1 INTRODUCTION

1.1 AIM

The Reconstruction and Development Programme (RDP) of the South African Government (ANC, 1994) has as one of its goals, the provision of clean drinking water and sanitation to all its people. This is not a major problem in and around the cities and smaller towns. In rural South Africa an increasing demand for clean drinking water puts even more pressure on one of our most valuable resources. Supplying all communities with surface water would be an impossible task in large parts of South Africa. Ground water, however, provide a quick and economic solution and is being widely utilized in community water supply programs. Some geological environments is classified as having both a poor ground water exploration potential as well as having a low exploitation potential. In these areas it is suggested that surface water rather than groundwater must play the major role in water supply schemes.

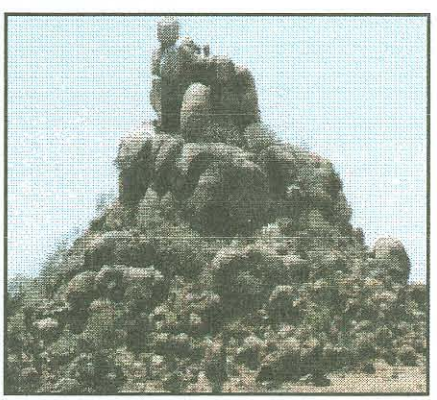
The Nebo Granite Suite, a Precambrian hard rock granitic layered intrusion, is known for its poor groundwater potential and it has therefore been suggested that surface water rather than ground water should be used in community water supply schemes. The development of the necessary infrastructure for surface water supply schemes is a time consuming process which may take at least 10 –15 years to complete. It is therefore necessary that supplementary water supplies be found and utilized as an immediate source. Ground water may serve as an interim water supply and may come in useful during future dry periods. It is thus essential that groundwater resources on the Nebo Plateau be developed and managed in a sustainable manner.

In an attempt to address the issue a research project was launched with the aim to understand the water regime and to find ways to utilise the available ground water. A strategy for future ground water exploration is also addressed (Botha, van Rooy & Croucamp, 1997).

1.2 DESCRIPTION OF RESEARCH AREA

The study area (site A) is situated near Jane Furse in the Nebo North Transitional Local Council district, located in the Northern Province, South Africa (Figure 1). Outcrops are common making structural geological mapping easy.

The area has a Weinert N-value of approximately 2.8, making chemical weathering predominant (Weinert, 1980). This result is a typical granitic landscape consisting of rocky granitic tors amongst rolling hills (Frame 1).



Frame 1. Granitic tors

Figure 1 Regional locality map

According to Cook (1996), several landforms can be identified in the area and consist of hill crests, concave slopes, convex slopes, pediment slopes and flood plains.

The area can either be reached from the south via Groblersdal following the Motetema road and the R579 which runs through the study area or from the north by following the R579 south from Lebowakgomo (Figure 2).

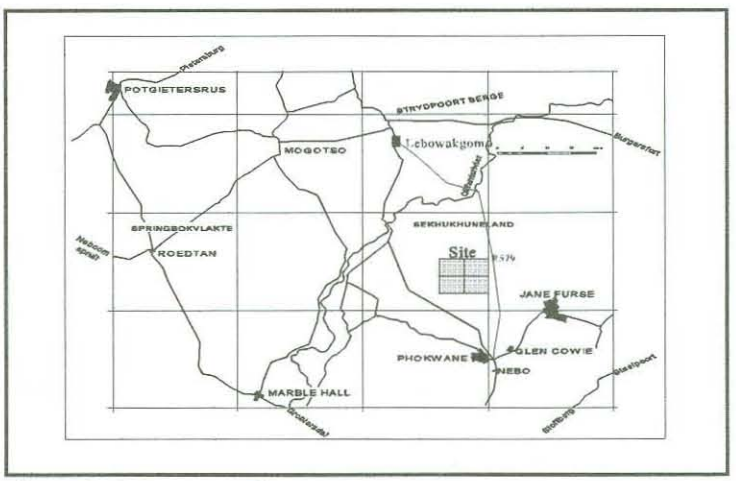
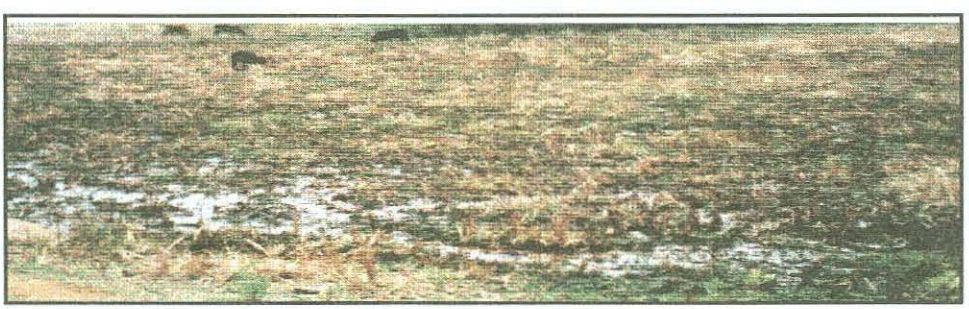


Figure 2. Access to study area

1.3 DRAINAGE REGIONS AND CATCHMENT AREA

The tertiary drainage region is B51 with B51H, B51C and B51B the quaternary drainage regions involved, all forming part of the Olifants River Catchment Area as described in the catchment management areas by the Department of Water Affairs and Forestry. The surface run-off is generally in the form of a dendritic system of small streams draining into the perennial Ngwaritsi River. Three non-perennial streams, the Mahlakeng and Thiti (from the south) and the Khulwayane River (from the east) contribute to the Ngwaritsi River. The area is drained to the north with the Piet Gouws Dam situated to the north of the site. From the dam the river flows into the Olifants River. Several of the wetlands occurring in the area could be the result of poor planning and bad construction of the R579 road (Frame 2).



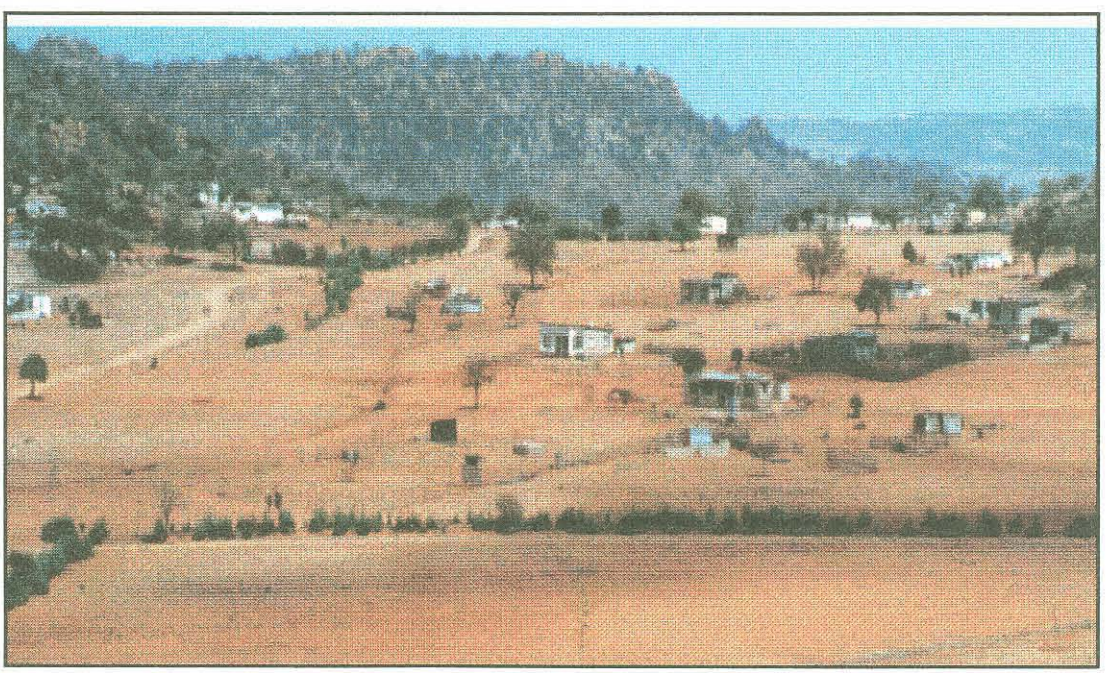
Frame 2. Marshes and wetlands are common next to roads.

1.4 METEOROLOGICAL CONDITIONS

Meteorological information was obtained from the Marble Hall weather station no. 591/509 (1939 -1996) and from Jane Furse Hospital no. 592/615 (1929 - 1986). The average daily maximum temperature according to the Marble Hall station is 28.27°C, with the average daily minimum temperature being 13.7°C, indicating very hot summers and fairly cold winters. The average annual rainfall measured over the indicated periods at Jane Furse Hospital is 719.2 mm and at Marble Hall 601.5 mm. According to the Thorntwaite classification system the area can be classified as a semi-arid region having a rainfall between 550 mm and 750 mm per year.

1.5 PHYTOGEOGRAPHY

The low summer rainfall region and harsh dry winters result in limited plant life. Communal farming practices and limited natural resources lead to further degradation of plant life (Frame 3). According to Acocks (1988) the veld type is of the Mixed Bushveld type and is refered to as the Combretum Appiculatum Veld Type. This veld type occurs in regions with an elevation of between 750 m and 1050 m above sea level, with an average rainfall between 350 mm - 650 mm per year (Acocks, 1988). The vegetation in the study area is typically sour grass veld with trees, including *Terminalia sericea, Acacia caffra and Xerophyta retinervis*. The demand for fire wood leads to fewer big trees occurring in the study area.



Frame 3. Little plant cover exists due to over exploitation of available resources.

1.7 SOCIOECONOMIC DEVELOPMENT

The study area is situated in the previous Lebowa homeland and limited modern infrastructure and other facilities were developed. Electricity is now provided as part of the RDP and new cell phone masts are also being erected. All roads except for the R579 are dirt roads. Most of these roads are not of a high standard and are therefore easily eroded. Several rural schools are operational and two new schools were built under the RDP. The primary economic activity is subsistence farming ranging from dryland crop farming to live stock farming. Boundary fences are non-existing and animals roam freely, controlled only by herd boys.