

**HERITAGE IMPACT ASSESSMENT
PROPOSED ENLARGEMENT OF THE HELPMEKAAR DAM ON
PORTION 5 OF THE FARM RIETRIVIER NO. 202,
WITZENBERG LOCAL MUNICIPALITY, CERES**

Assessment conducted under Section 38 (3) of the National Heritage Resource Act (No. 25 of 1999)

HWC CASE 25111407

Report prepared for

ENVIROAFRICA

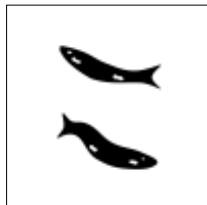
Postnet Suite 341, Private Bag X29, Somerset West, 7129
clinton@enviroafrica.co.za

Applicant

STERKWATER FARMING

jonathan@sterkwater.co.za

By



Jonathan Kaplan
ACRM

5 Stuart Road, Rondebosch, 7700
M 0823210172
jonathan@acrm.co.za

**JANUARY
2026**

Declaration of Independence

HERITAGE IMPACT ASSESSMENT, PROPOSED ENLARGEMENT OF THE HELPMKAAR DAM ON PORTION 5 OF THE FARM RIETRIVIER NO. 202, WITZENBERG LOCAL MUNICIPALITY, CERES

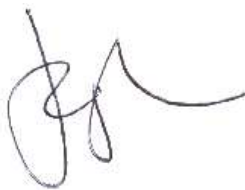
HWC CASE 25111407

This report has been compiled by Jonathan Kaplan, Director of the Agency for Cultural Resource Management, an independent Heritage Practitioner registered with the Association of Southern African Professional Archaeologists (ASAPA), CRM Membership No. 64.

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.

I further declare that I: **Jonathan Kaplan**

- act/ed as the independent specialist in the compilation of the above report.
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act.
- do not have any vested interest in the proposed activity proceeding.
- have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management act.
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.



Signature of the specialist

Date: 23 January 2026

Executive Summary

1. Site name

Heritage Impact Assessment, proposed enlargement of the Helpmekaar Dam on Portion 5 of the Farm Rietrivier No. 202, Witzenberg Local Municipality, Ceres

2. Location

Op Die Berg, about 50kms north of Ceres (Figures 1 & 2)

3. GPS Co-ordinates

32°56'2.31"S 19°14'37.97"E

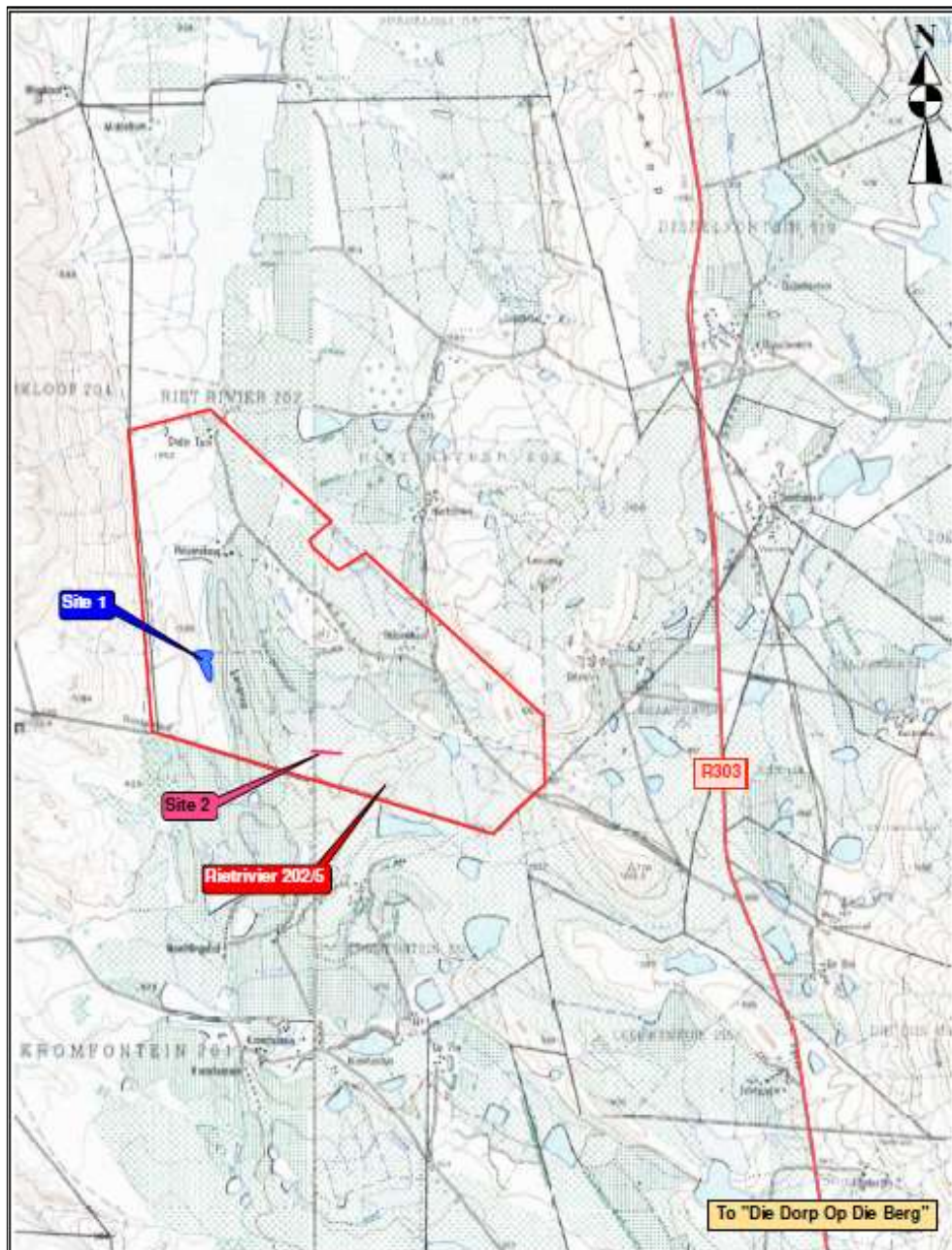


Figure 1. Locality map indicating the location of the Project Area north of Ceres in the Western Cape



Figure 2. Google Earth Satellite Map of the Study Site (yellow pin), key villages and towns

4. The development proposal

The project entails the enlargement of the Langrug-Boonste Dam, also known as the Helpmekaar dam, and the construction of a new buffer dam, on Portion 5 of the Farm Rietrivier No. 202, near Ceres in the Western Cape (Figure 3). A ± 2 km long pipeline connecting the two dams is also proposed. The pipeline will serve the purpose of moving water between the two dams to where it would be practical to irrigate from. The existing instream dam will be enlarged from a storage capacity of about 390 000m³ to a total capacity of about 800 000m³. All the bulk earth fill will be excavated from within the dam basin. The flooded area of the enlarged dam will be about 16ha. Water will be abstracted during winter surplus periods and stored for irrigation in the dry summer seasons. Enlargement of the Helpmekaar Dam will also ensure the conversion of about 45ha annual of cash crops into permanent fruit orchards. The agricultural expansion will also ensure long term economic viability as well as sustainability of the farming entity by creating additional permanent jobs within the agricultural industry.

Enviroafrica is the appointed environmental assessment practitioner (EAP) responsible for facilitating environmental authorisation for the project, which includes a Public Participation Process (or PPP).

An Environmental Impact Assessment (EIA) process will be followed in the application.

The Heritage Impact Assessment (or HIA) has considered the findings of a Screening Tool Report generated for the Helpmekaar Dam which indicates a **Low** archaeological and cultural heritage sensitivity and **Very High** overall palaeontological sensitivity for the area assessed.

ACRM was requested to conduct an Archaeological Impact Assessment (AIA) and to write up the integrated HIA, which includes comments from the Witzenberg Local Municipality and Interested and Affected parties (IAPs).

A Palaeontological Impact Assessment (PIA) for the development proposal has been conducted by Professor Marion Bamford.

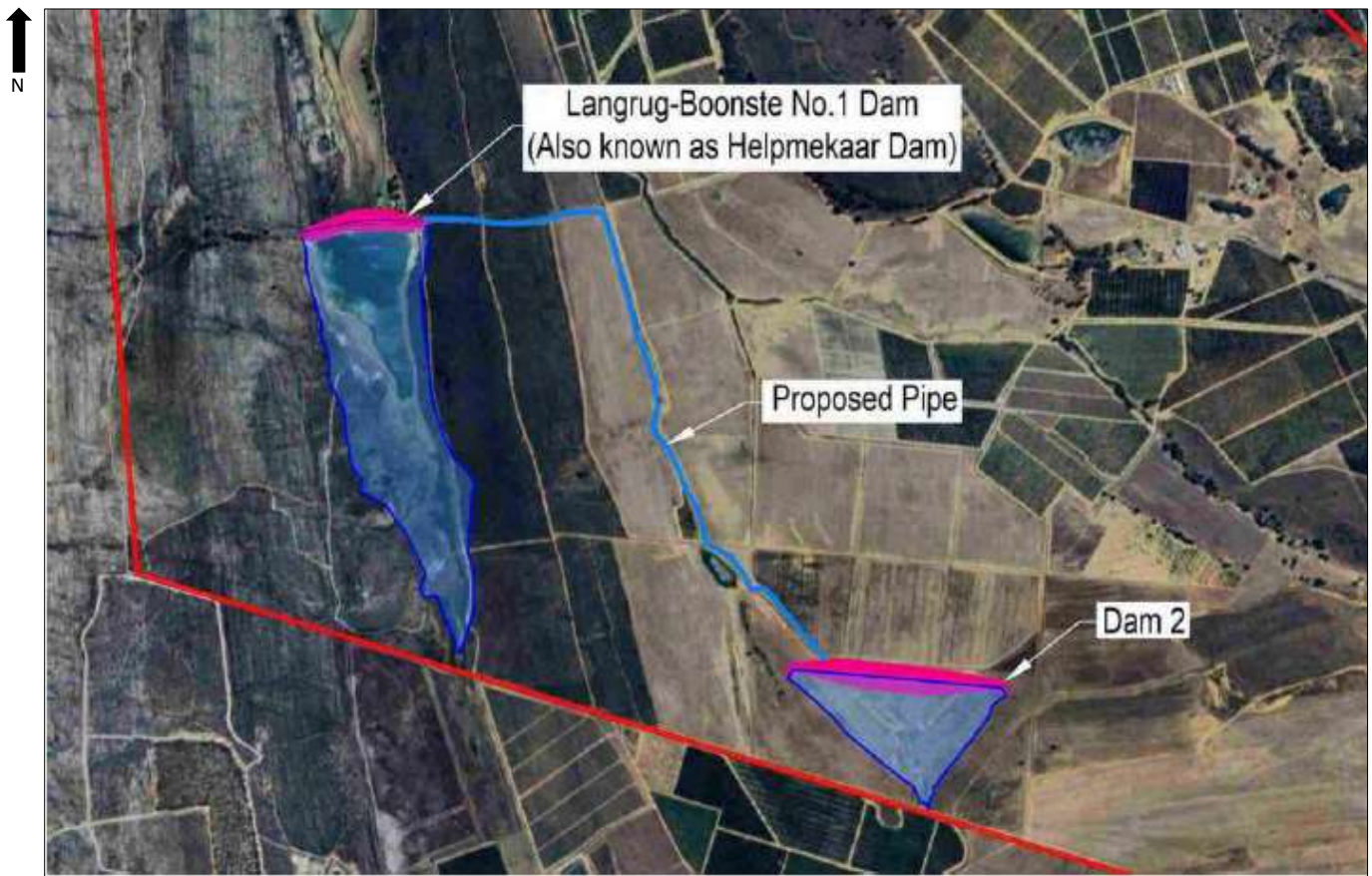


Figure 3. Layout of the proposed development

5. Aim of the study

The overall purpose of the study is to assess the sensitivity of archaeological and palaeontological heritage resources in Project Area and to determine the potential impacts (of the development) on such resources.

6. Constraints & limitations

There were no constraints or limitations associated with the study. Access to the Project Area was unrestricted and ground visibility where it mattered, was good.

7. Assumptions

It is assumed that all project information, including, maps, description of activities and KML files distributed to specialists are accurate and up to date.

8. Heritage resources

8.1 Archaeology

A field assessment was conducted on 18 November 2025, in which the following findings were made.

8.1.1 Dam 1 (existing Helpmekaar Dam)

No archaeological heritage resources were recorded in the expanded footprint area of Dam 1.

No rock art sites were recorded among sandstone outcroppings located on the edge of Dam 1. The closest recorded rock painting sites are about 10kms away on the Farm Schoongezicht.

8.1.2 Dam 2 (proposed new buffer dam)

Two, weathered/burnished, Early Stone Age (ESA) flake tools were encountered in the footprint area of the proposed new buffer dam, which comprises old agricultural land (dryland wheat). Several deep dongas intersect the site, as well as a small stream bed. No evidence of any human settlement was noted. The site has been transformed by historical agriculture.

The very small number, isolated and the transformed context in which they were found means that the remains have been graded as Not Conservation Worthy (NCW).

8.1.3 Pipeline

No archaeological heritage resources were recorded in/along the alignment of the proposed 2km long connecting pipeline, which follows existing farm roads and farm tracks.

8.2 Palaeontology

According to Bamford (2025), 'the proposed sites lie on the Quaternary fluvial sands of low palaeosensitivity and also on the potentially very highly sensitive Voorstehoek Formation (Ceres Subgroup, Bokkeveld Group, Cape Supergroup) that might preserve marine invertebrate fossils, but the sites are already disturbed by decades of ploughing and cultivation'.

8.3 Graves

No graves or were encountered during the field assessment.

8.4 Built Environment

No buildings, structures or features will be impacted by the development proposal.

8.5 Cultural Landscape

The Project Area is dominated by a rural agricultural landscape (mix of dryland wheat/cereal crops, stone fruit, grazing/cattle, & cut flowers/Protea), farm dams, farm roads, packing sheds, farm worker housing, and farm infrastructure.

8.6 Visual Impact

Enlargement of the existing Helpmekaar Dam and construction of a new buffer dam on Farm No. 202/5 will complement the surrounding landuse, which is dominated by agriculture. The visual impact is therefore rated as being Low.

9. Anticipated impacts

Indications are that the proposed enlargement of the Helpmekaar Dam (Dam 1), and construction of a new buffer dam (Dam 2), including a connecting pipeline will not have a significant impact on local archaeological heritage resources.

According to Bamford (2025), 'Dam 1 (enlargement of the Helpmekaar Dam) will have less impact on the palaeontology as it is mostly on Quaternary sands and alluvium'.

'Dam 2 could impact the palaeontology, but the land is already disturbed from current agricultural and is covered with soil'.

10. Conclusion

The HIA has shown that the proposed enlargement of the Helpmekaar Dam, construction of a new buffer dam, and construction of a $\pm$ 2km long connecting pipeline, does not pose a threat to local archaeological and palaeontological heritage resources.

A few discarded ESA flakes in Dam 2 have been graded as Not Conservation Worthy (NCW).

According to Bamford (2025), there is a 'very, small chance' that marine invertebrate fossils might occur in the unweathered sandstones below the cover soils in Dam 2.

Dam 1 (enlargement of the existing Helpmekaar Dam) 'will have less impact' on the palaeontology as it is mostly on Quaternary sands and alluvium.

Therefore, overall, there are no objections to the proposed development, which should be allowed to proceed.

11. Recommendations

1. No archaeological mitigation is required prior to construction excavations commencing.
2. No archaeological monitoring is required during construction excavations.
3. If any graves, or unmarked human remains are uncovered or exposed during site preparations, or excavations, work must immediately stop, and an archaeologist alerted to the finds. Human remains, and graves must not be altered or removed until inspected by a professional archaeologist.
4. The Fossil Chance Find Procedure should be added to the EMP. If fossils are found once excavations have commenced, they should be rescued and a palaeontologist called to assess and collect a representative sample.

12. Author notes

Kaplan, J. 2026. Proposed, Witzenberg Local Municipality, near Ceres, Western Cape. Report prepared for Enviroafrica. ACRM, Cape Town

Bamford, M. 2025. Palaeontological Impact Assessment for the proposed enlargement of Langrug-Boonste Nr1 dam, also known as Helpmekaar dam, on Rietrivier 202 portion 5, District Ceres, Sterkwater Farming, Western Cape Province

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1. INTRODUCTION

ACRM was requested by Enviroafrica on behalf of Sterkwater Farming to conduct a Heritage Impact Assessment (HIA) for the proposed enlargement of the Helpmekaar Dam on Portion 5 of the Farm Rietrivier No. 202 near Ceres, Witzenberg Local Municipality, in the Western Cape (Figure 1).

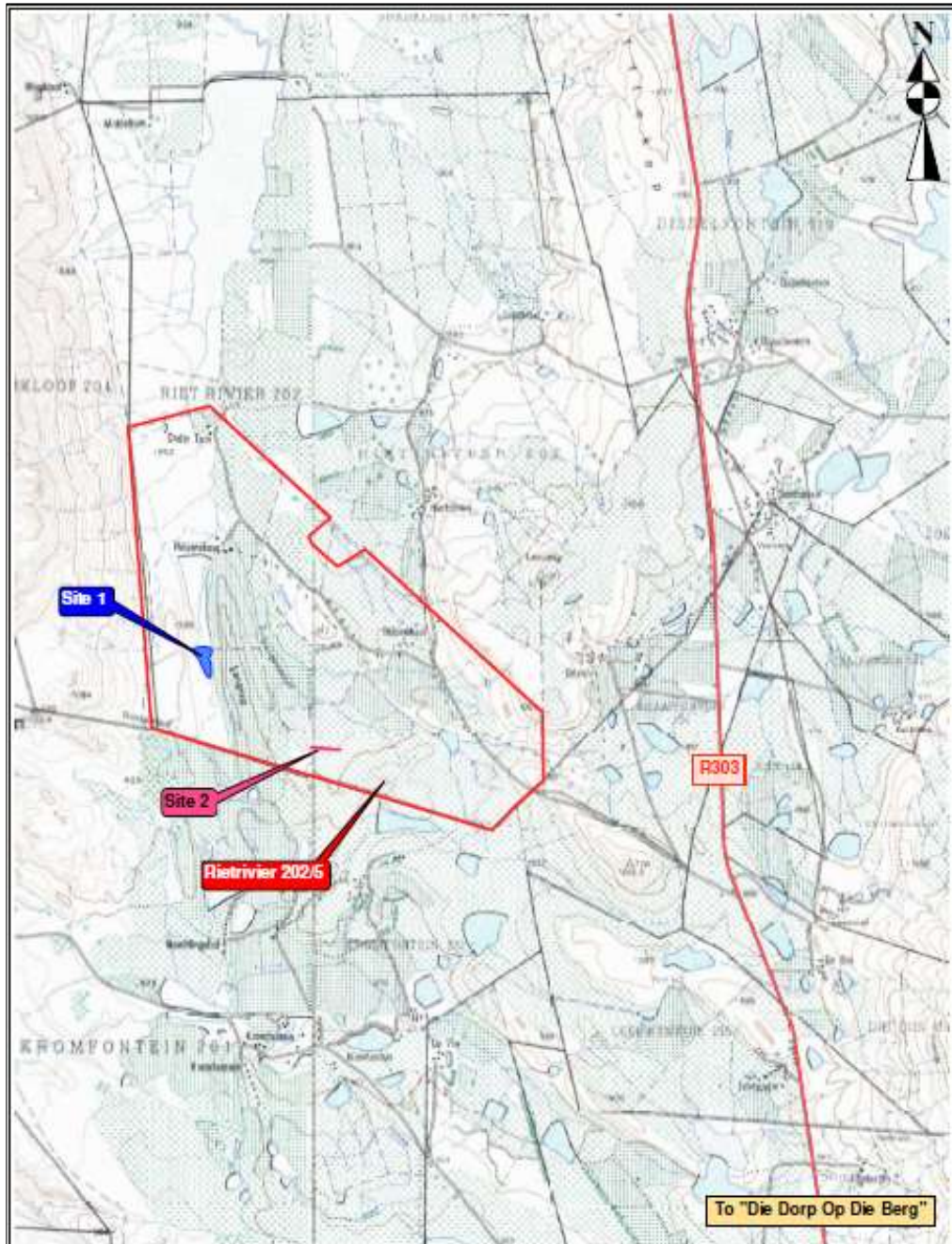


Figure 1. Locality map indicating the location of the Project Area north of Ceres in the Western Cape



Figure 2. Google Earth satellite map indicating the location of the Project Area northwest of Ceres in the Bokkeveld region of the Western Cape. Surrounding villages and towns of Op Die Berg, Prince Alfred Hamlet & Ceres are also illustrated.

2. THE DEVELOPMENT PROPOSAL

The project entails the enlargement of the Langrug-Boonste Dam, also known as the Helpmekaar Dam, and the construction of a new buffer dam, on Portion 5 of the Farm Rietrivier 202, near Ceres in the Western Cape (Figure 3). A ± 2 km long pipeline connecting the two dams is also proposed. The pipeline will serve the purpose of moving water between the two dams to where it would be practical to irrigate from. The existing instream dam will be enlarged from a storage capacity of about 390 000m³ to a total capacity of about 800 000m³. All the bulk earth fill will be excavated from within the dam basin. The flooded area of the enlarged dam will be about 16ha. Water will be abstracted during winter surplus periods and stored for irrigation in the dry summer seasons. The layout of the enlargement of the dam will follow the alignment of the existing dam wall, being a straight aligned embankment with a spillway on the left bank. It will also be equipped with a service spillway for low flows to reduce erosion in the return channel plus an extension to the existing outlet pipe.

Enlargement of the Helpmekaar Dam will ensure the conversion of about 45ha annual cash crops into permanent fruit orchards. This agricultural expansion will also ensure long term economic viability as well as sustainability of the farming entity by creating additional permanent jobs within the agricultural industry.

Enviroafrica is the appointed environmental assessment practitioner (EAP) responsible for facilitating environmental authorisation for the project, which includes a Public Participation Process (or PPP).

An Environmental Impact Assessment (EIA) process will be followed in the application.

The Heritage Impact Assessment (HIA) has considered the findings of a Screening Tool Report generated for the Helpmekaar Dam which indicates a **Low** archaeological and cultural heritage sensitivity and **Very High** overall palaeontological sensitivity for the area assessed.

ACRM was requested to conduct an Archaeological Impact Assessment (AIA) and to write up the integrated HIA, which includes comments from the Witzenberg Local Municipality and Interested and Affected parties (IAPs).

A Palaeontological Impact Assessment (PIA) for the development proposal has been conducted by Professor Marion Bamford.

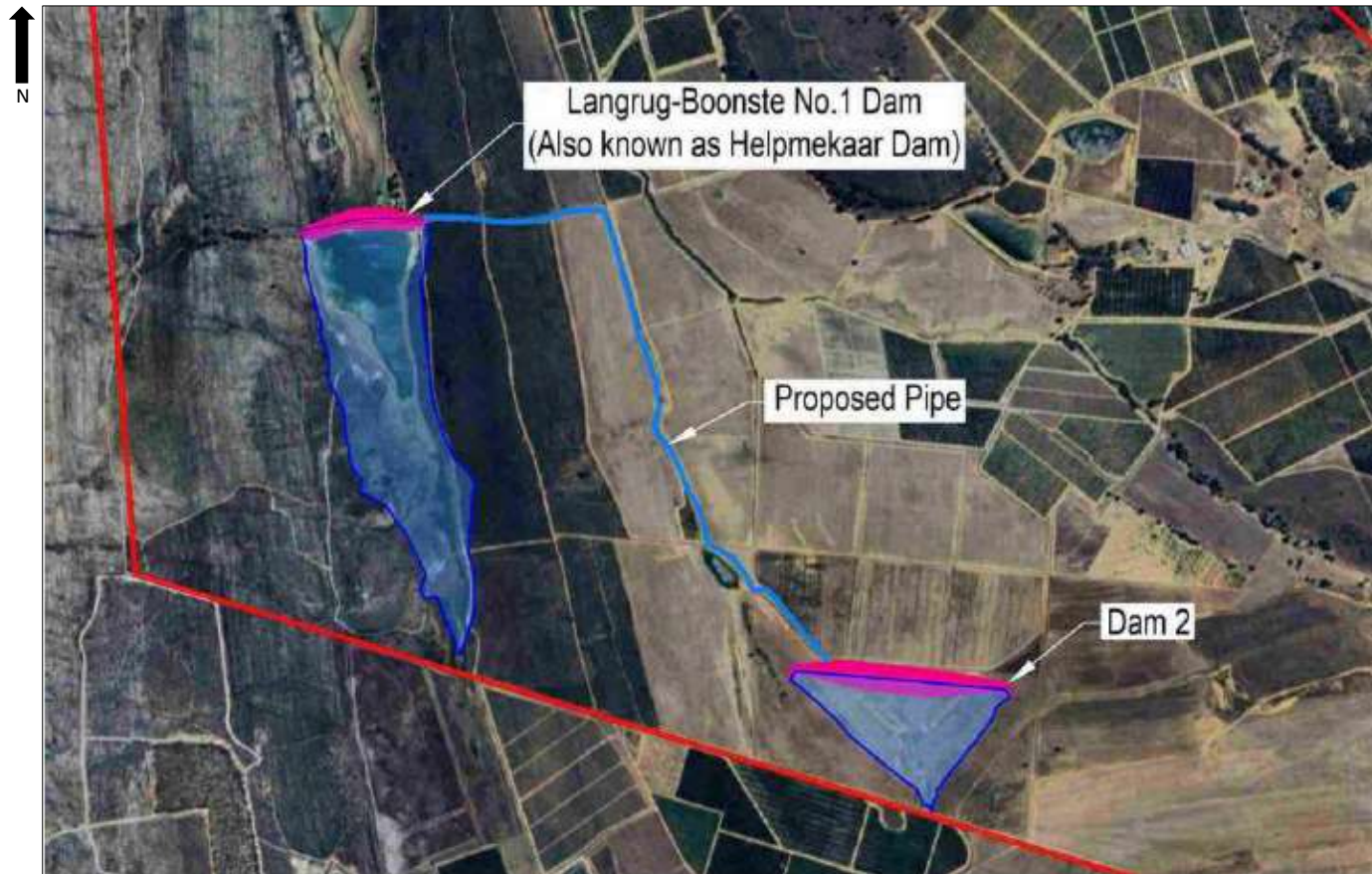


Figure 3. Layout of the proposed

3. HERITAGE LEGISLATION

The National Heritage Resources Act (Act No. 25 of 1999) makes provision for a compulsory Heritage Impact Assessment (HIA) when an area exceeding 5000 m² is being developed. This is to determine if the area contains heritage sites and to take the necessary steps to ensure that they are not damaged or destroyed during development.

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34).
- Archaeological sites, palaeontological material, and meteorites (Section 35).

- Burial grounds and graves (Section 36).
- Public monuments and memorials (Section 37).
- Living heritage (defined in the Act, as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society, and social relationships) (Section 2 (d) (xxi)).

Section 38 (1) (a) of the Act also stipulates that any person constructing a powerline, pipeline or road, or similar linear development or barrier exceeding 300m in length is required to notify the responsible heritage resources authority, who will in turn advise whether an impact assessment report is needed before development can take place.

4. STUDY APPROACH

4.1 Methodology

The archaeological study was conducted on foot. Archaeological resources identified during the assessment were recorded and mapped using a hand-held Garmin Oregon 700 GPS unit set on the map datum WGS 84. Photographs were also taken in order to capture the landscape setting of the project.

A literature survey was carried out to assess the heritage context surrounding the Project Area. The literature survey included published reports and unpublished commercial CRM reports. Nic Wiltshire of CTS Heritage was also consulted with regard to the presence of rock painting sites in the surrounding area.

Regarding palaeontological heritage, consultation of geological maps, relevant literature, palaeontological databases, published and unpublished records, was conducted to determine the likelihood of fossils occurring in the affected areas (Bamford 2025). Sources included records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA/SAHRIS databases.

4.2 Constraints & limitations

There were no constraints or limitations associated with the study. Access to the Project Area was unrestricted and ground visibility where it mattered, was good.

4.3 Assumptions

It is assumed that all project information, including, maps, drawings, description of activities and KMZ files distributed to specialists are accurate and up to date.

5. ARCHAEOLOGICAL HERITAGE

People have occupied the Witzenberg and Koue Bokkeveld region of the Western Cape for well over a million years and Early Stone Age (ESA) and Middle Stone Age (MSA) tools occur locally (Kaplan 2009, 2005). Later Stone Age (LSA) 'Bushman'/San rock paintings are also well known in the area (Wiltshire 2011), particularly those depicting colonial imagery (Hall & Mazel 2005; Johnson *et al* 1959; Yates *et al* 1993). Rock paintings record the remarkable artistic achievement of the indigenous San of southern Africa who created them for religious purposes as part of a changing cultural tradition that persisted for over 20 000 years.

The Koue Bokkeveld was also unusual in terms of early Cape history, in that unlike many other areas from which the Khoisan quickly disappeared, there was sustained contact in the region between remnants of the Khoisan and colonists throughout the eighteenth century (Hall & Mazel 2005; Penn 1987). As a result, many farm labourers today trace their ancestry back to the Khoisan.

A search of the South African Heritage Resources Information System (SAHRIS) showed that no impact assessments have been lodged for the area surrounding the Project Area. The nearest studies have been conducted more than 20kms away, on the Farms Donkerbos (Kaplan 2009), Tandfontein (Kaplan 2008, 2025), Houdenberg (Kaplan 2018), Libertas (Kaplan 2016), Driefontein (Kaplan 2023) and Schoongezicht (Nic Wiltshire pers. comm. 2026) which is located about 10kms north of Rietrivier. Rock paintings were recorded on all of these farms.

The Eastern Cederberg Rock Art Group (eCRAG) has also recorded several hundred rock art sites in the eastern Cederberg, but according to Nick Wiltshire (pers. comm.), the Koue Bokkeveld and Witzenberg regions has not been an area of focus of the eCRAG project. Several rock painting sites have, however, been documented in the area, on the Farm Visgat in the Witzenberg Valley (Nick Wiltshire pers. comm. 2022), while a few painted sites have been recorded on Kaleo Guest Farm, on the Farm Malabar 293, and on the Farm Goudmyn 458 (Hanu Swart pers. comm.). Well preserved rock painting sites also occur on the Farm Swanepoelspoort (Gene Swanepoel pers. comm. 2024) and at Kagga Kamma Nature Reserve about 35kms north of the Project Area on the edge of the Tankwa. Paintings of 'net scenes', dancing human figures, unidentified antelope, and a 'rain bull' were recorded on the Farm Driefontein 327 during Heritage Scoping for the proposed Gydo Renewable Energy Project/SPVR8 (Kaplan 2023).

6. THE PROJECT AREA

The Project Area is located near Op Die Berg, about 50km northwest of Ceres in the Bokkeveld region of the Western Cape. Agriculture, including deciduous fruit (apples & pears), dryland cereal, and vegetables crops dominate the historical landuse. Packing sheds, farm roads, farm dams, and farm infrastructure are all characteristic of the rural agricultural landscape. The R303/Gydo Pass from Ceres/Prince Alfred Hamlet is the primary gateway destination to the Bokkeveld, where visitor accommodation is offered on numerous farms (including Rietrivier), as well as recreational activities such as hiking, trail running, fishing, camping and mountain biking. Indigenous rock art abounds in the area.

6.1 Dam 1

The existing Langrug-Boonste Dam (also known as the Helpmekaar Dam) is located at the foot of the Koue Bokkeveld Mountain range, on Farm Rietrivier 202/5. The site of the instream dam is located within the upper tributary of the Leeu River (Figures 4-8). The north bank is surrounded by dense Protea sp. which are managed and cut for export, while the southern bank (the full inundation area) is covered with Protea, invasive Wattle, dense vlei grass, Fynbos and shrub vegetation. Scattered pines occur in places. Outcroppings of sandstone occur on the lower mountain slopes alongside the dam.



Figure 4. The existing Helpmekaar Dam. View facing northeast (November 2025)



Figure 5. The existing Helpmekaar Dam. View facing northeast (November 2025)



Figure 6. Inundation area. The Helpmekaar Dam can be seen in the distance. View facing southwest (November 2025)



Figure 7. Inundation area. The Helpmekaar Dam can be seen in the far distance. View facing southwest (November 2025)



Figure 8. Inundation area. View facing east. The Gydoberg can be seen in the distance (November 2025)

6.2 Dam 2

The proposed new buffer dam (Dam 2), covering an area of about 11ha is located in old agricultural land (dryland wheat) which has not been worked for a few years (Figures 9-12). Several deep dongas cut across the lower western portion of the site. A stream bed drains into the upper donga. There are no significant landscape features on the site, which slopes from east to west. A few soil test pits have been excavated on the site.



Figure 9. Proposed buffer dam. View facing southwest (November 2025)



Figure 10. Proposed buffer dam. View west, with the stream bed to the right of the plate (November 2025)



Figure 11. Proposed buffer dam. View facing northwest. Klein Tafelberg can be seen in the distance (November 2025)



Figure 12. Proposed buffer dam. View facing north west (November 2025)

6.3 Proposed Pipeline

The proposed ± 2 km long connecting pipeline follows existing gravel farm roads, and farm tracks, before heading up a steep rocky hill slope, before connecting with the existing Helpmekaar Dam (Figures 13-16). The surrounding land use is extensive dryland farming (wheat), stone fruit, and some grazing/cattle.



Figure 13. Route for the connecting pipeline follows existing farm. View facing southwest (November 2025)



Figure 15. Route for the connecting pipeline follows existing farm. View facing southwest (November 2025)



Figure 14. Route for the connecting pipeline follows existing farm roads



Figure 16. Route for the connecting pipeline follows existing farm. View facing southwest (November 2025)

7. RESULTS

A field assessment was conducted on the 18 November 2025 in which the following observations were made.

7.1.1 Dam 1

No Stone Age archaeological resources were recorded in the enlarged footprint area of the existing Helpmekaar Dam (Figure 17).

No rock art sites were recorded among sandstone outcroppings located on the edge of Dam 1. The closest known recorded rock painting sites are about 10kms away on the Farm Schoongezicht (Nic Wiltshire pers. comm. 2025).

7.1.2 Dam 2

Two weathered/burnished, Early Stone Age quartzite (cobble) flake tools (Waypoints 614 & 714) were recorded in the footprint area of the proposed buffer dam (Figure 18), which comprises old agricultural lands (dryland wheat) (Table 1). Several deep dongas intersect the site, as well as a small stream bed.

The very small number, isolated and the transformed context in which they were found means that the remains have been graded as Not Conservation Worthy (NCW).

7.1.3 Proposed Pipeline

No archaeological heritage resources were recorded in/along the alignment of the proposed 2km long connecting pipeline, which follows existing farm roads and farm tracks.



Figure 17. Trackpaths in blue and waypoints of archaeological finds

Waypoint	Name of Farm	Lat/long	Description of Finds	Grading	Mitigation
	Rietrivier 2022/5				
614		S 32°55'42.50" E 19°15'0.31"	ESA flake in old fields	NCW	None required
714		S 32°55'40.83" E 19°14'59.85"	ESA large cutting tool along side donga	NCW	None required

Table 1. Spreadsheet of waypoints and description of archaeological finds



Figure 18. ESA flake tools recorded in Dam 2. Scale is in cm

7.2 Palaeontology

According to Bamford (2025), 'the proposed sites lie on the Quaternary fluvial sands of low palaeosensitivity and also on the potentially very highly sensitive Voorstehoek Formation (Ceres Subgroup, Bokkeveld Group, Cape Supergroup) that might preserve marine invertebrate fossils, but the sites are already disturbed by decades of ploughing and cultivation' (Figure 19).

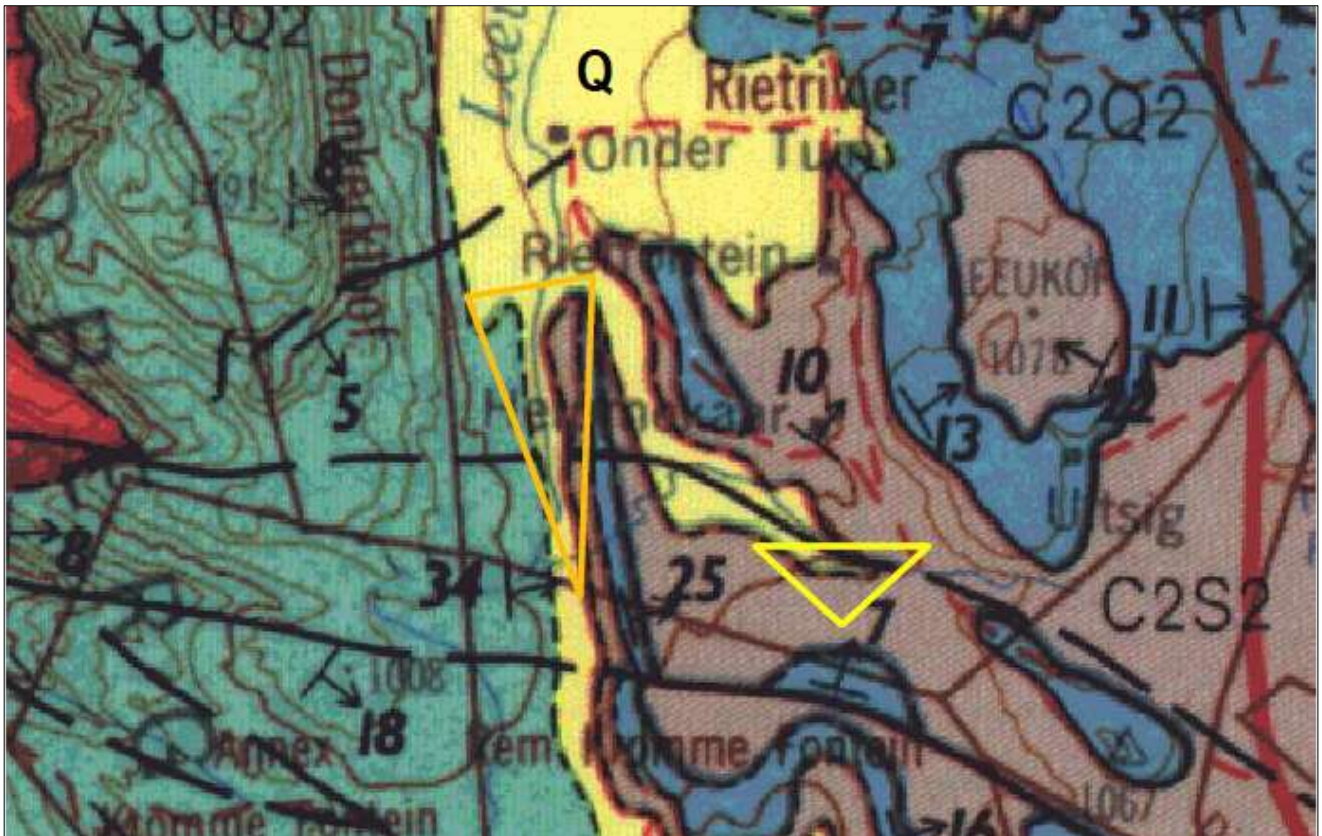


Figure 19. Geological map of the area around the Farm Rietrivier 202, with the proposed dam sites indicated within the orange outline (Dam 1) and yellow outline (Dam 2). Abbreviations of the rock types are explained in Table 2 below (Bamford 2025).

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Sands, alluvium, river sands	Quaternary Ca last 100 ka
C2Q2 Dh	Hex River Fm, Ceres Subgroup, Bokkeveld Group, Cape SG	Sandstone	Devonian
C2S2 Dv	Voorstehoek Fm, Ceres Subgroup, Bokkeveld Group, Cape SG	Mudrock, siltstone	Devonian
C2S1 Dg	Gydo Fm, Ceres Subgroup, Bokkeveld Group, Cape SG	Mudrock, siltstone	Devonian
C1Q2 Dr	Rietvlei Fm, Nardouw Subgroup, Table Mountain Group, Cape SG	Sandstone	Devonian

Table 2. Explanation of symbols for the geological map and approximate ages (Bamford 2025)

From the SAHRIS palaeo-sensitivity map (Figure 20), the part of the area indicated as very highly sensitive/red); the land (i.e. Dam 2) has been cultivated for decades and is covered with non-fossiliferous soils. Marine invertebrate fossils might occur in the unweathered sandstones below the soils, but this cannot be confirmed until excavations commence.

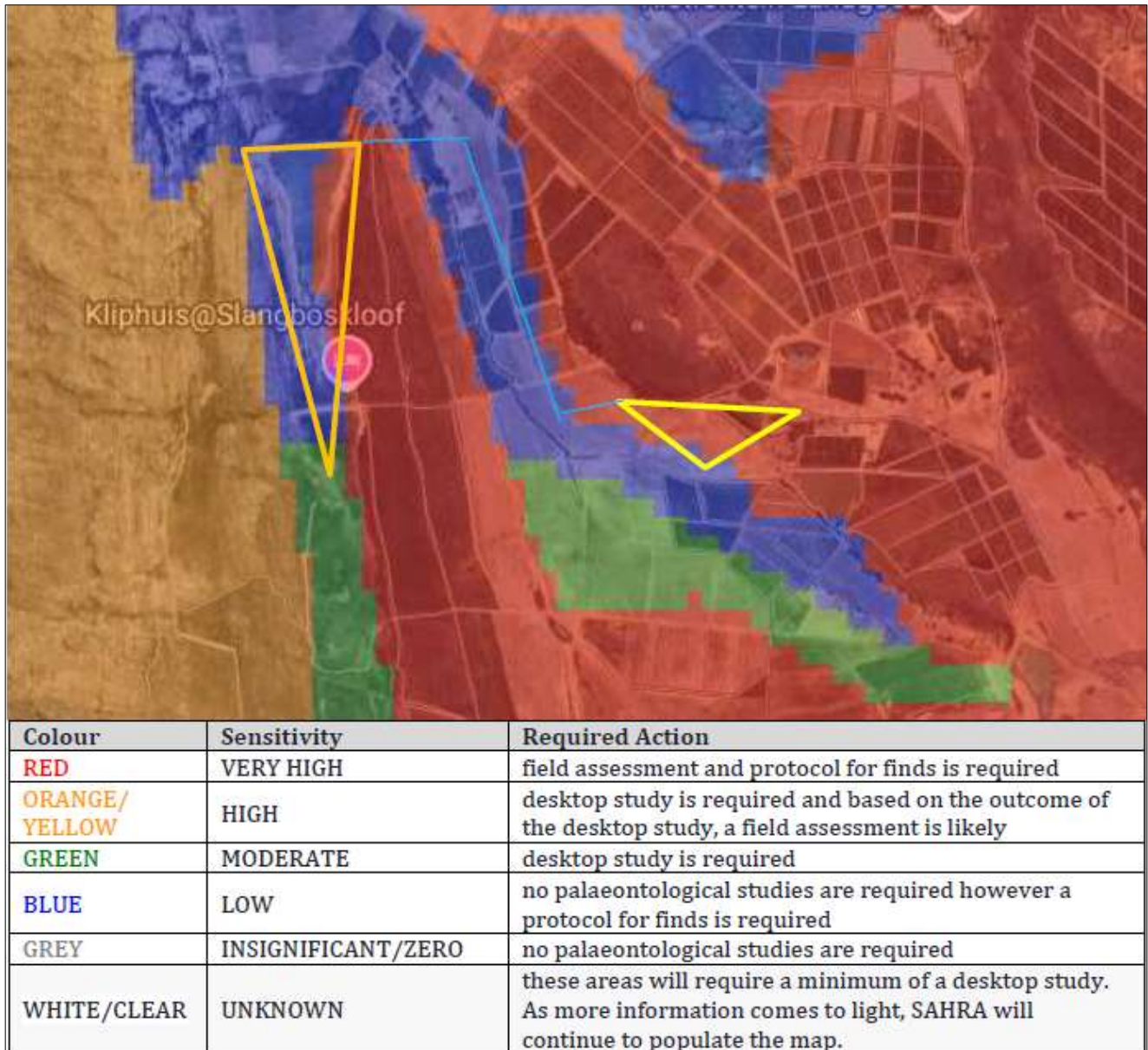


Figure 20. SAHRIS palaeontological sensitivity map of the Project Area (Bamford 2025)

7.3 Graves

No graves were encountered during the field assessment.

7.4 Built Environment

No buildings, structures or features will be impacted by the proposed development.

7.5 Cultural Landscape

The Project Area is dominated by a rural agricultural landscape (mix of dryland wheat/cereal crops, stone fruit, grazing/cattle, & cut flowers/Protea), farm dams, farm roads, packing sheds, farm worker housing, and farm infrastructure

7.6 Visual Impact

Enlargement of the existing Helpmekaar Dam (Dam 1) and construction of a new buffer dam (Dam 2) will complement the surrounding landuse, which is dominated by agriculture. The visual impact is therefore rated as being Low.

8. ANTICIPATED IMPACTS

8.1 Archaeology

Indications are that the proposed enlargement of the Helpmekaar Dam (Dam 1), and construction of a new buffer dam (Dam 2), including a connecting pipeline will not have a significant impact on local archaeological heritage resources.

8.2 Palaeontology

According to Bamford (2025), 'Dam 1 (enlargement of the Helpmekaar Dam) will have less impact on the palaeontology as it is mostly on Quaternary sands and alluvium'.

'Dam 2 could impact the palaeontology, but the land is already disturbed from current agricultural and is covered with soil'.

9. CONCLUSION

The HIA has shown that the proposed enlargement of the Helpmekaar Dam, construction of a new buffer dam, and construction of a ± 2km long connecting pipeline, does not pose a threat to local archaeological and palaeontological heritage resources. A few discarded ESA flakes in Dam 2 have been graded as Not Conservation Worthy (NCW).

According to Bamford (2025) there is a 'very, small chance' that marine invertebrate fossils might occur in the unweathered sandstones below the coversoils in Dam 2.

Dam 1 (enlargement of the existing Helpmekaar Dam) 'will have less impact' on the palaeontology as it is mostly on Quaternary sands and alluvium (Bamford 2025).

Therefore, overall, there are no objections to the development proceeding.

10. RECOMMENDATIONS

Regarding the proposed enlargement of the Helpmekaar Dam, construction of a new buffer dam, and connecting pipeline on Farm Rietrivier No. 202/5, the following recommendations are made.

1. No archaeological mitigation is required prior to construction excavations commencing.
2. No archaeological monitoring is required during construction phase excavations.
3. If any graves or unmarked human remains are uncovered or exposed during excavations, work must immediately stop, and an archaeologist alerted to the finds. Human remains, and graves must not be altered or removed until inspected by a professional archaeologist.

4. The Chance Fossil Find Protocol should be added to the EMP. If fossils are found once excavations have commenced, they should be rescued and a palaeontologist called to assess and collect a representative sample.

11. REFERENCES

- Bamford, M. 2025. Palaeontological Impact Assessment for the proposed enlargement of Langrug-Boonste Nr1 dam, also known as Helpmekaar dam, on Rietrivier 202 portion 5, District Ceres, Sterkwater Farming, Western Cape Province
- Johnson, R.T., Rabinowitz, H & Sieff, P. Rock paintings at Katbakkies, Koue Bokkeveld, Cape. South African Archaeological Bulletin 14: 99-103.
- Hall, S. & Mazel, A. 2005. The Private Performance of Events: Colonial Period Rock Art from the Swartruggens. Kronos vol.31 n.1 Cape Town.
- Johnson, R.T., Rabinowitz, H & Sieff, P. Rock paintings at Katbakkies, Koue Bokkeveld, Cape. South African Archaeological Bulletin 14: 99-103.
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Appendix A:

Details of Specialist / Curriculum Vitae

**Palaeontological Impact Assessment for the
proposed enlargement of Langrug-Boonste Nr1
dam, also known as Helpmekaar dam, on
Rietrivier 202 portion 5, District Ceres,
Sterkwater Farming, Western Cape Province**

Desktop Study (Phase 1)

Subcontracted by

ACRM

16 November 2025

Prof Marion Bamford

Palaeobotanist

P Bag 652, WITS 2050

Johannesburg, South Africa

Marion.bamford@wits.ac.za

1. Executive Summary

A Palaeontological Impact Assessment was requested for the proposed enlargement of Langrug-Boonste Nr1 dam, also known as Helpmekaar dam, on Rietrivier 202 portion 5, District Ceres, Sterkwater Farming, Western Cape Province. An alternative dam site is also under consideration.

To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development.

The proposed sites lie on the Quaternary fluvial sands of low palaeosensitivity and also on the potentially very highly sensitive Voorstehoek Formation (Ceres Subgroup, Bokkeveld Group, Cape Supergroup) that might preserve marine invertebrate fossils but the sites are already disturbed by decades of ploughing and cultivation. There would be no fossil in the soils. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr. Based on this information it is recommended that no further palaeontological impact assessment is required unless fossils are found by the contractor, environmental officer or other designated responsible person once excavations or drilling to construct the dam walls and the connecting pipe have commenced. Since the impact will be low, as far as the palaeontology is concerned, the project should be authorised.

Dam 1 (enlargement of an existing dam) will have less impact on the palaeontology as it is mostly on Quaternary sands and alluvium. Dam 2 could impact the palaeontology but the land is already disturbed from current agricultural and is covered with soil.

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

2. Declaration of independence and summary of expertise.

a. Declaration

This report has been compiled by Professor Marion Bamford, of the University of the Witwatersrand, sub-contracted by ACRM, South Africa. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the Project.

Specialist: Prof Marion Bamford

Signature:



b. Expertise

The Palaeontologist Consultant: Prof Marion Bamford

Qualifications: PhD (Wits Univ, 1990); FRSSAf, mASSAf, PSSA

Experience: 36 years research and lecturing in Palaeontology; over 28 years PIA studies and over 450 projects completed.

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

Declaration of Independence

I, Marion Bamford, declare that –

General declaration:

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

and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application,

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

Disclosure of Vested Interest

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

d. Summary of the specialist's expertise

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

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

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3. Project Background

A Palaeontological Impact Assessment was requested for the proposed enlargement of Langrug-Boonste Nr1 dam, also known as Helpmekaar dam, on Rietrivier 202 portion 5, District Ceres, Sterkwater Farming, Western Cape Province. An alternative or buffer dam site is also under consideration (Figures 1-2). Sterkwater Farming is planning to shift from cash crops to establishing an orchard so a reliable supply of sufficient water is required.

Two options are under consideration:

- a. Enlargement of the existing Helpmekaar dam (no 1 in Figure 2)
- b. Construction of a new buffer dam to the southeast (no 2 in Figure 2) on existing ploughed land.

In addition, a pipe connecting the two dams, about 1700 m long, situated alongside other cultivated lands and the road, is also under consideration. Sarel Bester Engineers of Ceres have completed a Feasibility Report, 2235DDR-S1 dated 15 December 2022; updated: 2235DDR-S2, 12/12/2024.

This report is for the palaeontological impact that is part of the required environmental authorisation.

A Palaeontological Impact Assessment was requested for the Helpmekaar Dam project. To comply with the regulations of the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed development and is reported herein. The minimum requirement for reporting are listed in Table 1.

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

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
ai	Details of the specialist who prepared the report,	Section 2
aii	The expertise of that person to compile a specialist report including a curriculum vitae	Section 2
b	A declaration that the person is independent in a form as may be specified by the competent authority	Section 2
c	An indication of the scope of, and the purpose for which, the report was prepared	Section 3

	A specialist report prepared in terms of the Environmental Impact Regulations of 2017 must contain:	Relevant section in report
ci	An indication of the quality and age of the base data used for the specialist report: SAHRIS palaeosensitivity map accessed – date of this report	Yes
cii	A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change	Section 6
d	The date and season of the site investigation and the relevance of the season to the outcome of the assessment	N/A
e	A description of the methodology adopted in preparing the report or carrying out the specialised process	Section 4
f	The specific identified sensitivity of the site related to the activity and its associated structures and infrastructure	Section 6
g	An identification of any areas to be avoided, including buffers	N/A
h	A map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A
i	A description of any assumptions made and any uncertainties or gaps in knowledge;	Section 7
j	A description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment	Section 8
k	Any mitigation measures for inclusion in the EMPr	Section 10, Appendix A
l	Any conditions for inclusion in the environmental authorisation	N/A
m	Any monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10, Appendix A
ni	A reasoned opinion as to whether the proposed activity or portions thereof should be authorised	Section 8
nii	If the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Sections 8, 10
o	A description of any consultation process that was undertaken during the course of carrying out the study	N/A
p	A summary and copies of any comments that were received during any consultation process	N/A
q	Any other information requested by the competent authority.	N/A
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A



Figure 1: Google Earth map of the general area to show the relative land marks. The Helpmekaar dam sites are shown by the yellow pins.

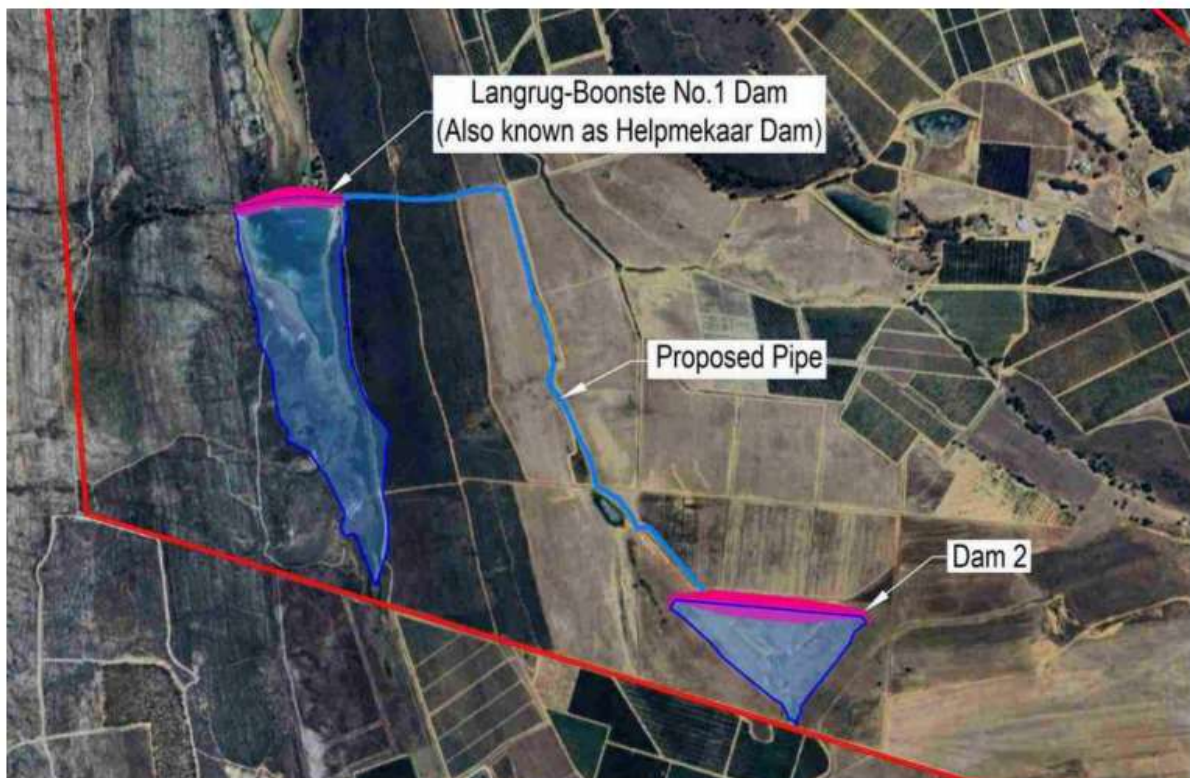


Figure 2: Google Earth Map of the proposed development of the Helpmekaar dam with two sites (enlarged dam and buffer dam). Map taken from the engineering report by Sarel Bester Engineers.

4. Methods and Terms of Reference

The Terms of Reference (ToR) for this study were to undertake a PIA and provide feasible management measures to comply with the requirements of SAHRA.

The methods employed to address the ToR included:

1. Consultation of geological maps, literature, palaeontological databases, published and unpublished records to determine the likelihood of fossils occurring in the affected areas. Sources include records housed at the Evolutionary Studies Institute at the University of the Witwatersrand and SAHRA databases; eg <https://sahris.sahra.org.za/map/palaeo>
2. Where necessary, site visits by a qualified palaeontologist to locate any fossils and assess their importance (*not applicable to this assessment*);
3. Where appropriate, collection of unique or rare fossils with the necessary permits for storage and curation at an appropriate facility (*not applicable to this assessment*); and
4. Determination of fossils' representativity or scientific importance to decide if the fossils can be destroyed or a representative sample collected (*not applicable to this assessment*).

5. Geology and Palaeontology

- i. Project location and geological context

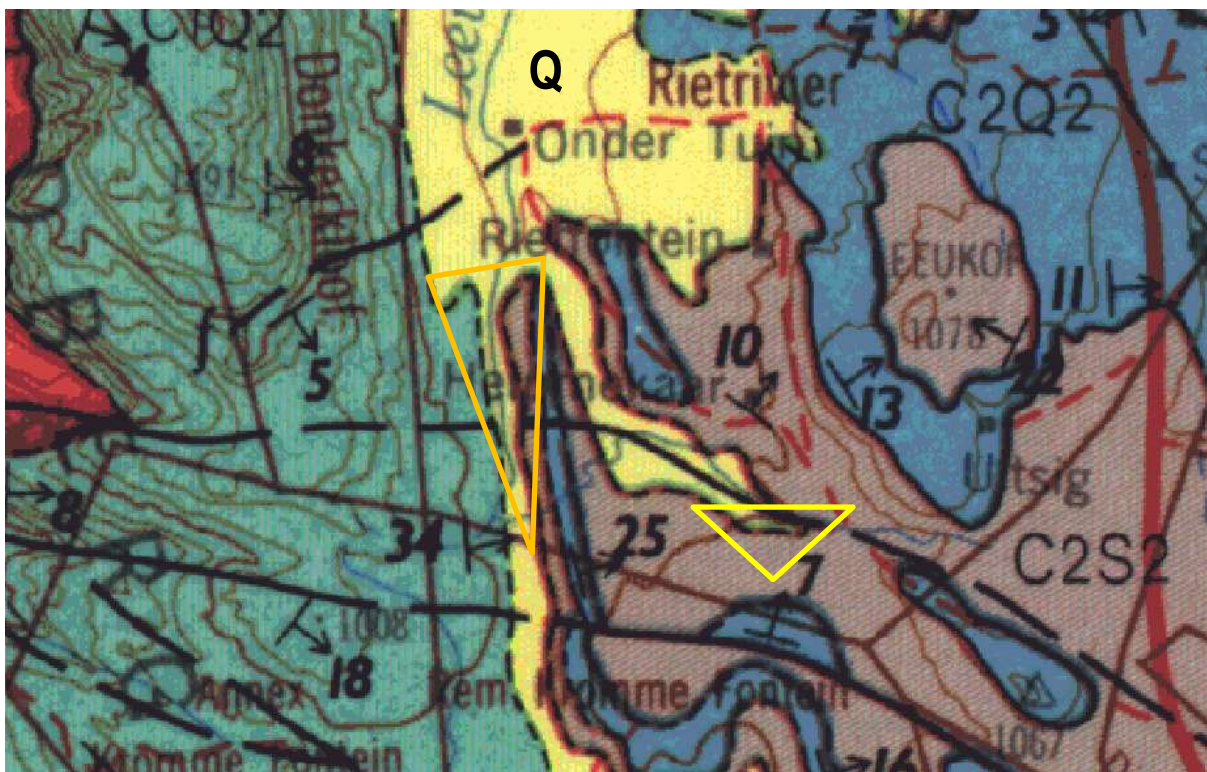


Figure 3: Geological map of the area around the Farm Rietfontein 202 with the proposed dam sites indicated within the red outline (Dam 1) and yellow outline (Dam 2). Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1: 250 000 map 3218 Clanwilliam.

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

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Sands, alluvium, river sands	Quaternary Ca last 100 ka
C2Q2 Dh	Hex River Fm, Ceres Subgroup, Bokkeveld Group, Cape SG	Sandstone	Devonian
C2S2 Dv	Voorstehoek Fm, Ceres Subgroup, Bokkeveld Group, Cape SG	Mudrock, siltstone	Devonian
C2S1 Dg	Gydo Fm, Ceres Subgroup, Bokkeveld Group, Cape SG	Mudrock, siltstone	Devonian
C1Q2 Dr	Rietvlei Fm, Nardouw Subgroup, Table Mountain Group, Cape SG	Sandstone	Devonian

The project lies in the northern part of the Cape Basin where the lower Bokkeveld Group rocks of the Cape Supergroup are exposed (Figure 3). During the Quaternary period sands and alluvium that has weathered and eroded from the surrounding rocks were deposited in the valleys and depressions.

The **Cape Supergroup** comprises a series of siliciclastic sediments that were deposited in a passive margin basin and is underlain by Cambrian rocks of the Saldanian Orogeny and Pan African depositional cycles. It is overlain by the Karoo Basin sequence (Thamm and Johnson, 2006). Representing some 170 million years of earth history, and up to 10km of strata, the Cape Supergroup has since been deformed by the Cape Orogeny. It extends along the southern Cape coast for about 1000km (ibid). There are three major subdivisions, the basal Table Mountain Group, Bokkeveld and Witteberg Groups ranging from the Early Ordovician (ca 500 Ma) to the Early Carboniferous (ca 330 Ma). The subgroups and formations differ slightly between the western and eastern regions.

The **Bokkeveld Group** has fossiliferous shale and sandstone units with a series of upward coarsening cycles that were attributed to repeated basin-ward progradation of wave-dominated deltas (Thamm and Johnson, 2006). Penn-Clarke et al. (2018) have reinterpreted the setting to rather have been a succession that accumulated in a storm- and-wave dominated deltaic palaeoenvironment.

The middle Devonian Bokkeveld Group has been divided into the basal **Ceres Subgroup** with five formations that stretch across the whole of the southern Cape. From the base upwards these formations are the Gydo, Gamka, Voorstehoek, Hex River, Tra-Tra and Boplaas Formations (Thamm and Johnson, 2006; Penn-Clarke et al., 2018a, b). To the west of 21°E the upper Bokkeveld Bidouw Subgroup five formations are recognised, the Waboom, Wupperthal, Klipbokkop, Osberg and Karoopoort Formations. To the east of 21°E the equivalent is the Traka Subgroup with three formations, the Karies, Adolphspoort and Sandpoort Formations (ibid).

ii. Palaeontological context

The palaeontological sensitivity of the area under consideration is presented in Figure 4. The two possible sites for development are in the potentially very highly sensitive Voorstehoek Formation (Ceres Subgroup, Bokkeveld Group) indicated in red in the SAHRIS map.

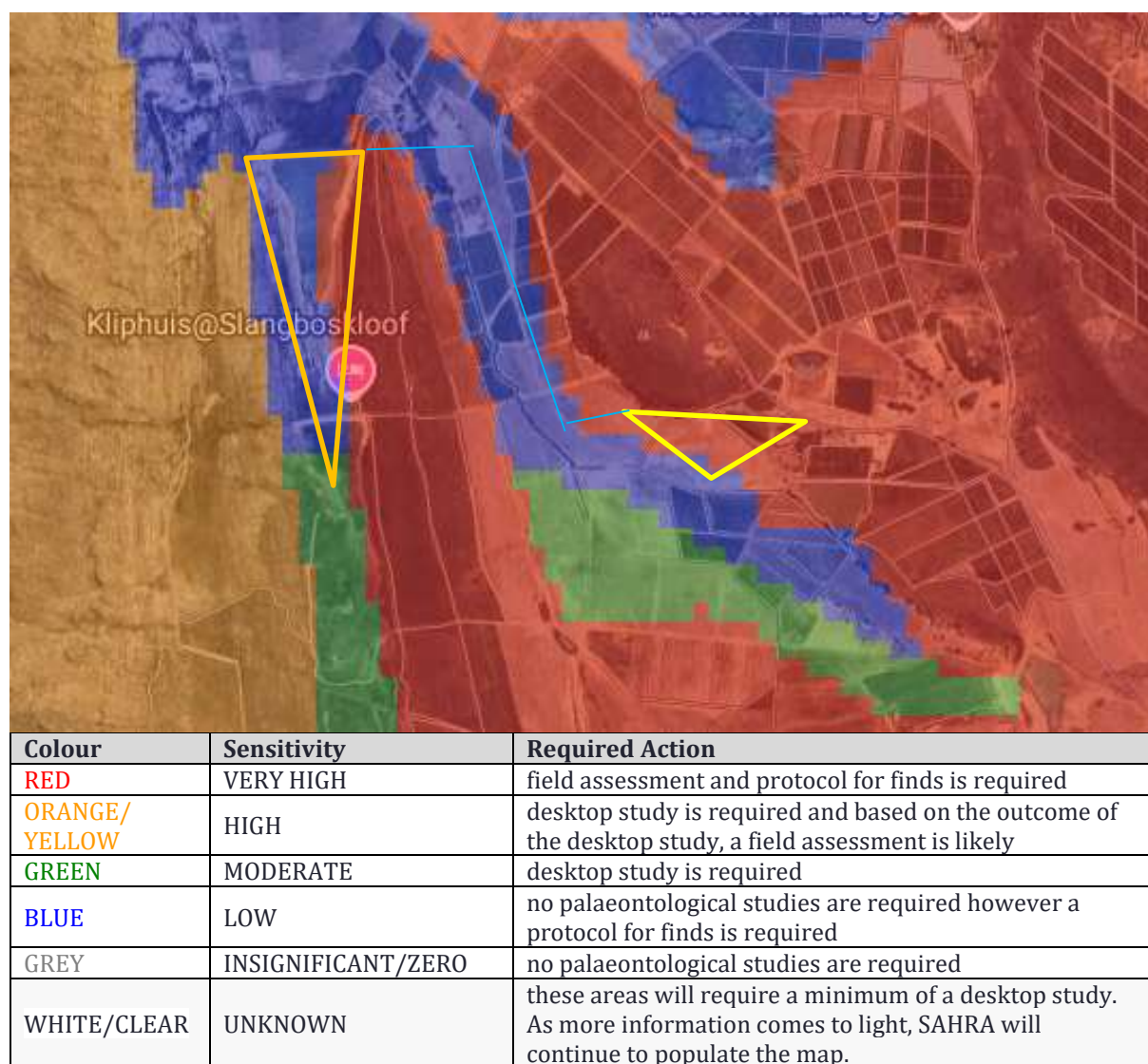


Figure 4: SAHRIS palaeosensitivity map for the site for the two proposed dam sites on Farm Rietfontein 202 shown within the orange (Dam 1) and yellow outlines (Dam 2).

The Ceres Subgroup has abundant marine benthic (bottom-dwelling) invertebrate fossils such as brachiopods, bivalves, trilobites, cephalopods, crinoids, ophiuroids, hyoliths, crinoid stems, corals and gastropods (Hiller and Theron, 1988; Theron and Johnson, 1991; Thamm and Johnson et al., 2006; Penn-Clarke et al., 2018a). These marine fossils occur mostly in the mudrock units while plant fossils occur in the sandstone units. Some units also show extensive bioturbation based on the presence of trace fossils of burrows, such as *Planolites*, *Skolithos* and *Arenicolites*.

From the SAHRIS map above the part of the area is indicated as very highly sensitive red) but the land has been cultivated for decades and is covered with non-fossiliferous soils. Fossils might occur in unweathered sandstones below the soils but this cannot be confirmed until excavations commence.

6. Impact assessment

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

Table 3a: Criteria for assessing impacts

PART A: DEFINITION AND CRITERIA		
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	H	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.
Criteria for ranking the DURATION of impacts	L	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of impacts	L	Localised - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national
PROBABILITY (of exposure to impacts)	H	Definite/ Continuous
	M	Possible/ frequent
	L	Unlikely/ seldom

Table 3b: Impact Assessment

PART B: Assessment		
SEVERITY/NATURE	H	-
	M	-

PART B: Assessment		
	L	Soils do not preserve fossils; so far there are no records from the Voorstehoek Fm of marine invertebrate fossils in this region so it is very unlikely that fossils occur on the site. The impact would be negligible
	L+	-
	M+	-
	H+	-
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since the only possible fossils within the area would be marine invertebrate fossils in the unweathered sandstones below the soil cover, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	It is extremely unlikely that any fossils would be found in the loose soils and sands that cover the area but is possible in the unweathered sandstones below the soil cover. Therefore, a Fossil Chance Find Protocol should be added to the eventual EMPr
	L	.

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are the correct age and type to contain fossils or but are covered with soil and crops. Furthermore, the material to be excavated is soil and this does not preserve fossils. Since there is a small chance that marine invertebrate fossils from the Voorstehoek Formation may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is low.

7. Assumptions and uncertainties

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and only some might contain fossil plant, insect, invertebrate and vertebrate material. The sands of the Quaternary period would not preserve fossils.

8. Recommendation

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils of the Quaternary. There is a very small chance that fossils may occur below the soil cover in

the unweathered sandstones of the Voorstehoek Formation (Ceres Subgroup, Bokkeveld Group, Cape Supergroup) so a Fossil Chance Find Protocol should be added to the EMPr. If fossils are found by the environmental officer, or other responsible person once excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. The impact on the palaeontological heritage would be low, as far as the palaeontology is concerned, so the project should be authorised.

Dam 1 (enlargement of an existing dam) will have less impact on the palaeontology as it is mostly on Quaternary sands and alluvium. Dam 2 could impact the palaeontology but the land is already disturbed from current agricultural and is covered with soil.

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

9. References

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10. Fossil Chance Find Protocol

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

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (marine invertebrates, plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figure 5). This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a HWC permit must be obtained. Annual reports must be submitted to HWC as required by the relevant permits.

7. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to HWC once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

11. **Appendix A** – Examples of fossils from the Bokkeveld Group.

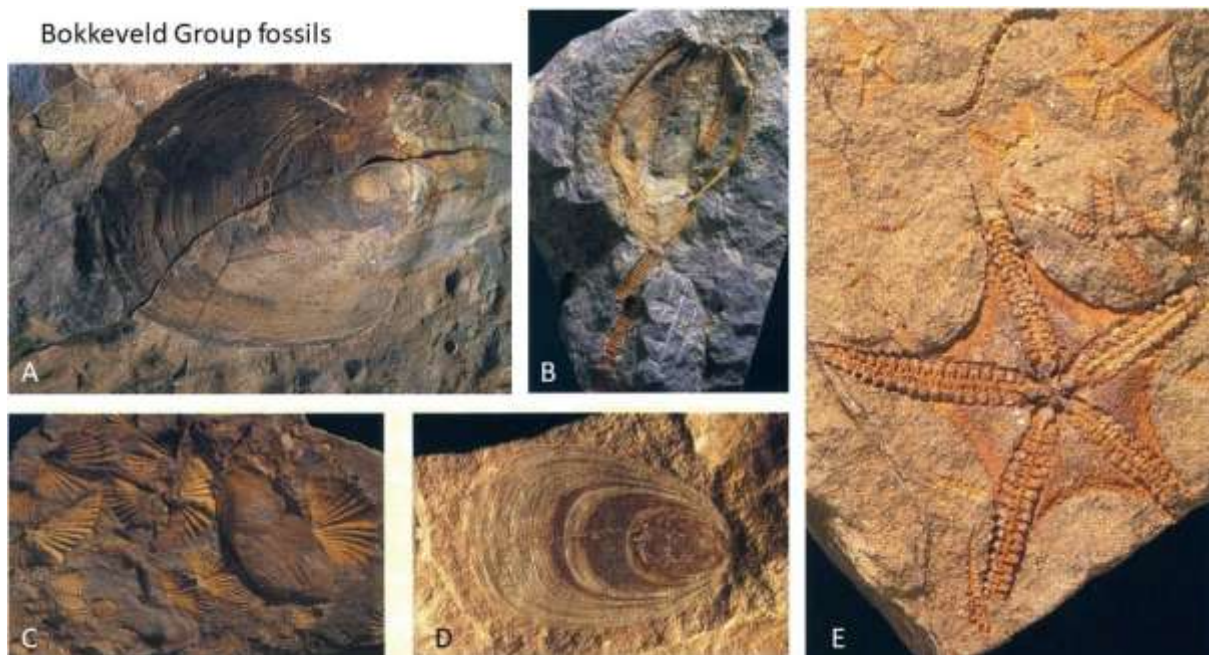


Figure 5: Photographs of marine invertebrate fossils from the Bokkeveld Group to assist the on-site responsible person.