



Mawedza Geo-Environmental

REVIEW OF GROUND PENETRATING RADAR REPORT – UNIVEN GATE 3

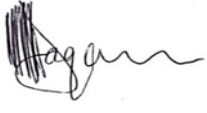
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Declaration

I declare that this report, as well as the execution has been prepared independently of any influence as may be specified by all relevant departments, institutions and organisations. I act as the independent specialist in this application and will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant. I declare that there are no circumstances that may compromise my objectivity in performing such work; and vow to comply with all relevant Acts, Regulations and applicable Legislation. Furthermore, Vhubvo Consultancy Cc, which is a company I represent in this application, is an independent service provider and apart from fair remuneration for services rendered, it has no financial interest or vested interest in the proposed project.

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EXECUTIVE SUMMARY

This report outlines the results of Ground Penetrating Radar (GPR) scan conducted on the 28 of July 2023 on an area assumed to be a burial ground. The main objective of this report is to assess the procedure followed, as well as review the conclusion reached, this is in consideration of Section 36(3) of the National Heritage Resources Act [NHRA (Act No. 25 of 1999)]. According to Moodley (2023), during construction of University of Venda access road, there was an individual who emanated and asserted that there is a grave on the area that they are constructing. To ascertain the assertion, Nyeleti Consulting propose that a GPR scan must be conducted. It appears the said individual did not accede to the proposal. However, and with approval of the developer (University of Venda), Nyeleti Consulting proceeded and operated a GPR on an assumed grave site. An area totaling 225 square (sq) meters was thus scanned. The results of the scan, according to Moodley (2023), indicated that there is no evidence of multiple or single burial detected from the data. Although anomaly was noted, this was because of stormwater pipes (Moodley, 2023). The GPR report by Nyeleti Consulting concludes by recommending that Nyeleti Consulting must continue with road construction to prevent any further delays.

Considering the potential impact of the project on the supposed burial ground, Mawedza Geo-Environmental on recommendation from SAHRA (to appoint a heritage practitioner) appointed Vhubvo Consultancy Cc to review the finding of the GPR report. Undertaking such examination was aimed at enabling University of Venda (UNIVEN), as the developer, to adhere to applicable measures in line with the National Heritage Resource Act (no. 25 of 1999). The University of Venda is the proprietor of the land on whose development is taking place, and they have a right regarding what can happen on their land. However, this does not give them consent to set aside, or discount subaltern voices, especially regarding matters surrounding burial ground. According to **Section 36(3)** No person may, without a permit issued by SAHRA or a provincial heritage resources authority: *Bring onto or use at a burial ground or grave any excavation equipment, or any equipment which assists in detection or recovery of metals.* Therefore, as per the NHRA's regulations, GPR cannot be transported to a supposed site (archaeological or paleontological) without a permit. Burials and burial grounds are accorded the highest heritage accolades in South Africa, principally because graves are by nature connected to human beings. Burial sites are often the focus of emotional and ethical sentiments to people and dealing with human remains requires the highest ethical standards.

GPR uses radar pulses to locate buried objects. Even when operated along transect spacing of 0.25 m apart, it's still not a definitive tool to indicate grave resources. On that note, I stand to disagree with the conclusion in the GPR report (Moodley 2023) that GSSI utility scan is a reliable mechanism to identify graves. It must be noted that Ground Penetrating Radar (GPR) which is by far amongst the latest technological device in this regard has not always yielded commendable results when used entirely. GPR is very good in identifying or detecting changes across the site, but is poor at actually identifying the cause of change, meaning reliance on



GPR can actually produce poor results. It must be understood that GPR is not here to replace traditional methods of identifying sites or graves, it is here to complement other tools that are used in archaeology.

In archaeological context, it's not uncommon to find shallow graves, at depths of, for example 30 centimeters from the surface layer. The GPR report thus comes short to articulate limitations associated with using GPR for detecting graves and does not highlight the fact that the area is disturbed by precedence activities such that it was not necessitated to use a GPR on such a perceptible disturbed area. In fact, if indeed there is a grave, there is a possibility that such could have been destroyed during the time when the area was being prepared for stormwater pipes, for example. More so, the issue of burial ground is broad, and complex and may include proxy graves, which may not always be detected by a GPR. Utilization of the GPR is thus a last stage that may be observed to identify graves or burial grounds. Therefore, GPR is not always an ideal technique for archaeological, cemetery and forensic surveys since data is fundamentally full of external interferences and soil-related issues (see Leach 2001). According to Conyers (2016), there are many factors that affect GPR interpretation, which may affect its success in detecting a grave site. Overall, the main conclusion reached in the review was that:

- ✚ The GPR report has no mandate to issue conclusion on matter of graves and heritage. In addition, the conduction of the GPR on the site was completed illegitimately and in contradiction of all regulations as set in the National Heritage Resource Act. This is not standard in matters of heritage upkeep. Bluntly put, it is very unethical, and is a violation of the Vermillion Accord (1989), which South African archaeologists and all heritage professionals worldwide recognize as carrying cardinal ethical guidelines for the treatment of human remains and engagement of descendant communities.
 - ✓ The GPR report (Moodley 2023) is thus inadmissible from a heritage point of view and must be set aside.

The following are the recommendations based on the main conclusion of the review:

- ✚ The area assumed to be a grave must be demarcated by a danger tape and treated as a burial ground until such time that it has been assessed. No construction activity must transpire on the said area, and the ECO must ensure that construction activities don't impinge on this area;
- ✚ A customized investigation on the people who resided in the area prior 1980 must be initiated to authenticate the validity of all assertions regarding grave (s). This consultation must involve interviews and consultation with indigenous groups. Some of these families who resided in the area before it became the property of the University, can still be found in neighboring villages.



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Acronyms and Abbreviations

“AIA” Means Archaeological Impact Assessment

“ECO” Means Environmental Control Officer

“EMPr” Means Environmental Management Programme

“EO” Means Environmental Officer

“GPR” Means Ground Penetrating Radar

“HSE” Means Health, Safety and Environment

“NDT” Means Non-Destructive Technique

“NHRA” Means National Heritage Resources Act

“PPE” Means personal protective equipment.

“SAHRA” Means South African Heritage Resources Agency

“SAHRIS” Means South African Heritage Resources Information System

“WAC” Means World Archaeological Congress

“UNIVEN” Means University of Venda



1. Introduction and Background

Mawedza Geo-Environment requested Vhubvo Consultancy Cc to review the Ground Penetrating Radar (GPR) conducted by Nyeleti. This review is a specialist component which will provide the necessary input into the significance of the report. The main objective of this review is to assess the process followed and assess the conclusion reached. The review was conducted in accordance with the National Heritage Resource Act, 1999 (Act 25 of 1999). According to Moodley (2023), during construction of University of Venda access road, there was an individual who emanated and asserted that there is a grave on the area that they are constructing. To ascertain the assertion, Nyeleti Consulting propose that a GPR scan must be conducted. It appears the said individual did not accede to the proposal. However, and with approval of the developer (University of Venda), Nyeleti Consulting proceeded and operated a GPR on an assumed grave site without observing proper procedure.

The World Archaeological Congress (WAC) has set international ethical standards for the treatment of human remains, and these includes:

- ✚ Respect for the mortal remains of the dead shall be accorded to all, irrespective of origin, race, religion, nationality, custom and tradition;
- ✚ Respect for the wishes of the dead concerning disposition shall be accorded whenever possible, reasonable and lawful, when they are known or can be reasonably inferred;
- ✚ Respect for the wishes of the local community and of relatives or guardians of the dead shall be accorded whenever possible, reasonable and lawful;
- ✚ Respect for the scientific research value of skeletal, mummified and other human remains (including fossil hominids) shall be accorded when such value is demonstrated to exist;
- ✚ Agreement on the disposition of fossil, skeletal, mummified and other remains shall be reached by negotiation based on mutual respect for the legitimate concerns of communities for the proper disposition of their ancestors, as well as the legitimate concerns of science and education; and
- ✚ The express recognition that the concerns of various ethnic groups, as well as those of science are legitimate and to be respected, will permit acceptable agreements to be reached and honored.

Ground Penetrating Radar (GPR) sends an electromagnetic pulse into the ground and then calculates the strength and the time required for the return of any reflected signal. By using GPR a sub-surface image can be produced. The size of the object cannot be determined since a small but highly conductive material (like steel) could appear the same way as a larger but less conductive material (like PVC conduit). The depth of penetration depends on the electrical conductivity of



the material, the frequency of the electromagnetic pulse and the radiated power. Essentially in dry materials depth penetration is deeper than in moist or clay-laden soils. A high frequency pulse would give a better resolution feedback but will not penetrate as far as a lower frequency pulse. The depth of an object is calculated by the Machine software using the time it takes to send and receive a pulse.

2. Purpose of the GPR Study

The purpose of this report is to entirely review the GPR report, these will, in turn, assist the developer in ensuring proper conservation measures in line with the National Heritage Resource Act, 1999 (Act 25 of 1999). Assessments highlight many issues facing development in terms of their management, conservation, monitoring and maintenance, and the environment in and around the site.

3. Applicable Heritage Legislation

Several legislations provide the legal basis for the protection and preservation of graves. These include the National Health Act (61 of 2003); National Environment Management Act (No. 107 of 1998); Cultural Institution Act (No. 119 of 1998), and the National Heritage Resources Act (Act 25 of 1999). Section 36 (3) of the National Heritage Resources Act requires that where relevant, no person may, without a permit issued by SAHRA or a provincial heritage resources authority:

- ✚ destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside formal cemetery administered by a local authority; or
- ✚ bring onto or use at a burial ground or grave any excavation equipment, or any equipment which assists in detection or recovery of metals.

4. Findings and Discussions

GPR uses radar pulses to locate buried objects. Even when operated along transect spacing of 0.25 m apart, it's still not a definitive tool to indicate grave resources. On that note, I stand to disagree with conclusion in the GPR report (Moodley 2023) that GSSI utility scan is a reliable mechanism to identify graves. It must be noted that Ground penetrating radar (GPR) which is by far amongst the latest technological device in this regard has not always yielded commendable results when used entirely. GPR is however very good in identifying or detecting changes across the site, but is poor at actually identifying the cause of change, meaning reliance on GPR can actually produce



poor results. It must be understood that GPR is not here to replace traditional methods of identifying sites or graves, it is here to complement other tools that are used in archaeology. The following are the limitations noted in the report:

- ✚ The GPR report comes short to articulate limitations associated with GPR (see Leach 2001) and does not highlight the fact that the area is already disturbed by precedence activities such that a GPR was not necessitated.
- ✚ In archaeological context, it's not uncommon to find shallow graves, at depths of, for example 30 centimeters from the surface layer. More so, the issue of burial ground is broad, and complex and may include proxy graves, which may not always be detected by a GPR. Utilization of the GPR is thus a last stage that may be observed to identify graves or burial grounds in archaeology. Therefore, GPR is not an ideal technique for archaeological, cemetery and forensic surveys since data is fundamentally full of external interferences and soil-related issues (Leach 2001). According to Conyers (2016), there are many factors that affect GPR interpretation, which may affect its success in detecting a grave site.
- ✚ The conduction of the GPR on the site was completed illegitimately and is in contradiction of all regulations as set in the National Heritage Resource Act. This is not standard in matters of heritage upkeep. Bluntly put, it is very unethical, and is a violation of the Vermillion Accord (1989), which South African archaeologists and all heritage professionals worldwide recognize as carrying cardinal ethical guidelines for the treatment of human remains and engagement of descendant communities. The GPR report (Moodley 2023) is therefore inadmissible from a heritage point of view and must be set aside.

5. General Recommendations and Conclusions

The National Heritage Resource Act only dates to 1999. As a result, most development prior 1999 were done without conduction of impact studies. Meaning, many developments have impeded on heritage resources. There is thus a need to empower the previously powerless peoples, particularly the indigenous and local communities that have lost rights to their heritage through colonialism. This is mostly in that the democratisation did not immediately involve the inclusion of local communities in protecting their heritage past. To address the above, this report makes the following recommendation:

- The area must be demarcated by a danger tape and treated as a burial ground until such time that it has been assessed by a professional;



- No construction activity must transpire on the said area, and the ECO must ensure that construction activities don't impinge on this site;
- A customized investigation on the people who resided in the area prior 1980 is generally recommended and must be initiated to authenticate the validity of all assertions regarding grave (s). This consultation must involve interviews and consultation with indigenous groups. Some of these families who resided in the area before it became the property of the University, can still be found in neighboring villages. Despite that there is a possibility that there may be opportunist who may take advantage of this situation, there are several measures that may be adopted to mitigate on this;
- The final product must be a Conservation Management Plan (CMP) that addresses aspects of graves in the University perimeter.



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