Palaeontological Heritage Comment: desktop study

RUSTY GATE MOUNTAIN RETREAT DEVELOPMENT ON FARMS 887, 824 AND 826 NEAR VILLIERSDORP (CALEDON DISTRICT, THEEWATERSKLOOF LOCAL MUNICIPALITY), WESTERN CAPE PROVINCE

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The proposed Rusty Gate Mountain Retreat development is situated on farms 887, 824 and 826, *c*. 10 km southeast of Villiersdorp (Caledon District, Theewaterskloof Local Municipality), Western Cape Province. Here the rugged, mountainous terrain of the Riviersonderend Mountains forming part of the southern branch of the Cape Fold Belt (CFB) is covered by1: 250 000 geology sheet 3319 Worcester (Gresse & Theron 1992) (Figure 1). The project area lies on the dissected southern limb of a major anticline of Table Mountain Group sediments of Early to Middle Palaeozoic age (Middle Ordovician to Early Devonian) which are assigned to the Peninsula, Pakhuis, Cederberg, Goudini and Rietvlei Formations.

Based on extensive field experience in the CFB as well as recent site photos kindly supplied by J. Kaplan of ACRM, bedrock exposure within the development footprint is likely to be minimal due to the pervasive cover by Late Caenozoic colluvial slope deposits (scree, hillwash, soils) as well as dense Fynbos vegetation. As shown on the geological map, the bedrocks are transected by several major faults in the region and locally show closely-spaced fold axes, so moderately high levels of tectonic deformation and secondary mineralisation are likely. Provisional palaeosensitivity mapping (DFFE Screening tool, SAHRIS website; Figure 2) suggests that the TMG braided fluvial to shallow marine quartzitic formations (Peninsula, Goudini, Rietvlei Formations) are generally of Low to Medium sensitivity, with at most low diversity trace fossil assemblages and rarer shelly marine faunules (Disa Member of Cederberg Formation, possibly also Rietvlei Formation) associated with finer-grained facies (Almond 2008, Almond & Pether 2008). Karstification (solution weathering) of cleaner-washed quartzitic facies is expected. The glaciogenic Pakhuis Formation has hitherto only yielded occasional trace fossils and possibly palynomorphs. It is probable that finer-grained, clay-rich facies (*e.g.* mudrocks, siltstone interbeds), including Soom Member of the potentially High Sensitivity, post-glacial Cederberg Formation, have been preferentially tectonized as well as subsequently subject to deep chemical weathering in Caenozoic times. Significant impacts on fresh (unweathered) Cederberg Formation mudrocks, which within less deformed and weathered sectors of the CFB have yielded an important shelly fossil biota showing soft-part preservation as well as microfossils (*cf* Cocks & Fortey 1986, Aldridge *et al*. 1994, 2001, Selden and Nudds 2004) are considered highly unlikely here. **It is concluded that the overall palaeosensitivity of the project area is, in practice, LOW to VERY LOW and the provisional DFFE sensitivity mapping is accordingly *rejected* here.**

For these reasons, as well as the very small footprint of the proposed development (small total surface area *plus* shallow, small-scale excavations for foundations) and the already disturbed character of portions of the site (*e.g*. farm dams, agricultural developments, tracks), **no significant impacts on local palaeontological heritage resources are anticipated as a result of the Rusty Gate Mountain Retreat development.** Pending the exposure of significant new fossils (*e.g.* shelly invertebrates, well-preserved trace fossil assemblages) during construction, **no further specialist palaeontological studies are recommended here and there are no objections on palaeontological heritage grounds to authorization of the proposed development.**

KEY REFERENCES

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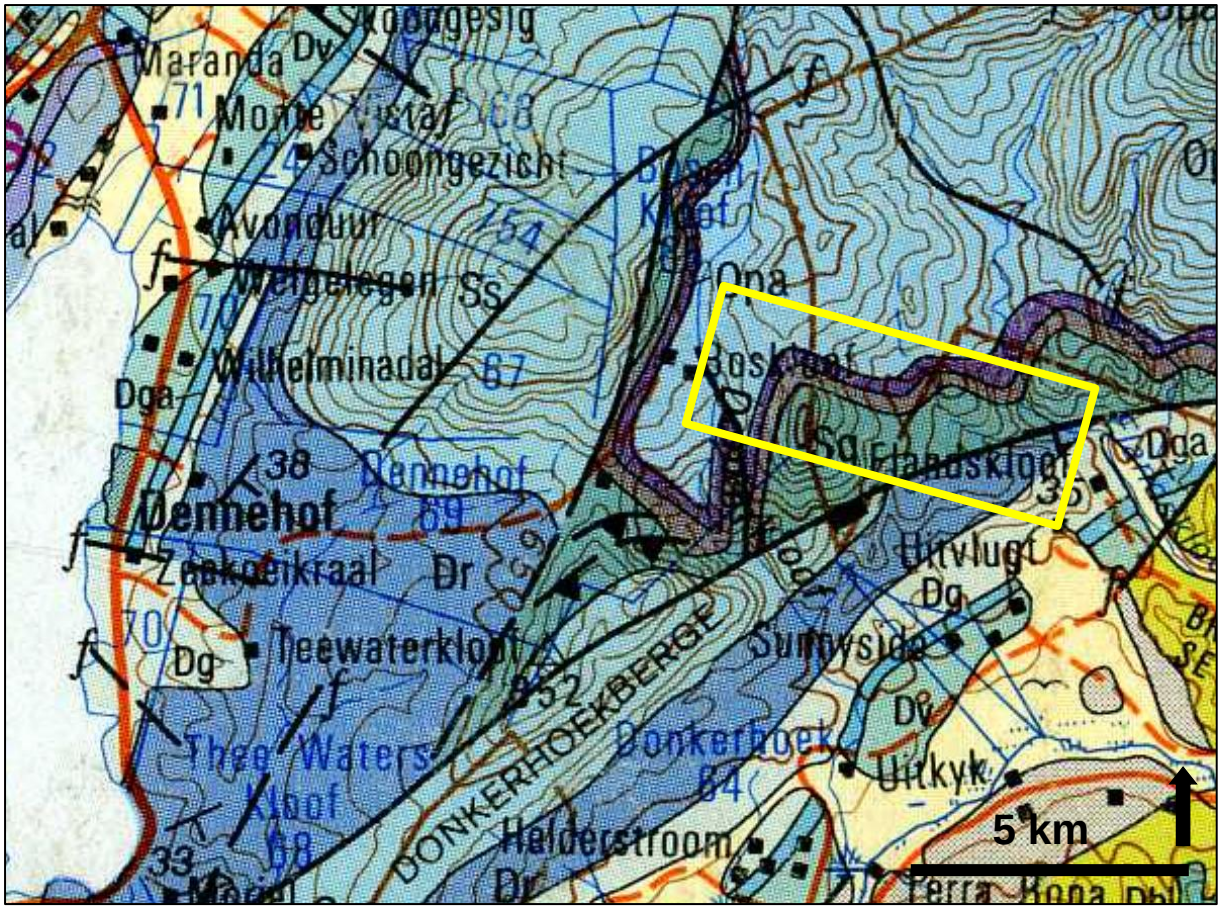

Figure 1: Extract from 1: 250 000 geological sheet 3319 Worcester (Council for Geoscience, Pretoria) showing the *approximate* location of proposed Rusty Gate Mountain Retreat development near Villiersdorp, Western Cape (yellow rectangle). The main bedrock units underlying the project area include:

TABLE MOUNTAIN GROUP (Early Devonian)
Peninsula Formation (Ope, pale blue)
Pakhuis Formation (Opa, purple)
Cederberg Formation (O-Sc, grey)
Giudini Formation (Sg, greenish-blue)
Rietvlei Formation (Dr, dark blue)

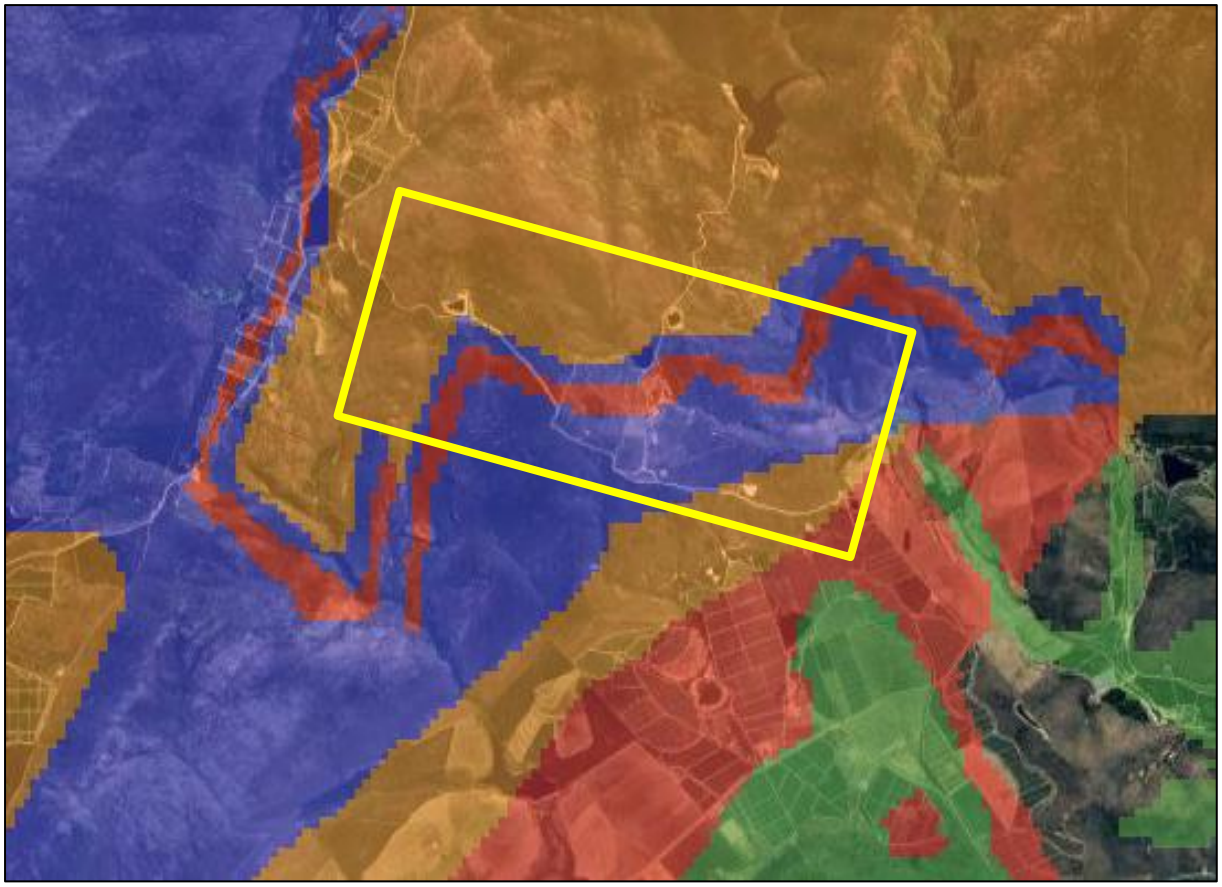

Figure 2: Provisional sensitivity mapping of the based on the SAHRIS palaeosensitivity map of the proposed Rusty Gate Mountain Retreat development project area (*approximately* outlined by the yellow rectangle) near Villiersdorp, Western Cape. The narrow Very High sensitivity zone represents the mudrock-rich Cederberg Formation but this is likely to be highly weathered and deformed in the study area, so good fossil preservation here is unlikely.