



Advisory and Consulting

**GEOHYDROLOGICAL DESKTOP
INVESTIGATION OF THE PROPOSED NYALA
SOLAR FARM NEAR NORTHAM,
THABAZIMBI LOCAL MUNICIPALITY,
LIMPOPO PROVINCE
20 SEPTEMBER 2022**

Prepared for: AFZELIA

**Compiled by:
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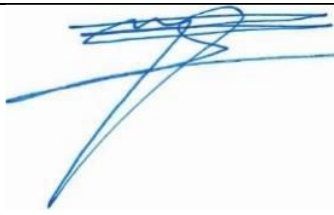

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**HYDROGEOLOGICAL DESKTOP INVESTIGATION OF
THE PROPOSED NYALA SOLAR FARM NEAR
NORTHAM, THABAZIMBI LOCAL MUNICIPALITY,
LIMPOPO PROVINCE
15 September 2022**

Approval of Document		
Date:	15 September 2022	
Reference:		
Professional Name	SACNASP No	Signature
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1. TERMS OF APPOINTMENT

Luhlaza Advisory and Consulting (Pty) Ltd were requested by Praxos 373 (Pty) Ltd to provide specialist services on geohydrological impact assessment for the proposed Nyala Solar Farms near Northam, Thabazimbi Local Municipality in Limpopo Province.

This Desktop geohydrological investigation has been carried out according to standard practice codes and guidelines as indicated in the South African National Standards (SANS) 10299:2003, titled "*Development, Maintenance and Management of Groundwater Resources*".

2. BACKGROUND INFORMATION

According to the Terms of Reference (ToR) dated 28 July 2022, the proposed Nyala Solar Farm is one of the Solar farms where the Ndau and Nyala Solar PV is planning to apply for environmental authorisations for the establishment of a combination of Solar PV Farms and associated infrastructure across two sites clusters, i.e. Ndau and Nyala located in Limpopo province. It is understood that the Nyala site is made up of 8 properties over 2 sites, where Nyala site 1 has two properties (western part of Nyala) and Nyala site 2 has 6 properties (eastern part of Nyala). Furthermore, it is planned that the Nyala site will consist of 4 Solar PV Farms.

A specialist geohydrological investigation required to determine possible impacts of the solar farm project in the Nyala site may have on aspects of the site and surrounding areas. Additionally, the investigation is required to assess the likelihood and severity of these impacts (directly, indirectly and cumulatively), both before and after mitigation measures have been applied.

Therefore, the objective of this Geohydrological desktop investigation is to undertake impact assessment on the entire Nyala site and provide a sensitivity assessment report from a geohydrological perspective.

3. EXISTING INFORMATION

The following information used to assist with this geohydrological Desktop investigation:

- a) A kml file showing the proposed site boundaries supplied by the Client.
- b) Council for Geoscience Geological Map of Polokwane at a scale of 1:250 000.
- c) Department of Water and Sanitation Hydrogeological Map Sheet Polokwane at a scale of 1:500 000.
- d) Land use map of the Republic of South Africa published in 2018

- e) National Groundwater Archive of the Department of Water Affairs and sanitation (DWS).
- f) Information from the National Groundwater Resources Assessment project (GRAII)

4. METHODOLOGY FOR SITE WORK

The methodology for this portion of the investigation comprised a review of the available information for the site from existing geological and hydrogeological maps and data bases.

5. SITE DESCRIPTION

The Nyala Site is located near the town of Northam, Thabazimbi Local Municipality in Limpopo province, South Africa as shown in Figure 1. The site is located within the quaternary catchments of A24C, A24E and A24F.

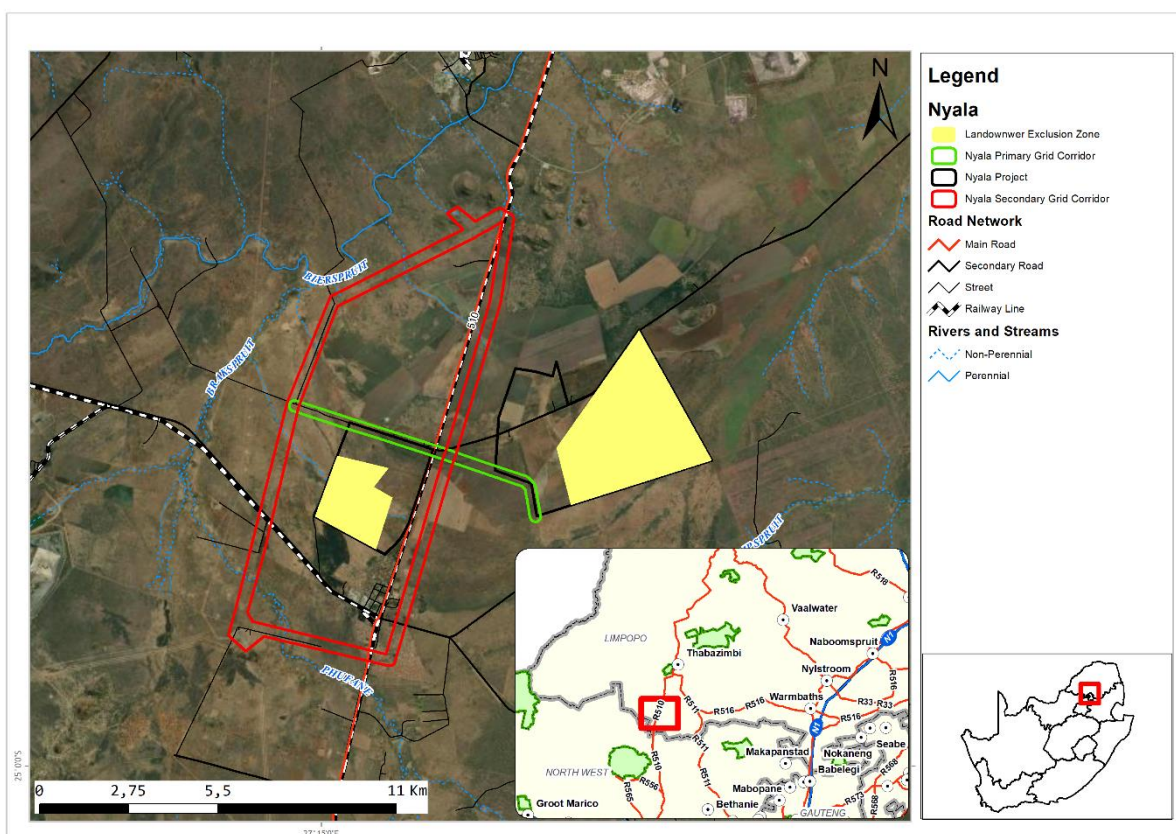


Figure 1: Locality map of the Nyala site

6. GEOLOGICAL DESCRIPTION OF THE SITE

According to the Geological Map as shown in Figure 2, the immediate vicinity of the Nyala site is underlain by mafic and ultramafic intrusive rocks made up of dolerite, diabase, diorite, gabbro, dunite, pyroxenite, norite, anorthosite, hornblendite and carbonatite rocks. Further away from the site, other rock types including argillaceous, carbonaceous and various acidic to alkaline intrusive rocks outcrop.

Figure 2 shows the local geology of the Nyala site and its surrounding.

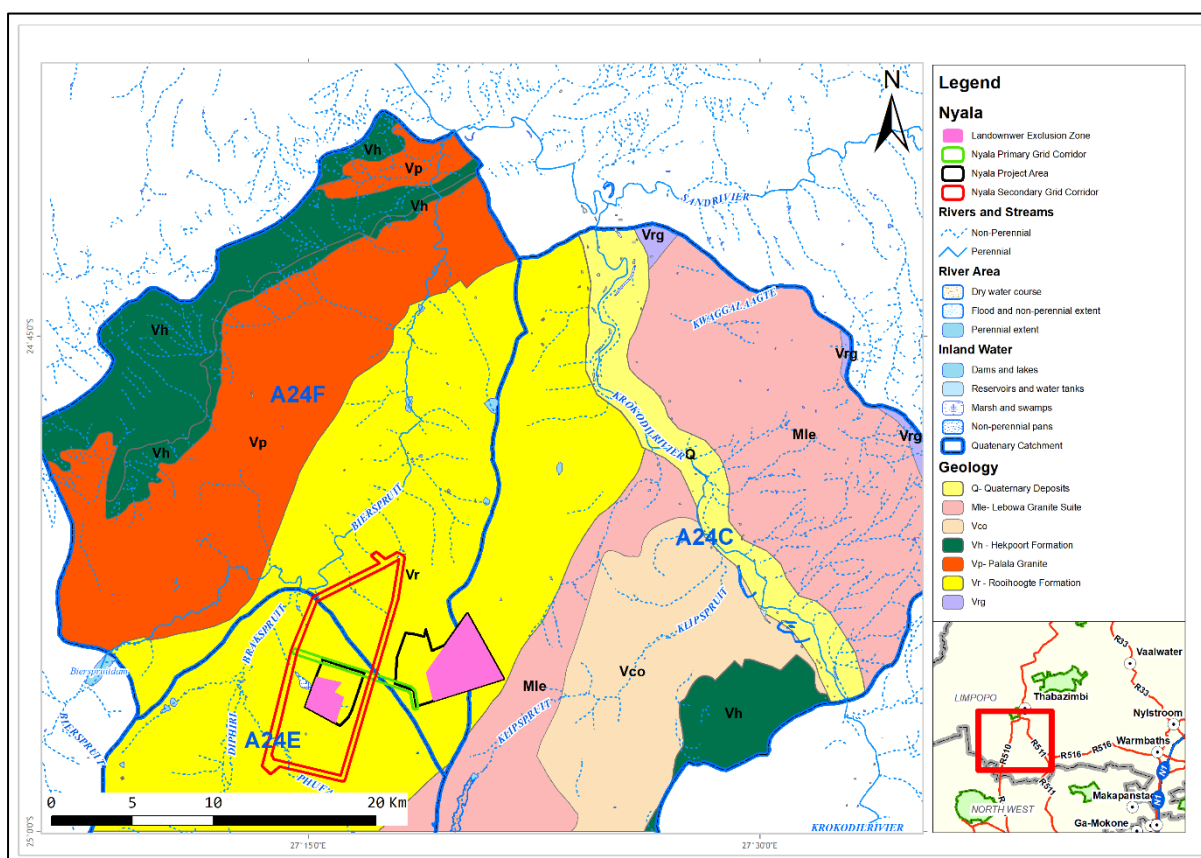


Figure 2: Local geological map of the Nyala site and its surroundings.

7. HYDROGEOLOGICAL DESCRIPTION OF THE SITE

According to the Hydrogeological Map Series of Polokwane as shown in Figure 3, the Nyala site area is underlain by intergranular and fractured aquifer system with approximate yields in the range from 0.1 litres/second (l/s) to 0.5 l/s, which can be described as a poorly productive aquifer. Areas outside the Nyala site generally are characterised by indicative moderate yielding aquifer system with a yield ranging from 0.5 l/s to 2 l/s and has been designated as d3 by Department of Water and Sanitation.

Since most of the aquifers at the Nyala site are mafic to ultramafic intrusive rocks, in addition to the weathered profile, zones of interest for encountering groundwater are likely to be along the contact zones between the rock units and/or at the contact zone of the various intrusive rocks.

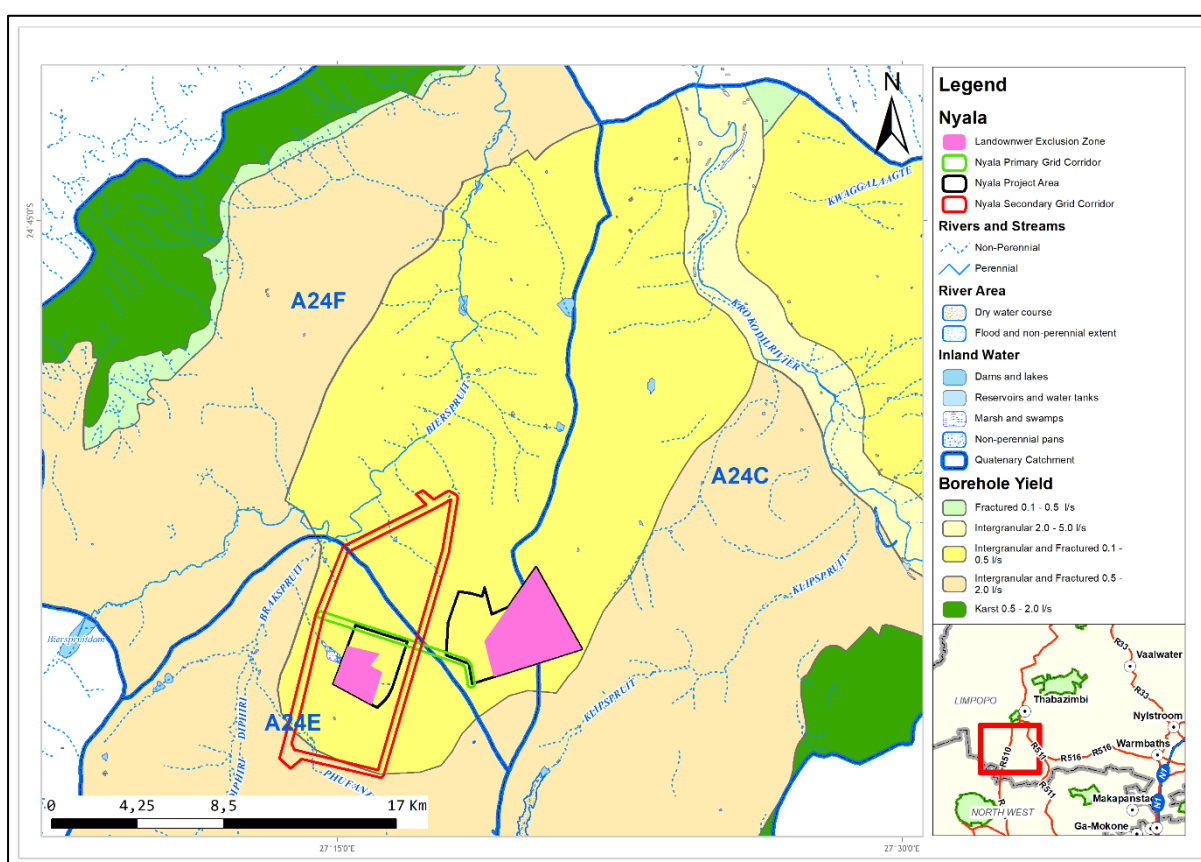


Figure 3: Hydrogeological Map of the Nyala site as modified from the Polokwane sheet Hydrogeological map.

The drainage map of the Nyala site is shown in Figure 4. The site is located between two streams and also crosses two quaternary catchments, both indicating its location near a local surface water divide (Figure 4).

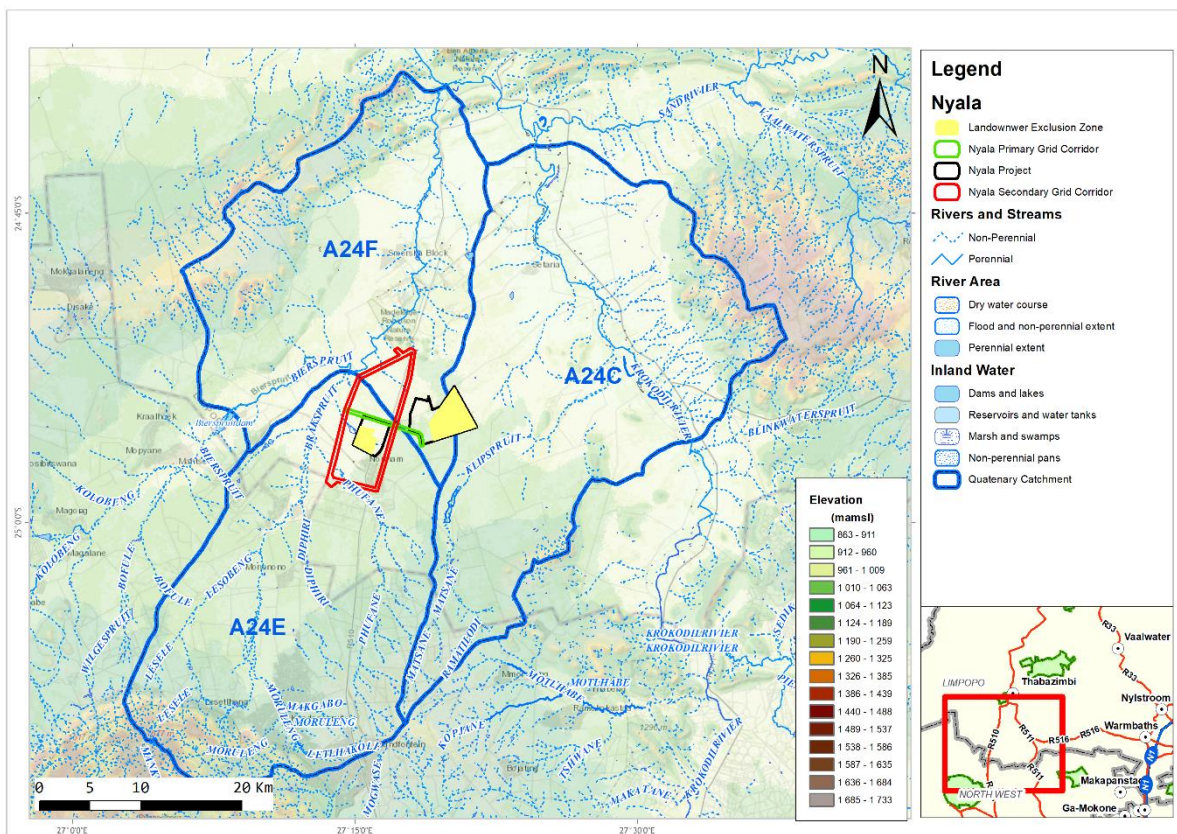


Figure 4: Drainage map of the area around the Nyala sites

Based on the Hydrological Aquifer types and drainage patterns around the project area, Nyala is classified by low sensitivity (Figure 5).

The national groundwater quality map (Figure 6) indicates that the approximate groundwater quality based on electrical conductivity (EC) values is between mainly between 70 to 300 mS/m but some areas show EC values less than 70 mS/m which is generally indicative of a moderate to good groundwater quality.

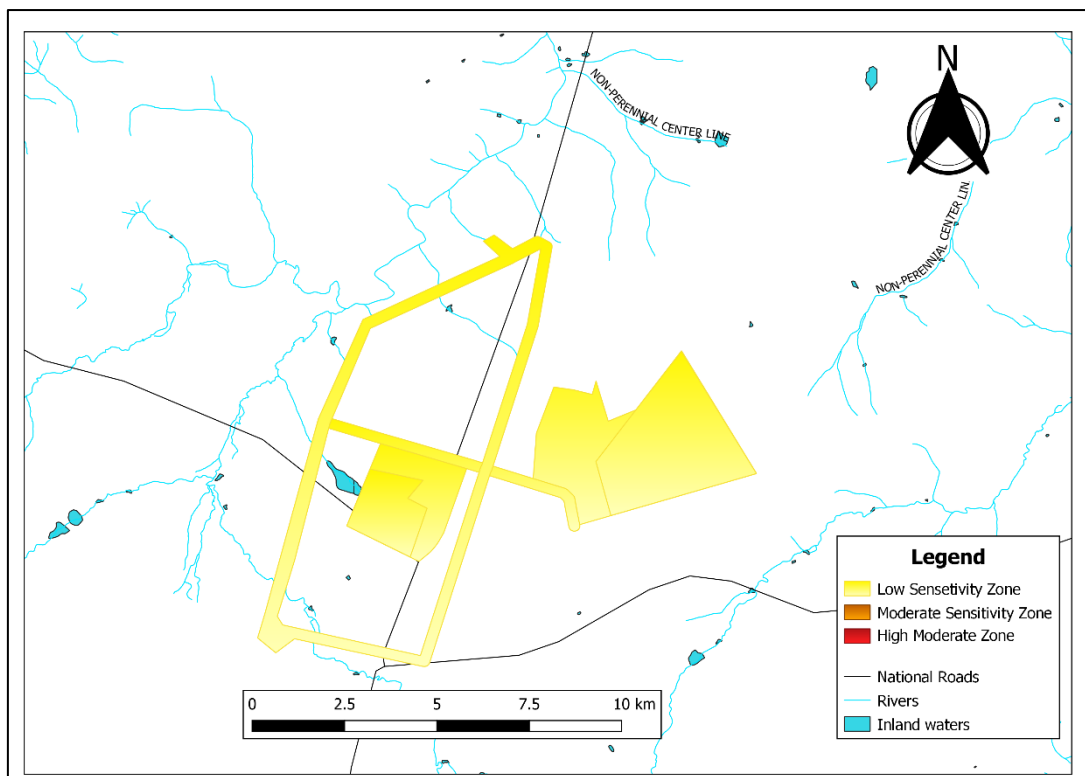


Figure 5: Groundwater Aquifer Sensitivity Map for Nyala site

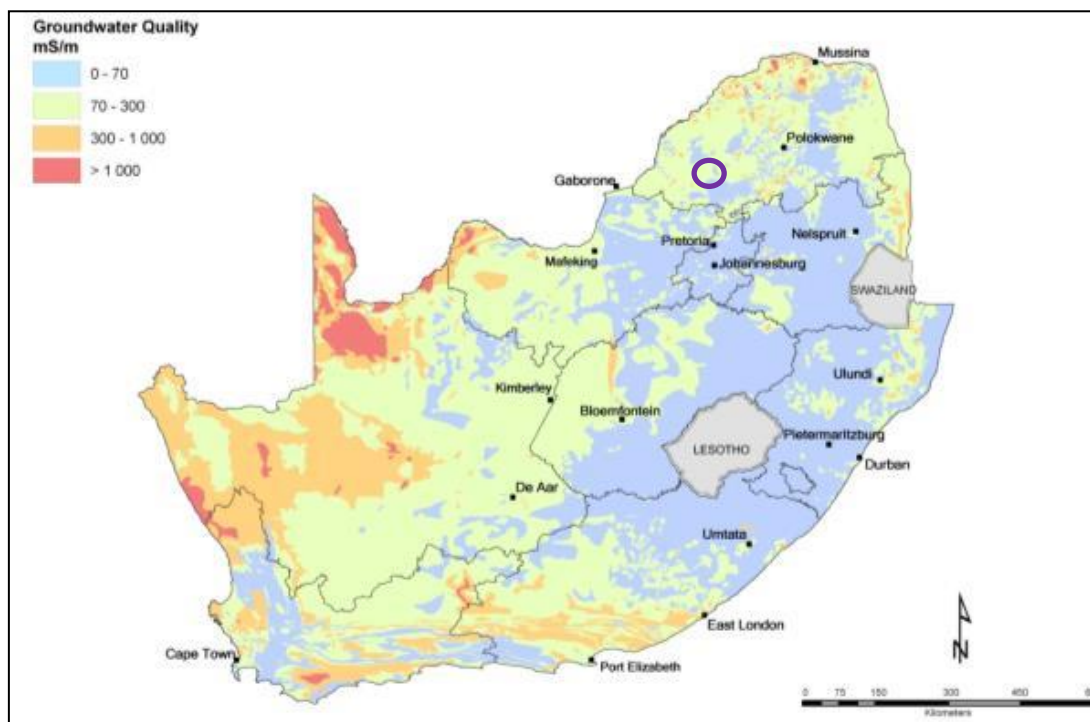


Figure 6: Inferred General Groundwater Quality of RSA

Based on the National groundwater level map (Figure 7), depth to groundwater in the Nyala site ranges generally from 25 to 35 m below ground level (m bgl), which is moderately deep commensurate with the mean annual precipitation (MAP which is about 595 mm/year and the groundwater recharge rate of the areas is about 14 mm/year or 2.4% (GRAII data).

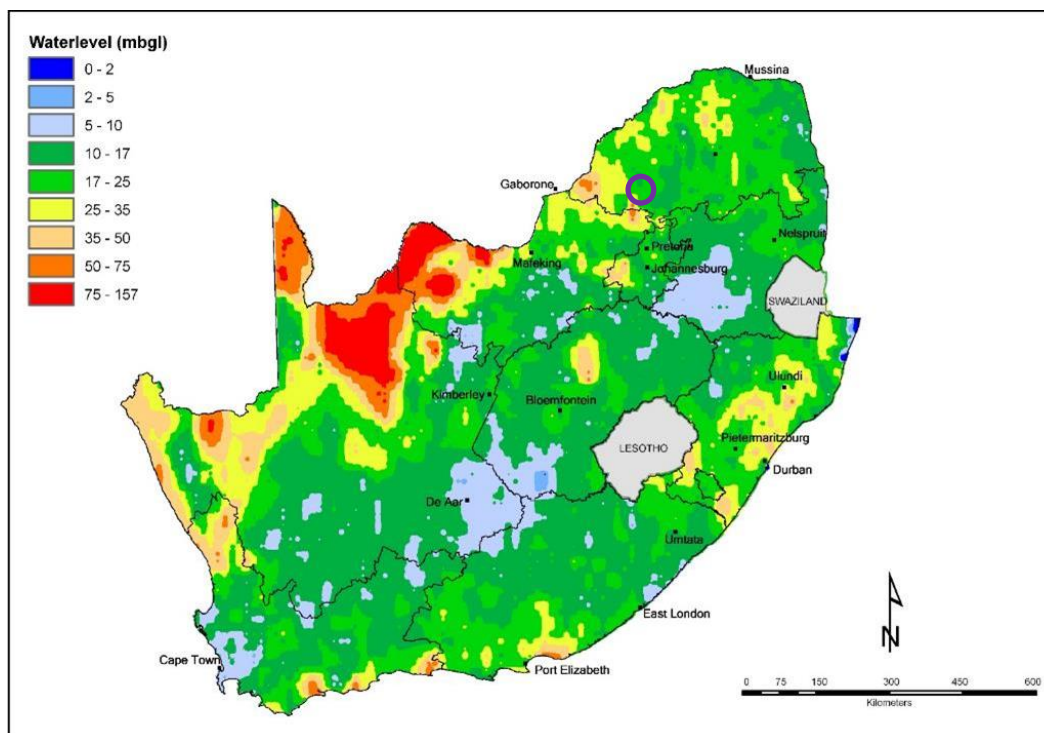


Figure 7: National Groundwater Level Map of South Africa

A Desktop hydrocensus was carried out at a 2 km and 5 km radius of the site as shown in Figure 8. Figure 8 below provides a summary of the borehole data information sourced from the National Groundwater Archive (NGA) of the Department of Water and Sanitation for the area around the site. The information provided in the hydrocensus indicated that though there are a number of boreholes around the site, no groundwater level information exists to compare with the National groundwater level map indicated in Figure 6. Furthermore, the borehole data extracted from the NGA doesn't show groundwater use type and pumping rate.

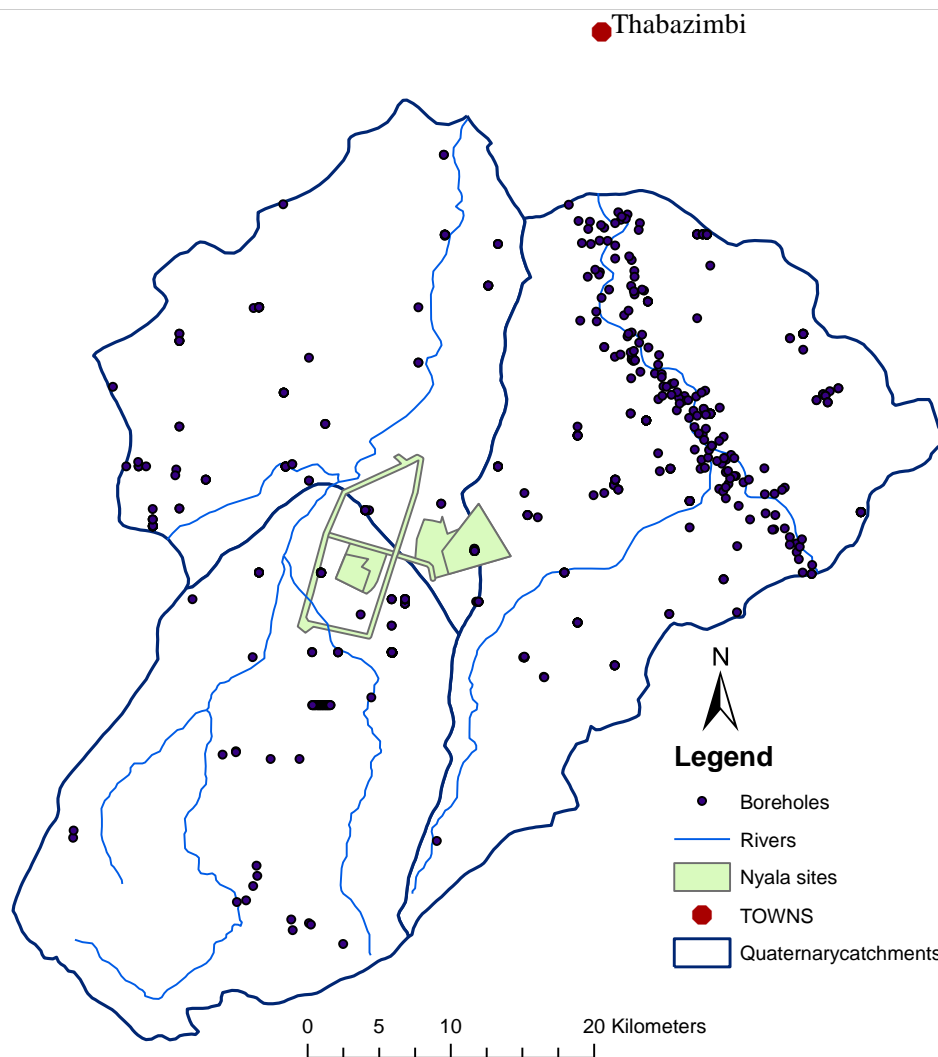


Figure 8: Hydrocensus of boreholes around the Nyala site

Since there are a number of boreholes within and around the study site, it is recommended that additional investigations based on site visit be done so as to get detailed information missing in the Desktop hydrocensus of the NGA data. The site visit must generate information including whether the boreholes are actively used locally or not, for what purpose they are being used, what is the pumping rate from these boreholes, what is the ambient groundwater quality from these boreholes, the depth to groundwater level in these boreholes, etc.

8. CONCLUDING COMMENTS

The immediate vicinity of the site is located in an area where groundwater occurs in fractured and weathered aquifers with a very poor yield that ranges from 0.1 to 0.5 l/s.

This implies that the site is not characteristic by a major aquifer. Furthermore, the Nyala site is located at a local drainage region (i.e. between two quaternary catchments and between two streams). Furthermore, the generalized groundwater recharge for the area is limited to about 14 mm/year or 2.4 % of the MAP, an indication that the groundwater resources within the site are limited.

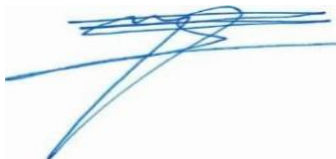
These all-important information leads to the interim conclusion that the project may not have a considerable impact on the geohydrological conditions of the area. Furthermore, the site will have low sensitivity from a geohydrological perspective to the intended solar Farm project.

It is recommended that additional investigations be carried out on site such as a field hydrocensus to have a complete picture of the area including detailed geohydrological information related to the boreholes located within and in the vicinity of the Nyala site.

There are known instances in which ground conditions can vary once the site investigation proceeds. It is imperative that Luhlaza Advisory and Consulting (Pty) Ltd is informed of any irregularities on-site so that updated recommendations can be given.

Yours faithfully,

For Luhlaza Advisory and Consulting (Pty) Ltd



Molla Demlie Pr. Sci. Nat (400297/11)

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PhD in Geohydrology

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environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Nyala 3 Solar Energy Facility

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

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Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
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Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
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473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	MVB Consulting			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	Contribution level (indicate 1 to 8 or non-compliant)	Contribution level (indicate 1 to 8 or non-compliant)	Contribution level (indicate 1 to 8 or non-compliant)
Specialist name:	Marius van Biljon			
Specialist Qualifications:	PHD Geohydrology			
Professional affiliation/registration:	SACNASP Registration No. 400177/13			
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Postal code:	1751			
Telephone:				
E-mail:	marius@mvbconsult.co.za			

2. DECLARATION BY THE SPECIALIST

I, Marius van Biljon, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



Signature of the Specialist

MVB Consulting

Name of Company:

04/07/2023

Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Marius van Biljon, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.



Signature of the Specialist

MVB Consulting

Name of Company

04/07/2023

Date

Signature of the Commissioner of Oaths



17 JUL 2023

Date

Administering oath comply with the regulations contained in
Government Gazette No. R1258 of July 1972, as
amended

Signature: _____

COMMISSIONER OF OATHS (RSA)
J. L. van BILJON
Ex Officio - MTP (SA)

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17 JUL 2023