Palaeontological Impact Assessment for the proposed quarry on Farm Vingerfontein 162, west of Victoria West, Northern Cape Province

Desktop Study (Phase 1)

Subcontracted by

Beyond Heritage (Pty) Ltd

02 December 2025

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1. Executive Summary

A Palaeontological Impact Assessment was requested for the proposed quarry on a portion of Farm Vingerfontein 162 to the west of the town of Victoria West, Northern Cape Province. An abandoned digging site is evident near the proposed new site.

To comply with the regulations of 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 Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed site lies on the potentially very highly sensitive Poortjie Member (Teekloof Formation, Adelaide Subgroup) of the Karoo Supergroup, but very close to a large expanse of dolerite that is probably the target material. A site visit and walkdown was completed on 13 November 2035 (summer). NO FOSSILS of any kind were seen even though the vegetation is sparse. Only dolerite and sandstone boulders and cobbles were visible.. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations, drilling or mining activities have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

ASPECT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/ PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	Very High	Low	Palaeontological Impact Assessment	Section 7.2. SAHRA Requirements

2. **Declaration of independence and summary of expertise**.

a. Declaration

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by Beyond Heritage (Pty) Ltd, 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: 

b. Expertise

The Palaeontologist Consultant: Prof Marion Bamford
Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf, PSSA
Experience: 36 years research and lecturing in Palaeontology; over 28 years PIA studies and over 450 projects completed.

c. Specialist declaration of independence and statement of objectivity for the assessment.

Declaration of Independence

I, Marion Bamford, declare that –
General declaration:

- I act as the independent palaeontology practitioner in this application,
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant,
- I declare that there are no circumstances that may compromise my objectivity in performing such work,
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation,
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application,
- I have no, and will not engage in, conflicting interests in the undertaking of the activity,
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority,
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties

and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application,
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- All the particulars furnished by me in this form are true and correct,
- I will perform all other obligations as expected from a heritage practitioner in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Regulations.

d. **Summary of the specialist's expertise**

I, Marion Bamford, am a professional Palaeontologist with a PhD in Palaeontology (Wits University, 1990). I have more than 35 years of experience in palaeontological research and have published over 190 papers in peer-reviewed journals and published more than 14 scholarly book chapters. I review manuscripts for international and local journals and also review funding proposals for international funding bodies. Currently I am the Director of the Evolutionary Studies Institute, the only palaeontological institute in Southern Africa.

I have completed more than 450 palaeontological impact assessments (desktop and site visit studies) in the last 28 years for a variety of projects (solar energy projects, wind energy projects, powerlines, roads, infrastructure, housing and retail projects and from all over South Africa. I have been subcontracted by over 30 different companies. From my own projects and training provided by me and other staff in the ESI for Palaeontological Impact Assessments, I am familiar with the legislation.

Table of Contents

3. Project Background

A Palaeontological Impact Assessment was requested for the proposed quarry on a portion of Farm Vingerfontein 162 to the west of the town of Victoria West, Northern Cape Province. An abandoned digging site is evident near the proposed new site.

The proposed quarry site is south of the R62 with an existing access road. The site is undeveloped and is covered with natural, low vegetation (Figures 1-2).

A Palaeontological Impact Assessment was requested for the Vingerfontein Quarry project. To comply with the regulations of 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 and walkdown Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein. The minimum requirements for reporting are listed in Table 1.

Table 1: National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) - Requirements for Specialist Reports (Appendix 6). Includes the requirements from GNR Appendix 6 of GN 326 EIA Regulation 2017.

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
ai	Details of the specialist who prepared the report,	Section 2
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Section 2
b	A declaration that the person is independent in a form as may be specified by the competent authority	Section 2
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 3
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 6
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 4
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 6
g	An identification of any areas to be avoided, including buffers	N/A

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	**Relevant section in report**
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 7
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 8
k	Any mitigation measures for inclusion in the EMPr	Section 10, 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	Section 10, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 8
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	Sections 8, 10
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 of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

Figure 1: Google Earth map of the general area to show the relative land marks. The Vingerfontein quarry sites are shown within the yellow circle.

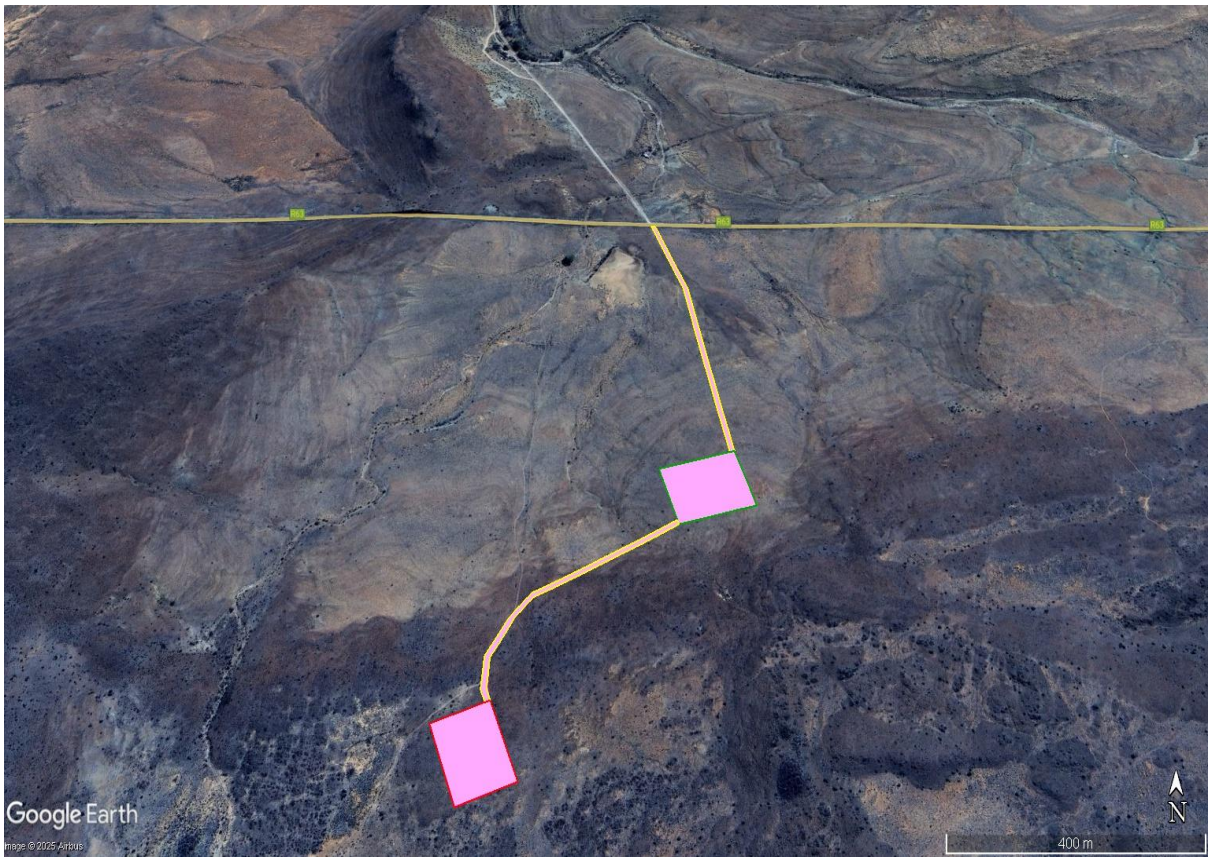


Figure 2: Google Earth Map of the proposed development of two quarries on Farm Vingerfontein 162 shown by the pink polygons.

4. 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 include records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases; eg https://sahris.sahra.org.za/map/palaeo
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' representativity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

5. Geology and Palaeontology

i. Project location and geological context

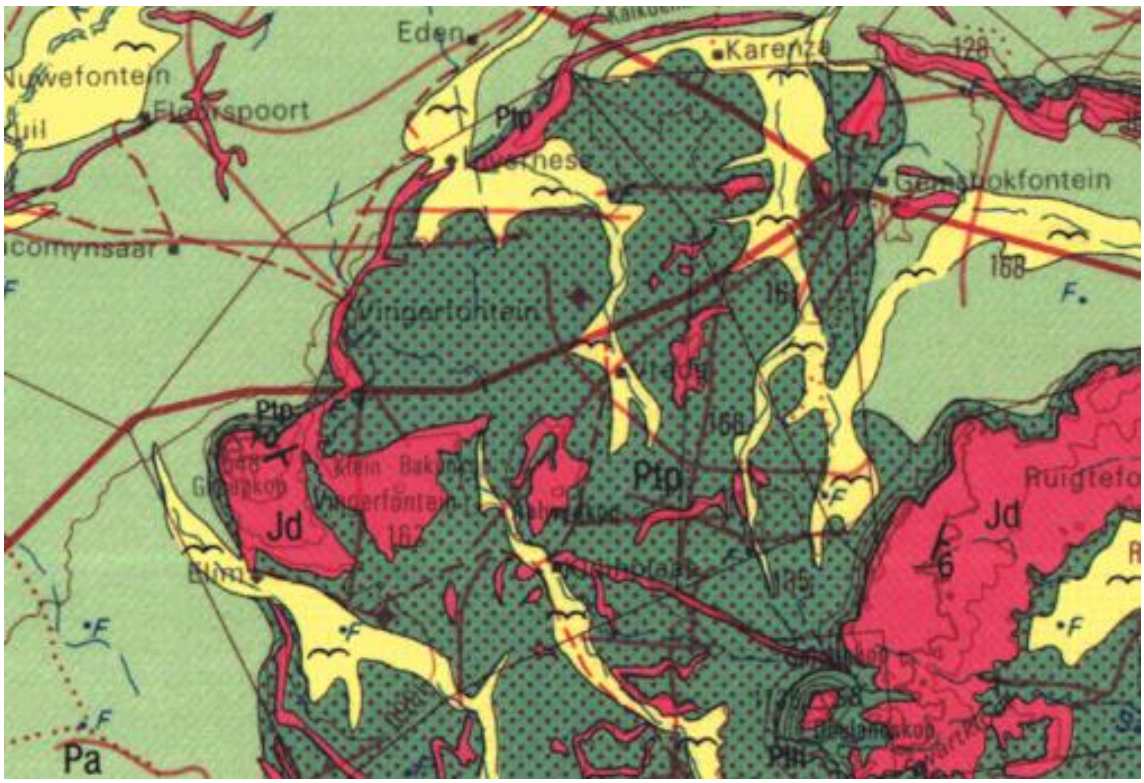


Figure 3: Geological map of the area around the Farm Vingerfontein 162 with the proposed quarry sites indicated within the yellow rectangle. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map Victoria West 3122.

Table 2: Explanation of symbols for the geological map and approximate ages (Eriksson et al., 2006. Johnson et al., 2006; McCarthy et al., 2006; Robb et al., 2006; van der Westhuizen et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Quaternary ca 1.0 Ma to Present
Jd	Jurassic dykes	Dolerite dykes, intrusive	Jurassic, Ca 183. 180 Ma
Pfp	Poortjie Mb, Teekloof Fm, Adelaide Subgroup, Beaufort Group, Karoo SG	Mudstone, sandstone, thin greenish cherty beds	Late Permian, ca 260 - 255 Ma
Pa	Abrahamskraal Fm, Adelaide Subgroup, Beaufort Group, Karoo SG	Mudstone, sandstone, thin greenish cherty beds	Late Permian, ca 266 - 260 Ma

The project lies in the western part of the Main Karoo Basin where the older rocks of the sequence are present (Figure 3). Much of the area is unconformably overlain by the much younger Quaternary sands and alluvium.

The Karoo Supergroup rocks cover a very large proportion of South Africa and extend from the northeast (east of Pretoria) to the southwest and across to almost the KwaZulu Natal south coast. It is bounded along the southern margin by the Cape Fold Belt and along the northern margin by the much older Transvaal Supergroup rocks. Representing some 120 million years (300 – 183Ma), the Karoo Supergroup rocks have preserved a diversity of fossil plants, insects, vertebrates and invertebrates.

Overlying the basal Dwyka Group glacigene rocks are rocks of the Ecca Group that are Early Permian in age. There are eleven formations recognised in this group but they do not all extend throughout the Karoo Basin. In the west and central part are the following formations, from base upwards: Prince Albert Formation, Whitehill Formation, Collingham Formation, Laingsburg / Ripon Formations, Tierberg / Fort Brown Formations, and Waterford Formation. All of these sediments have varying proportions of sandstones, mudstones, shales and siltstones and represent shallow to deep water settings, deltas, rivers, streams and overbank depositional environments.

Overlying the Ecca Group are the rocks of the Beaufort Group that has been divided into the lower Adelaide Subgroup for the Upper Permian strata, and the Tarkastad Subgroup for the Early to Middle Triassic strata. As with the older Karoo sediments, the formations vary across the Karoo Basin.

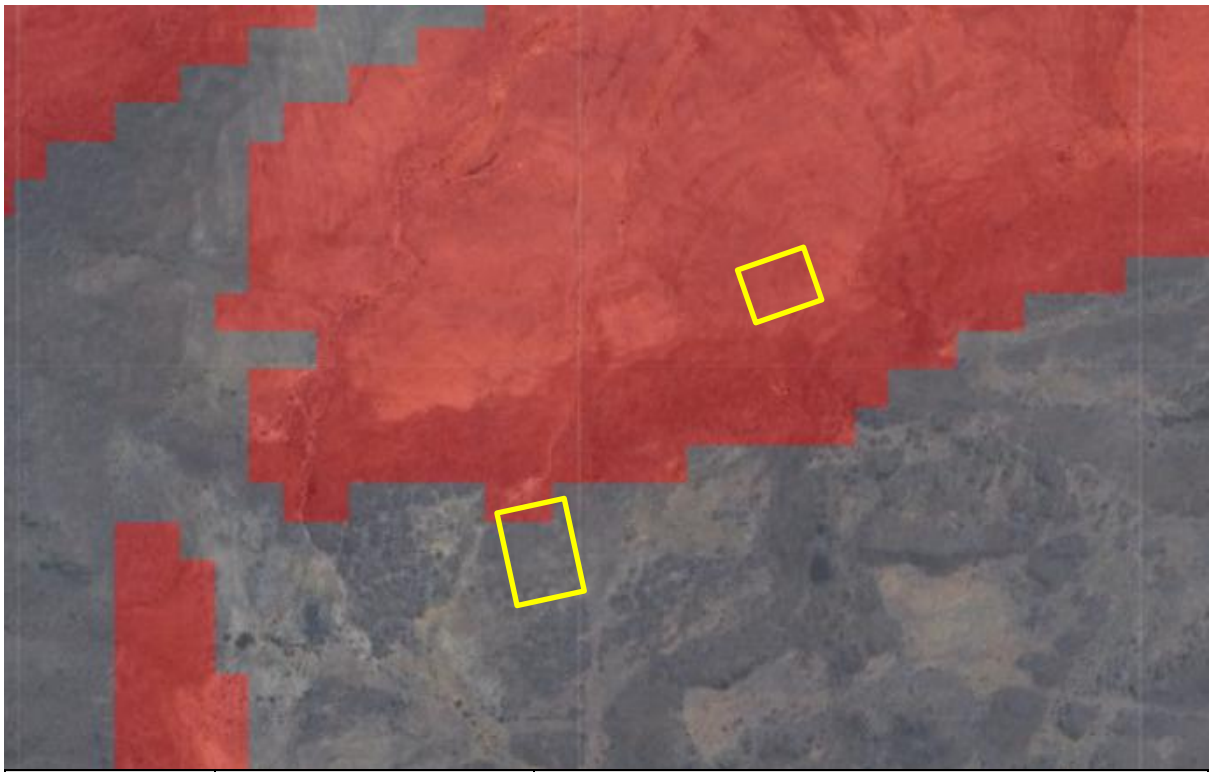
There are only two formations of the Adelaide Subgroup west of 24°E in the Karoo Basin, the basal Abrahamskraal Formation and the Teekloof Formation. The latter has been divided into four members, from the base upwards they are the **Poortje,** Hoedemaker, Oukloof and Steenkampsvlakte Members. There are no younger strata in this part of the basin (Smith et al., 2020).

Large exposures of Jurassic dolerite dykes occur throughout the area. These intruded through the Karoo sediments around 183 million years ago at about the same time as the Drakensberg basaltic eruption.

From uplift of the continent at various times in the past, weathering and erosion, sands alluvium and colluvium have washed down and been deposited on lower pediments, hillslopes and depressions. Some of these have become consolidated and in the eastern areas are known as the Masotcheni Formation (Partridge et al., 2006). These Late Pleistocene deposits are well represented in some parts of KwaZulu Natal but tend to erode easily and leave dongas (Botha, 2021). Along the rivers and valleys such sands are reworked and deposited and also are difficult to date.

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 4. The sites for development are in the Poortjie Member (red; northern quarry) and the non-fossiliferous Jurassic dolerite (grey; southern quarry).



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/ YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required

WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

Figure 4: SAHRIS palaeosensitivity map for the site for the two proposed quarry sites on Farm Vingerfontein 162 shown within the yellow rectangles.

The Abrahamskraal Formation (lower Adelaide Subgroup) has been divided into the *Eodicynodon* and *Tapinocephalus* Assemblage Zones based on the dominant basal therapsid genera.

Typical fossils of the *Eodicynodon* Assemblage Zone are fish, amphibians, dinocephalians, anomodonts (including *Eodicynodon*), gorgonopsians, therocephalians, invertebrate trace fossils and molluscs (Rubidge and Day, 2020). Plants are not common but there are leaves of *Glossopteris* and *Schizoneura* (sphenophyte) (Plumstead, 1969; Anderson and Anderson, 1985; Bamford, 2004).

Typical fossils of the *Tapinocephalus* Assemblage Zone are fish, amphibians, parareptiles, eureptiles, biarmosuchians, dinocephalians (including *Tapinocephalus*), anomodontians, therocephalians, vertebrate and invertebrate trace fossils and molluscs (Day and Rubidge. 2020). There is a low diversity of fossil plants from this assemblage zone but they include glossopterids, sphenophytes and gymnosperm woods (Plumstead, 1969; Anderson and Anderson, 1985; Bamford, 2004).

The **Teekloof Formation** (Adelaide Subgroup) has been divided into the *Endothiodon, Cistecephalus* and lower *Daptocephalus* Assemblage Zones based on the dominance of various vertebrate taxa. Fauna of the ***Endothiodon* Assemblage Zone** include the co-occurrence of the dicynodonts *Endothiodon, Emydops, Pristerodon* as well as the gorgonopsian *Gorgonops* (Day and Smith, 2020). Other vertebrates are fish, amphibians, biarmosuchains, anomodontians, other gorgonopsians, therocephalians and vertebrate and invertebrate traces. Plants include glossopterids, lycopods and sphenophytes (Plumstead, 1969; Anderson and Anderson, 1985; Bamford, 2004).

From the SAHRIS map above the area is indicated as very highly sensitive (red) so a site visit required. This was done on 13 November 2025 (summer).

iii. Site Visit Observations

The site is on a slight slope and as the vegetation is low and sparse the visibility of the geology was good. The northern site was covered in soil and a scatter of sandstone boulders and cobbles (Figures 5-6). The southern site was covered with soils and a scatter of the typical dark-weathering dolerite boulders and cobbles.

No outcrops of mudstones that could preserve fossil vertebrates or plants were seen. No fossils were seen on the land surface at either quarry site.

Figure 5: Site visit photographs for Vingerfontein Quarries. A-B – Northern quarry and only dolerite boulders and cobbles are present. C-D –Southern Quarry with only a scatter of sandstone boulders and cobbles between the sparse vegetation. No mudstones, shales or fossils were found.

Figure 6: Site visit photographs for Vingerfontein Quarries. A-D – southern quarry with only sandstone scatter. No mudstones, shales or fossils were found.

6. Impact assessment

An assessment of the potential impacts to possible palaeontological resources considers the criteria encapsulated in Table 3:

Table 3a: Criteria for assessing impacts

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

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	**H**	-
	M	-
	L	Soils and dolerite do not preserve fossils; so far there are no records from the Poortjie Mbr Fm of plant or animal fossils in this region so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-
DURATION	**L**	-

PART B: Assessment		
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	**L**	Since the only possible fossils within the area would be fossil vertebrates or plants in the mudstones, 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 loose soils and sands that cover the area or in the dolerite. There is a chance that vertebrate bones might occur in unweathered mudstones below the surface. Therefore, a Fossil Chance Find Protocol should be added to the eventual EMPr**-**
	L	.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the wrong kind (dolerite) to contain fossils but bones might occur in the mudstones. If dolerite is the target material it does not preserve fossils. Since there is a small chance that fossils from the Poortjie Member may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low.

7. 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 only some might contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils.

8. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary or in the dolerite. Since the Poortjie Member (Teekloof Formation, Adelaide Subgroup, Karoo Supergroup) is very highly sensitive a site visit was conducted on 13 November 2025 (summer). The site visit confirmed that there were NO FOSSILS of plants or vertebrates on the land surface. As there is a very small chance that fossils may occur in the unweathered mudstones below the land surface of the southern Quarry site, a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations and drilling or blasting. have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, the project should be authorised.

ASPECT	SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/ PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
Palaeontology	Very High	Low	Palaeontological Impact Assessment	Section 7.2. SAHRA Requirements

9. 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.

Bamford, M.K. 2004. Diversity of woody vegetation of Gondwanan southern Africa. Gondwana Research 7, 153-164.

Bamford, M.K., Cairncross, B., Lombard, H., 2020. Silicified fossil woods from the Late Permian Middleton Formation, Beaufort Group, Eastern Cape Province, South Africa and their palaeoenvironmental significance. South African Journal of Geology 123, 465-478. doi:10.25131/sajg.123.0036

Cowan, R., 1995. History of Life. 2nd Edition. Blackwell Scientific Publications, Boston. 462pp.

Day, M.O., Smith, R.M.H., 2020. Biostratigraphy of the *Endothiodon* Assemblage Zone (Beaufort Group, Karoo Supergroup). South African Journal of Geology 123, 156-180.

Day, M.O., Rubidge, B.S., 2020. Biostratigraphy of the *Tapinocephalus* Assemblage Zone (Beaufort Group, Karoo Supergroup), South Africa. South African Journal of Geology 123, 149-164. doi:10.25131/sajg.123.0012

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.

Rubidge, B.S., 2005. 27th Du Toit Memorial Lecture: re-uniting lost continents — fossil reptiles from the ancient Karoo and their wanderlust. South African Journal of Geology 108: 135-172.

Rubidge, B.S., Day, M.O., 2020. Biostratigraphy of the *Eodicynodon* Assemblage Zone (Beaufort Group, Karoo Supergroup). South African Journal of Geology 123, 141-148.

Smith, R.M.H., Rubidge, B.S., Day, M.O., Botha, J., 2020. Introduction to the tetrapod biozonation of the Karoo Supergroup. South African Journal of Geology 123(2), 131-140.

10. Fossil Chance Find Protocol

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

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 7-9). 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 no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

11. **Appendix A** – Examples of fossils from the Adelaide Subgroup

Figure 7:Photographs of fossil plants from the Adelaide Subgroup (*Vertebraria* roots, *Glossopteris* leaves and silicified wood.

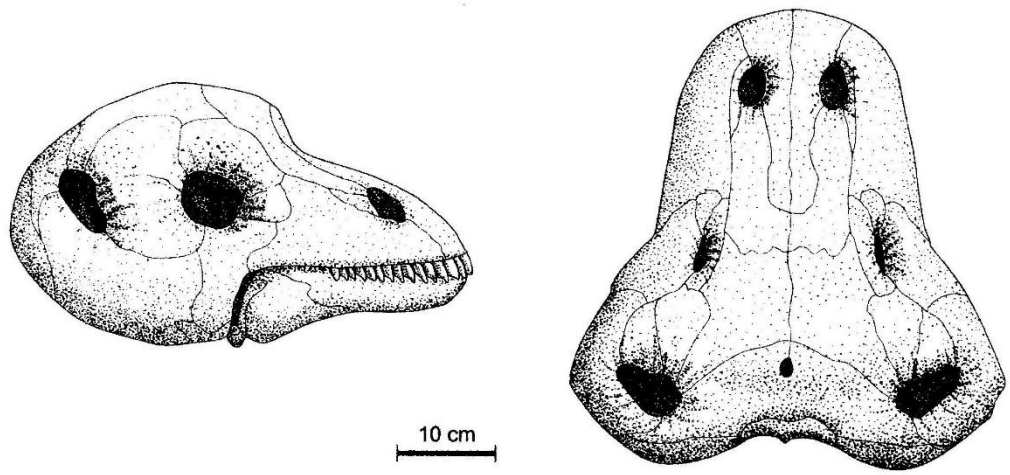


Figure 8: Diagrams of the skull of *Tapinocephalus* sp (From Rubidge, 2005; Day and Rubidge, 2020).

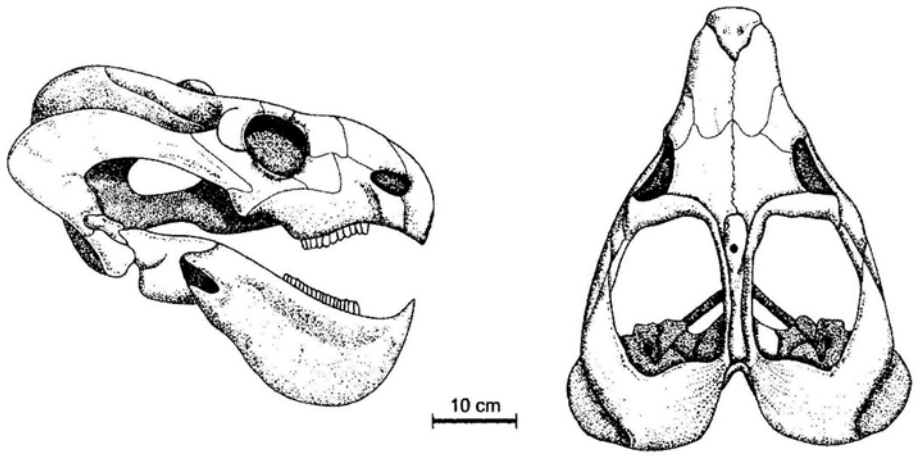


Figure 9: Diagrams of the skull of *Endothiodon* sp. (From Rubidge, 2005; Rubidge and Day, 2020).