PALAEONTOLOGICAL HERITAGE COMMENT:

KAMIESKROON BULK WATER SUPPLY, PORTION 4 OF FARM 445, KAMIESBERG MUNICIPALITY, NORTHERN CAPE

John E. Almond PhD (Cantab.)
***Natura Viva* cc,**
PO Box 12410 Mill Street,
Cape Town 8010, RSA
naturaviva@universe.co.za

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EXECUTIVE SUMMARY

The overall palaeontological impact significance of the proposed Bulk Water Supply System development on Portion 4 of Farm 445 near Kamieskroon, Namaqualand, Northern Cape, is considered to be VERY LOW because the study area is underlain by unfossiliferous metamorphic basement rocks (granite-gneisses, migmatites *etc*) and / or mantled by superficial sediments of low palaeontological sensitivity while the development footprint is very small and in part already disturbed. It is therefore recommended that, pending the exposure of significant new fossils during development, exemption from further specialist palaeontological studies and mitigation be granted for this development.

1. PROJECT OUTLINE

The proposed Bulk Water Supply System development on Portion 4 of Farm 445 near Kamieskroon, Kamiesberg Municipality, Northern Cape involves the following infrastructural components (CTS Heritage 2017; Fig. 1):

- equipment for existing boreholes;
- equipment for additional boreholes;
- construction of a 600kl clean water storage reservoir;
- installation of pipelines;
- construction of a Water Treatment Works (desalination plant) and associated evaporation ponds (waste brine).

2. GEOLOGICAL CONTEXT

The footprint of the proposed Bulk Water Supply System development is situated at *c*. 770 m asl in fairly flat, disturbed, semi-arid, rocky terrain on the outskirts of the town of Kamieskroon, some 600 m southeast of the N7 trunk road (Fig. 1).

The geology of the study area near Kamieskroon is shown on the 1: 250 000 geology map 3017 Garies (Council for Geoscience, Pretoria; Fig. 2 herein). A comprehensive sheet explanation for this map has been published by De Beer (2010). The proposed development footprint is underlain by Precambrian basement rocks – notably the **Mesklip Gneiss** (**Little Namaqualand Suite**) – that belong to the **Namaqua-Natal Province** of Mid Proterozoic (Mokolian) age (Cornell *et al.* 2006, De Beer 2010). These high grade metamorphic basement rocks are approximately 1.2 Ga (billion years old) and entirely unfossiliferous (Almond & Pether 2008).

The Precambrian basement rocks within the Namaqualand *klipkoppe* study region are mantled with a spectrum of coarse to fine-grained **Late Caenozoicsuperficial deposits** such as rocky soils, downwasted surface gravels, colluvium (slope deposits), sheet wash, calcrete hardpans and alluvium of intermittently-flowing streams. These deposits are generally young (Quaternary to Recent) and largely unfossiliferous. In the Kamieskroon area substantial accumulations of such deposits mapped in less rocky (and extensively cultivated) areas to the east of town have been assigned to the **Panvlei Formation** of the **West Coast Group**. This composite unit is probably of Pleistocene age for the most part, based on enclosed stone artefacts (De Beer 2010, p. 81) and is not mapped within the development footprint itself, where much thinner surface sands and downwasted gravels are likely to predominate.

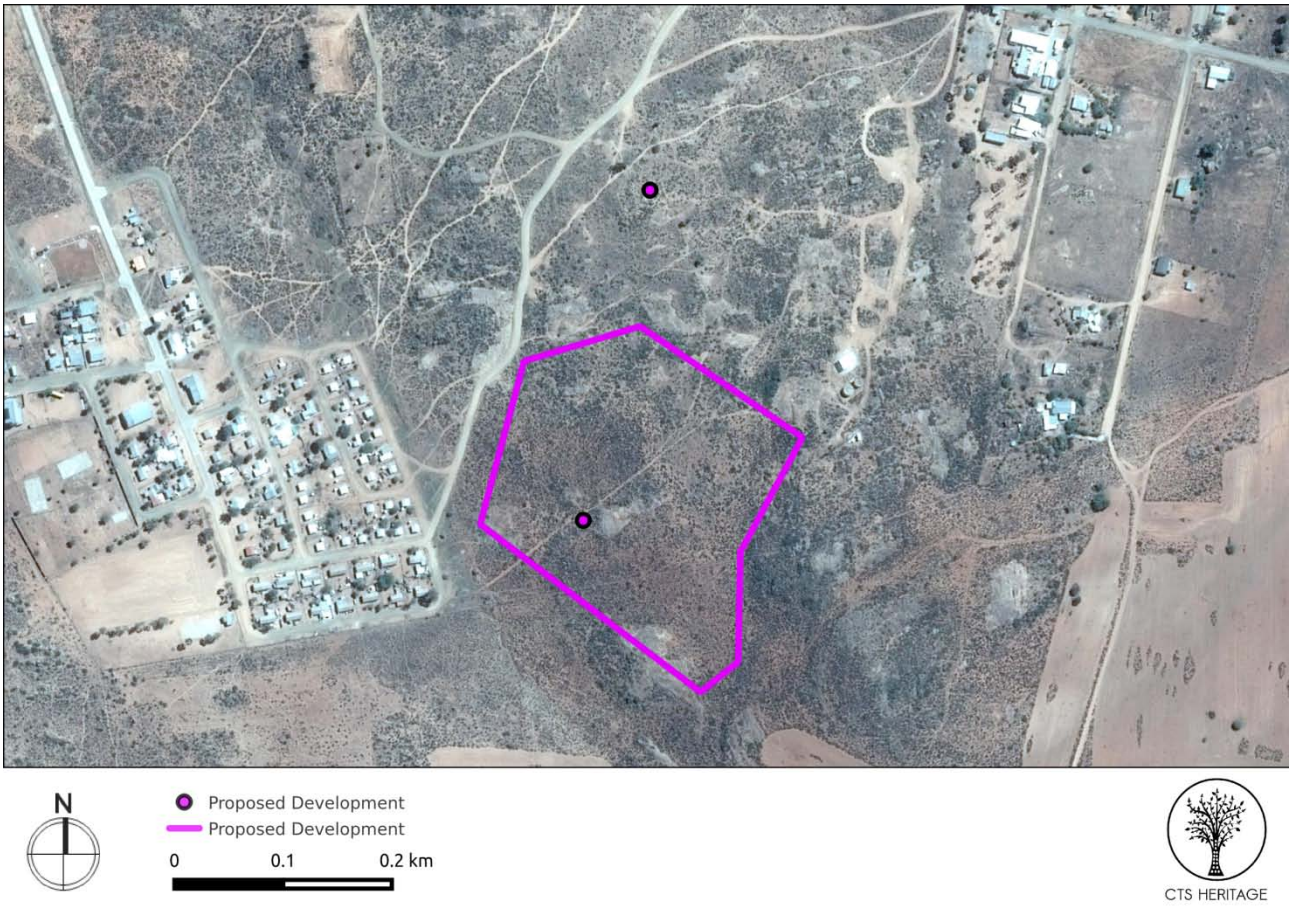

Figure 1: Satellite image of the study area on the outskirts of Kamieskroon, Northern Cape, showing the footprint of the proposed Bulk Water Supply System development on Portion 4 of Farm 445 (Image abstracted from Heritage Screener by CTS Heritage 2017).

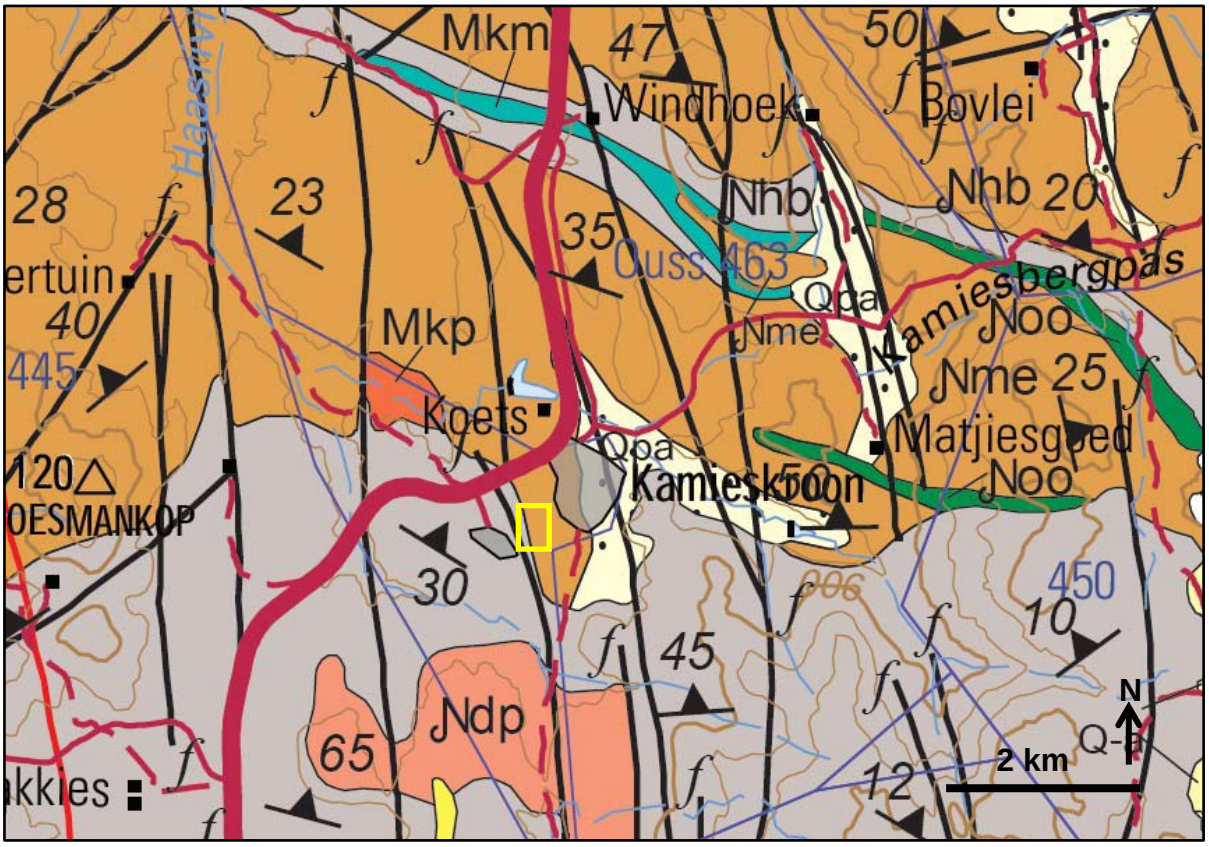

Figure 2: Extract from 1: 250 000 geological map 3017 Garies (Council for Geoscience, Pretoria) showing the approximate location of proposed Bulk Water Supply System development on the outskirts of Kamieskroon, Northern Cape Province (small yellow rectangle). The study area is underlain by unfossiliferous Precambrian (Middle Proterozoic / Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province, principally the Mesklip Gneiss (Nme, orange). Pleistocene alluvial and colluvial sands of the Panvlei Formation (West Coast Group) (Qpa, pale yellow) are *not* mapped in the study area.

3. PALAEONTOLOGICAL HERITAGE

The **Precambrian metamorphic and igneous basement rocks** of the Namaqua-Natal Metamorphic Province in the study area, including the Mesklip Gneiss, are entirely unfossiliferous (Almond & Pether 2008).

Late Caenozoic superficial sands and gravels overlying the basement rocks are of very low palaeontological sensitivity. Thicker Panvlei Formation sediments are not mapped here.

The palaeontological sensitivity of the Kamieskroon Bulk Water Supply development study area is assessed as VERY LOW.

4. CONCLUSIONS & RECOMMENDATIONS

The overall palaeontological impact significance of the proposed Bulk Water Supply System development on Portion 4 of Farm 445 near Kamieskroon is considered to be VERY LOW because:

- The study area is underlain by unfossiliferous metamorphic basement rocks (granite-gneisses, migmatites *etc*) and / or mantled by superficial sediments of low palaeontological sensitivity;

- The development footprint is very small;

- Parts of the area are already highly disturbed.

It is therefore recommended that, pending the exposure of significant new fossils during development, exemption from further specialist palaeontological studies and mitigation be granted for this development.

There are no objections on palaeontological heritage grounds to authorisation of the proposed bulk water supply development. Should any substantial fossil remains (*e.g.* vertebrate bones and teeth, shells, calcretised burrows) be encountered during excavation, however, these should be reported to SAHRA for possible mitigation by a professional palaeontologist (Contact details: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za).

5. KEY REFERENCES

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6. QUALIFICATIONS & EXPERIENCE OF THE AUTHOR

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral

research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Gauteng, KwaZulu-Natal, Mpumalanga, Northwest and Free State under the aegis of his Cape Town-based company *Natura Viva* cc. He has been a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.

Dr John E. Almond
Palaeontologist
***Natura Viva* cc**