

Phase 1 Palaeontological Impact Assessment for Plot 32 Shannon Valley, Bloemfontein, Free State Province.

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Introduction

The application relates to a proposed residential development at Plot 32 Shannon Valley, Bloemfontein (**Fig. 1 & 2**). The 4 ha site is situated on flat terrain in Glover Street Shannon Valley, about 2 km east of the M10 going south and 500 m south of the old Thaba Nchu Road (**Fig. 3**).

Site Coordinates (see Fig. 2):

A) 29° 8'40.37"S 26°17'19.17"E

B) 29° 8'42.72"S 26°17'26.95"E

C) 29° 8'48.39"S 26°17'24.63"E

D) 29° 8'46.03"S 26°17'16.59"E

Map Ref.:

1:50 000 scale topographic 2926 AB Maselspoort

1:250 000 scale geological 2926 Bloemfontein

The heritage significance of the affected area was evaluated on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Maps and aerial photographs (incl. Google Earth) were consulted and integrated with data acquired during the on-site inspection.

Background

The palaeontological footprint in the region is primarily represented by Permian Karoo fossils preserved within bedrock sedimentary strata, as well as late Quaternary mammalian fossils preserved within superficial alluvial deposits (e.g. river gravels and overbank sediments) (Broom 1909 a, b; Kitching 1977; Churchill *et al* 2000; Rossouw 1999, 2000, 2006) (**Fig 4**). The site is located within an outcrop area of potentially fossil-bearing Beaufort Group

(Adelaide Subgroup) strata (**Fig. 5**). The succession of Beaufort Group sedimentary rocks is subdivided into eight biostratigraphic units, called assemblage zones (Rubidge 1995) and the sedimentary strata underlying the affected area are assigned to the *Dicynodon* Assemblage Zone (AZ) (Kitching 1995) (**Fig. 6**). This biozone is characterized by the presence of a distinctive and fairly common dicynodont genus. Therapsids and other vertebrate fossils from this biozone are usually found as dispersed and isolated specimens in mudrock horizons, associated with an abundance of calcareous nodules. Plant fossils (*Dadoxylon*, *Glossopteris*) and trace fossils (arthropod trails, worm burrows) are also present. The sediments assigned to the *Dicynodon* AZ are associated with stream deposits consisting of floodplain mudstones and subordinate, lenticular channel sandstones.

Field Assessment

A brief inspection of the site indicated that the underlying geology is capped by well-developed superficial deposits that are made up of (palaeontologically sterile) Quaternary wind-blown sands and residual soils. The site lies on low relief terrain with no bedrock exposure present.

Impact Statement & Recommendation

The impact area is not situated within or near pan alluvial or spring deposits (considered to be potentially fossiliferous in the region). Visibility of Adelaide Subgroup outcrop is most likely low given the generally low topography terrain and well-developed Quaternary overburden, so it will be difficult to determine the potentially adverse effect of excavations into potentially fossil-bearing bedrock sediments underlying the area other than to emphasize that such impacts on fossil heritage are generally irreversible. Conversely, the recovery of new fossils as a result of industrial excavation activities can also be considered a positive impact, but only if the process is accompanied by appropriate scientific recording and retrieval methods. Given the depth of the overburden, which is not considered to be palaeontologically sensitive, it is recommended that the planned development can proceed, but should any excavation > 1 m² and exceeding depths of >1 m into unweathered/fresh bedrock occur, monitoring by a professional palaeontologist will be required.

References

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DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project and have no conflicting interests in the undertaking of the activity.

A handwritten signature in black ink, appearing to read 'L Rossouw', written in a cursive style.

14 / 02 / 2017

Figures

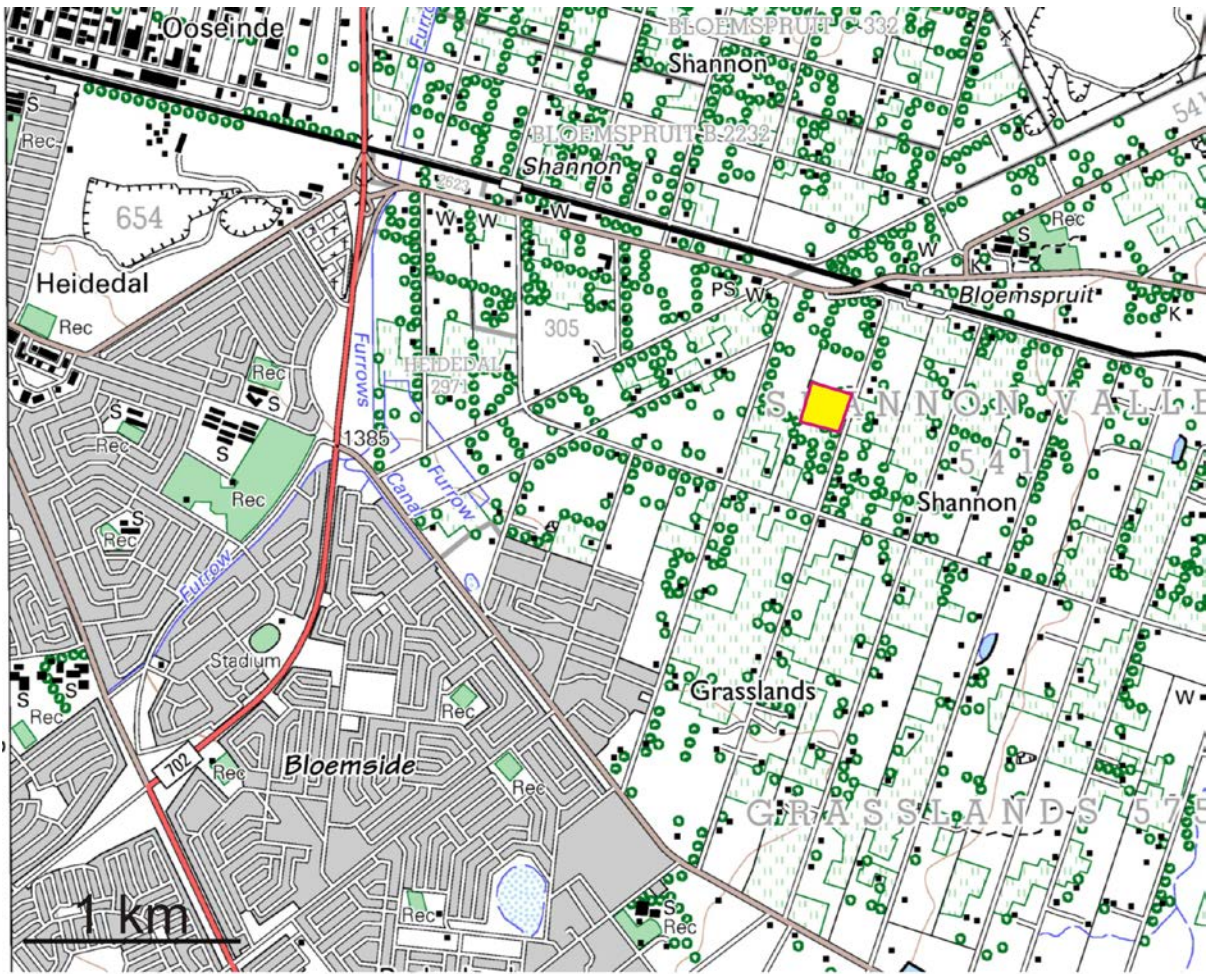


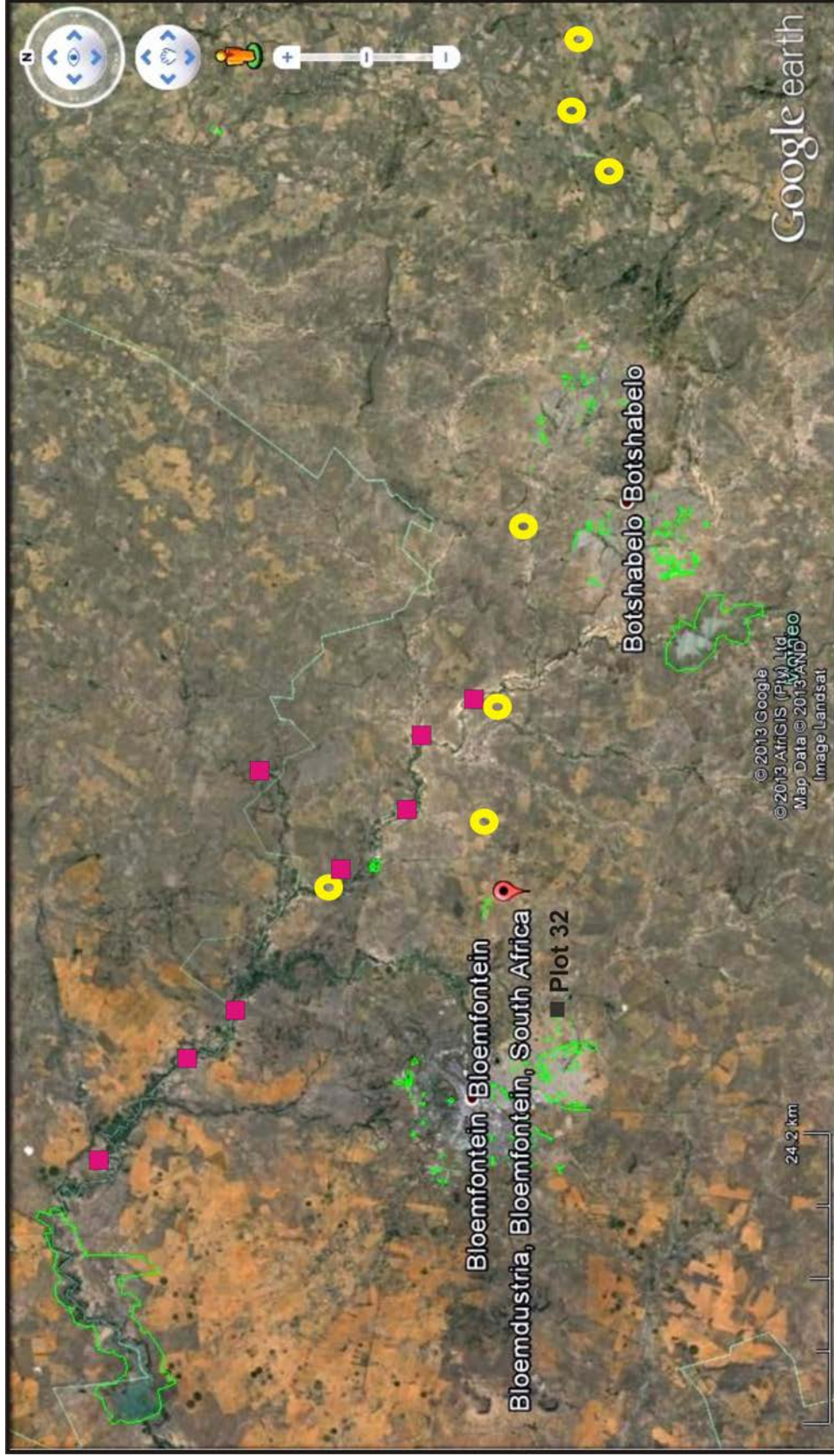
Figure 1. Map of the proposed development at Plot 32 Shannon Valley, Bloemfontein (portion of 1:50 000 scale topographic map 2926 AB Maselspoort, circa 1992)



Figure 2. Aerial view of the study area.



Figure 3. General view of the area, looking east (top), and west(bottom).



- Karoo vertebrate fossil locality
- Quaternary macrofossil locality

Figure 4. Map of known fossil sites in the vicinity of Plot 32



Figure 5. Portion of the 1:250 000 scale geological map Bloemfontein 2926. The site (arrow) is situated within the Beaufort Group, Adelaide Subgroup, which is represented by Late Permian, Balfour Formation sedimentary rocks, made up of alternating sandstone and mudstone layers (green area). The sedimentary rocks are intruded by resistant Jurassic dolerites (Karoo Dolerite Suite, red area). Surface (superficial) sediments are primarily made up of alluvium, aeolian sands and residual soils.

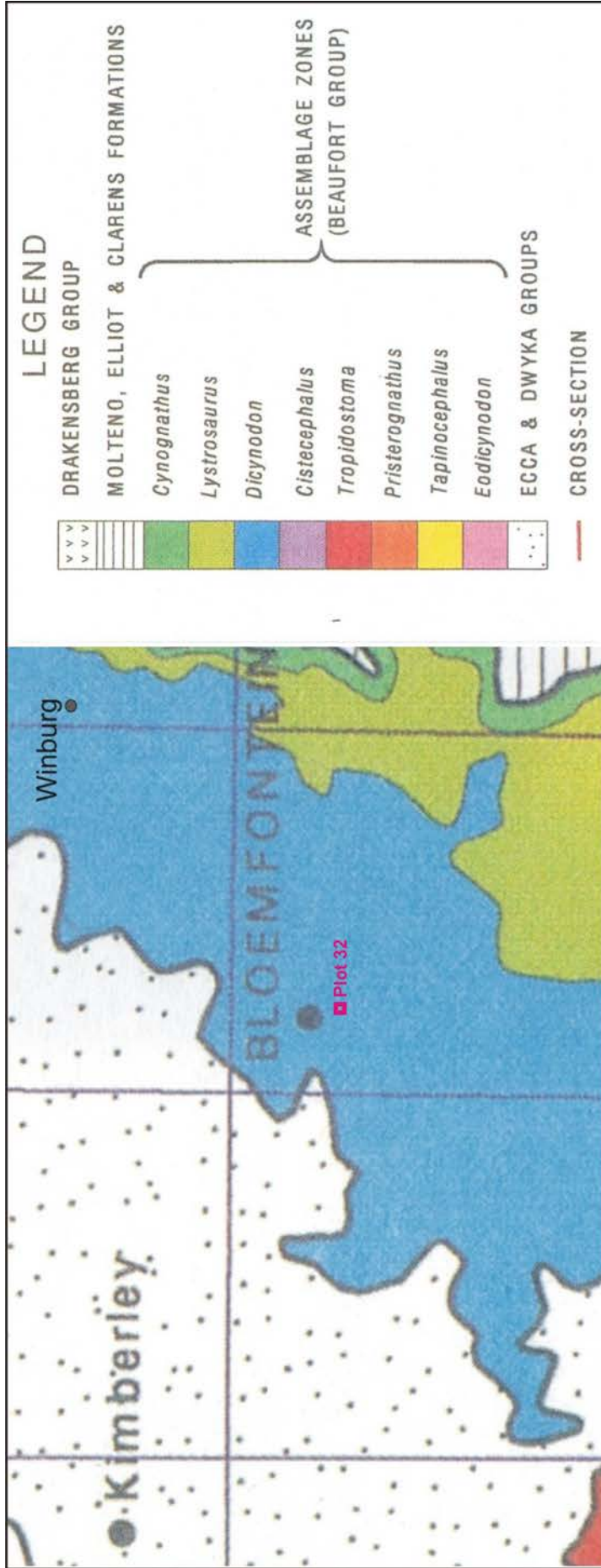


Figure 6. Geographical distribution of vertebrate biozones of the Beaufort Group around Bloemfontein (Rubidge 1995).