Appendix G8: Palaeontology

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Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

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SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

REPORT TITLE

SOUFFLET MALT FACTORY PROJECT

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with '*the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

1. SPECIALIST INFORMATION

Title of Specialist Assessment	Palaeontology
Specialist Company Name	Banzai Environmental (Pty) Ltd
Specialist Name	Elize Butler
Specialist Identity Number	[redacted]
Specialist Qualifications:	MSc
Professional affiliation/registration:	PSSA
Physical address:	14 Eddie de Beer, Bloemfontein
Postal address:	14 Eddie de Beer, Bloemfontein
Postal address	14 Eddie de Beer, Bloemfontein
Telephone	[redacted]
Cell phone	[redacted]
E-mail	[redacted]

2. DECLARATION BY THE SPECIALIST

I, Elize Butler. declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing –
    - any decision to be taken with respect to the application by the competent authority; and;
    - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.

Signature of the Specialist

Banzai Environmental

Name of Company:

10-07-2024

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Elize Butler, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

[redacted]

Signature of the Specialist

Banzai Environmental.

Name of Company

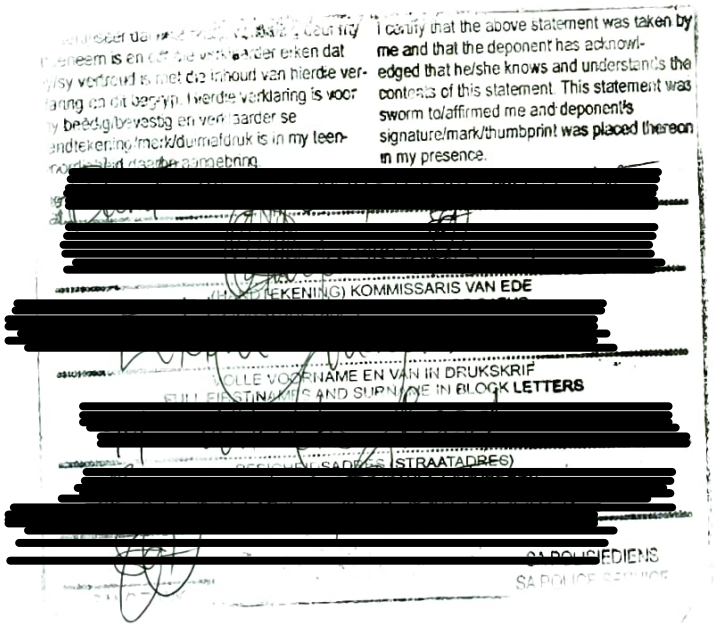
10-07-2024

Date

Signature of the Commissioner of Oaths

10-07-2024

Date


I certify that the above statement was taken by me and that the deponent has acknowledged that he/she knows and understands the contents of this statement. This statement was sworn to/affirmed me and deponent's signature/mark/thumbprint was placed thereon in my presence.

[redacted]

KOMMISSARIS VAN EDE

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FULL FIRST NAMES AND SURNAME IN BLOCK LETTERS

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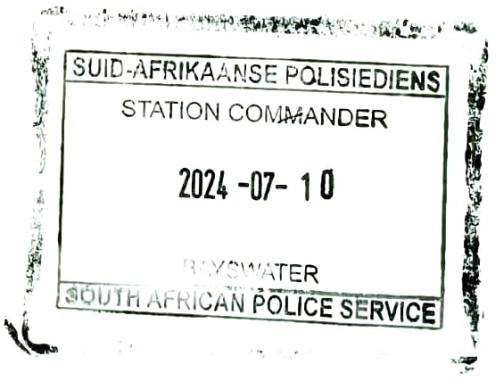
SA POLICE SERVICE



BANZAI ENVIRONMENTAL

PALAEONTOLOGICAL IMPACT ASSESSMENT

SOUFFLET MALT FACTORY PROJECT

JUNE 2024

COMPILED FOR: PGS HERITAGE

Declaration of Independence

I, Elize Butler, declare that –

General declaration:

- I act as the independent palaeontological specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting palaeontological impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations, and all other applicable legislation.
- I will take into account, to the extent possible, the matters listed in section 38 of the NHRA when preparing the application and any report relating to the application.
- I have no, and will not engage in, conflicting interests in the undertaking of the activity.
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority.
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application.
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favorable to the applicant or not
- All the particulars furnished by me in this form are true and correct.
- I will perform all other obligations as expected a palaeontological specialist in terms of the Act and the constitutions of my affiliated professional bodies; and
- I realize that a false declaration is an offense in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the NEMA.

Disclosure of Vested Interest

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

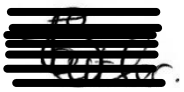
PALAEONTOLOGICAL CONSULTANT: Banzai Environmental (Pty) Ltd

CONTACT PERSON: Elize Butler

Tel: +27 844478759

Email: info@banzai-group.com

SIGNATURE:



This Palaeontological Impact Assessment report has been compiled considering the National Environmental Management Act 1998 (NEMA) and Environmental Impact Regulations 2014 as amended, requirements for specialist reports, Appendix 6, as indicated in the table below.

Table 1: NEMA Table	
Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Relevant section in report**
1.(1) (a) (i) Details of the specialist who prepared the report	Page ii and Section 2 of Report – Contact details and company and Appendix A
(ii) The expertise of that person to compile a specialist report including a curriculum vitae	Section 2 – refer to **Appendix A**
(b) A declaration that the person is independent in a form as may be specified by the competent authority	Page ii of the report
(c) An indication of the scope of, and the purpose for which, the report was prepared	Section 4 – Methods and TOR
(cA) An indication of the quality and age of base data used for the specialist report	Section 5 – Geological and Palaeontological history
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8
(d) The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment	Executive Summary, Section 7 and 9
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 4 Approach and Methodology
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternative;	Section 1 and 9
(g) An identification of any areas to be avoided, including buffers	Section 5 No buffers or areas of sensitivity identified
(h) A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Section 5 – Geological and Palaeontological history

Table 1: NEMA Table	
Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	**Relevant section in report**
(i) A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.1 – Assumptions and Limitation
(j) A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Executive Summary, Section 9
(k) Any mitigation measures for inclusion in the EMPr	Section 10
(l) Any conditions for inclusion in the environmental authorisation	Executive Summary and Section 9
(m) Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Executive Summary and Section 9
(n)(i) A reasoned opinion as to whether the proposed activity, activities or portions thereof should be authorised and	Executive Summary and Section 9
(n)(iA) A reasoned opinion regarding the acceptability of the proposed activity or activities; and	
(n)(ii) If the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Executive Summary and Section 9
(o) A description of any consultation process that was undertaken during the course of carrying out the study	N/A
(p) A summary and copies if any comments that were received during any consultation process	N/A
(q) Any other information requested by the competent authority.	N/A
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Section 3 compliance with SAHRA guidelines

EXECUTIVE SUMMARY

PGS Heritage commissioned Banzai Environmental to conduct the Palaeontological Impact Assessment (PIA) to evaluate the proposed Sedibeng Soufflet Malting Plant in the Sedibeng District and Midvaal Local Municipality in Gauteng Province. This PIA is required to confirm whether fossil material may potentially be present in the planned development area and to assess the potential impact of the proposed development on the local palaeontological heritage in order to comply with the National Heritage Resources Act (No 25 of 1999, section 38) (NHRA).

The proposed Sedibeng Soufflet Malting Plant is underlain by the Quaternary alluvium and Vaalian aged rocks of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup). The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the Quaternary alluvium is moderate, while that of the Malmani Subgroup is Very High (Almond and Pether, 2009; Almond *et al*., 2013, Groenewald et al 2014). The suggested location is classified as having a Very High and Medium Palaeontology Theme Sensitivity in the DFFE Screening Report. Updated geology (2014, Council for Geosciences, Pretoria) indicates that the entire study area is underlain by the Malmani Subgroup,

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 13 June 2024. No fossiliferous outcrop was detected in the proposed development. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and conservational interest in the development footprint is rare. This is in contrast with the Very High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. This classification is thus contested as far as the impact of the development is concerned (National Environmental Web-bases Screening Tool and SAHRIS), based on actual conditions recorded on the ground during the site visit in June 2024. A medium Palaeontological Significance has been allocated for the construction phase of the development pre-mitigation and a low significance post mitigation.

The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that

no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

If significant fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist.

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

It is therefore considered that the proposed development is deemed appropriate and will not lead to detrimental impacts on the palaeontological reserves of the area. Thus, the construction of the development may be authorised in its whole extent.

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1 INTRODUCTION

The envisaged project is meant for the establishment of a Malting Plant which is to be located in the Sedibeng District of Gauteng. Malted barley (Malt) is the major raw material used in brewing of most beers. Of the total malt production, approximately 90 % is produced from barley. About 94 % of malt is used for making beer. The beer sector in South Africa contributes to roughly 1 in every 66 jobs in the country, with the supply chain comprising farmers, packaging manufacturers, brewers, distributors, and retailers.

1.1 Project Location

The Soufflet Malting Facility is to be established at Graceview Industrial Park in Sedibeng which is located in the southern part of Gauteng. The site has been zoned as an industrial development area and the outline scheme reports has been handed over to the council by the original developers of the property. Graceview Industrial Park is selected as the best location because of the following reasons:

- Strategically located next to the Heineken Sedibeng facility
- Availability of ample land for industrial zone development
- Located in close proximity to the national highway network
- Ease of access to raw materials
- Availability of variety of types of labour and creation of employment opportunities

1.2 Objective of the Project

The objective of the project is the establishment of a malt production plant with annual capacity of 100kT in Phase 1 and 135kT in Phase 2 for the local market.

1.3 Justification of the Project

The Soufflet Malting Project greatly contributes as import substitution and for the enhancement of barley production for the agricultural sector in the country

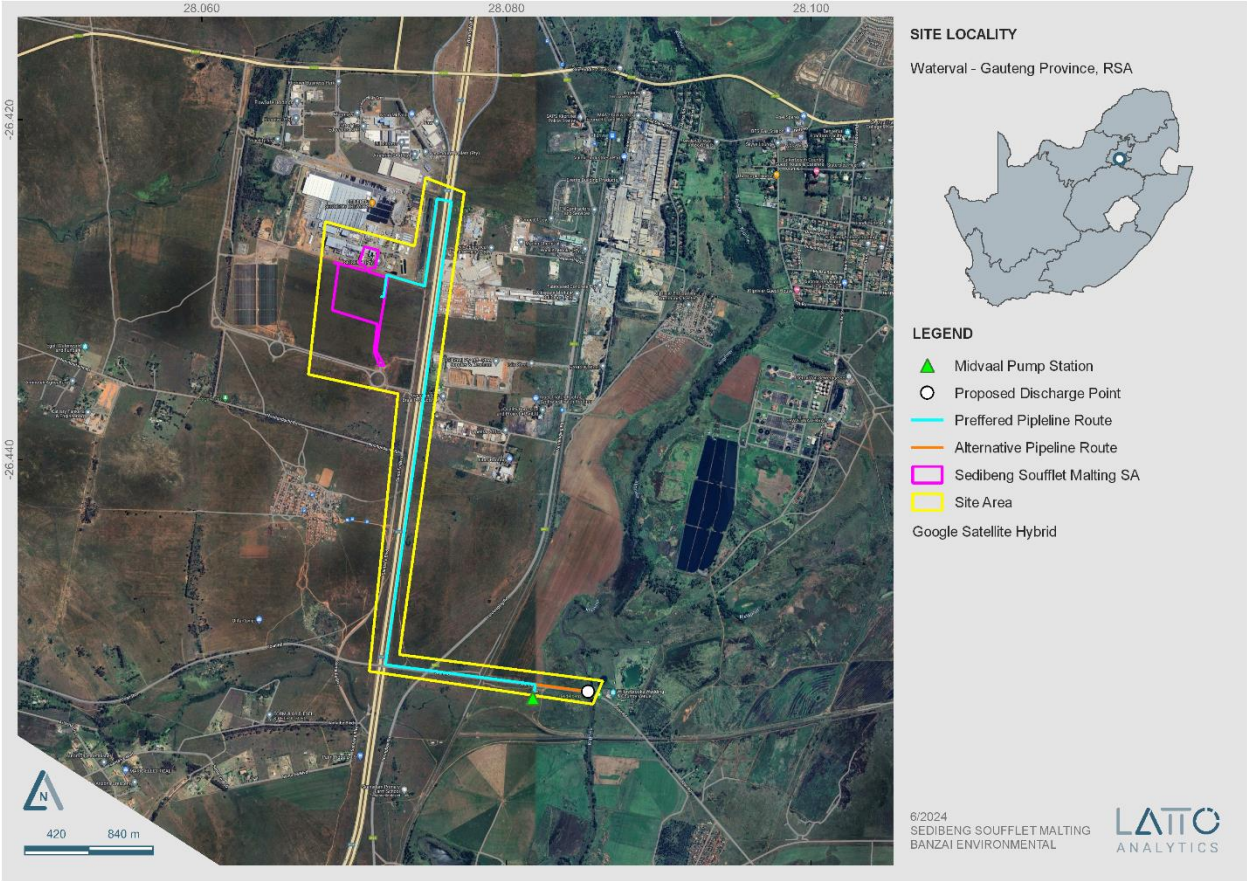

Figure 1: Google Earth image (2024) of the proposed Sedibeng Soufflet New Malting Plant in the Sedibeng District, Midvaal Local Municipality in Gauteng Province.

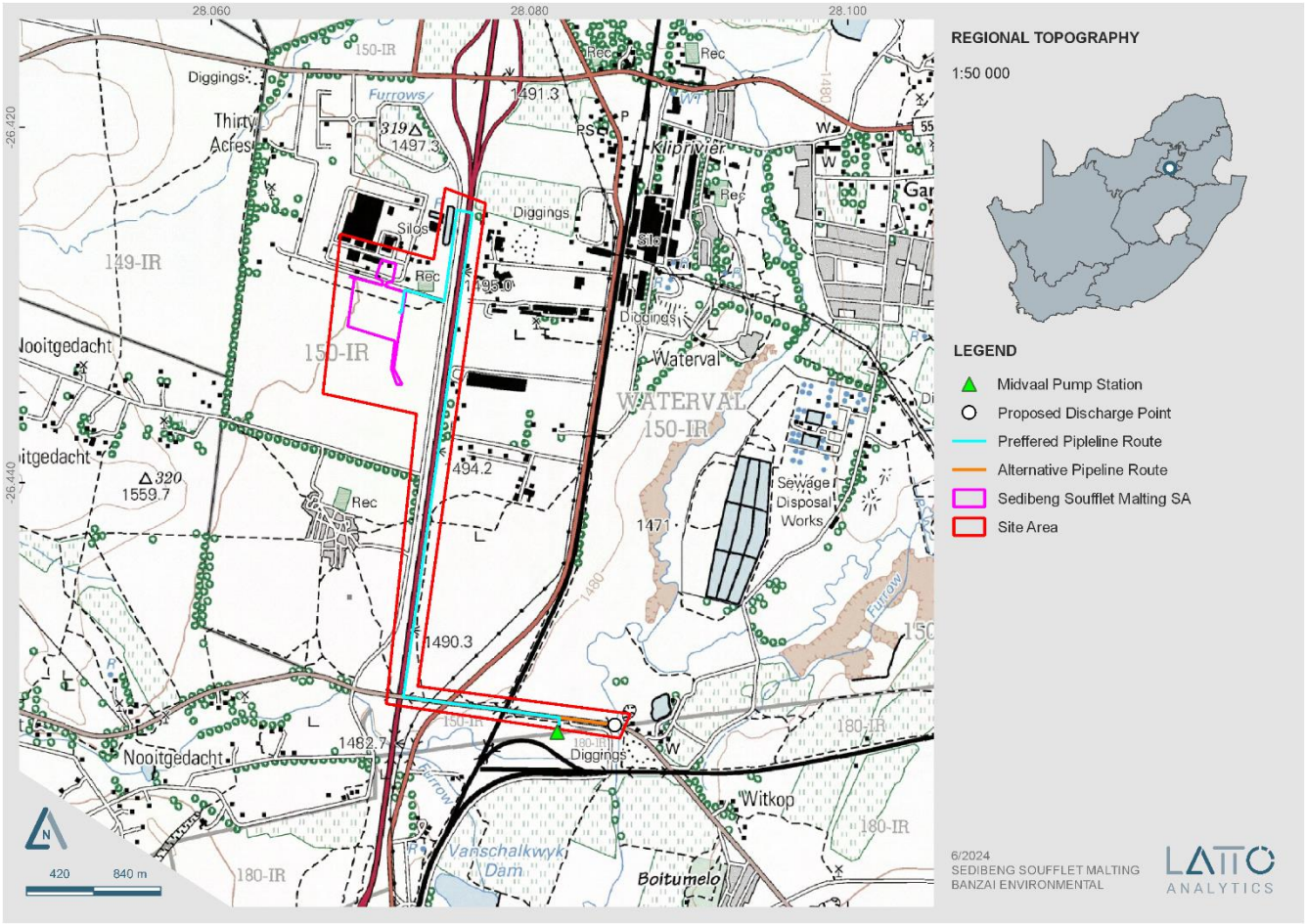

Figure 2: Regional topography of the proposed Sedibeng Soufflet New Malting Plant in the Sedibeng District, Midvaal Local Municipality in Gauteng Province.

2 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR

Please refer to Appendix 1 (Specialist CV).

This study has been conducted by Mrs. Elize Butler of Banzai Environmental (Pty) Ltd. She has conducted approximately 500 palaeontological impact assessments (PIA) for developments in the Free State, KwaZulu-Natal, Eastern and Northern Cape, Northwest, Gauteng, Limpopo, and Mpumalanga. She has an MSc (*cum laude*) in Zoology (specializing in Palaeontology) from the University of the Free State, South Africa and has been working in Palaeontology for more than thirty years. She has experience in locating, collecting, and curating fossils, including exploration field trips in search of new localities in the Karoo Basin. She has been a member of the Palaeontological Society of South Africa (PSSA) since 2006 and has been conducting PIAs since 2014.

3 LEGISLATION

3.1 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 adhere 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 m^2 in extent or

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

4 METHODS AND TERMS OF REFERENCE

This PIA 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 rock segment and the potential impact of development on fossil history take into account the palaeontological status of the rocks, the type of development, and the amount of bedrock removed.

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 scoping reports.

When the development footprint has a moderate to high palaeontological sensitivity, a field-based assessment is necessary. A desktop or field assessment of the exposed rock is used to evaluate the significance of the proposed development's impact, and recommendations for more research or mitigation are made. Excavations for the project often only take place during the building phase, changing the terrain and destroying or permanently encasing fossils at or below the ground surface. Then, access to Fossil Heritage will no longer be available for academic study.

When doing a site investigation, a palaeontologist examines the local development as well as the quantity and variety of fossils found there. This can be demonstrated by looking at representative fossiliferous rock exposures (most igneous and metamorphic rocks are not fossiliferous, whereas sedimentary rocks contain fossil heritage). Examined rock exposures frequently contain a sizeable portion of the stratigraphic unit, which is primarily made up of recently exposed (unweathered) rock. These exposures may be man-made (such as quarries, open building excavations, even railway and road cuttings) or natural (such as cliffs, and dongas as well as rocky outcrops along stream or river banks). It is usual practice for palaeontologists to record well-preserved fossils (GPS, and stratigraphic data) during field assessment examinations.

Although mitigation is often done prior to construction, it may take place if potentially fossiliferous bedrock is revealed. Fossil collection and documentation are examples of mitigation. A permit from SAHRA must be obtained before beginning any fossil excavation, and the material must be stored at an authorized facility. When mitigation is properly used, it is possible to have a positive impact by raising awareness of the palaeontological past of the area.

By physically evaluating bedrock outcrops to determine their lithology and fossil richness and crisscrossing the development footprint, one can assess an area's fossil potential. Because the presence of fossils at the surface is so unexpected, an average sample size of the region is investigated. To be

clear, however, the lack of fossils in a development footprint does not automatically suggest that there is no palaeontologically important material present on the site (on or below the ground surface).

The terms of reference of a PIA are as follows:

General Requirements:

- Adherence to the content requirements for specialist reports in accordance with Appendix 6 of the EIA Regulations 2014, as amended;
- Adherence to all applicable best practice recommendations, appropriate legislation and authority requirements;
- Submit a comprehensive overview of all appropriate legislation, guidelines;
- Describe of the proposed project and provide information regarding the developer and consultant who commissioned the study;
- Describe location of the proposed development and provide geological and topographical maps
- Provide palaeontological and geological history of the affected area;
- Identify sensitive areas to be avoided (providing shapefiles/kmls) in the proposed development;
- Evaluate the significance of the planned development during the Pre-construction, Construction, Operation, Decommissioning Phases and Cumulative impacts. Potential impacts should be rated in terms of the direct, indirect and cumulative:
    a. Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity.
    b. Indirect impacts of an activity are indirect or induced changes that may occur as a result of the activity.
    c. Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities.
- Fair assessment of alternatives (infrastructure alternatives have been provided);
- Recommend mitigation measures to minimise the impact of the proposed development; and
- Detail the implications of specialist findings for the proposed development (such as permits, licenses etc).

4.1 Assumptions and Limitations

The geology of the area is the focal point of geological maps, and the sheet explanations of the Geological Maps were not intended to focus on palaeontological heritage. Many inaccessible areas of South Africa have never been examined by palaeontologists, and data is typically dependent solely on aerial pictures. Locality and geological information in museums and university databases is out of date, and data acquired in the past is not always adequately documented.

Comparable Assemblage Zones in other places are also used to provide information on the existence of fossils in areas that have not before been recorded. When similar Assemblage Zones and geological formations are used for Desktop studies, it is commonly assumed that exposed fossil exists within the footprint. As a result, a field assessment will improve the accuracy of the desktop evaluation.

5 GEOLOGICAL AND PALAEONTOLOGICAL HISTORY

The proposed new Sedibeng Soufflet Malting Plant is depicted on the 2628 East-Rand (1986) Geological map (Council of Geoscience, Pretoria) (Figure 3, Table 3). This map indicates that the study area is underlain by Quaternary alluvium (yellow, single bid figure) and Vaalian aged rocks that include the Malmani Subgroup (Vmd, Chuniespoort Group, Transvaal Supergroup). The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the Quaternary aeolian sand is Moderate (green), and that of the Malmani Subgroup is Very High (red) (Almond and Pether, 2009; Almond et al., 2013, Groenewald et al 2014) (Figure 4). The suggested location is classified as having a Very High and Medium Palaeontology Theme Sensitivity in the DFFE Screening Report, as seen in Figure 5. Updated geology (Council for Geosciences, Pretoria) indicates that the study area is entirely underlain by the Malmani Subgroup (anml) (Figure 6).

The fossil assemblages of the Quaternary superficial deposits are generally Low in diversity and occur over a wide range. These fossils represent terrestrial plants and animals with a close resemblance to living forms. Fossil assemblages include bivalves, diatoms, gastropod shells, ostracods, and trace fossils. The palaeontology of the superficial deposits has been relatively neglected in the past. Fossils may comprise of bones, horn corns as well as mammalian teeth. Tortoise remains have also been uncovered as well as trace fossils which includes termite and insect's burrows and mammalian trackways. Amphibian and crocodile skeletons have been uncovered where the depositional settings in the past were wetter.

The Malmani Subgroup is divided into five formations (Figure 7) that are classified by the amount of chert, stromatolitic morphology, erosion surfaces and intercalated shales in them. The Malmani Subgroup overlies the Black Reef Formation and comprises of stromatolitic carbonates. The oldest Formation in the Malmani Subgroup is the Oaktree Formation that consists of stromatolitic dolomites, carbonaceous shales, and locally developed quartzites. This formation overlies the (Monte Christo Formation that comprises of stromatolitic and oolitic platform dolomites as well as erosive breccia. The Lyttleton Formation overlies the Monte Christo Formation and consists of stromatolitic dolomites as well as shale quartzites. The Eccles Formation follows and comprises of erosional breccias while the youngest Formation is the Frisco Formation that mostly comprises of stromatolitic dolomites.

The Malmani Subgroup succession is about 2 km-thick and consists of a series of formations of oolitic and stromatolitic carbonates (limestones and dolomites), black carbonaceous shales and minor secondary cherts. The Malmani Dolomites also consist of historic lime mines, and palaeocave fossil deposits. Dolomite (limestone rock) forms in warm, shallow seas from slow gathering remainders of marine microorganisms and fine-grained sediment. Dolomites of the Malmani Subgroup has a higher magnesium content than other limestones. These materials contain high levels of calcium carbonate and are often referred to as carbonates.

The carbonates of the Transvaal Basin comprise of an assortment of stromatolites (microbial laminates), ranging from supratidal mats to intertidal columns and large subtidal domes (Eriksson *et al.* 2006). Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. These structures were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the earliest known fossils. These algae photosynthesised in the low oxygen atmosphere and deposited layer upon layer of calcium sulphate, magnesium sulphate and calcium carbonate as well as other compounds to form these domes. Researchers have examined and classified the stromatolite structures but seldomly find preserved algal cells. The oxygen atmosphere that we depend on today was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era.

Stromatolites and oolites from the Transvaal Supergroup have been described by various authors (Eriksson and Altermann, 1998). Detailed descriptions of South African Archaean stromatolites are available in the literature (Altermann, 2001; Buick, 2001; and Schopf, 2006). The Malmani stromatolites literature includes articles by Truswell and Eriksson (1972, 1973, 1975), Eriksson and MacGregor (1981), Eriksson and Altermann (1998), Sumner (2000), Schopf (2006).

Currently very few palaeontologists study stromatolites but geologists find the stromatolites interesting because they reveal the change from a reducing environment (that is an oxygen-poor) to an oxidizing environment (oxygen--rich). This transition is known as the Great Oxygen Event (Eroglu et al., 2017).

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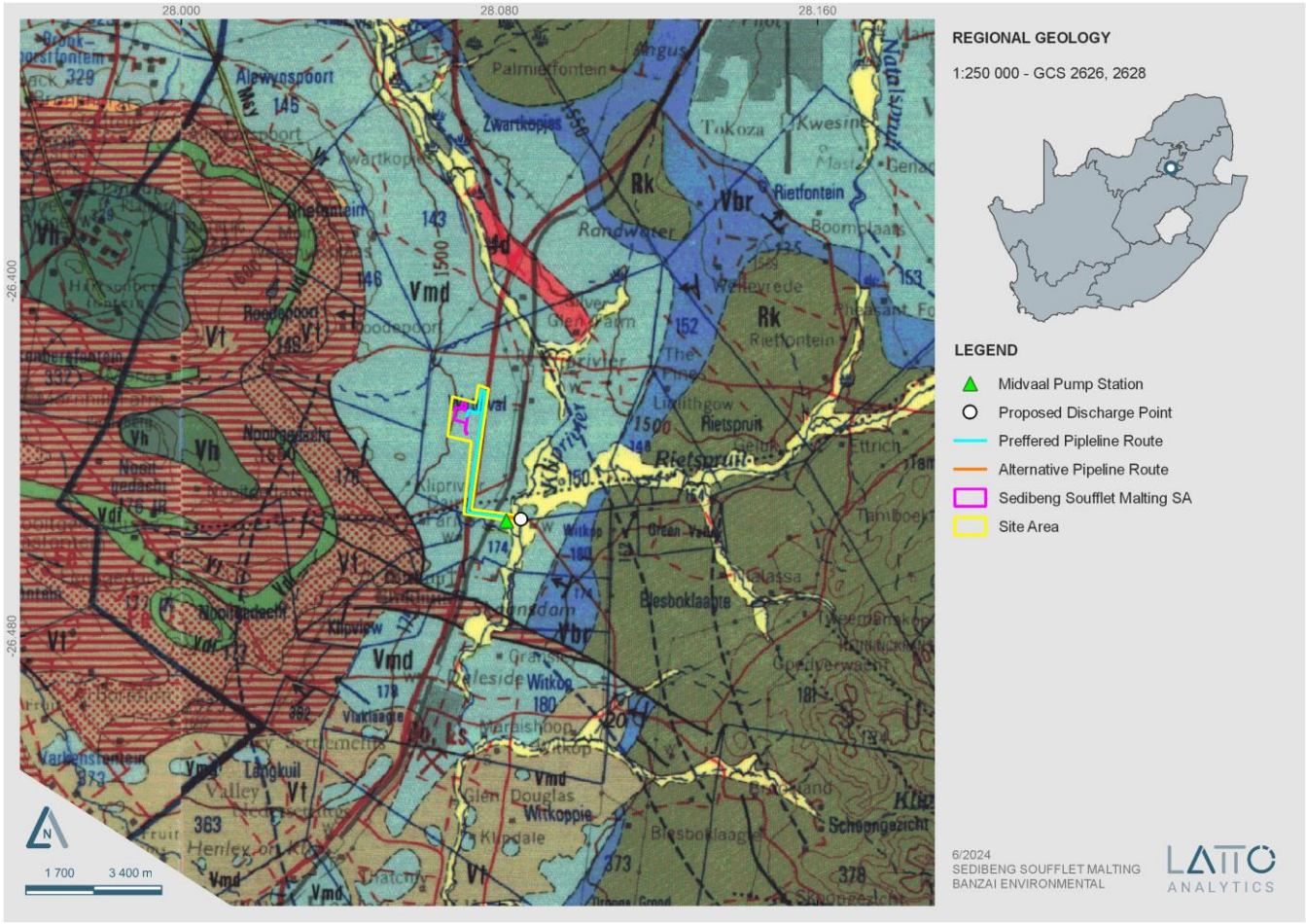
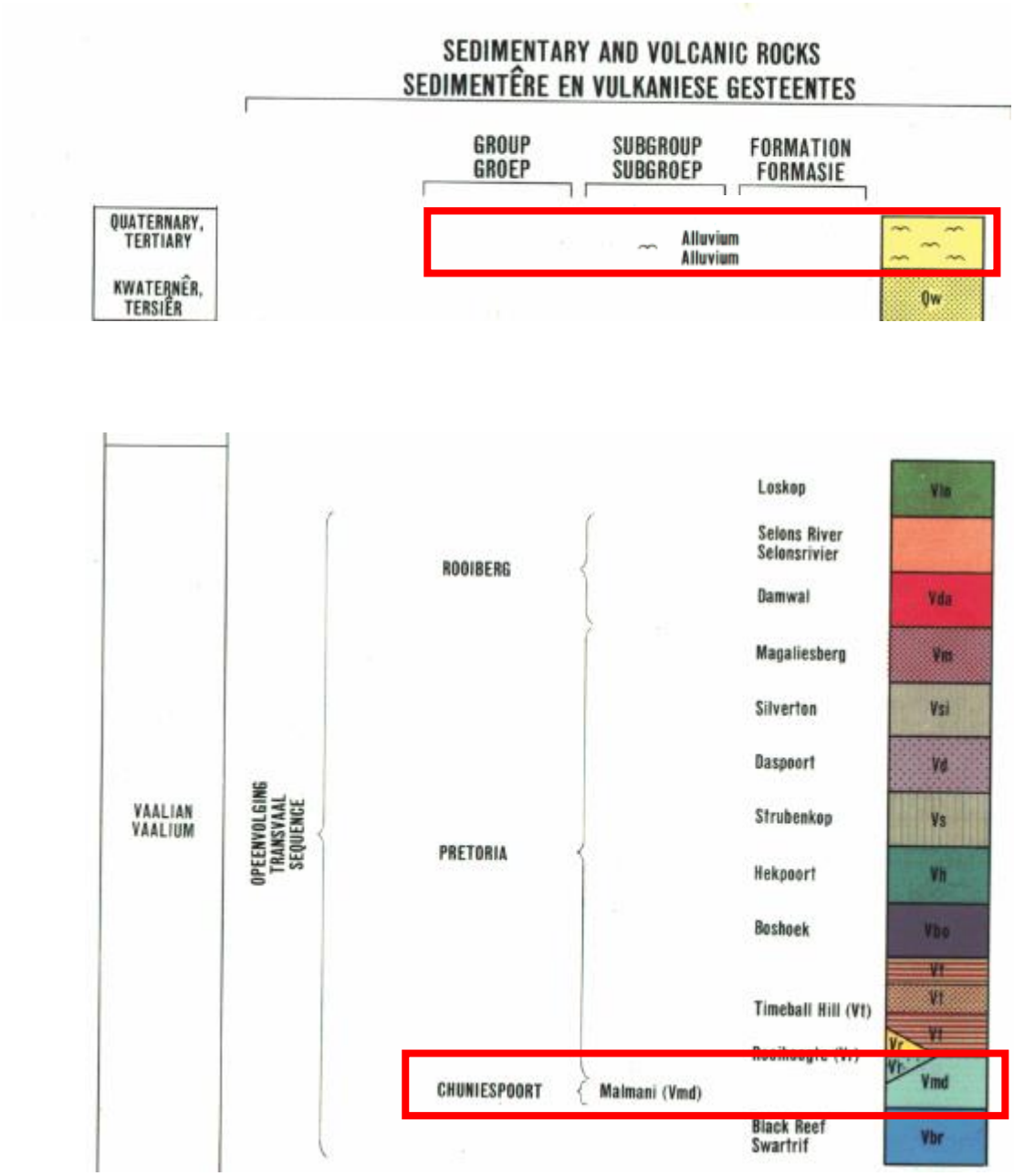


Figure 3: Extract of the 1:250 000 East Rand 2628 Geological map (1986) (Council of Geoscience, Pretoria) indicates that the study area is underlain by the Quaternary alluvium (yellow, single bird figure) and the Malmani Subgroup (Vmd, Chuniespoort Subgroup, Transvaal Supergroup).

Table 2: Legend of the 1:250 000 East-Rand 2628 Geological map (1986) (Council of Geoscience). Pretoria). Relevant lithology is indicated by red polygons.



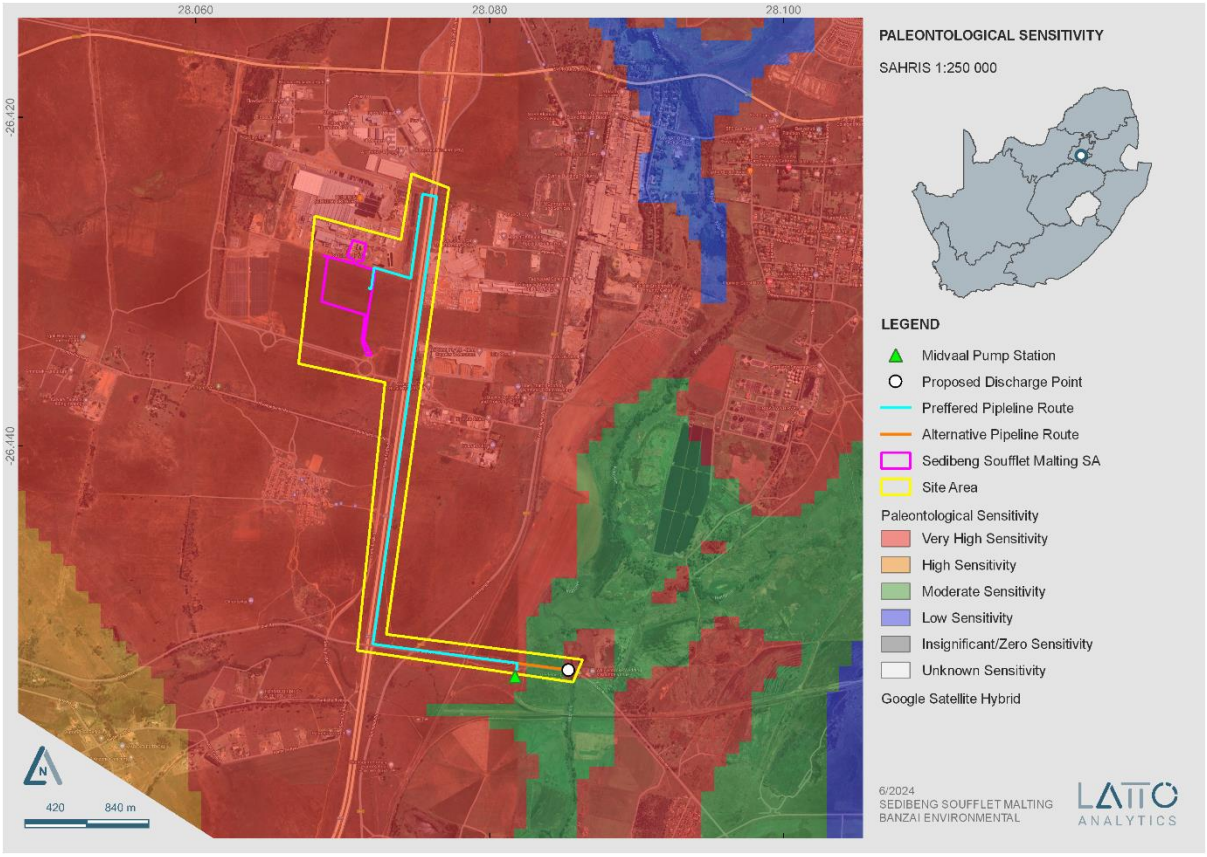


Figure 4: Extract of the 1 in 250 000 SAHRIS PalaeoMap map (Council of Geosciences) indicating that the proposed development is underlain by sediments with a Very High (red, Malmani Subgroup) and Moderate (green, Quaternary alluvium) Palaeontological Sensitivity.

Table 3: Palaeontological Sensitivity

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.

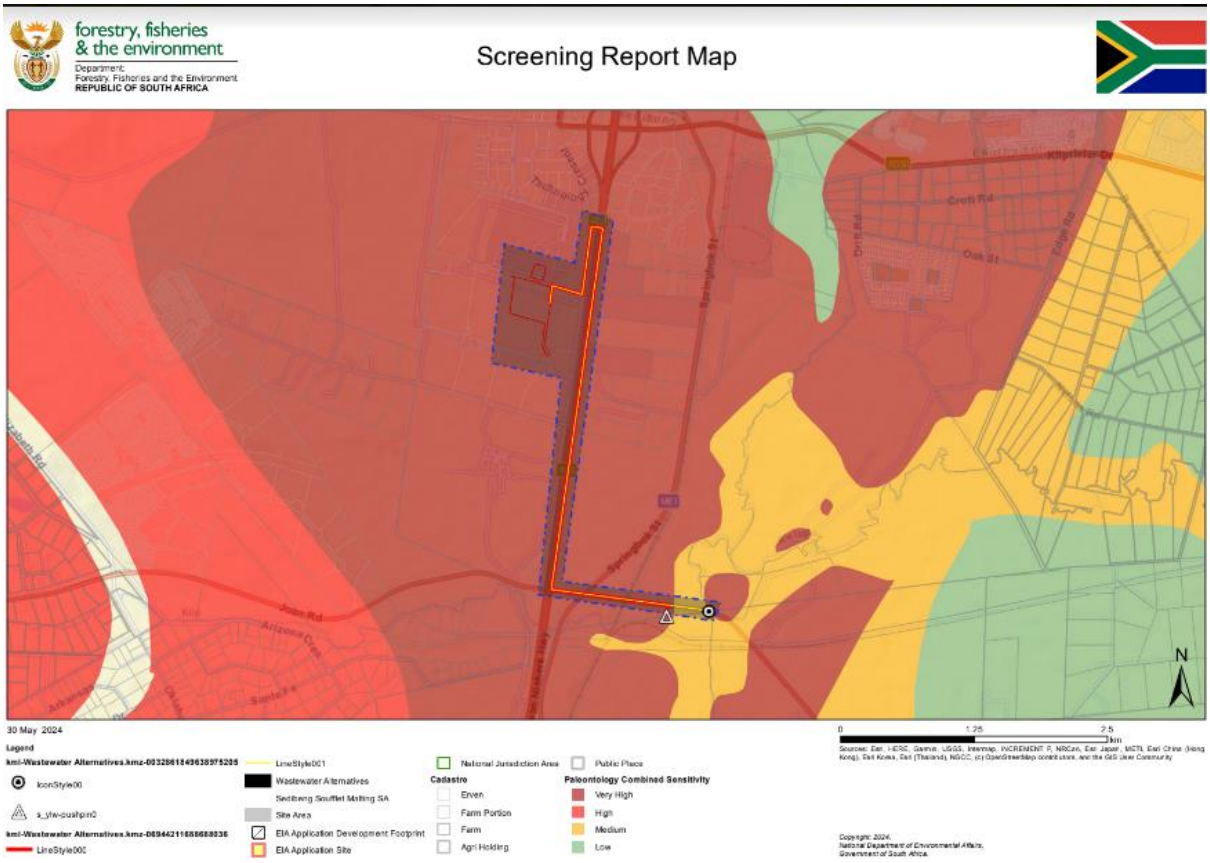


Figure 5: Palaeontological Sensitivity generated by the DFFE National Environmental Web-Based Screening indicating the Very High Palaeontological Sensitivity of the proposed development, while areas with a Medium Sensitivity also underlies the study area.

Although the SAHRIS PalaeoMap (Figure 4) and the DFFE Screening Tool (Figure 5) indicates a Very High (dark red) and Medium (yellow) Palaeontological Sensitivity. However, no fossiliferous outcrops were detected in the field survey of 13 June 2024

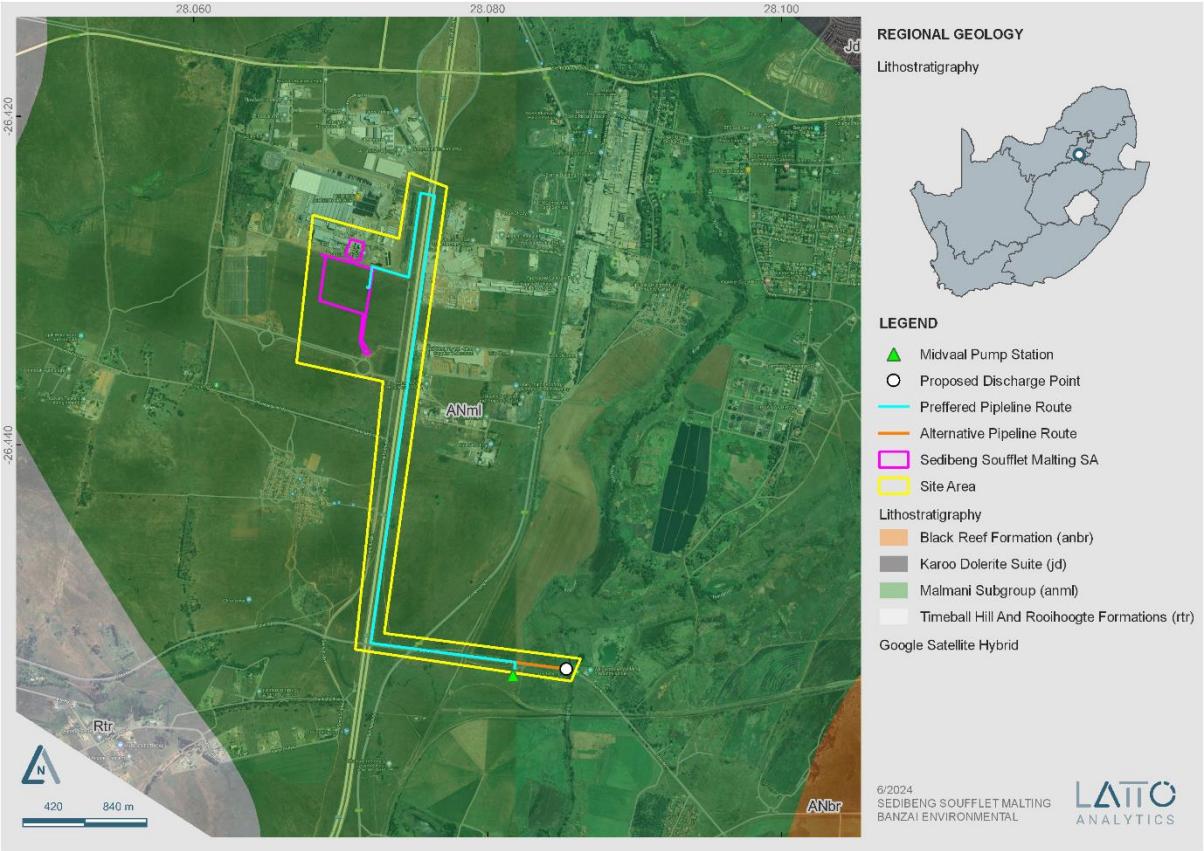


Figure 6: Updated geology (2014, Council for Geosciences, Pretoria) indicates that the study area entirely is underlain by the Malmani Subgroup (anml).

6 ADDITIONAL INFORMATION CONSULTED

In compiling this report the following sources were consulted:

- Geological map 1:100 000, Geology of the Republic of South Africa (Visser 1984).
- A Google Earth map with polygons of the proposed development was obtained from Milnex cc.
- 1: 250 000 West Rand 2626 Geological Map (1986) (Council of Geosciences, Pretoria)
- Updated Geology produced by the Council of Geosciences (Pretoria).
- Palaeosensitivity map on SAHRIS website.
- The National Environmental Web-based Screening Tool.

7 SITE VISIT

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 13 June 2024. Sedibeng. This site is open with lush vegetation and very few outcrops. There are two shallow dams and a gravel road on the site.

Figure 7: View in south looking northeast.

Figure 8: View of site towards the brewery in the north.

Figure 9: View towards brewery taken from the southeast.

Figure 10: View in west indicating lack of outcrops.

Figure 11: Sandstone boulder.

Figure 12: No outcrops, low vegetation.

Figure 13: Gravel Road towards east.

Figure 14: Fenced area in north, east of brewery.

Figure 15: Road in east towards site. This road is parallel to the R59 Road

Figure 16: Dolomite boulder on side of road.

8 IMPACT ASSESSMENT

The impact assessment rating is based on the rating scale as contained in Appendix A. The following section provides an analysis of the impact of the proposed project area on heritage resources

Details of alternatives

This section describes alternative means of carrying out the operation and the consequences of not proceeding with the proposed project. The "no-go" alternative refers to the option of not going ahead with the proposed project. This will entail maintaining the current status quo with no impact from the project

As no heritage features of cultural significance were located, the impact significance during the construction phase is rated as LOW before and after mitigation

Impact assessment summary

Table Implementing the impact assessment methodology as supplied by Royal Has Koning DHV provides a quantitative assessment of the impacts of the proposed Soufflet Malt Project

Table 4: Impact Table

Site	Occurrence		Severity		Impact
Impact	Probability	Durance	Scale/extent	Magnitude (severity) of impact	SP rating
Loss of fossil heritage by destruction, moving and sealing in fossils below ground surface so that they are no longer available for scientific research	High	Permanent	Site only	Moderate	Moderate
Pre-mitigation	4	5	1	6	48
Loss of fossil heritage by destruction, moving and sealing in fossils below ground surface so that they are no longer available for scientific research	Low	Permanent	Site only	Low	Low
Post-mitigation	2	5	1	2	16

9 FINDINGS AND RECOMMENDATIONS

The proposed Sedibeng Soufflet Malting Plant is underlain by the Quaternary alluvium and Vaalian aged rocks of the Malmani Subgroup (Chuniespoort Group, Transvaal Supergroup). The SAHRIS PalaeoMap indicates that the Palaeontological Sensitivity of the Quaternary alluvium is moderate, while that of the Malmani Subgroup is Very High (Almond and Pether, 2009; Almond *et al*., 2013, Groenewald et al 2014). The suggested location is classified as having a Very High and Medium Palaeontology Theme Sensitivity in the DFFE Screening Report. Updated geology (2014, Council for Geosciences, Pretoria) indicates that the entire study area is underlain by the Malmani Subgroup,

A site-specific field survey of the development footprint was conducted on foot and by motor vehicle on 13 June 2024. No fossiliferous outcrop was detected in the proposed development. Based on the site investigation as well as desktop research it is concluded that fossil heritage of scientific and

conservational interest in the development footprint is rare. This is in contrast with the Very High Sensitivity allocated to the development area by the SAHRIS Palaeosensitivity Map and DFFE Screening Tool. This classification is thus contested as far as the impact of the development is concerned (National Environmental Web-bases Screening Tool and SAHRIS), based on actual conditions recorded on the ground during the site visit in June 2024. A medium Palaeontological Significance has been allocated for the construction phase of the development pre-mitigation and a low significance post mitigation.
The construction phase will be the only development phase impacting Palaeontological Heritage and no significant impacts are expected to impact the Operational and Decommissioning phases. As the No-Go Alternative considers the option of 'do nothing' and maintaining the status quo, it will have a Neutral impact on the Palaeontological Heritage of the development. The Cumulative impacts of the development is considered to be medium pre- mitigation and Low post mitigation and falls within the acceptable limits for the project. It is therefore considered that the proposed development will not lead to damaging impacts on the palaeontological resources of the area. The construction of the development may thus be permitted in its whole extent, as the development footprint is not considered sensitive in terms of palaeontological resources. It is consequently recommended that no further palaeontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.

If significant fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations the Chance Find Protocol must be implemented by the ECO/site manager in charge of these developments. These discoveries ought to be protected (if possible, *in situ*) and the ECO/site manager must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation (recording and collection) can be carry out by a paleontologist.

Preceding any collection of fossil material, the specialist would need to apply for a collection permit from SAHRA. Fossil material must be curated in an accredited collection (museum or university collection), while all fieldwork and reports should meet the minimum standards for palaeontological impact studies suggested by SAHRA.

It is therefore considered that the proposed development is deemed appropriate and will not lead to detrimental impacts on the palaeontological reserves of the area. Thus, the construction of the development may be authorised in its whole extent.

10 MITIGATION AND EMPR REQUIREMENTS

The naturally preserved remnants (or traces) of plants or animals imbedded in rock are known as fossils. These plants and animals existed millions of years ago in the geologic past. Fossils are incredibly

valuable and difficult to replace. It is possible to identify the environmental conditions that occurred in a certain geographical area millions of years ago by analysing fossils.

This fact sheet is intended for construction workers and foremen. It describes what to do if fossil material is discovered accidently during construction.

It is the responsibility of the project's Environmental Site Officer (ESO) or site manager to train the workers and foremen on what to do if a fossil is accidently discovered. In the absence of the ESO, a member of staff must be designated to be accountable for the effective application of the chance discovery protocol so that the conservation of fossil material is not jeopardized.

If fossils are discovered during excavation, the following method shall be followed.

10.1 Legislation

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act No 25 of 1999) (NHRA).** According to Section 3 of the Act, all Heritage resources 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 NHRA protects and owns the state's palaeontological legacy, which is unique and non-renewable. It is consequently the responsibility of the state to manage and protect fossils on behalf of South African citizens. According to Section 35 of the NHRA, palaeontological resources may not be excavated, broken, transferred, or destroyed by any development without previous assessment and a permit from the relevant heritage resources authority.

10.2 Chance Find Procedure

- If a chance find is made, the person responsible for the find must immediately stop working, and all work in the immediate vicinity of the find must stop as well.
- The individual who discovered the item must immediately notify his or her direct supervisor, who must then notify his or her management and the ESO or site manager. The ESO or site manager must notify the relevant Heritage Agency (South African Heritage Resources Agency, SAHRA) of the discovery. (Contact information: SAHRA, 111 Harrington Street, Cape Town, South Africa. PO Box 4637, Cape Town 8000, South Africa. Fax: +27 (0)21 462 4509. Tel: 021 462 4502. Web address: www.sahra.org.za). Photographs of the find from various perspectives, as well as GPS coordinates, must be submitted to the Heritage Agency.
- Within 24 hours of the discovery, a preliminary report must be sent to the Heritage Agency, which must include the following: 1) the date of finding; 2) a description of the discovery; and 3) a description of the fossil and its context (depth and position of the fossil), as well as GPS coordinates.

- Photographs of the discovery (the more the merrier) must be of high quality, in focus, and accompanied by a scale. Photographs of the vertical part (side) where the fossil was discovered are also required.
- Upon receipt of the preliminary report, the Heritage Agency will notify the ESO (or site manager) whether a palaeontologist rescue excavation or collection is required.
- The place must be guarded to prevent future damage. There should be no attempt to remove material from their environment. Stabilize the exposed items and cover them with a plastic sheet or sand bags. The Heritage organization will also be able to advise on the best way to protect the find.
- If the fossil cannot be stabilized, the ESO (site manager) may carefully collect the fossil.
- Once the Heritage Agency has received the written authorization, the developer may continue with the development on the affected area.
- Fossil finds must be placed in tissue paper and in an appropriate box while necessary care must be taken to remove any fossil material from the rescue site.

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Appendix 1: ENVIRONMENTAL IMPACT METHODOLOGY

Royal Haskoning DHV: IMPACT ASSESSMENT METHODOLOGY

Impact Rating Methodology:

The potential environmental impacts associated with the project will be evaluated according to its nature, extent, duration, intensity, probability and significance of the impacts, whereby:

- Nature: A brief written statement of the environmental aspect being impacted upon by a particular action or activity;
- Extent: The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a local scale, but low at a regional scale;
- Duration: Indicates what the lifetime of the impact will be;
- Intensity: Describes whether an impact is destructive or benign;
- Probability: Describes the likelihood of an impact actually occurring; and
- Cumulative: In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further sub-divided as follows:

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude (severity) of impact

To assess each of these factors for each impact, the following four ranking scales are used:

1.1 Criteria for the Ranking of Impacts

Probability	Duration
5 - Definite/ don't know	5 - Permanent
4 - Highly probable	4 - Long-term
3 - Medium probability	3 - Medium-term (8 - 15 years)
2 - Low probability	2 - Short-term (0 - 7 years) (impact ceases after the operational life of the activity)
1 - Improbable	1 – Immediate
0 – None	0 - None

Scale	Magnitude
5 - International	10 - Very high/ don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
0 – None	0 - None

Once these factors have been ranked for each impact, the significance of the two aspects, occurrence and severity, must be assessed using the following formula:

SP (significance points) = (magnitude + duration + scale) x probability

The maximum value is 100 significance points (SP). The impact significance is then rated as follows:

1.2 Impact significance:

SP >75	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 75	Indicates moderate Environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that constitutes an improvement over pre-project conditions

Impacts must be assessed and rated before and after mitigation.

APPENDIX B: CURRICULUM VITAE

PROFESSION:	Palaeontologist
YEARS' EXPERIENCE:	30 years in Palaeontology
EDUCATION:	B.Sc Botany and Zoology, 1988 University of the Orange Free State
	B. Sc (Hons) Zoology, 1991 University of the Orange Free State
	Management Course, 1991 University of the Orange Free State
	M. Sc. *Cum laude* (Zoology), 2009 University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant	Department of Zoology & Entomology University of the Free State Zoology 1989-1992
Part time laboratory assistant	Department of Virology University of the Free State Zoology 1992
Research Assistant	National Museum, Bloemfontein 1993 – 1997
Principal Research Assistant and Collection Manager	National Museum, Bloemfontein 1998–2022

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