ABSTRACT OF THE OUDTSHOORN BROCHURE

The Oudtshoorn Hydrogeological Map and the accompanying explanatory brochure introduce the current state of groundwater knowledge and the basic geohydrological characteristics of the map area. The primary aim of the map is to produce a synoptic overview of the geohydrological character of the area. The map thus features borehole yield, aquifer type, groundwater quality and groundwater use, which are superimposed against a somewhat subdued surface lithology background. The brochure discusses these topics in more detail, as well as issues such as geological controls on groundwater yield and quality, borehole siting methods, groundwater management, groundwater levels, suggestions for future studies, etc.

The map area can roughly be divided into three physiographic regions, namely the coastal plain, the Klein-Karoo and the Karoo. These regions are divided by the Outeniqua-Tsitsikamma Mountain range in the south and the Swartberg-Baviaanskloof Mountain range in the north striking parallels to the coastline.
The Klein-Karoo and Karoo regions have typically semi-desert climates, hot summers and mild winters with summer temperatures regularly exceeding 30º C
The map area is drained by a network of rivers of which the Olifants-Gouritz River system is the most dominant.

The map area is mainly underlain by sedimentary rocks of the Cape Supergroup and by the Karoo Supergroup further northward. Pre-Cape and post-Karoo rocks cover only small areas.
The Cape Fold Belt (CFB) is largely east-west striking and is located approximately south of latitude 33º. It consists predominantly of sedimentary rocks, which were subjected to great pressure from the south, resulting in a variety of structural features.

- **Fractured Aquifers:** Consolidated hard rocks cover approximately 92% of the map area. This rock mass formed over a period of about 800 million years, experienced intrusion episodes in an early stage and subsequently endured several deformation phases. The deformation processes and succeeding orogenesis, continental uplift, weathering and erosion all aided in the development of the present groundwater environment.
  Competent rocks underwent brittle failure, resulting in numerous fracture structures in formations containing significant arenaceous material, thus furthering the formation of fracture porosity. In contrast, the incompetent rocks were more flexible and less inclined to break, thereby inhibiting the formation of fracture porosity.
  The existence or absence of fracture structures and prevailing groundwater recharge conditions thus play a decisive role in the occurrence and characteristics of groundwater in the consolidated rocks of the Cape Fold Belt.
  The fractured Aquifers comprises of: Kaaimans Group, Cape Granite Suite, Kango Group, Table Mountain Group, Bokkeveld Group, Witteberg Group, Dwyka Group, Ecca, Beaufort and the Uitenhage Groups.

- **Karst Aquifers:** The basal Matjies River Formation of the Kango Group is the only veritable karst aquifer in the map area.

- **Intergranular Aquifers:** The integranular aquifers cover less than 8% of the map area. Three intergranular aquifer types can be distinguished, of which the Bredasdorp Group and Coastal Sands aquifers are essentially coastal aquifers. The third comprises an Alluvial Deposits aquifer, which occurs mainly along various rivers in the area between Calitzdorp and De Rust

Taking all the geological units into account, an analysis of the available data indicates that the highest percentage of groundwater levels shallower than 10m occur in the Kango, Table Mountain, Bokkeveld and Ecca Groups as well as the coastal sands and alluvial deposits.

For the optimum development of a groundwater resource, sound groundwater management practices are essential in order to prevent over-exploitation and/or pollution of these resources, and in order to achieve some measure o sustainable resource yield.
The most common groundwater management approach applied in the map area is the conjunctive use of groundwater and surface water.

A fairly recent groundwater management approach is the continuous abstraction of groundwater at low abstraction rates to prevent turbulence and minimize groundwater level fluctuations, which in turn will discourage the development of iron bacteria. This management strategy is currently being implemented in the Klein Karoo Rural Water Supply Scheme.

Evidence exists of deep groundwater circulation mainly in the TMG sandstones. To elucidate this phenomenon, the tectonics of the CFB and associated fracturing of the deeper sections of the TMG and its groundwater exploitation potential should be comprehensively studied.