The Institute must be informed about the finding/s.
- The heritage specialist will assess the significance of the resource and provide guidance on the way forward.
- Permits must be obtained from the Institute if heritage resources are to be removed, destroyed or altered.
- Under no circumstances may any heritage material be destroyed or removed from site unless under direction of a heritage specialist.
- Should any recent remains be found on site that could potentially be human remains, the South African Police Service as well as the Institute must be contacted. No SAPS official may remove remains (recent or not) until the correct permit/s have been obtained.
- If fossils are found in the cores by the prospecting team, or other responsible person once excavations for amenities, roads and foundations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.
- All recommendations and mitigation measures provided in the desktop palaeontological study must be adhered to such as the inclusion of the fossil chance find protocol into the EMP.

11. REFERENCES

Bamford, M. 2022. *Palaeontological impact assessment for the proposed prospecting right application on Portion 2 of Farm Zallager, Portion 1 and RE of Farm Ongemaakt and Portions 2, 8 and 13 of Farm Mademoiselle, east of Vryheid, KwaZulu-Natal Province. Desktop study (Phase 1)*

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