



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

GROUNDWATER SITE INSPECTION REPORT FOR THE PRODUCTION BOREHOLES LOCATED AT ONVERWACHT, CULLINAN

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ABBREVIATIONS AND ACRONYMS

BH	Borehole
CA	Catchment Area
COT	City of Tshwane
DWS	Department of Water and Sanitation
GIS	Geographical Information System
ℓ/s	Litres per seconds
m and mm	metres and millimetre
mbgl	metres below ground level
m ² /d	square metres per day
mMSL	metres above Mean Sea Level
RSA	Republic of South Africa

INSPECTION REPORT

Production Boreholes located at Onverwacht (Cullinan)

Visited on the 13 March 2024 by LV Mmako (DWS), A Kganyago (DWS), J Mabona (COT), L Sidu (Ward Counsellor) and S Ndhlala (Ward Counsellor)

1. Purpose

To technically inspect and evaluate the status of the production boreholes at Onverwacht in the Cullinan area situated within City of Tshwane Metropolitan Municipality of Gauteng Province, Republic of South Africa (RSA).

2. Site Information

Onverwacht settlement is a semi-rural community situated near the mining town of Cullinan, approximately 40 km north of Pretoria in City of Tshwane Metropolitan Municipality in the Gauteng Province, Republic of South Africa (RSA). Magalies Water Board was employed to oversee and supply water to the community through the groundwater exploration and exploitation. The settlement has no municipal water supply pipe line. A total of three (3) production boreholes were drilled at the BH1-Clinic, BH2-Cemetery and BH3-Veld (Figure 1).

The boreholes are connected to a 40 000 Litre Slimline Steel Water Tank at primary school, that supply the community with portable groundwater (Photograph 1). The steel tank is elevated up to 10 m above the ground surface. The boreholes are equipped with submersible pumps and a small water treatment systems. The boreholes are pumped for roughly 3 – 4 hours to fill the steel tank. BH1-Clinic was tested using a drawdown method up to 4 hours and the yield was 0.3 l/s with a 1.0 m²/d transmissivity rate (Matikwane and Mohlala, 2022). However, the recommended abstraction rate for this boreholes is 0.2 l/s for 4 hours duty cycle and 4 hours of groundwater recovery (no pumping). Table 1 showing the position information at Onverwacht settlement.



Figure 1: Location of the production boreholes at Onverwacht Area near Cullinan



Photograph 1: View of the Slimline Steel Water Tank at Primary School

Table 1: Showing boreholes position information at Onverwacht settlement

Geo-sites	Area	Latitude	Longitude	Elevation (mMSL)
BH1 - Clinic	Onverwacht/ Cullinan	25°36'11.42"S	28°35'58.16"E	1336
BH2 - Cemetery	Onverwacht/ Cullinan	25°36'18.28"S	28°35'52.24"E	1338
BH3 - Veld	Onverwacht/ Cullinan	25°36'24.73"S	28°36'02.30"E	1336

3. Field Observation

3.1 Borehole 1 (Clinic)

BH 1 – Clinic site was locked with pad locks on the gate but we were informed the ward counsellor Mr. Ndhkala that the pump is no working due cable thief. Ms Lutendo Masemola from Magalies Water confirmed this information telephonically. She also highlighted that vandalism is a constant problem and they required Eskom for solution but it require a significant revenues that can be sourced in the next financial year. The plan is to source electric power directly from the transformer at the clinic. The 5.5 Kw submersible pump and motor connected to approximately 60 m long pipe was observed with the clinic premise (Photo 3). The borehole is located about 200m from the steel water tank. The site was fairly clean but small weeds should be monitored regularly.



Photo 2: View of BH1 - Clinic



Photo 3: View of 5.5 Kw pump at BH1

3.2 Borehole 2 (Cemetery)

BH 2 – Cemetery site was accessible because the padlock on the gate was missing and palisade on the right corner was loss due to vandalism (Photo 4). The borehole is

positioned about 180 m from the Cemetery and approximately 300m from the steel water tank. There was no submersible pump inside the well and some of the electric equipment outside were missing (Photo 5). A huge hole underneath the manhole was observed and this tend to provide pathway for runoff into the well. Therefore, should be sealed as soon as possible with cement and gravel/sand. Magalies Water did indicate that the borehole dry out after 4 hours pumping and this could be due to a well depth of 30 m. The water table was sitting at 5.60 metres below ground level (mbgl) during site inspection. The borehole can be an ideal groundwater quantity/quality monitoring point in this area. The site was overgrown with small scrubs and grassveld vegetation, making this borehole dangerous to assess, as this condition will enable lethal animal to habitat.



Photo 4: View of damaged palisade



Photo 5: View of the BH2 at Cemetery

3.3 Borehole 3 (Veld)

A private fence currently surrounds Borehole 3 – Veld site and it was accessible since the padlock on the gate was missing. The borehole is positioned roughly 500 m from borehole 1 at the Clinic. The palisade fence around the borehole is still good condition and the surrounding is overgrown with trees/grassveld vegetation (Photo 6). It was noted at this site that the electric copper cables from the well to the pump hut were stolen. The manhole was not accessible but through the help of the community, we

managed to secure a vital tool that can open. The water table was sitting at 3.13 metres below ground level (mbgl) during site inspection (Table 2). The dip meter was inserted in a small hole next to the pipe (Photo 7). The submersible pump is connected to a newly installed water-reading meter to determine the flow volumes out of the well.



Photo 6: View of the BH3 at Veld



Photo 7: View of the submersible pump

Table 2: Groundwater level data collected during site visits at Onverwacht Area

Geo-sites	BH Depth (m)*	Reading (m)	Date	Time	Remarks
BH1 - Clinic	75	---	13/03/2024	12h17	BH has concrete/grout sanitary seal and protected by manhole
BH2 - Cemetery	30	5.60	13/03/2024	14h00	BH has broken concrete/grout sanitary seal underneath the manhole
BH3 - Veld	---	3.13	13/03/2024	14h40	BH has concrete/grout sanitary seal and protected by manhole

*sourced from Matikwane and Mohlala (2022)

4. Recommendations

- Magalies Water Board should use non-copper cables for the scheme operations in order to slowdown vandalism in this area and further engage Eskom with new power source(s).
- The overgrown vegetation in and around the boreholes and steel water tank should be cleared as soon as possible to allow easy access.
- The padlocks at the gates of BH2 - Cemetery and BH3 - Veld should be installed.
- The damaged palisade fence at BH2 - Cemetery should be repaired.
- Submersible pump and motor with 60m long pipe at the Clinic should be re-installed inside the well, if necessary repairs were done.
- The daily meter readings should be shared with DWS in order to determine the actual water usage from this groundwater scheme.
- Magalies Water Board should be conduct pump testing for BH2 - Cemetery and BH3 - Veld in to determine the aquifer potential or capacity. The pump test was only performed at BH1 - Clinic according their latest hydrogeological report in 2022.
- BH2 should be drilled or exploited further down up to the depth of below 80 below ground surface. Alternately, a new well can drilled nearby and use BH2 to establish a new DWS groundwater quality and quantity monitoring in this area.
- Further hydrogeological investigations (e.g. sampling) and engagements (with Magalies Water) needs to be done by DWS in the coming week.
- DWS and other stakeholder (e.g. Magalies Water, COT, political leaders, etc.) should run campaigns or awareness in this area to alert the community concerning the safe guarding the government infrastructure for present/future generation.

5. Conclusions

The groundwater scheme at Onverwacht settlement appeared to be good conditions but have huge infrastructural problems with regards to electric connection and vandalism. Borehole 2 at the Cemetery provide a good oppoturnity for DWS to establish a groundwater-monitoring network.

6. References

Matikwane F.E. and Mohlala T.D. (2022). Hydrogeological Report – To assess, equip and commission existing boreholes that are in Cullinan. Magalies Water Report No: E22 – 02.

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