Tronox KZN Sands (Pty) Ltd Port Dunford Project

uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal Province.

Farm: Portion 0, 1 Richard 16802, Portion 0, 1 Birkett 16802, Portion 0 Ruth 16833, Portion 5 Birkett 16832, Portion 3, 4 Richard 16832

Fourie, H. D

Palaeontological Impact Assessment: Phase 1 Field Study

Facilitated by: WSP Group Africa (Pty) Ltd

Maxwell Office Park,

Magwa Crescent West,

Waterfall City, Midrand

1685

Tel: 011 313 1123

2024/10/13

Ref: KZN 30/5/1/2/2/10117 MR

Example of an Ammonite fossil – Pondoland

B. Executive summary

Outline of the development project: WSP Group Africa (Pty) Ltd appointed Dr H. Fourie, a palaeontologist, to undertake a Palaeontological Impact Assessment (PIA), Phase 1: Field Study of the suitability of the proposed Tronox KZN Sands (Pty) Ltd Port Dunford Mineral Sands Mine in the uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal Province on Farm: Portion 0, 1 Richard 16802, Portion 0, 1 Birkett 16802, Portion 0 Ruth 16833, Portion 5 Birkett 16832, Portion 3, 4 Richard 16832.

The applicant, Tronox KZN Sands (Pty) Ltd has lodged a mining rights application to mine ilmenite, rutile, zircon and leucoxene. The proposed mine will be developed in two Phases.

The Project includes one locality Option (see Figure 1a):
Option 1: A polygon area blocked in white 15 km south-west of Richards Bay, Port Dunford is 60 m south-south-east and the N2 National Road cuts through the middle of the property. It is north-east of Mtunzini. The approximate size of the Mining Rights Area (MRA) is 4682 hectares (Ha) of which 2086 Ha will be utilised for the mine, mine residue disposal and mine-associated infrastructure.

Legal requirements:-

The **National Heritage Resources Act (Act No. 25 of 1999) (NHRA)** requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. The Republic of South Africa (RSA) has a remarkably rich fossil record that stretches back in time for some 3.5 billion years and must be protected for its scientific value. Fossil heritage of national and international significance is found within all provinces of the RSA. South Africa's unique and non-renewable palaeontological heritage is protected in terms of the National Heritage Resources Act. According to this act, palaeontological resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

The main aim of the assessment process is to document resources in the development area and identify both the negative and positive impacts that the development brings to the receiving environment. The PIA therefore identifies palaeontological resources in the area to be developed and makes recommendations for protection or mitigation of these resources.

"palaeontological" means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or traces.

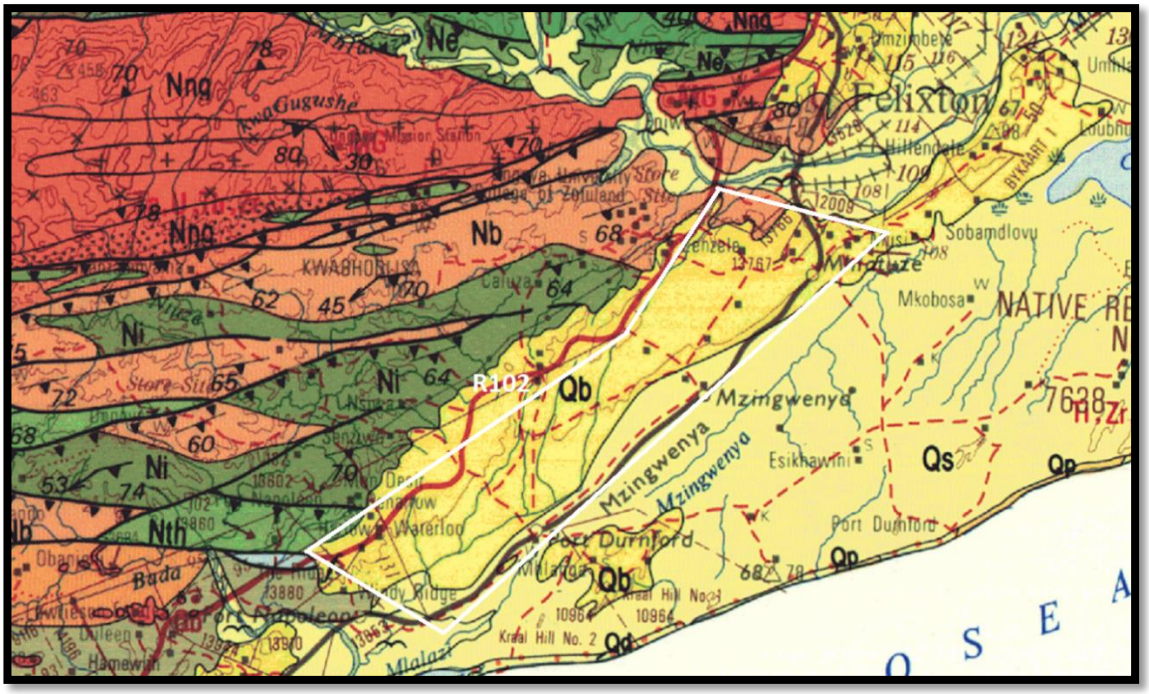
For this study, resources such as geological maps, scientific literature, institutional fossil collections, satellite images, aerial maps and topographical maps were used. It provides an assessment of the observed or inferred palaeontological heritage within the study area, with recommendations (if any) for further specialist palaeontological input where this is considered necessary.

A Palaeontological Impact Assessment is generally warranted where rock units of **LOW** to **VERY HIGH** palaeontological sensitivity are concerned, levels of bedrock exposure within the study area are adequate; large scale projects with high potential heritage impact are planned; and where the distribution and nature of fossil remains in the proposed area is unknown. The specialist will inform whether further monitoring and mitigation are necessary.

Types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (Act No.25 of 1999):
(i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.
This report adheres to the guidelines of Section 38 (1) of the National Heritage Resources Act (Act No. 25 of 1999). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (b) the construction of a bridge or similar structure exceeding 50 m in length; (c) any development or other activity which will change the character of a site (see Section 38); (d) the re-zoning of a site exceeding 10 000 m² (1 ha) in extent; (e) or any other category of development provided for in regulations by SAHRA or a PHRA authority.

This report (Appendix 6, **1c)** aims to provide comment and recommendations on the potential impacts that the proposed development could have on the fossil heritage of the area and to state if any mitigation or conservation measures are necessary.

Outline of the geology and the palaeontology:
The geology was obtained from map 1:100 000, Geology of the Republic of South Africa (Visser 1984) and 2530 Dundee (Linström and Wolmarans 1985) 1:250 000 geological map.



Legend to Figure and short explanation.
M – Alluvium, landslide rubble (yellow). Quaternary.
Qs – Grey and brown fine-grained sand (light yellow).
Qb- Sand, brownish-red clayey sand (dark yellow). Berea Formation. Quaternary.
Nb – Quartz-feldspar gneiss, quartz-feldspar-biotite gneiss, flaser gneiss; mylonite (amber). Buhleni Gneiss Intrusive rocks, Natal Structural and Metamorphic Province.
…… – (black) Lineament (Possible dyke).
--f— Fault.
f-^-^-^- - Thrust fault.
⊥68˚ - Strike and dip.
□ – Approximate position of development (blocked in white).

Figure: The geology of the development area.

Over areas totalling fully 40% of Southern Africa the 'hard rocks', from the oldest to the Quaternary, are concealed by normally unconformable deposits – principally sand, gravel, sandstone, and limestone. Inland deposits are much more extensive than marine deposits and are terrestrial and usually not-fossiliferous. Some of these deposits date back well into the Tertiary, whereas others are still accumulating. Owing to the all-to-often lack of fossils and of rocks suitable for radiometric or palaeomagnetic dating, no clear-cut dividing line between the Tertiary and Quaternary successions could be established (Kent 1980). The alluvium sands were deposited by a river system and reworked by wind action (Snyman 1996). A thick cover of Kalahari reddish sand blankets most outcrops and is dominated by the typical Kalahari thornveld (Norman and Whitfield 2006).

The Berea Formation comprises the inland dune cordons which can occur as far as 80 km inland in KwaZulu Natal. These red sand dunes are rich in artefacts (Kent 1980).

During a collision event on the southern margin of the Kaapvaal Craton 1 750 Ma, the Namaqua-Natal Metamorphic Belt (Nb) was formed but no fossils have up to date been recorded from this sequence (Groenewald and Groenewald 2014).

Palaeontology – Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of strata the palaeontological sensitivity can generally range from **VERY LOW** to **VERY HIGH**, and here locally in the development area **VERY HIGH** for the Berea Formation and **MODERATE** for the Quaternary sediments (SG 2.2 SAHRA APMHOB, 2012).

A wide range of possible fossil remains occur in the Cenozoic, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size. They are the result of algal growth in shallow water, indicating a very rich growth that would have caused an enrichment in the amount of oxygen in the atmosphere. Deposits of cenozoic aged cave breccia associated with sinkholes and karst formations contain the remains of the ancestors of man (Groenewald and Groenewald 2014).

Summary of findings (**1d**): The Phase 1: Field Study was undertaken in February 2023 in the summer in dry and hot conditions. As this is a field study the season has an influence, and the following is reported:

Field Observation: The area is large and falls mostly on the Quaternary sediments. Plantations are present with some gravel roads and smaller areas of natural vegetation. As vegetation is lush it is difficult to see amongst the trees and natural woody areas.
The MRA, except for the land bordering the south-western boundary, is surrounded by land under control of Traditional Authorities. Much of the land is currently under lease for commercial plantation forestry. Access to the site by members of adjacent communities is not restricted and grazing, hunting and plant collection activities take place. The first day of the site visit was mostly taken up with orientation and induction where-after an escorted site visit was conducted accompanied by Tronox/Mondi staff. The field team work independently on the second day. The fieldwork did not extend south east of the railway line where no mine development is proposed. Photographs from the field visit presented in Figures 5 to 15.

Recommendation:
Concerns/threats **(1k,l,m)** to be added to EMPr:

1. Threats to fossil heritage are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in, disturbance, damage or destruction of the fossils by development, vehicle traffic, prospecting, mining, and human disturbance.
2. Special care must be taken during the digging, drilling, and excavating of trenches, channels and footings and removal of overburden not to intrude fossiliferous layers.

The recommendations are **(1g)**:

1. The potential impact of the development on fossil heritage is **VERY HIGH** **(Berea Formation)** and therefore a field survey was necessary for this development (according to SAHRA protocol). A Phase 1 Palaeontological Impact Assessment: Field Study was done. A Phase 2: Mitigation will be recommended if the Phase 1: Field Study finds fossils (not found) or if fossils are found during the mining. The Quaternary sediments have a palaeontological sensitivity of **MODERATE**.
2. Mitigation will be needed if fossils are found during the mining.

3. No consultation with parties was necessary. The Environmental Control Officer (ECO) must familiarise him- or herself with the formations present and its fossils and follow protocol.
4. The development may go ahead aligned to the recommendations for mitigation that have been made .
5. The ECO must survey for fossils before and or after clearing, blasting (if done), drilling or excavating (ground breaking).
6. The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during mining activities. For a chance fossil find, the protocol is to immediately cease all construction or mining activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation.

Stakeholders	Developer	Tronox KZN Sands (Pty) Ltd
	Environmental	WSP Group Africa (Pty) Ltd Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand,1685. Tel: 011 313 1123
	Landowner	Several.

C. Table of Contents

D. Background information on the project

Report

This report is part of the environmental impact assessment process under the National Environmental Management Act, as amended (Act No. 107 of 1998) (NEMA) and includes Appendix 6 (GN R326 of 7 April 2017) of the Environmental Impact Assessment Regulations (see Appendix 2). It also is in compliance with *The Minimum Standards for Palaeontological Components of Heritage Impact Assessment Reports*, SAHRA, APMHOB, Guidelines 2012, Pg 1-15 **(2)**.

Outline of development

This report discusses and aims to provide the developer with information regarding the location of palaeontological material that will be impacted by the development. In the pre-construction phase it may be necessary for the developer to apply for the relevant permit from the South African Heritage Resources Agency depending on the presence of fossils (SAHRA / PHRA).

The applicant, Tronox KZN Sands (Pty) Ltd has lodged an application for a mining right to mine for ilmenite, rutile, zircon and leucoxene, with the mine to be developed in two Phases.

Titanium dioxide and a variety of other secondary products are manufactued from ilmenite, rutile, zircon, and other heavy minerals. Tronox operates the existing Fairbreeze Mine located south-west of Mtunzini. They propose to develop the Port Durnford mine as a replacement for the Fairbreeze operation. During the proposed Phase 1 low-volume mining period material will be processed at the existing Fairbreeze processing plant. During the proposed Phase 2 high-volume mining. Material will be processed at a new plant to be developed as part of the Port Durnford project and located within the Port Durnford MRA. Further beneficiation of mineral concentrate for both Phases of the operation will take place at the existing Tronox Central Processing Complex (CPC) located in Empangeni.

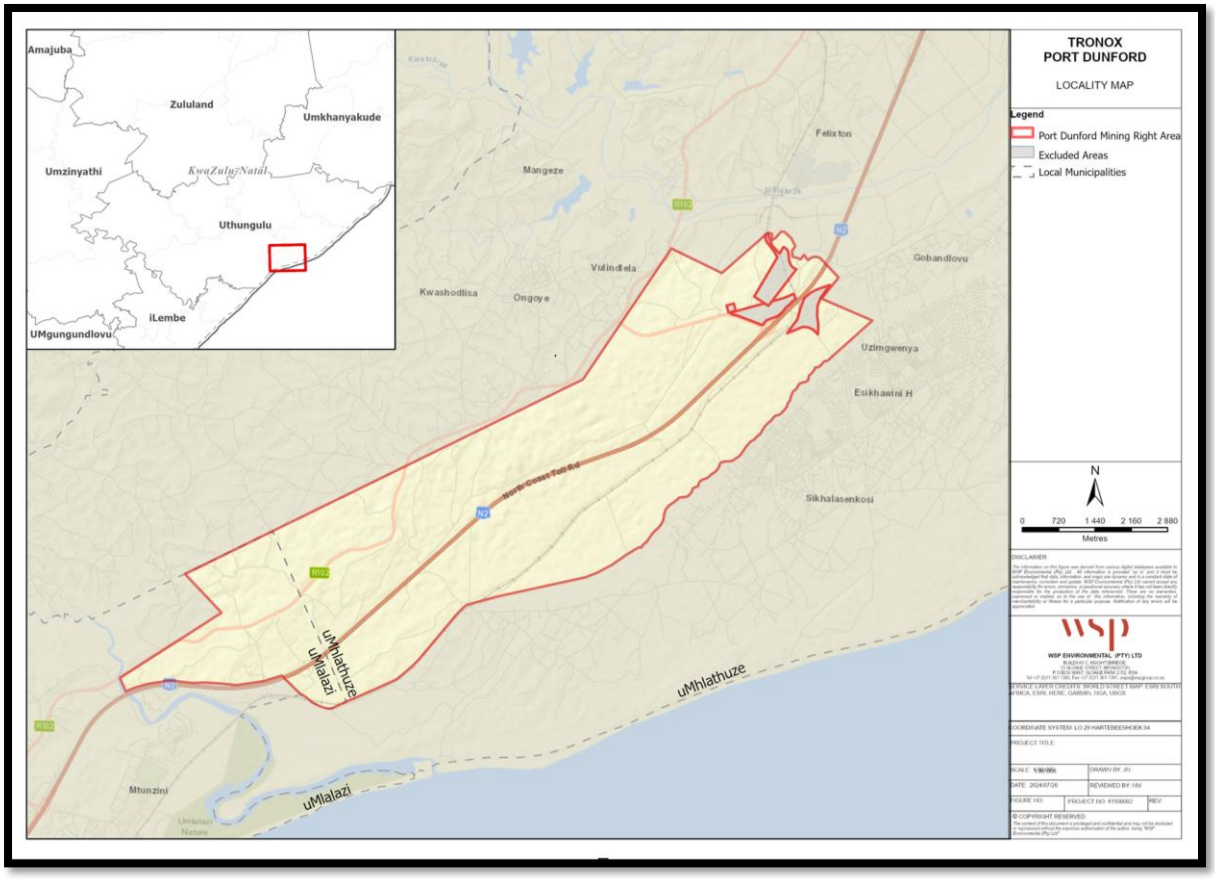


Figure 1a: Site locality map (WSP)
Related Infrastructure:

1. ROM Stockpile
2. Maintenance Workshop and Laydown area
3. Office and Ablutions
4. Access Roads
5. Electrical Servitudes and Substation
6. Fuel and Lubricant Storage
7. Bulk Water Supply Pipeline
8. Waste Disposal and Storage
9. High Light Mask
10. Potable Water Tank
11. Septic Tank
12. Parking.

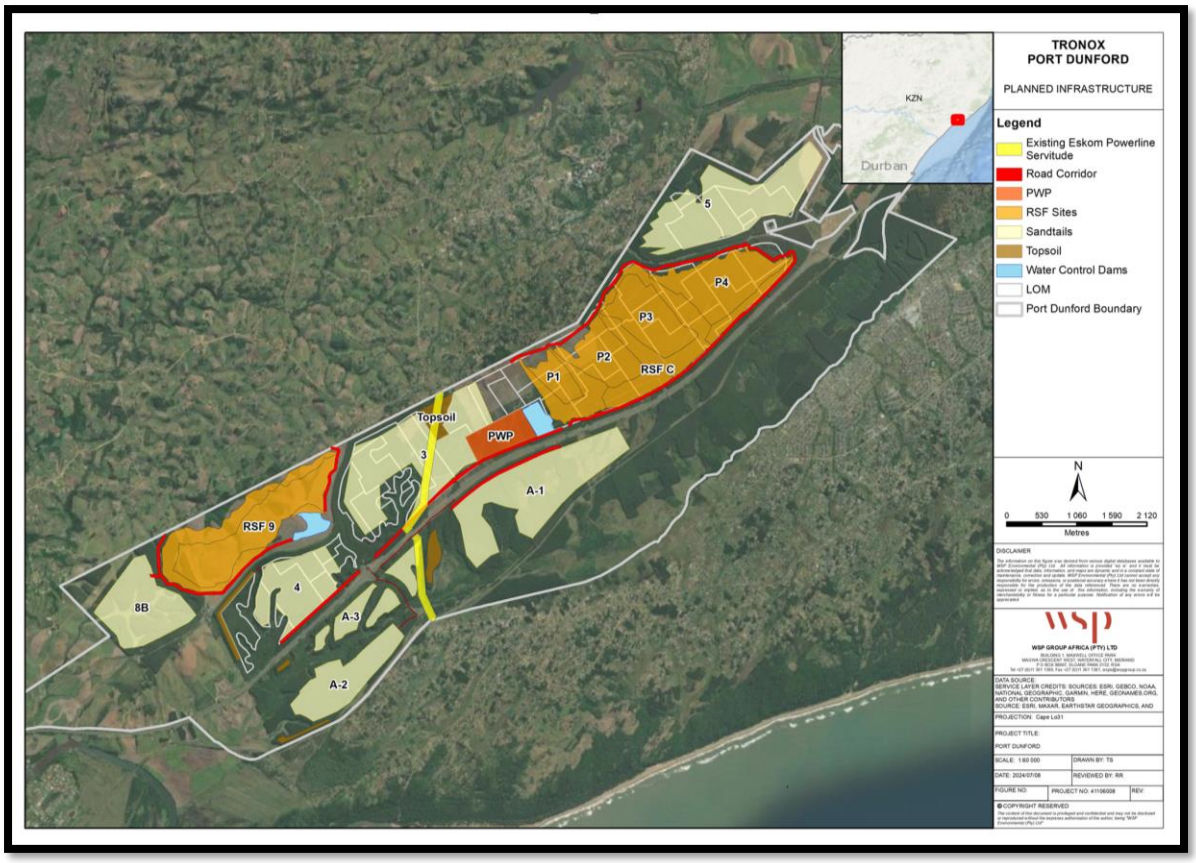


Figure 1b: Figure showing location of infrastructure (WSP).

The Project includes one locality Option (see Figure 1a):
Option 1: A polygon area blocked in white 15 km south-west of Richards Bay, Port Dunford is 60 m south-south-east and the N2 National Road cuts through the middle of the property. It is south-west of Mtunzini. The approximate size of the site is 4733.64 hectares of which 996 will be utilised for the mine.

Rezoning/ and or subdivision of land: No.
Name of Developer and Consultant: Tronox KZN Sands (Pty) Ltd and WSP Group Africa (Pty) Ltd.
Terms of reference: Dr H. Fourie is a palaeontologist commissioned to do a palaeontological impact assessment: field study to ascertain if any palaeontological sensitive material is present in the development area. This study will advise on the impact on fossil heritage mitigation or conservation necessary, if any.
Short *Curriculum vitae* (***1ai,aii)***: Dr Fourie obtained a Ph.D from the Bernard Price Institute for Palaeontological Research (now ESI), University of the Witwatersrand. Her undergraduate degree is in Geology and Zoology. She specialises in vertebrate morphology and function concentrating on the Therapsid Therocephalia. At present she is curator of a large fossil invertebrate collection, Therapsids, dinosaurs, amphibia, fish, reptiles, and plants at Ditsong: National Museum of Natural History. For the past 14 years she carried out field work in the North West, Western Cape, Northern Cape, Eastern Cape, Limpopo, Mpumalanga, Gauteng and Free State Provinces. Dr Fourie has been employed at the Ditsong: National Museum of Natural History in Pretoria (formerly Transvaal Museum) for 26 years.
Legislative requirements: South African Heritage Resources Agency (SAHRA) for issue of permits if necessary. National Heritage Resources Act (Act No. 25 of 1999). An electronic copy of this report must be supplied to SAHRA/AMAFA.

E. Description of property or affected environment
Location and depth:

The Proposed Tronox KZN Sands (Pty) Ltd Port Dunford Project will be situated in the uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal Province on Farm: Portion 0, 1 Richard 16802, Portion 0, 1 Birkett 16802, Portion 0 Ruth 16833, Portion 5 Birkett 16832, Portion 3, 4 Richard 16832.

Depth is determined by the related infrastructure to be developed and the thickness of the formation in the development area as well as depth of the foundations, footings and channels to be developed. Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to determine due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot. Geological maps do not provide depth or superficial cover, it only provides mappable surface outcrops. The depth can be verified with test pit results or drill cores.

Figure 2: Google Earth image showing location and infrastructure (WSP).
The site is underlain by the Quaternary Formations.

F. Description of the Geological Setting

Description of the rock units:

Over areas totalling fully 40% of Southern Africa the 'hard rocks', from the oldest to the Quaternary, are concealed by normally unconformable deposits – principally sand, gravel, sandstone, and limestone. Inland deposits are much more extensive than marine deposits and are terrestrial and usually not-fossiliferous. Some of these deposits date back well into the Tertiary, whereas others are still accumulating. Owing to the all-to-often lack of fossils and of rocks suitable for radiometric or palaeomagnetic dating, no clear-cut dividing line between the Tertiary and Quaternary successions could be established (Kent 1980). The alluvium sands were deposited by a river system and reworked by wind action (Snyman 1996). A thick cover of Kalahari reddish sand blankets most outcrops and is dominated by the typical Kalahari thornveld (Norman and Whitfield 2006).

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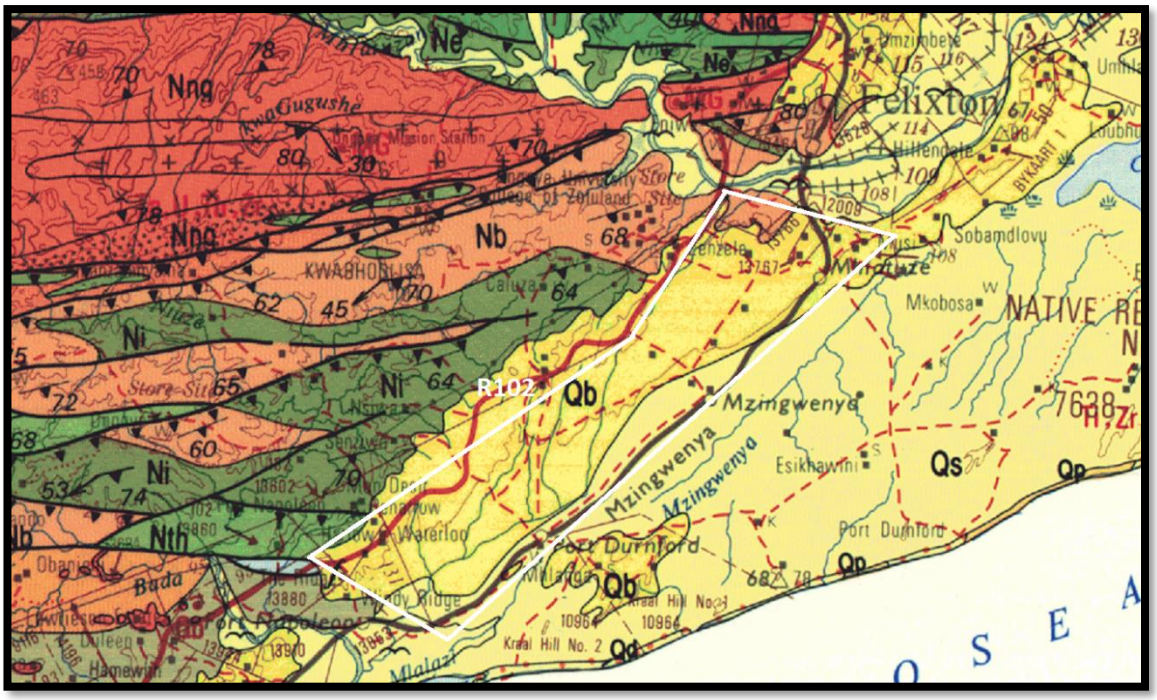

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--f— Fault.
f-^-^-^- - Thrust fault.
⊥68˚ - Strike and dip.
□ – Approximate position of development (blocked in white).

Figure 3: Geology of the development area **(1h)**.

Mining Activities in area:
None, but the Fairbreeze mine is present.
Mining past and present has no influence on the project.

During a collision event on the southern margin of the Kaapvaal Craton 1 750 Ma, the Namaqua-Natal Metamorphic Belt (Nb) was formed but no fossils have up to date been recorded from this sequence (Groenewald and Groenewald 2014).

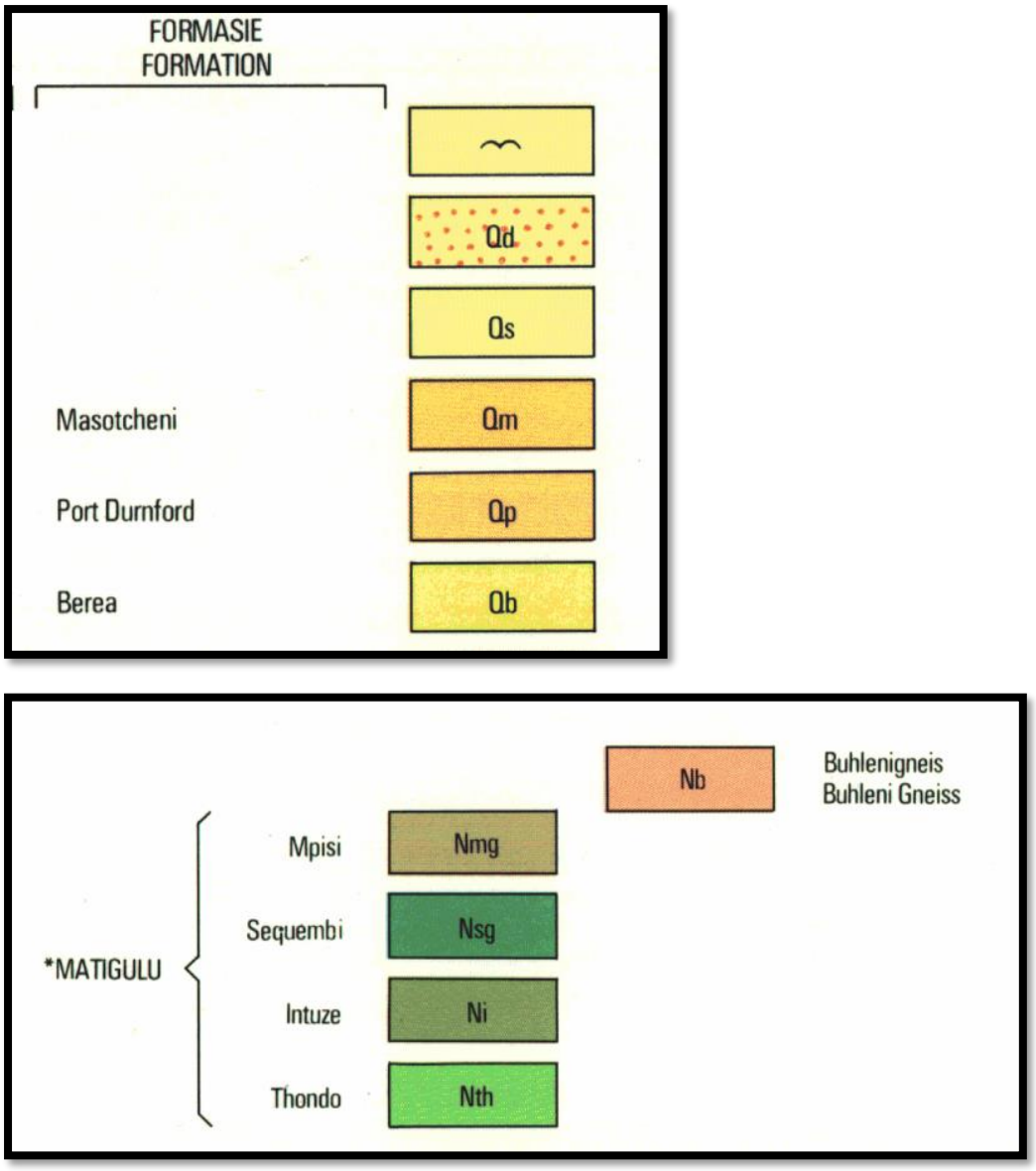

Figure 4: Lithostratigraphic column of the development area (Dundee).

Field Observation: The area is large and falls mostly on the Quaternary sediments. Plantations are present with some gravel roads and smaller areas of natural vegetation. As vegetation is lush it is difficult to see amongst the trees and natural woody areas.

The Mining Rights Area, except for the land bordering the south-western boundary, is surrounded by land under control of Traditional Authorities. Much of the land is currently under lease for commercial plantation forestry. Access to the site by members of adjacent communities is not restricted and grazing, hunting and plant collection activities take place. The first day of the site visit was mostly taken up with orientation and induction where-after an escorted site visit was conducted accompanied by Tronox/Mondi staff. The field team work independently on the second day. The fieldwork did not extend southeast of the railway line where no mine development is proposed. Photographs from the field visit presented in Figures 5 to 15.

Figure 5: View of the area towards middle of project area.

Figure 6: Small bushes, grass and trees amongst the natural vegetation.

Figure 7: View of one of the gravel roads, west of the N2 National Road.

Figure 8: Trench showing different soil layers forming overburden.

Figure 9: Pylons are present on grassed area, outcrops are absent here.

Figure 10: Scattered rocks on site.

Figure 11: Isolated mudstone, perhaps brought in.

Figure 12: Railway line and local road crossing.

Figure 13: Sandy area in the north.

Figure 14: Gravel on-site that is used to dress roads or for railway line.

Figure 15: Areas between trees have thick layers of tree litter and here some isolated limestone rocks.

Figure 16: East to west view of Sand Dump #8 footprint looking south-east.

Figure 17: Area in east (Sand dump #8 looking NNW) with grass and no outcrops, but loose rocks are present.

Figure 18: View of Sand dump #8 area looking east, trees have been harvested, outcrops are absent.

Figure 19: View of Sand Dump #8 area in the west.

Figure 20: Gravel and loose rocks on surface of roads indicative of what is found below.

It is recommended to wait for the response from SAHRA on the Phase 1: Field Study (this report). SAHRA protocol must be followed.

G. Background to Palaeontology of the area

Summary: When rock units of moderate to very high palaeontological sensitivity are present within the development footprint, a desk top and or field scoping (survey) study by a professional palaeontologist is usually warranted. The main purpose of a field scoping (survey) study would be to identify any areas within the development footprint where specialist palaeontological mitigation during the construction phase may be required (SG 2.2 SAHRA AMPHOB, 2012).

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of sediments the palaeontological sensitivity can range from **LOW** to **VERY HIGH**.

A wide range of possible fossil remains occur in the Cenozoic, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size. They are the result of algal growth in shallow water, indicating a very rich growth that would have caused an enrichment in the amount of oxygen in the atmosphere. Deposits of cenozoic aged cave breccia associated with sinkholes and karst formations contain the remains of the ancestors of man (Groenewald and Groenewald 2014).

Table 1: Taken from Palaeotechnical Report (Groenewald 2012) (**1cA)**.

Formation	Member	Lithology	Fossil Record
m m m m m		Recent alluvial sediments	None
Qs		Dune sand from extensive reworking of the Kosi Bay Formation on the Northern Natal coastal plain that resulted from marine regressionand dry periods when dune formation was wide spread. Yellowish red grey and white dune sands with local pockets of calcareous clays	Local peat deposits up to 4m thick
Δ Δ Δ Δ Δ		Debris	None
Masocheni (Qm)		Thin sedimentary deposit on hillsides and in valley floor, on floodplains of rivers	Fossil plant roots preserved as silcrete around original roots
Berea (Qb / Qbe)		Rocky shoreline along the Bluff in Durban. Basal aeolianites, truncated by calcified beach and dune deposits of the Last Interglacial-age	Oyster beds are present in karst potholes and an elephant tusk was collected at the Umlaas Canal outfall, associated with the Last Interglacial beach
Natal Structural and metamorfic province	Mapumulo	Nmz, Nmk, Ns, Ne, Nmn, Nml, Nmg, Nmc, Nmi, Nh, Nma, Nly, No, Nss, Nsm, Ni, Nb, Na, Ns, Ncg, Nhg, Ngg, Ng, Nn, Nm, Nmh, Nl, Nt, Nmu, Nmp, Nq, Nh, Nbi, Nmg, Nsg, Nmg, Nsg, Nw, Nta, Ndg, Nnt	Various formations of intrusive and metamorphic rocks, comprising mainly of granite, gneises and amphibolite	None
	Matigulu			
	Tugela			
	Ntingwe			
	Mfongosi			

Table 2: Criteria used (Fossil Heritage Layer Browser/SAHRA) **(1cB)**:

Rock Unit	Significance/vulnerability	Recommended Action
Qs and m	Moderate	Desktop Study is required and field assessment likely
Berea Formation	Very High	Field assessment and protocol for finds is required
Natal Structural MP	Low	Desktop Study is required

Databases and collections: Ditsong: National Museum of Natural History. Evolutionary Studies Institute, University of the Witwatersrand (ESI).
Impact: **VERY HIGH** for the Berea Formation, **MODERATE** for the Quaternary sediments. There are significant fossil resources that may be impacted by the development (mudstone, shale) and if destroyed are no longer available for scientific research or other public good (Almond, *et al.* 2009).

The Project includes one locality Option, the proposed Mining Rights Area (MRA) which corresponds with the area of mineral interest (see Figure 1a) (**1f,j)** The palaeontological sensitivity is as stated above.
Option 1: A polygon area blocked in white 15 km south-west of Richards Bay, Port Dunford is 60 m south-south-east and the N2 National Road cuts through the middle of the property. It is north-east of Mtunzini. The approximate size of the site is 4682 hectares (the MRA) of which 2086 ha will be utilised for the mine (see Figure 2 for proposed development footprint within the MRA).

All the land involved in the development was assessed **(ni,nii)** and none of the property is unsuitable for development (see Recommendation B).

H. Description of the Methodology (1e)

The palaeontological impact assessment field study was undertaken in February 2023. A Phase 1: Field Survey of the affected portion includes photographs (in 7.1 mega pixels) taken of the site with a digital camera (Canon PowerShot A470). Additionally, Google Maps was accessed on a cellular phone/tablet for navigation. A Global Positioning System (GPS) (Garmin eTrex 10) is used to record fossiliferous finds and outcrops (bedrock) when the area is not covered with topsoil, subsoil, overburden, vegetation, grassland, trees or waste. The survey did identify the Karoo Supergroup. A literature survey is included and the study relied heavily on geological maps.

SAHRA document 7/6/9/2/1 (SAHRA 2012) requires track records/logs from archaeologists not palaeontologists as palaeontologists concentrate on outcrops which may be recorded with a GPS. Isolated occurrences of rocks usually do not constitute an outcrop. Fossils can occur in dongas, as nodules, in fresh rock exposures, and in riverbeds. Finding fossils require the experience and technical knowledge of the professional palaeontologist, but that does not mean that an amateur can't find fossils. The geology of the region is used to predict what type of fossil and zone will be found in any particular region. Archaeozoologists concentrate on more recent fossils in the quaternary and tertiary deposits.

Assumptions and Limitations (**1i)**:-
The accuracy and reliability of the report **may be** limited by the following constraints:

1. Most development areas have never been surveyed by a palaeontologist or geophysicist.
2. Variable accuracy of geological maps and associated information.
3. Poor locality information on sheet explanations for geological maps.
4. Lack of published data.
5. Lack of rocky outcrops.
6. Inaccessibility of site - site was accessible and not too overgrown.
7. Insufficient data from developer and exact lay-out plan for all structures – Sufficient, Google Earth and Site lay-out were provided.

A Phase 2 Palaeontological Impact Assessment: Mitigation will include:

1. Recommendations for the future of the site.
2. Description of work done (including number of people and their responsibilities).
3. A written assessment of the work done, fossils excavated, not removed or collected and observed.
4. Conclusion reached regarding the fossil material.
5. A detailed site plan.
6. Possible declaration as a heritage site or Site Management Plan.

The National Heritage Resources Act No. 25 of 1999 further prescribes.

Act No. 25 of 1999. National Heritage Resources Act, 1999.
National Estate: 3 (2) (f) archaeological and palaeontological sites,

(i)(1) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens,
Heritage assessment criteria and grading: (a) Grade 1: Heritage resources with qualities so exceptional that they are of special national significance;
(b) Grade 2: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and (c) Grade 3: Other heritage resources worthy of conservation.
SAHRA is responsible for the identification and management of Grade 1 heritage resources.
Provincial Heritage Resources Authority (PHRA) identifies and manages Grade 2 heritage resources.
Local authorities identify and manage Grade 3 heritage resources.

No person may damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of a provincially protected place or object without a permit issued by a heritage resources authority or local authority responsible for the provincial protection.
Archaeology, palaeontology and meteorites: Section 35.
(2) Subject to the provisions of subsection (8) (a), all archaeological objects, palaeontological material and meteorites are the property of the State.
(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

Mitigation involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or excavation, recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and / or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before a Phase 2 may be implemented.

The Mitigation is done in order to rescue representative fossil material from the study area to allow and record the nature of each locality and establish its age before it is destroyed and to make samples accessible for future research. It also interprets the evidence recovered to allow for education of the public and promotion of palaeontological heritage.

Should further fossil material be discovered during the course of the development (*e. g.* during bedrock excavations), this must be safeguarded, where feasible *in situ,* and reported to a palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (*e. g.* Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample.

When a Phase 2 palaeontological impact study is recommended, permission for the development to proceed can be given only once the heritage resources authority has received and approved a Phase 2 report and is satisfied that (a) the palaeontological resources under threat have been adequately recorded and sampled, and (b) adequate development on fossil heritage, including, where necessary, *in situ* conservation of heritage of high significance. Careful planning, including early consultation with a palaeontologist and heritage management authorities, can minimise the impact of palaeontological surveys on development projects by selecting options that cause the least amount of inconvenience and delay.

Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012).

I. Description of significant fossil occurrences

All Karoo Supergroup geological formations are ranked as **LOW** to **VERY HIGH**, and here the impact is potentially **VERY HIGH** for the Berea Formation.

A wide range of possible fossil remains occur in the Cenozoic, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size. They are the result of algal growth in shallow water, indicating a very rich growth that would have caused an enrichment in the amount of oxygen in the atmosphere. Deposits of cenozoic aged cave breccia associated with sinkholes and karst formations contain the remains of the ancestors of man (Groenewald and Groenewald 2014).

Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to be determined due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot.

The threats are:-

- Earth moving equipment/machinery (front end loaders, excavators, graders, dozers) during construction,
- The sealing-in or destruction of fossils by development, vehicle traffic, prospecting, mining, and human disturbance. See Description of the Geological Setting (F) above.

J. Recommendation

a. There is no objection (see Recommendation B) to the development, it was necessary to request a Phase 1 Palaeontological Impact Assessment: Field Study to determine whether the development will affect fossiliferous outcrops as the palaeontological sensitivity of the area is **VERY HIGH**. A Phase 2 Palaeontological Mitigation is only required if the Phase 1 Palaeontological Assessment identified a fossiliferous formation (Karoo Supergroup) and fossils or if fossils are found during mining and construction. Protocol is attached (Appendix 2).
b. Preferred choice: Locality Option 1 is preferred and possible.
c. The following should be conserved: if any palaeontological material is exposed during clearing, digging, excavating, drilling or blasting SAHRA must be notified. All construction activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures.
d. This report must be submitted to SAHRA/PHRA together with the Heritage Impact Assessment Report.

Sampling and collecting:

Wherefore a permit is needed from the South African Heritage Resources Agency (SAHRA / PHRA).

a. Objections: Cautious. See heritage value and recommendation.
b. Conditions of development: See Recommendation.
c. Areas that may need a permit: Yes.
d. Permits for mitigation: Only needed from SAHRA/PHRA prior to Mitigation.

K. Conclusions

a. Most of the land involved in the development was assessed and none of the property is unsuitable for development (see Recommendation B).
b. All information needed for the Phase 1 Palaeontological Impact Assessment and Field Study was provided by the Consultant. All technical information was provided by WSP Group Africa (Pty) Ltd.
c. Areas that would involve mitigation and may need a permit from the South African Heritage Resources Agency are discussed.
d. The following should be conserved: if any palaeontological material is exposed during clearing, digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped, a 30 m barrier constructed, and a palaeontologist should be called in to determine proper mitigation measures.
e. This project may benefit the community, will create short- and long-term employment, the life expectancy of the community, the growth of the community, and social development in general.
f. Consultation with parties was not necessary **(1o,p,q).**
g. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

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Declaration (1b)

I, Heidi Fourie, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project for which I was appointed to do a palaeontological assessment. There are no circumstances that compromise the objectivity of me performing such work.

I accept no liability, and the client, by receiving this document, indemnifies me against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the use of the information contained in this document.

It may be possible that the Phase 1: Field Study may have missed palaeontological resources in the project area as outcrops are not always present or visible while others may lie below the overburden of earth and may only be present once development commences.

This report may not be altered in any way and any parts drawn from this report must make reference to this report.

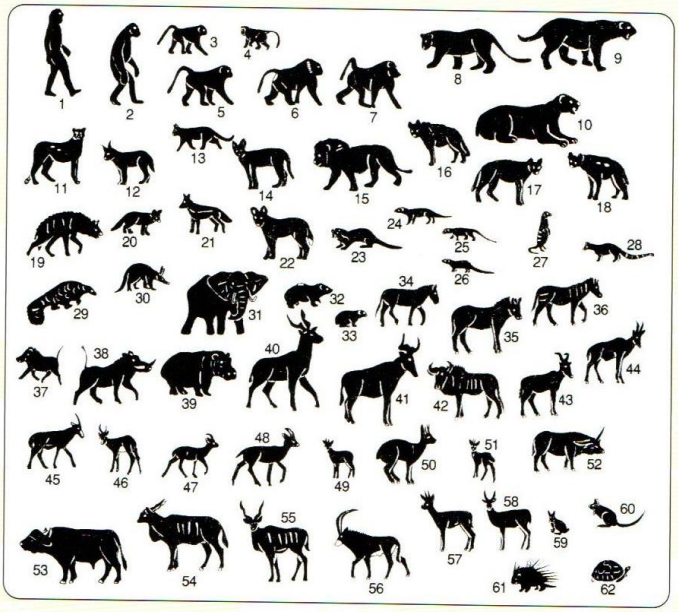
POPI Act 2013 Statement

It provides that everyone has the right to privacy and includes a right to protection against the unlawful collection, retention dissemination and use of personal information contained in this document and pertains to the phone and contact details, signature and contents.

As per the Declaration Section none of the information may be shared without the permission of the author.

Heidi Fourie
2024/10/13

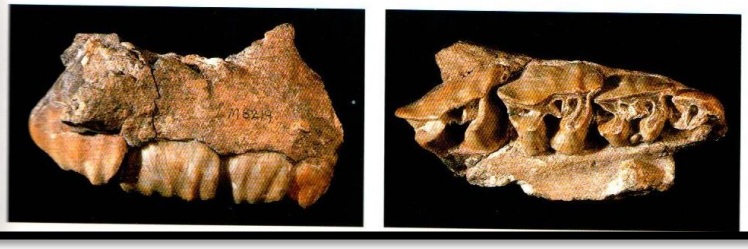
Appendix 1: Example of Quaternary age fossils (MacRae 1999)



Silhouette representation of the larger vertebrates whose remains are represented in Members 1-3 of the Swartkrans site on the outskirts of the town of Krugersdorp. Numbers after each taxon comprise minimum numbers of individuals represented in the remains of the lower bank (Member 1), hanging remnant (Member 1), Member 2 and Member 3 respectively.
Courtesy of Dr C.K. Brain.
Museum of Natural History, Pretoria

FAUNA FROM MEMBERS 1 - 3, SWARTKRANS (Makapanian Mammal Age)
Courtesy Dr B. Brain, - Museum of Natural History, Pretoria

1: *Homo erectus* (man) 1,3,2,0. **2**: *Australopithecus robustus* (robust apeman) 13,87,17,9. **3**: *Parapapio jonesi* 0,8,0,0. **4**: *Cercopithecoides* sp. 1,0,0,0. **5**: *Papio hamadryas robinsoni* 6,38,8,11. **6**: *Theropithecus oswaldi danieli* 1,17,1,14. **7**: *Dinopithecus ingens* 1,26,0,0. **8**: *Panthera pardus* (leopard) 4,12,2,5. **9**: *Dinofelis* sp. (false sabre-toothed cat) 0,1,0,0. **10**: *Megantereon* sp. (dirk-toothed cat) 0,1,0,1. **11**: *Acinonyx jubatus* (cheetah) 0,1,0,1. **12**: *Felis caracal* (caracal) 1,0,0,0. **13**: *Felis lybica* (African wild cat) 0,0,0,1. **14**: *Felis serval* (serval) 1,0,0,0. **15**: *Panthera leo* (lion) 1,1,0,0. **16**: *Hyaena brunnea* (brown hyaena) 1,4,2,3. **17**: *Chasmaporthetes nitidula* (hunting hyaena) 2,8,1,2. **18**:*Crocuta crocuta* (spotted hyaena) 0,2,1,1. **19**: *Proteles* sp. (large fossil aardwolf) 1,1,0,1. **20**: *Vulpes* sp. (fox) 0,2,0,3. **21**: *Canis mesomelas* (black-backed jackal) 3,4,4,5. **22**: Large canid gen. and sp. indet. 0,0,1,1. **23**: *Aonyx capensis* (Cape clawless otter) 2,0,1,2. **24**: *Atilax* sp. (water mongoose) 0,0,1,1. **25**: *Cynictis penicillata* (yellow mongoose) 0,0,1,1. **26**: *Herpestes ichneumon* (large grey mongoose) 1,0,0,0. **27**: *Suricata suricatta* (suricate) 0,0,2,1. **28**: *Genetta tigrina* (large-spotted genet) 0,0,0,1. **29**: *Manis* sp. (pangolin) 0,0,0,1. **30**: *Orycteropus afer* (antbear) 1,0,1,1. **31**: cf. *Elphas* sp. 2,0,0,1. **32**: *Procavia transvaalensis* (large fossil dassie) 3,8,3,5. **33**: *Procavia antiqua* (fossil dassie) 17,16,10,11. **34**: *Hipparion lybicum steytleri* (three-toed horse) 1,1,1,1. **35**: *Equus capensis* (giant Cape horse) 2,6,3,5. **36**: *Equus burchelli* (Burchell's zebra) 0,0,0,1. **37**: *Phacochoerus* sp. (warthog) 1,0,3,1. **38**: cf. *Tapinochoerus meadowsi* (large fossil pig) 1,7,1,1. **39**: *Hippopotamus* sp. (hippopotamus) 1,0,0,1. **40**: Giraffid 0,1,1,1. **41**: *Megalotragus* sp. (giant hartebeest) 0,3,1,3. **42**: *Connochaetes* sp. (wildebeest) 7,19,7,7. **43**: Medium alcelaphine: *Alcelaphus* sp. or *Beatragus* sp. (hartebeest) 3,22,3,6. **44**: *Rabaticerus porrocornutus* 0,2,0,0. **45**: *Damaliscus* sp. (blesbok) 2,4,6,6. **46**: *Antidorcas marsupialis australis* (springbok) 11,0,10,18. **47**: *Antidorcas recki* 0,6,2,1. **48**: cf. *Gazella* sp. (gazelle) 5,6,5,14. **49**: *Oreotragus oreotragus* (klipspringer) 1,0,0,1. **50**: *Oreotragus major* (fossil klipspringer) 0,1,0,0. **51**: *Raphicerus campestris* (steenbok) 1,0,1,3. **52**: *Makapania* sp. (musk ox) 0,3,0,0. **53**: *Syncerus* sp. (buffalo) 2,3,2,3. **54**: *Taurotragus oryx* (eland) 0,0,1,1. **55**: *Tragelaphus strepsiceros* (kudu) 0,4,0,1. **56**: *Hippotragus* cf. *niger* (sable) 0,0,1,3. **57**: *Pelea* sp. (rhebck) 0,2,0,2. **58**: *Redunca arundinum* (reedbuck) 0,1,0,0. **59**: Lagomorph gen. and sp. indet. (hare) 9,0,4,7. **60**: *Pedetes* sp. (springhare) 1,0,1,1. **61**: *Hystrix africaeaustralis* (porcupine) 2,2,1,2. **62**: *Chelonia* indet. (tortoise) 1,0,2,2.



Left: Teeth of the white rhino *Ceratotherium simum* from Makapansgat. **Right**: View from above shows the sharp cutting edges of the tooth row of this predominant grazer. Specimen 170 mm long.
In the collection of the Bernard Price Institute for Palaeontological Research, University of the Witwatersrand, Johannesburg.
Photograph C.S. MacRae

Appendix 2: Protocol for Chance Finds and Management Plan **(1k,l,m)**

This section covers the recommended protocol for a Phase 2 Mitigation process as well as for reports where the Palaeontological Sensitivity is **LOW**; this process guides the palaeontologist / palaeobotanist on site and should not be attempted by the layman / developer. As part of the Environmental Authorisation conditions, an Environmental Control Officer (ECO) will be appointed to oversee the construction activities in line with the legally binding Environmental Management Programme (EMPr).

- The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities.
- For a chance find, the protocol is to immediately cease all construction activities, construct a 30 m no-go barrier, and contact SAHRA for further investigation. Construction workers must be informed that this is a no-go area.
- It is recommended that the EMPr be updated to include the involvement of a palaeontologist for pre-construction training of the ECO or during the digging and excavation phase of the development.
- The ECO must visit the site after clearing, drilling, excavations and blasting and keep a photographic record.
- The developer may be required to survey the areas affected by the development and indicate on plan where the construction / development / mining will take place. Trenches may have to be dug to ascertain how deep the sediments are above the bedrock (can be a few hundred metres). This will give an indication of the depth of the topsoil, subsoil, and overburden, if need be trenches should be dug deeper to expose the interburden.

Mitigation will involve recording, rescue and judicious sampling of the fossil material present in the layers sandwiched between the geological / coal layers. It must include information on number of taxa, fossil abundance, preservational style, and taphonomy. This can only be done during mining or excavations. In order for this to happen, in case of coal mining operations, the process will have to be closely scrutinised by a professional palaeontologist / palaeobotanist to ensure that only the coal layers are mined and the interlayers (siltstone and mudstone) are surveyed for fossils or representative sampling of fossils are taking place.

The palaeontological impact assessment process presents an opportunity for identification, access and possibly salvage of fossils and add to the few good plant localities. Mitigation can provide valuable onsite research that can benefit both the community and the palaeontological fraternity.

A Phase 2 study is very often the last opportunity we will ever have to record the fossil heritage within the development area. Fossils excavated will be stored at a National Repository.

A Phase 2 Palaeontological Impact Assessment: Mitigation will include (SAHRA) -

1. Recommendations for the future of the site.
2. Description and purpose of work done (including number of people and their responsibilities).
3. A written assessment of the work done, fossils excavated, not removed or collected and observed.
4. Conclusion reached regarding the fossil material.
5. A detailed site plan and map.
6. Possible declaration as a heritage site or Site Management Plan.
7. Stakeholders.
8. Detailed report including the Desktop and Phase 1 study information.
9. Annual interim or progress Phase 2 permit reports as well as the final report.
10. Methodology used.

Mitigation involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or excavation, recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and / or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before a Phase 2 may be implemented.

The Mitigation is done in order to rescue representative fossil material from the study area to allow and record the nature of each locality and establish its age before it is destroyed and to make samples accessible for future research. It also interprets the evidence recovered to allow for education of the public and promotion of palaeontological heritage.

Should further fossil material be discovered during the course of the development (*e. g.* during bedrock excavations), this must be safeguarded, where feasible *in situ,* and reported to a palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (*e. g.* Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample.

When a Phase 2 palaeontological impact study is recommended, permission for the development to proceed can be given only once the heritage resources authority has received and approved a Phase 2 report and is satisfied that (a) the palaeontological resources under threat have been adequately recorded and sampled, and (b) adequate development on fossil heritage, including, where necessary, *in situ* conservation of heritage of high significance. Careful planning, including early consultation with a palaeontologist and heritage management authorities, can minimise the impact of palaeontological surveys on development projects by selecting options that cause the least amount of inconvenience and delay.

Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012).

The Palaeontological Society of South Africa (PSSA) does not have guidelines on excavating or collecting, but the following is suggested:

1. The developer needs to clearly stake or peg-out (survey) the areas affected by the mining/ construction/ development operations and dig representative trenches and if possible supply geological borehole data. When the route is better defined, it is recommended that a specialist undertake a 'walk through' of the entire road as well as construction areas, including camps and access roads, prior to the start of any construction activities, this may be done in sections.
2. When clearing vegetation, topsoil, subsoil or overburden, hard rock (outcrop) is found, the contractor needs to stop all work.
3. A Palaeobotanist / palaeontologist (contact SAHRIS for list) must then inspect the affected areas and trenches for fossiliferous outcrops / layers. The contractor / developer may be asked to move structures, and put the development on hold.
4. If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue.
5. After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected.
6. When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once every week).

7. At this stage the palaeontologist / palaeobotanist in consultation with the developer / mining company must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist.

Fossil excavation if necessary, during Phase 2:

1. Photography of fossil / fossil layer and surrounding strata.
2. Once a fossil has been identified as such, the task of extraction begins.
3. It usually entails the taking of a GPS reading and recording lithostratigraphic, biostratigraphic, date, collector and locality information.
4. Using Paraloid (B-72) as an adhesive and protective glue, parts of the fossil can be kept together (not necessarily applicable to plant fossils).
5. Slowly chipping away of matrix surrounding the fossil using a geological pick, brushes and chisels.
6. Once the full extent of the fossil / fossils is visible, it can be covered with a plaster jacket (not necessarily applicable to plant fossils).
7. Chipping away sides to loosen underside.
8. Splitting of the rock containing palaeobotanical material should reveal any fossils sandwiched between the layers.

This document forms part of the Environmental Monitoring Programme. For practical reasons a palaeontologist/palaeobotanist may be required to be on site as predetermined. If any fossil material is discovered then a Phase 2 rescue operation may be necessary, and a permit will be required.

The South African Heritage Resources Agency has the following documents in place:
Guidelines to Palaeontological Permitting policy.
Minimum Standards: Palaeontological Component of Heritage Impact Assessment reports.
Guidelines for Field Reports.
Palaeotechnical Reports (Eastern Cape, North West, Northern Cape, Mpumalanga, Gauteng, Western Cape, Free State, Kwazulu Natal, and Limpopo)

Appendix 3: Table 3: Listing points in Appendix 6 of the Act and position in Report (bold in text).

Section in Report	Point in Act	Requirement
B	1(c)	Scope and purpose of report
B	1(d)	Duration, date and season
B	1(g)	Areas to be avoided
D	1(ai)	Specialist who prepared report
D	1(aii)	Expertise of the specialist
F Figure 3	1(h)	Map
F, B	1(ni)(iA)	Authorisation
F, B	1(nii)	Avoidance, management, mitigation and closure plan
G Table 1	1(cA)	Quality and age of base data
G Table 2	1(cB)	Existing and cumulative impacts
G, D	1(f)	Details or activities of assessment
G	1(j)	Description of findings
H	1(e)	Description of methodology
H	1(i)	Assumptions
J	1(o)	Consultation
J	1(p)	Copies of comments during consultation
J	1(q)	Information requested by authority
Declaration	1(b)	Independent declaration
Appendix 2	1(k)	Mitigation included in EMPr
Appendix 2	1(l)	Conditions included in EMPr
Appendix 2	1(m)	Monitoring included in EMPr
D	2	Protocol or minimum standard

Appendix 4: Impact Statement.

Most of the development footprint is situated on the Berea Formation (Qb) of the Quaternary with a **VERY HIGH** palaeontological sensitivity. The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact.

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be irreversible. With Mitigation the impact will be moderate and the cumulative impact is low. Impacts on palaeontological heritage during the mining/construction and pre-mining/preconstruction phase could potentially occur and is regarded as having a high possibility. The significance of the impact occurring will be as below:

Impact	Pre-Mitigation	Post- Mitigation
The extent of the impact only extends in the region of the development activity footprint and may include transport routes.	2	2
The expected duration of the impact is assessed as potentially permanent.	5	5
The activity will lead to an impact that is in all practical terms permanent.	5	5
The intensity/magnitude of the impact is high as it is destructive.	5	3
The probability of the impact occurring will be definite and will occur regardless of preventative measures.	5	4
S= (E2+D5+R5+M5) P5 S = (2+5+5+3)4	S = 85 High (>60).	S = 30 Medium (30-60)

Small parts (to the east) of the development footprint is situated on the Quternary geological layer with a **MODERATE** palaeontological sensitivity. The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact.

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner. With Mitigation the impact will be medium and the cumulative impact is low. Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur but are regarded as having a moderate possibility. The significance of the impact occurring will be:

Impacts	**Pre-Mitigation**	**Post-Mitigation**
The extent of the impact only extends in the region of the development activity footprint and may include transport routes.	2	2
The expected duration of the impact is assessed as potentially permanent.	5	5
The activity will lead to an impact that is in all practical terms permanent.	5	5
The intensity/magnitude of the impact is moderate as it may continue in a modified way.	3	3
The probability of the impact occurring will be high.	4	4
S = (2+5+5+3) 4	S = 30 Medium (30-60).	S = 30 Medium

Phase 1 and Phase 2 will have the same impacts for site establishment, operations and decommissioning.

Mitigation: The following should be conserved:

- If any palaeontological material is exposed during clearing, digging, excavating, or drilling SAHRA must be notified. All construction activities must be stopped, a 30 m no-go barrier constructed, and a palaeontologist should be called in to determine proper mitigation measures.
- The Chance Fossil Find Protocol must be followed.
- All Phases whether it be pre-construction clearing, construction and operational (routine maintenance) will have the same impact as the geological layers are intruded.
- Outcrops should be avoided and as far as possible, existing roads should be used.
- All infrastructure will have either a HIGH or MEDIUM sensitivity.

Impacts to be assessed (WSP)

Palaeontological	***Site establishment for Phase 2 (simultaneous to Phase 1 operation):*** Damage/destruction of palaeontological resources
	Operational Phases (note there are two of these required for the impact assessment – Phase 1 and 2): • Damage/destruction of palaeontological resources
	Decommissioning and Closure Phases: • No need areas to be disturbed so not likely that this phase will require further assessment
	Interfaces: None currently envisaged
	Other information required: None currently envisaged