PALAEONTOLOGICAL IMPACT ASSESSMENT

For the proposed Blikana Dam Bulk Water Supply Scheme by Joe Gqabi District Municipality in Senqu Local Municipality, Joe Gqabi District, Eastern Cape Province

September 2025

COMPILED FOR: Abantu Environmental Services (Pty) Ltd

Site Visit (Phase 2) Report

Short *Curriculum vitae:* Dr. S.S. Mavuso obtained his PhD in Geology at the University of the Witwatersrand, where his doctoral research focused on the sequence stratigraphy of the upper Koobi Fora Formation (Turkana Basin, Kenya) and its implications for hominid habitats in the Pleistocene. He also holds an MSc in Geology and a BSc Honours in Geology and Palaeontology from the University of the Witwatersrand, as well as a BSc degree in Geology, Archaeology, and Environmental and Geographical Sciences from the University of Cape Town. In addition, he was awarded an Erasmus Mundus scholarship, spending time at the University of Toulouse III – Paul Sabatier, France. Dr. Mavuso is a Plio-Pleistocene palaeogeologist with a focus on reconstructing past environments linked to human evolution and ecological change through time. His expertise spans palaeontology, palaeoanthropology, sedimentology, sequence stratigraphy, geochemistry, geochronology, and micromorphology.

He is currently a Lecturer in the Department of Geology at Rhodes University, where he teaches sedimentology, stratigraphy, and palaeoanthropology, and serves as an Adjunct Professor at Arizona State University. He also advises the Eastern Cape Provincial Heritage Resources Authority. Dr. Mavuso has worked extensively at major fossil localities in southern and eastern Africa, including Elandsfontein, Sterkfontein, Gondolin, Laetoli, Olduvai Gorge, Koobi Fora, and South Luangwa. He has also conducted research in the Karoo Basin of South Africa and regularly supervises postgraduate students working in these deposits. His work is complemented by significant involvement in science communication and heritage outreach, particularly in advancing public engagement with African Palaeosciences.

Declaration of Independence

This report has been compiled by Dr. Silindokuhle Mavuso, of the Rhodes University, sub-contracted by Abantu Environmental Service (Pty) Ltd, 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: Dr. Silindokuhle Mavuso

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

EXECUTIVE SUMMARY

Abantu Environmental Services (Pty) Ltd was appointed to conduct a palaeontological impact study for the proposed Blikana Dam Bulk Water Supply Scheme in the Senqu Local Municipality, Joe Gqabi District, Eastern Cape Province. As part of this process, Dr. Silindokuhle Mavuso, an independent palaeontologist and geologist, was engaged to conduct a Palaeontological Impact Assessment. This report was prepared in line with the Environmental Impact Assessment Regulations of 2014 and the National Environmental Management Act (Act No. 107 of 1998), which require the protection of South Africa's fossil heritage. The Blikana Dam project involves the construction of a new dam on the tributaries of the Blikana River, a water treatment works, several reservoirs, and a pipeline network to provide water to surrounding communities. The area where the project will be built is known to contain ancient rocks that often preserve fossils of early dinosaurs, amphibians, reptiles, and other prehistoric life. These fossils are of great scientific value, as they help researchers understand the history of life on Earth. Thus, a field visit is warranted. Although no fossils were documented in this area, the type of rocks in the area means that fossils could still be uncovered during a site visit. To ensure that any discoveries are properly managed, a Fossil Chance Find Protocol will be included in the Environmental Management Programme. This protocol sets out clear steps for construction teams to follow if fossils are found, including halting work in the immediate area and contacting a professional palaeontologist. With these precautionary measures in place, the project can move forward responsibly, while ensuring that South Africa's fossil heritage is protected for future generations.

1. INTRODUCTION

Abantu Environmental Services (Pty) Ltd engaged the services of [Specialist's Name], an independent specialist in palaeontology and geology, to conduct a Palaeontological Impact Assessment. This report was prepared in accordance with the requirements set out in Appendix 6 of the 2014 Environmental Impact Assessment Regulations, as stipulated under Section 24(5) of the National Environmental Management Act (Act No. 107 of 1998), which mandates a thorough assessment of palaeontological heritage resources.

South Africa possesses an unparalleled palaeontological heritage, offering invaluable insights into the history of life on Earth; from the earliest microbial life and the first vertebrates to the rise of dinosaurs, mammals, and ultimately humans. Beyond its already significant contributions, the country continues to yield important fossil discoveries, underscoring the enduring relevance of palaeontology and palaeoanthropology in the region. These findings not only enrich South Africa's scientific legacy but also enhance our global understanding of prehistoric life and continental evolution, such as that of Gondwana. Therefore, it is essential to protect and conserve fossil-rich deposits to ensure they remain available for future research and educational purposes. The Heritage Act of South Africa stipulates that fossils and fossil sites may not be altered or destroyed.

This document serves to assess the likelihood of encountering fossil resources within the study area that may be impacted by the proposed development of the Blikana Dam Bulk Water Supply Scheme, situated within the Senqu Local Municipality, under the jurisdiction of the Joe Gqabi District Municipality, Eastern Cape Province (Figure 1; Figure 2). The proposed development entails the construction of the Blikana Dam on the eastern and western tributaries of the Blikana River, upstream of abstraction point C-B1, as well as associated infrastructure. Water released from the dam will be abstracted from a pick-up weir at point C-B2 and conveyed to a new 7.5 Mℓ/day Water Treatment Works (WTW), where it will be treated, stored, and pumped to a network of command and supply reservoirs. These include

Command Reservoirs CR1 (9 Mℓ), CR2 (2 Mℓ) and CR3 (2.5 Mℓ), as well as Supply Reservoirs SR1 (0.8 Mℓ), SR2 (0.8 Mℓ), and a 0.2 Mℓ reservoir at Dangershoek. The project further involves the installation of extensive rising mains and gravity pipelines, totalling more than 125 km in length, to distribute potable water to various wards and rural communities in the region.

Given the scale and nature of these activities, a Palaeontological Impact Assessment is essential to identify and mitigate potential impacts on palaeontological resources within the affected area.

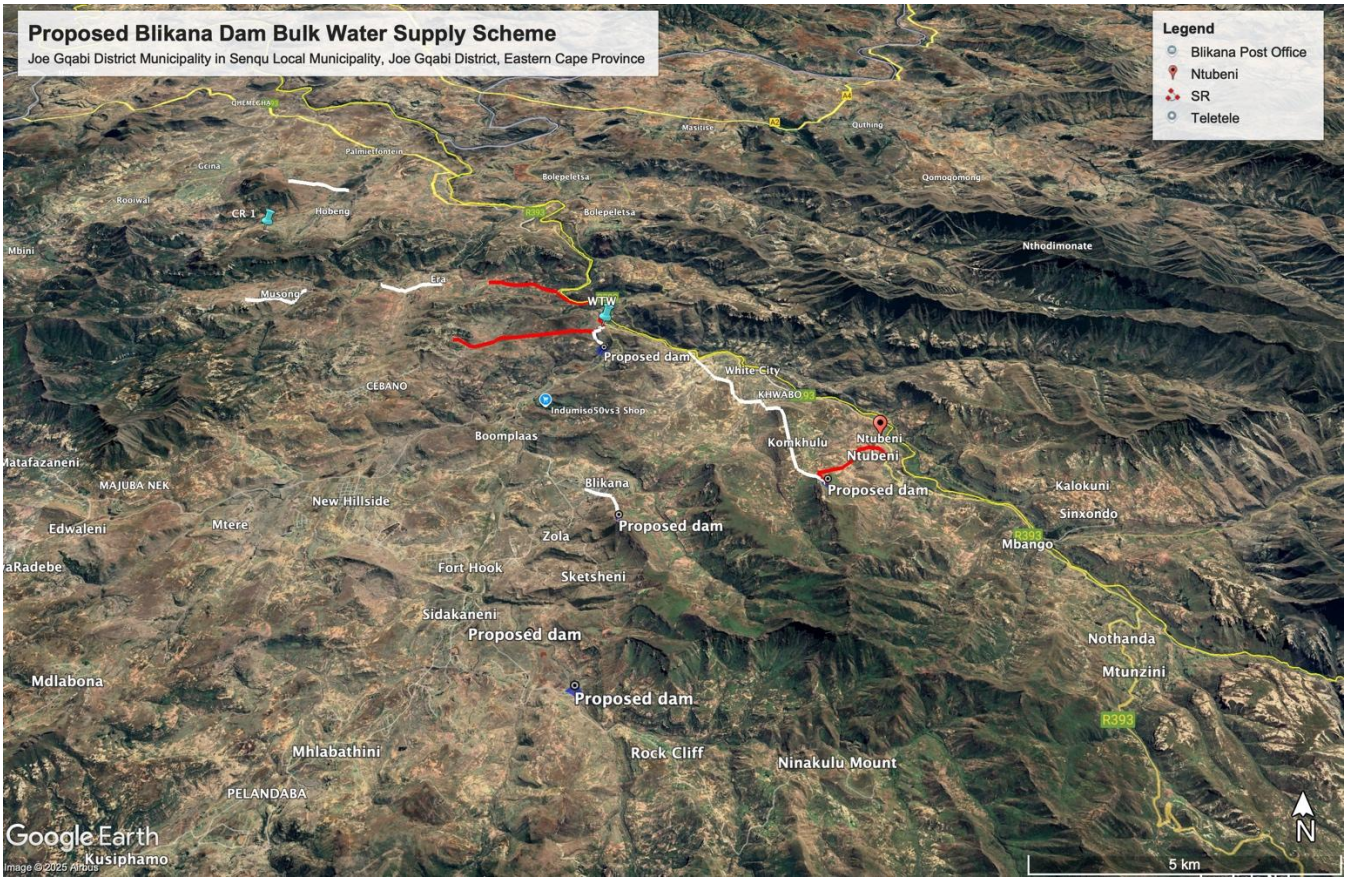

Figure 1. Images showing satellite map of the proposed development in relation to the broader geographical.

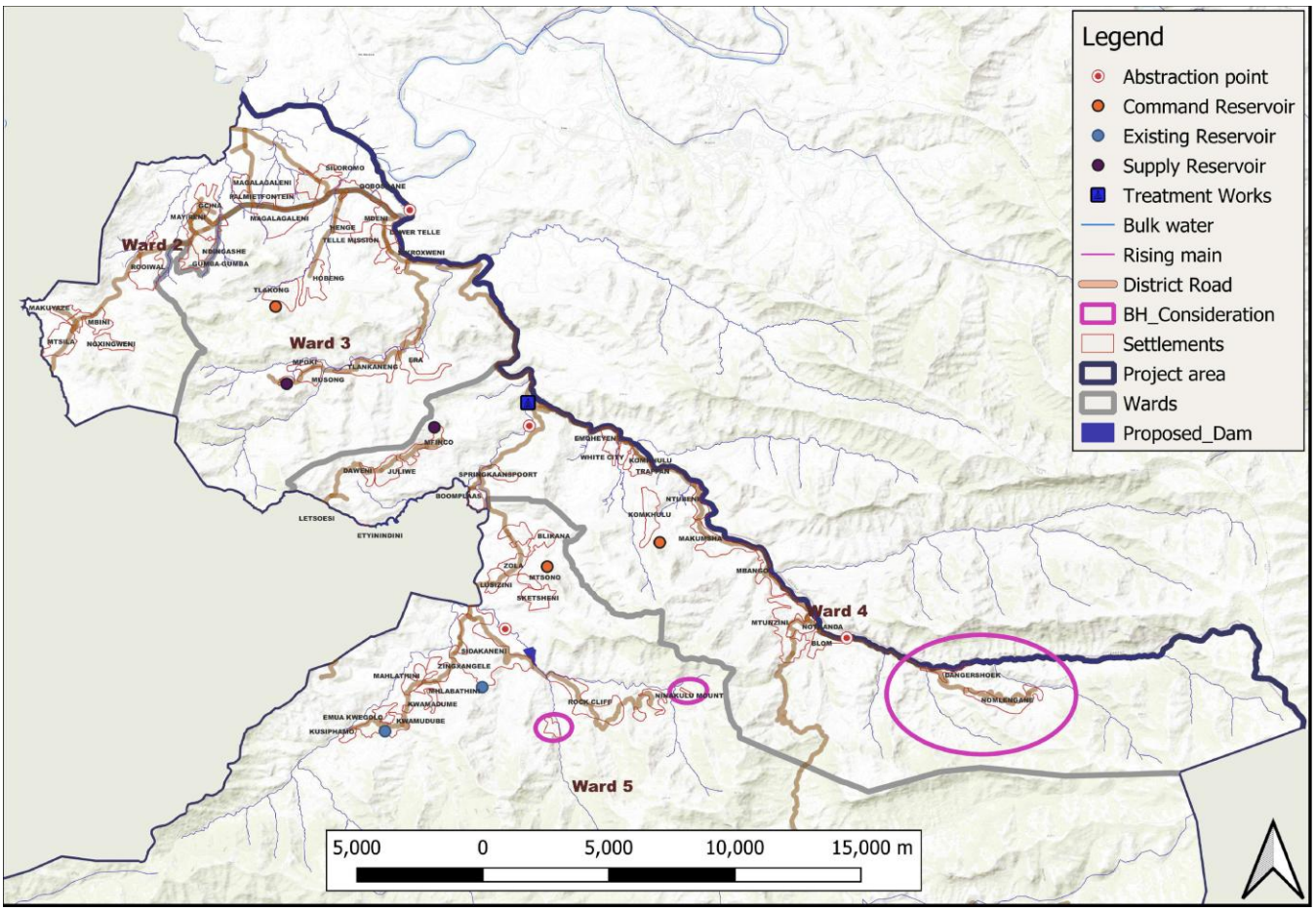

Figure 2. Images showing topographical map of the proposed development in relation to the broader geographical.

1.1. LEGISLATION

National Heritage Resources Act (25 of 1999)

Cultural Heritage in South Africa, includes all heritage resources, is protected by the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include *"all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens".*

The identification, evaluation and assessment of any cultural heritage site, artefact or finds in the South African context is required and governed by the following legislation:

- National Environmental Management Act (NEMA) Act No. 107 of 1998
- National Heritage Resources Act (NHRA) Act No. 25 of 1999

- Minerals and Petroleum Resources Development Act (MPRDA) Act No. 28 of 2002
- Notice 648 of the Government Gazette 45421- general requirements for undertaking an initial site sensitivity verification where no specific assessment protocol has been identified.

The next section in each Act is directly applicable to the identification, assessment, and evaluation of cultural heritage resources.

GNR 982 (Government Gazette 38282, 14 December 2014) promulgated under the National Environmental Management Act (NEMA) Act No. 107 of 1998

- Basic Assessment Report (BAR) - Regulations 19 and 23
- Environmental Impacts Assessment (EIA) - Regulation 23
- Environmental Scoping Report (ESR) - Regulation 21
- Environmental Management Programme (EMPr) - Regulations 19 and 23

National Heritage Resources Act (NHRA) Act No. 25 of 1999

- Protection of Heritage Resources - Sections 34 to 36
- Heritage Resources Management - Section 38

The NEMA (No. 107 of 1998) states that an integrated EMP should (23:2 (b)) "…identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage"

In agreement with legislative requirements, EIA rating standards as well as SAHRA policies a comprehensive and legally compatible PIA report has been compiled.

Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken, moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

This Palaeontological Impact assessment forms part of the Heritage Impact Assessment (HIA) and adheres to the conditions of the Act. According to Section 38(1), an HIA is required to assess any potential impacts to palaeontological heritage within the development footprint where:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length.
- the construction of a bridge or similar structure exceeding 50 m in length.
- any development or other activity which will change the character of a site—
    - exceeding 5 000 m^2 in extent; or
    - involving three or more existing erven or subdivisions thereof; or
    - involving three or more erven or divisions thereof which have been consolidated within the past five years; or
    - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority or
    - the re-zoning of a site exceeding 10 000 m² in extent or

any other category of development provided for in regulations by SAHRA or a Provincial heritage resources authority.

2. METHODOLOGY AND TERMS OF REFERENCE

Terms of reference: Dr. S.S. Mavuso is a palaeogeologist commissioned to conduct a palaeontological impact assessment: 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.

This Palaeontological Impact assessment assesses the development's potential impact on the fossil heritage. This Palaeontological Assessment is part of the HIA Report.

The PIA's goals are to:

1) identify the palaeontological significance of the rock formations in the footprint;

2) evaluate the palaeontological magnitude of the formations;

3) clarify the impact on fossil heritage; and

4) make recommendations for how the developer might protect and minimize potential harm to fossil heritage, according to the "SAHRA APM Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports".

Calculations of the palaeontological state of each stratigraphic and lithological segment and the potential impact of development on fossil history consider the palaeontological status of the rocks, the type of development, and the amount of bedrock removed.

The preparation of the palaeontological study will be mostly based on assessing the geology of the area to assess for rocks that may house potentially fossiliferous rock units. This will be largely based on geological maps looking at formations and groups etc. The Provisional DFFE Screening Tool, the SAHRIS Palaeosensitivity map, all Palaeontological Impact Assessment reports for the same area, Google Earth images, topographical and geological maps, as well as academic articles about specimens from the development area and Assemblage Zones, are all used to create Palaeontological Impact Assessments. This will include a plot of nearby collected fossil data in relation to the site being assessed. The range of this activity will be

done at a 100km radius. Should it produce abundant fossil, particularly near the development site, the scale of the scope will go into more recent literature as well as procuring more fossil databases, particularly from museums. As most geological data was done decades ago by the Council of Geoscience and the South African Committee for Stratigraphy, a research study shall also be conducted for updated information by both published literature as well as senior postgraduate work procured from all the schools of geology and palaeontology in the country.

3. GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

The proposed Blikana Dam Bulk Water Supply Scheme is located within the Senqu Local Municipality of the Joe Gqabi District, Eastern Cape Province, an area underlain by sedimentary rocks of the Karoo Supergroup. The study area is situated within the eastern part of South Africa's Main Karoo Basin, one of the most extensive sedimentary basins in Gondwana. Within this part of the basin, the relevant stratigraphy belongs to the upper units of the Karoo Supergroup, specifically the Late Triassic to Early Jurassic Stormberg Group. The Elliot Formation, which underlies the aeolian Clarens Formation and rests unconformably on the Molteno Formation, is the principal unit of concern in this PIA (Figure 3). It is composed mainly of red to purple mudstones interbedded with sandstones deposited in fluvial and floodplain environments that record a progressive shift from semi-arid to increasingly arid climatic conditions (Bordy et al., 2004a; Eriksson, 1985). The Elliot Formation is further divided into the Lower Elliot Formation (LEF) and Upper Elliot Formation (UEF), separated by a regional unconformity (Bordy et al., 2005). The LEF is dominated by meandering fluvial systems and thicker mudstone intervals, while the UEF is characterised by sheet-like sandstones and well-developed palaeosols, reflecting reduced accommodation space and greater climatic seasonality (Bordy et al., 2004b).

From a palaeontological perspective, the Elliot Formation is globally significant. It preserves diverse vertebrate faunas, including some of the earliest dinosaurs, as well as amphibians, reptiles, and abundant trackways. The LEF has yielded temnospondyls, early archosauriforms, and basal sauropodomorphs, whereas the UEF is especially rich in prosauropod dinosaurs such as Massospondylus, early ornithischians, and theropods (Anderson et al., 1998; Barrett, 2009; Viglietti et al., 2022). These assemblages document a critical evolutionary transition from Triassic to Jurassic ecosystems in Gondwana and make the Elliot Formation a unit of exceptional heritage value.

Supergroup / Group	**Formation(s)**	**Age**	**Key Lithology / Fossil Significance**
Drakensberg Group (Karoo Igneous Province)	Drakensberg Group	Early Jurassic (~183 Ma)	Extensive flood basalts; capping unit of Karoo sequence
Stormberg Group	Clarens Formation	Early Jurassic (Pliensbachian–Toarcian)	Aeolian sandstones, desert deposits
	Elliot Formation (Upper & Lower)	Late Triassic (Norian–Rhaetian) to Early Jurassic (Hettangian–Pliensbachian)	Mudstones and sandstones; abundant vertebrate fossils incl. early dinosaurs (Massospondylus), theropods, early mammals
	Molteno Formation	Late Triassic (Carnian)	Fluvial sandstones; rich in plant fossils and insect fauna
Beaufort Group	Tarkastad Subgroup	Early Triassic	Vertebrate-rich deposits (therapsids, archosaurs)
	Adelaide Subgroup	Late Permian	Famous therapsid fossil assemblages; record of end-Permian extinction
Ecca Group	Numerous formations (e.g. Vryheid, Volksrust, Pietermaritzburg)	Early to Middle Permian	Predominantly shales and sandstones; coal deposits, Glossopteris flora
Dwyka Group	Dwyka Formation	Late Carboniferous–Early Permian	Glacial diamictites, tillites; evidence of Gondwanan ice age

Table 1. The stratigraphy of the Karoo Supergroup showing stratigraphic context of the Elliot Formation

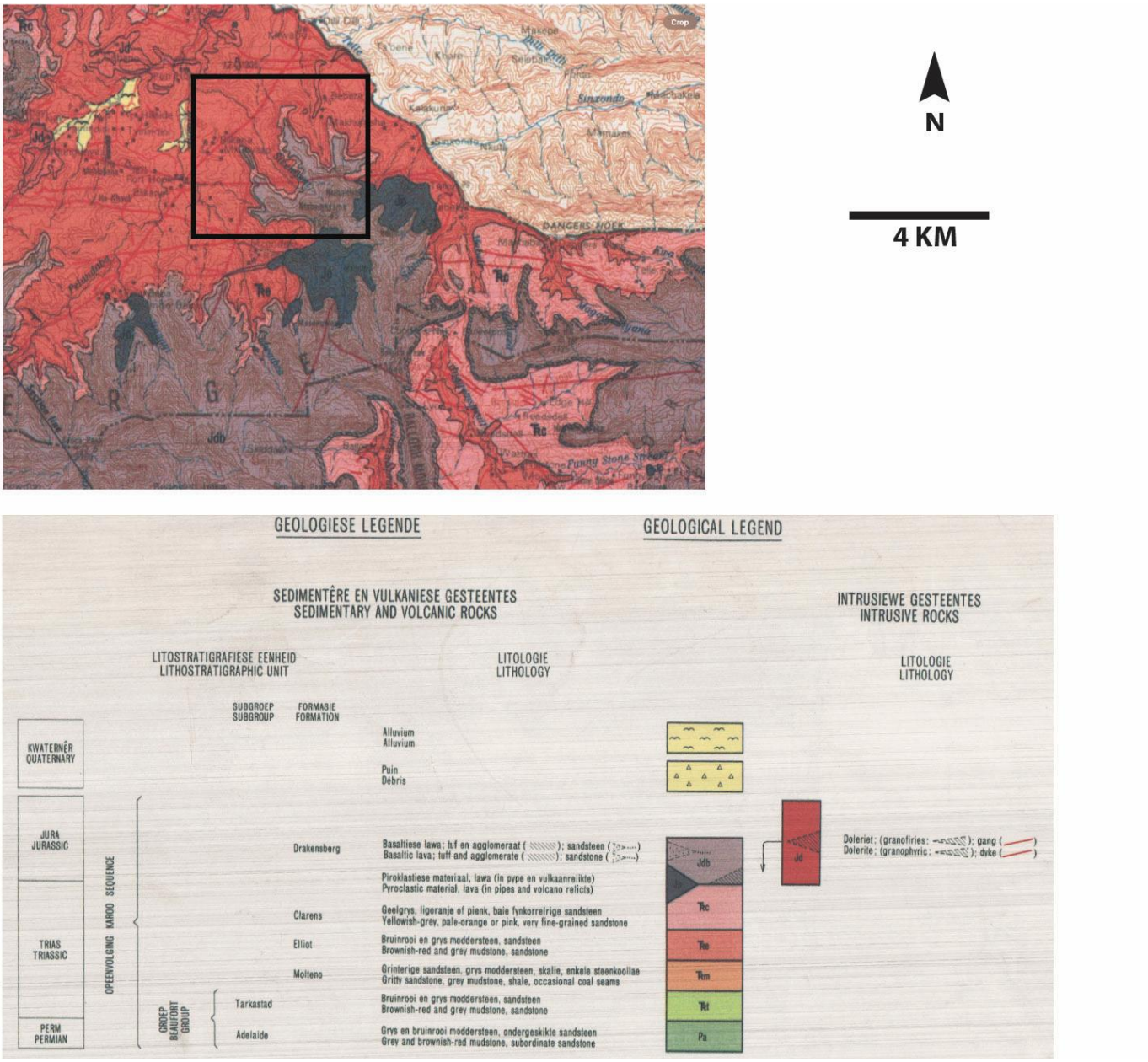

Figure 3. 1:250 000 km geological map (from Council for geoscience) showing the area development site with the proposed project site highlighted.

3.1. THE KAROO SUPERGROUP

The Karoo Supergroup in southern Africa represents a thick and laterally extensive sedimentary succession deposited from the Late Carboniferous through to the Early Jurassic (Johnson, 1991; Catuneanu et al., 1998). It formed within a retroarc foreland basin system, created by flexural subsidence of the Gondwanan lithosphere in response to loading from the adjacent Cape Fold Belt (Lock, 1980; Pysklywec & Mitrovica, 1999). This stratigraphy preserves a diverse range of depositional environments including glacial, fluvial, lacustrine, aeolian, and eventually volcanic settings, reflecting significant tectonic and climatic changes

across Gondwana. In the Main Karoo Basin of South Africa, the upper part of the succession is referred to as the “Stormberg Group,” comprising the Molteno, Elliot, and Clarens formations. These were deposited during the Late Triassic to Early Jurassic and are arranged as unconformity-bounded tectono-sedimentary sequences. Their accumulation was strongly influenced by episodic loading and unloading of the Cape Fold Belt, which controlled subsidence rates, depositional style, and sediment supply (Catuneanu et al., 1998; Bordy et al., 2004a).

The Karoo Supergroup is globally significant for its fossil record, which documents the evolution of ecosystems on the southern supercontinent. It preserves a near-continuous sequence of vertebrate and plant assemblages that have been critical in reconstructing the history of Gondwanan life (Rubidge, 2005).

3.2. THE ELLIOT FORMATION

The Elliot Formation was deposited during the Late Triassic to Early Jurassic and forms the central unit of the Stormberg Group. It rests unconformably on the Molteno Formation, with the boundary representing a regional second-order sequence boundary that marks an abrupt lithological and palaeoenvironmental change across the basin (Bordy et al., 2005). The Elliot Formation is composed predominantly of red to purple mudstones interbedded with fine- to medium-grained sandstones. These reflect deposition in fluvial systems, which in the Lower Elliot Formation (LEF) were dominated by moderately meandering rivers with extensive overbank areas, formed under semi-arid climatic conditions (Bordy et al., 2004b). Towards the Upper Elliot Formation (UEF), the deposits become increasingly arid in character, with sheet-like sandstones interbedded with palaeosols, reflecting the development of more seasonal and drier conditions (Eriksson, 1985; Bordy et al., 2004a). The formation can be subdivided into two main units separated by an additional basin-wide unconformity. This internal stratigraphic break distinguishes the LEF from the UEF and is supported by marked differences in fluvial

architecture, palaeocurrent directions, sandstone composition, and the abundance of palaeosols (Bordy et al., 2004a).

3.3. ELLIOT FORMATION FOSSILS

The Elliot Formation is one of the most fossiliferous units of the Karoo Supergroup and is particularly important for its vertebrate assemblages. Fossils are concentrated in fine-grained overbank deposits and palaeosol horizons, where conditions were favourable for the preservation of bone, burrows, and trace fossils. The Lower Elliot Formation has yielded diverse faunas, including temnospondyl amphibians, early archosauriform reptiles, and basal sauropodomorph dinosaurs (Anderson et al., 1998; Bordy et al., 2004a). The Upper Elliot Formation is especially significant for its abundant and diverse dinosaur record, including prosauropods such as Massospondylus, early ornithischians, and theropods. Trace fossils are also abundant, with numerous dinosaur trackways providing evidence of locomotion and behaviour (Visser & Botha, 1980; Bordy et al., 2004b; Barrett, 2009; Barrett et al., 2019).The fossil record of the Elliot Formation illustrates a major faunal turnover linked to climatic change. Amphibians and other moisture-dependent taxa are common in the LEF but decline upwards, while dinosaur diversity increases substantially in the UEF, reflecting adaptation to increasingly arid environments (Bordy et al., 2004a; Bordy et al., 2004b; Viglietti et al., 2022).

4. PALAEONTOLOGICAL SENSITIVITY

The palaeontological sensitivity of the proposed development area is shown in Figure 4, which illustrates the likelihood of fossil occurrence and preservation potential. Based on the South African Heritage Resources Information System (SAHRIS) Palaeosensitivity Map, areas highlighted in red correspond to the Elliot Formation and are classified as having very high palaeontological sensitivity. In contrast, areas shown in green are of moderate sensitivity,

representing the Drakensberg Group Lavas as well as soils and alluvium, which generally have a low potential for fossil preservation.

Given the high sensitivity associated with the Elliot Formation within the study area, as identified in the SAHRIS database, a field survey is recommended.

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. Map and colour guide for palaeosensitivity of the study area; development marked in black dots.

5. SITE VISIT

A non-intrusive site investigation was conducted on the 01 October 2025 by Dr. S. Mavuso. Locations were visited to understand the landscape and look for potentially fossilifeous outcrops (Figure 5 to Figure 11). The assessment revealed that the area is largely covered by grassland with hilly areas showing significant outcrop (Figure 5, Figure 6). There were areas with colluvium (Figure 7). These areas would mostly show Elliot Formation arenites (Figure 8) that may have pebble lag deposits (Figure 9) as well as doleritic intrusions (Figure 10). The riverbeds on the road that will form part of the development also has similar geology as seen in the riverbeds; most of the sandstones form the riverbed with river cobbles and colluvium comprised of mafic (dark, grey) volcanics (Figure 13). No fossils or trace fossils were identified during the field investigation.

Figure 5. Landscape of the development area showing hilly outcroup (27° 35' 3,192" E 30° 29' 28,632" S).

Figure 6. Landscape of the development area showing hilly outcroup (27° 37' 10,884" E 30° 31' 23,712" S).

Figure 7. Photo showing colluvium in development area (27° 34' 41,064" E 30° 29' 50,268" S).

Figure 8. Figure showing Elliot Formation sandstones arenite (27° 36' 15,18" E 30° 33' 8,694" S)

Figure 9. Elliot Formation arenites in the Blikana development with pebble lag deposit. (27° 39' 40,098" E, 30° 37' 53,754" S)

Figure 10. Photo showing road by riverbed contact between dark grey volcanics and sandstones of the Elliot Formation arenites in the Blikana development (27° 36' 23,64" E, 30° 29' 30,12" S)

Figure 3. Photo showing riverbed contact between dark grey volcanic clasts and sandstones of the Elliot Formation arenites in the Blikana development (27° 35' 43,932" E, 30° 35' 31,428"S)

6. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this assessment, the proposed Blikana Dam Bulk Water Supply Scheme is located within the **Elliot Formation (Stormberg Group, Karoo Supergroup)**, which is internationally recognised for its high fossil potential. The Elliot Formation is well documented for yielding important vertebrate fossils, including early dinosaurs, mammal-like reptiles, and other Triassic–Jurassic fauna, as well as trace fossils of significant scientific value. While no fossils were directly recorded during this assessment, the underlying geology indicates a **moderate to high probability** of fossil material being unearthed during excavation activities associated with dam construction, reservoir basin development, and trenching for bulk pipelines.

Given this potential, it is strongly recommended that a **Fossil Chance Find Protocol** be incorporated into the project's Environmental Management Programme (EMPr). This protocol will ensure that if fossil remains are exposed during construction, work in the immediate vicinity will be temporarily suspended and a qualified palaeontologist will be contacted to evaluate the find. Any scientifically valuable specimens must be recovered, documented, and curated in line with the requirements of the National Heritage Resources Act (Act No. 25 of

1999). This approach allows the project to proceed while safeguarding heritage resources of national and global significance.

From a palaeontological standpoint, the sensitivity of the Elliot Formation means that precautionary measures are essential across the entire development footprint. While no pre-construction mitigation is required, the following recommendations should be implemented during the construction phase to manage potential fossil discoveries:

- **ECO Awareness**: The Environmental Control Officer (ECO) should be trained to recognise fossil material and be aware of the procedures to follow in case of a discovery.
- **Construction Team Induction**: Site managers and supervisors must be briefed on the possibility of fossil finds and the correct steps to follow under the Chance Find Protocol.
- **Exposure Monitoring**: Excavated exposures, particularly in mudstones and sandstones, should be visually inspected for fossil remains.
- **Palaeontologist Notification**: Any significant fossil finds must be reported immediately to a qualified palaeontologist for assessment, recovery, and recording.
- **Specimen Curation**: All scientifically valuable material recovered should be properly recorded, sampled, and curated by the palaeontologist, with costs borne by the developer as part of their environmental responsibility.

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Appendix 1: Fossil Chance Finds Procedure

PROCEDURE: CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL

Introduction

This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training

Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO. It is recommended that copies

of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared if accidental discovery of fossil material takes place.

Actions to be taken

One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

i The ECO or site agent must ensure that all **work ceases** immediately in the vicinity of the area where the fossil or fossils have been found;

ii The ECO or site agent must **inform HWC of the find immediately.** This information must include photographs of the findings and GPS co-ordinates**;**

iii The ECO or site agent must compile a **Preliminary Report and fill in the *Fossil Discoveries: HWC Preliminary Record Form*** within 24 hours without removing the fossil from its original position. The **Preliminary Report** records basic information about the find including:

- The date
- A description of the discovery
- A description of the fossil and its context (e.g. position and depth of find) Where and how the find has been stored
- Photographs to accompany the preliminary report (the more the better):
    - A scale must be used

- Photos of location from several angles Photos of vertical section should be provided
- Digital images of hole showing vertical section (side);
- Digital images of fossil or fossils.

iv Upon receipt of this **Preliminary Report**, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

v **Exposed finds must be stabilized where they are unstable and the site capped, e.g. with a plastic sheet or sand bags.** This protection should allow for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilization.

vi If the find cannot be stabilized, **the fossil may be collect with extreme care** by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the fossil material and any breakage of fossil material must be avoided at all costs.

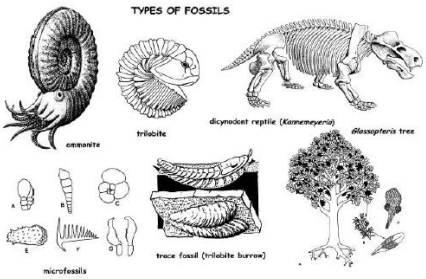
No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: HWC PRELIMINARY RECORDING FORM			
Name of project			
Name of fossil location			
Date of discovery			
Description of situation in which the fossil was found:			
Description of context in which the fossil was found:			
Description and condition of fossil identified:			
GPS coordinates:	Lat:	Long:	
If no co-ordinates available then please describe the location:			
Time of discovery:			
Depth of find in hole:			
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)		
	Fossil from different angles		
	Wider context of the find		
Temporary storage (where it is located and how it is conserved)			
Person identifying the fossil	Name: Contact:		
Recorder:	Name: Contact:		
Photographer	Name: Contact:		

Palaeontology: what is a fossil?

Fossils are the traces of ancient life (animal, plant or microbial) preserved within rocks and come in two forms:

- Body fossils preserve parts, casts or impressions of the original tissues of an organism (e.g. bones, teeth, wood, pollen grains); and
- Trace fossils such as trackways and burrows record ancient animal behaviour.



How to report chance fossil finds: What should I do if I find a fossil during construction/mining?

If you think you have identified a fossil:

Immediately inform the ECO or Site Agent. He/she will then contact HWC and write a report and if necessary operations will stop in that specific area until the fossil is recovered

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Types of palaeontological finding - What does a fossil look like?

Fossils vary in size, from fossilised tree trunks and dinosaur bones down to very small animals or plants. Finds can be **individual fossils** (one isolated wood log or bone) or **clusters and beds** (several bones, teeth, animal or plant remains, trace fossils in close proximity or bones resembling part of a skeleton). A bed of fossils is a layer with many fossil remains.

Below there is a list of few examples of fossils which may be identified during excavations in the Western Cape.

Image	Description	Image	Description
	Leaves		Snail shells and other shells
	Fossil wood		Bones of larger animals
	The remains of fish and marine life (e.g. teeth, scales, starfish)		Large burrows made by moles and other animals
	Stromatolites		Traces made by burrowing insects (ants, wasps, dung-beetles etc.).
	Animal footprints		

Images provided by Dr John Almond

Text by HWC's Archaeology, Palaeontology & Meteorites Committee June 2016