



**EASTERN CAPE
PROVINCIAL HERITAGE
RESOURCES AUTHORITY**

SOUTH AFRICA

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FOR OFFICIAL USE ONLY:

File No.:
Date received:
Date approved:.....
Applicant:
Site / Object:
Permit No.:

**APPLICATION FOR PERMIT:
ARCHAEOLOGICAL AND PALAEOLOGICAL SITES AND METEORITES**

Please note: Permit Applications expire one year after the date of receipt.

In terms of Section 35 (4) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) no person may, without a permit issued by the relevant heritage resources authority, destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or material or any meteorite; or bring onto, or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

Applicants are advised that without full details no permit may be issued.

A. APPLICANT'S DETAILS

1. Name and address of applicant: **Robert Muir --- Room 324 Geology Department, University of the Free State, Bloemfontein, South Africa**
 Phone: (H) (W) **. 0514019928.** (Cell) **0732707896**
 Fax: E-mail: **muirra@ufs.ac.za**
 Identity number of applicant (or passport): **RSA ID: 9105205280082**
2. Academic qualifications of applicant:
PhD in Geology
3. Previous relevant experience of applicant: **.....Performed isotopic analysis, performed geological mapping and worked on the Uitenhage Group rocks of the Algoa Basin.....**.....
4. Name and address of a person who can serve as a reference, i.e. a qualified archaeologist, palaeontologist or geologist, as relevant:
(1) Dr. Rob Gess --- Albany Museum, Somerset Street, Makhanda, Eastern Cape. Email address:
robg@imagnet.co.za
(2) Dr. Rose Prevec --- Albany Museum, Somerset Street, Makhanda, Eastern Cape. Email address:
r.prevec@am.org.za

5. Name and address of the South African scientific institution with which the applicant collaborates:
University of the Free State (Park West, Bloemfontein 9300, Free State) &
University of Cape Town (Rondebosch, Cape Town, 7701)
6. Name and address of the South African scientific institution that will curate the material recovered:.....
University of the Free State Geology Department
 Geology Department Sample Archive (Room 116),
 Bloemfontein Campus, Park West, 9300
 Bloemfontein,
 Free State, RSA

NOTE: The laboratory samples will be sliced in half and drilled but will be available for viewing and further analyses in the UFS Geology Department, room 116.

B. DETAILS OF SITE(S) OR OBJECT(S)

7. Name(s) of site:
 Two sites:
 (1) Coega Quarry near the Coega Wind Farm (GPS co-ordinates: -33.7558, 25.6696).....
 (2) Jagtvlakte south of Kariega (GPS co-ordinates: -33.8225, 25.4236)
- The sites are either owned by the Coega Development Corporation (1), or under their custodianship (2).
8. Nature of site or object(s) *e.g. archaeological, palaeontological, meteorite**: **palaeontological**
** Please supply a short description of the site, including, type and approximate date on a separate sheet of paper*
9. Period, era, age or date of site or object(s) *: **Upper Jurassic to Lower Cretaceous (Mesozoic)**
10. Geographical situation of site / object MARK POSITION OF SITE ON A PHOTOSTAT OF A 1:10 000 or 1:50 000 MAP:
 District Municipality: Nelson Mandela Bay
 Local Chieftainship: :N/A 1: 50 000 Map number : . . . **see attached maps** (or SAN chart)
 Latitude & Longitude: . : **-33.7558, 25.6696** & . . . **-33.8225, 25.4236** . . . Recording method (GPS, Trig., Other) : **GPS**.....
 Farm Name and No.: Swarte Koppen 302 & Jagtvlakte . .(Now under Coega Development Corporation custodianship) / Town
 Nearest Town: . . (1)**Coega and (2)Kariega respectively**. . . / Street address & Erf #: N/A.....
11. If it is a provincial heritage site / object, the number and date of the notice in the *Government Gazette*

C. PURPOSE OF APPLICATION

12. Purpose of and reasons for application*

The purpose of this application is to support a part of ongoing research into the Palaeoclimate of the Jurassic-Cretaceous boundary in the Algoa Basin. A full research proposal is attached, but a short explanation is provided here. The aspect of the research that is relevant to this ECPHRA application is the marine fossil stable isotope analysis, which is a method I hope to employ to determine the palaeo-sea conditions. This research will help establish what the climate and sea-water conditions were in the Late Jurassic and Early Cretaceous during the initial formation of the African continent, when the sea first transgressed across southern Gondwana and wrapped around what is now the southern Cape of South Africa.

The principal aims of this part of the project are:

(A) Sample marine invertebrate fossils along a vertical stratigraphic profile in the Sundays River Formation at Coega Quarry (site 1) and from the marine Bethelsdorp Member of the Kirkwood Formation exposed at Jagtvlakte (site 2).

(B) Analyse the shells for stable isotopes of carbon (C) and oxygen (O), to determine palaeo-temperature and identify shifts and excursions in the global carbon cycle.

(Methods and motivation): These two sites expose Lower Cretaceous and Upper Jurassic fossiliferous strata and *in-situ* marine fossils. The isotopic composition of their shells likely record sea-water conditions (temperature/evaporative rates and global carbon cycling) during shell growth, when the marine organisms were alive. I plan to collect a grand total of 30 specimens of some of the most abundant taxa from Coega Quarry (*Pistotrigonia kraussii*, *Transitrigonia herzogi* & *Steinmanella holubi* e.g., Cooper, 2018), and oysters from Jagtvlakte (*Amphidonte (Cerastostreon)* see Almond, 2012). The samples will be brought back to the University of the Free State for processing, which involves cutting them in half to expose a cross section and using a microdrill to extract about 50 mg of powder from sections of the shells. These will then be analysed at the University of Cape Town stable isotope laboratory. The samples will be kept for storage at UFS upon completion of the analyses, in order to preserve the neatly sampled specimens.

References:

Almond, J. E., (2012). Proposed Jagtvlakte Precinct Human Settlement Plan, Nelson Mandela Bay Municipality, Eastern Cape. *Natura Viva c, Palaeontological Assessment: Combined Desktop and Scoping Study*, 22pp.

Cooper, M. R. (2018). *The Cretaceous Fossils of South-Central Africa: an illustrated guide: An Illustrated Guide*. CRC Press. 49pp

*** PLEASE SUPPLY FULL MOTIVATION OR RESEARCH PROPOSAL**

13 Nature of activity. *Please circle the appropriate activities below*

Destruction or Damage* for: **Analysis** / Dating / Restoration / Security / Other*

Excavation or disturbance*

Alteration*

Removal from original site*

Exhumation and re-interment*

Explore with a metal detector or other equipment**

Other (e.g. removal of graffiti at rock art site)*

Please supply extra details on a separate sheet of paper:*

Please see explanation provided in section 12 above. The request is to remove and partially damage common fossils in the marine rocks at two sites to perform stable isotope analysis of the shell walls.

14. Period for which permit is required. *Permits are not normally issued for periods longer than three years:*

From 01-05-2023 **To** 01-05-2024

15. Have you consulted the landowner about this project? Please supply documentation.

16. Institutional support (as relevant):

I, Prof. Bisrat Gibas-Babao Head of the Geology Department
(South African institution) where the applicant will be based while undertaking this project, hereby state that I support the application.

Signature: [Signature] Date: 08-05-23

I, Prof. Bisrat Gibas-Babao Head of the Geology Department
(institution) hereby undertake to store in our institution the material and records from this project once completed.

Signature: [Signature] Date: 08-05-23

I, Dr. Robert Muir

undertake strictly to observe the terms, conditions, restrictions, regulations and guidelines under which the Council may issue the permit to me.

Signature: [Signature] Place: Bloemfontein
(APPLICANT) Date: 8-May-23

Please note:

By the submission of this form and all material submitted in support of this application (i.e: 'the material'), all applicant parties acknowledge that they are aware that the material and/or parts thereof will be put to the following uses and they consent to such use being made: filing as a public record; presentations to committees, etc; inclusion in the database of the national estate (commonly known as SAHRIS) and other databases dealing with heritage management; inclusion on and downloading from websites; distribution to committee members and other stakeholders and any other use required in terms of the powers, functions, duties and responsibilities allocated to the relevant heritage authority(s) under the terms of the National Heritage Resources Act (Act 25 of 1999). Should the applicant seek to impose restrictions on the use of the information by ECPHRA or if it is not possible to copy or lift information from any part of the material submitted, the material will be returned unprocessed.

