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Date: 1 November 2022
Ref: Ladysmith Quarry;
Additional Aquatic Information

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Attention: To whom it may concern.

WETLAND/AQUATIC COMMENTS: THE ADDRESSING OF ASPECTS THAT WAS NOT INCLUDED WITHIN THE ORIGINAL LADYSMITH QUARRY WETLAND SPECIALIST REPORT (2017), BUT ARE NOW REQUIRED IN ORDER TO MEET THE RESPONSIBILITIES IN TERMS OF:

- » **THE “NEWLY” GAZETTED PROTOCOLS 3(b), IN TERMS OF SECTION 24(5)(a) AND 24(5)(h) OF NEMA (PUBLISHED ON THE 20TH OF MARCH 2020);**
- » **THE AQUATIC BIODIVERSITY PROTOCOL PUBLISHED IN GN NO. 1105 OF 30 OCTOBER 2020**

I. DECLARATION OF CONSULTANTS INDEPENDENCE

- » act/ed as the independent specialist in this application;
- » regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- » do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- » have and will not have any vested interest in the proposed activity proceeding;
- » have disclosed, to the applicant, EAP and competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- » have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- » am aware that a false declaration is an offense in terms of regulation 48 of GN No. R. 326.

REPORT AUTHOR

Gerhard Botha *Pr.Sci.Nat* 400502/14 (Botanical and Ecological Science)



01 November 2022

The original wetland delineation and assessment was conducted by myself (GA Botha - *Pr.Sci.Nat* 400502/14), with the field work conducted on the 2nd of January 2017 and the final report being submitted to Greenmined Environmental (EAP) on the 22nd of February 2017.

The EAP has since reached out to Nkurenkuru Ecology and Biodiversity to enquire whether the content of the report is still applicable in terms of the “new” published protocols (published in 2020).

Thus, the main aim of this letter is to address the enquiry¹ and to provide any additional information, were deemed necessary, in order to align the report with the current protocols.

Subsequently, in order to determine whether any changes may have occurred within the study site and surrounding area, over the past five years, various satellite images (between the period of the on-site survey and the most recent satellite image) were meticulously analysed and used to roughly compare/confirm/dispute the findings of the original report (especially in terms of the extent of the wetland features, their current Present Ecological Status and Ecological Importance and Sensitivity). The comparison between satellite imagery, during the period of the on-site survey and most recent satellite imagery, can provide fairly accurate results, however small changes, and certain biodiversity aspects can sometimes be challenging to assess via this route.

However, a survey of various satellite images, between the period of the on-site survey and the most recent satellite image, may still provide reliable and valid results and as such this route was followed.

Based on this survey of various satellite images it appears that NO significant change in land use has occurred since the time of the study.

The condition of the wetlands as well the surrounding terrestrial areas (within the 500m regulated area) appears to have remained, for most part, largely unchanged. A small improvement of vegetation coverage (roughage) within the historically ploughed areas, may have occurred, but this improvement is not likely enough to have improved the Wetlands’ PESs.

¹ Please take note that a site visit was not requested to verify the findings and all findings and conclusions provided within this letter are based on the latest available spatial data sets including satellite imagery.

1. THE CURRENT REQUIREMENTS THAT HAVE BEEN ADDRESSED WITHIN THE ORIGINAL WETLAND REPORT

Table 1 below provides a NEMA checklist taking into account the current protocols as well the section within the report which has addressed the specific aspect/criteria/requirement. The aspects/requirements that have not been addressed, will be addressed within the next section.

Requirements/Criteria	Sections where this is addressed in the Specialist Report	Comments
2.1 The assessment must be undertaken by a suitably qualified and SACNASP registered specialist, within the preferred development site and on the preferred developments footprint.	Declaration of Consultant's Independence (Page 5)	Proof of SACNASP registration and updated CV will be included (as an appendix) within this letter.
2.2 The assessment must be undertaken on the preferred site and within the proposed development footprint	Section 4 (Pg. 22)	Within the report a focus area comprising of the preferred site as well as a buffer area of 500m around the preferred area (DWS regulated area) have been surveyed and assessed.
2.3 The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:		
2.3.1 A description of the aquatic biodiversity and ecosystems on the site, including: a) aquatic ecosystem types; and b) presence of aquatic species, and composition of aquatic species communities, their habitat, distribution and movement patterns;	Section 5.1 (Pg. 48-57); Section 5.2 (Pg. 57- 59); Section 5.3 (Pg. 59 – 60)	The delineation, classification and description of freshwater resources was conducted using the standards and guidelines produced by the DWS (DWAf, 2005 & 2007) and the South African National Biodiversity Institute (SANBI, 2009). According to the site visit as well as the recent survey of satellite imagery, no aquatic/wetland features were identified within the project site. The nearest aquatic/wetland feature is a seepage wetland located approximately 156 m to the south of the project site (outside of the development footprint)

<p>2.3.2 The threat status of the ecosystem and species as identified by the screening tool</p>	<p>Not addressed within original wetland report.</p>	<p>According to the screening tool:</p> <ul style="list-style-type: none"> » The project site is regarded as Low Sensitive in terms of the Aquatic Biodiversity Theme. » The project site is regarded as Very High Sensitive in terms of the Terrestrial Biodiversity Theme due to: <ul style="list-style-type: none"> ○ The project site includes an area that has been classified as a Critical Biodiversity Area 2 ○ The area falls within a Strategic Water Source Area. <p>These sensitivities will be discussed below, in Section 2.</p>
<p>2.3.3 An indication of the national and provincial priority status of the aquatic ecosystems, including a wetland or a river freshwater ecosystem priority area or sub-catchment, a strategic water source area, a priority estuary, whether or not they are free-flowing rivers, wetland clusters, a critical biodiversity or ecologically sensitivity area; and</p>	<ul style="list-style-type: none"> » FEPA priority Rivers and Wetland and Sub-catchments: Section 4.8 (Pg. 44) » Aquatic Critical Biodiversity Areas: Section 4.8 (Pg. 44) » Strategic Water Source Areas: Not addressed. 	<p>In terms of the NFEPA and KwaZulu-Natal Biodiversity Spatial Planning (KZN BSP) spatial data sets; these data sets have not been updated since the time of the undertaking of the study in 2017 and as such the information provided within the original wetland report pertaining to these aspects are still relevant.</p> <ul style="list-style-type: none"> » According to these data sources no FEPA priority wetlands or rivers are located in close proximity to the project site with the nearest FEPA priority wetland located approximately 682 m to the south-east of the site (channelled valley-bottom wetland). The site is also not located within a FEPA priority sub-catchment, but is located within in Upstream sub-catchment. » According to the KZN BSP (2016) no aquatic/freshwater CBAs are located within the development site or in close proximity to the project site (CBA optimal area located within project site relates to terrestrial features). » Even though the Environmental Screening Tool classified the site as High Sensitivity due to the fact that the site falls within a Strategic Water Source Area (SWSA); upon interrogating the SWSA (2017)

		<p>spatial data it was determined that the project site is located quite a distance from any SWSA with the nearest SWSA located approximately 12.5 km to the north of the project site.</p> <ul style="list-style-type: none"> » As such it can be concluded that the proposed development will not impact any nationally or provincially identified priority aquatic feature.
<p>2.3.4 A description of the ecological importance and sensitivity of the aquatic ecosystem including: a) the description (spatially, if possible) of the ecosystem process that operate in relation to the aquatic ecosystems on and immediately adjacent to the site (e.g. movement of surface and subsurface water, recharge, discharge, sediment transport etc.); and b) the historic ecological condition (reference) as well as the ecological state of rivers (in-stream, riparian and floodplain habitat), wetlands and/or estuaries in terms of possible changes to the channel and flow regime (surface and groundwater)</p>	<p>Section 3.3.3 (Pg. 13-17); Section 5.1 (Pg. 48-57); Section 5.3 (Pg. 59 – 60); Section 5.4 (Pg. 61-67)</p>	<p>The following wetland functional tools were used during the wetland assessment:</p> <ul style="list-style-type: none"> » WET-Health Tool (MacFarlane et. al. 2008): Current and Historical Ecological State of wetlands. A Level 1 assessment was undertaken. » WET-EcoServices Tool (Kotze et. al. 2009): Assessment of the demand for and supply of the wetland services under the broader categories of regulating and supporting services, provisional services and cultural services » Wetland Ecological Importance and Sensitivity (EIS) Tool (DWAF 1999c; Rountree & Malan, 2013).
<p>2.4 The assessment must identify alternative development footprints within the preferred site which would be of a “low” sensitivity as identified by the screening tool and verified through the site sensitivity verification and which were not considered appropriate</p>	<p>Not applicable</p>	<p>No aquatic features were identified within the development site and this site is furthermore located well outside of the recommended aquatic buffer area (for the wetland feature located to the south of the development site) and as such the development site is located within a low sensitive area and as such does not necessitate the identification of an alternative site.</p>
<p>2.5 Related to impacts, a detailed assessment of the potential impacts of the proposed development on the following aspects must be undertaken to answer the flowing questions:</p>	<p>Section 3.3.3 (Pg. 18-20); Section 6 (Pg. 69-81)</p>	<p>All of these aspects have been considered during the Assessment of Impacts and the determination of an appropriate aquatic buffer area.</p>
<p>2.5.1 Is the proposed development consistent with maintaining the priority aquatic ecosystem in its current state and according the sated goal?</p>		<p>The main findings of the impact assessment were that the proposed development will not directly impact any wetland feature. However, there</p>

<p>Is the proposed development consistent with maintaining the resource quality objectives for the aquatic ecosystems present?</p>		<p>is a slight potential for indirect impacts on the seepage wetland located approximately 156 m to the south of the project site. Indirect impacts on the valley bottom wetland is negligible due to the distance between development and this wetland and this size of the development in relationship to the catchment area of this wetland feature (very small area).</p>
<p>How will the proposed development impact on fixed and dynamic ecological processes that operate within or across the site? This must include:</p> <p>(a) impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes);</p> <p>(b) will the proposed development change the sediment regime of the aquatic ecosystem and its sub-catchment (e.g. sand movement, meandering river mouth or estuary, flooding or sedimentation patterns);</p> <p>(c) what will the extent of the modification in relations to the overall aquatic ecosystem be (e.g. at the source, upstream or downstream portion, in the temporary/seasonal/permanent zone of a wetland, in the riparian zone or within the channel of a watercourse etc.); and</p> <p>(d) to what extent will the risk associated with water uses and related activities change;</p>		<p>The most likely impacts on the seepage wetland were determined to be a small change in surface water runoff and infiltration, within the wetland's catchment, and subsequently a small potential change in water inputs into the wetland (very slight decrease in water input). However, it was determined that due to the small size of the development, this impact (with the necessary mitigation measures in place), will not result in a significant change in the;</p> <ul style="list-style-type: none"> » Dynamic ecological processes; » Ecological drivers; » Current ecological status (PES); and » Functions and Services provided by the wetland feature.
<p>2.5.4 How will the proposed development impact on the functioning of the aquatic feature? This must include:</p> <p>(a) base flows (e.g. too little or too much water in terms of characteristics and requirements of the system);</p> <p>(b) quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over-abstraction or instream or off-stream impoundment of a wetland or river);</p> <p>Change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchanneled valley-bottom wetland to a channelled valley-bottom wetland);</p> <p>(d) quality of water (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication);</p>		

<p>(e) fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal); and (f) the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils etc.);</p> <p>2.5.5 How will the proposed development impact on key ecosystem regulating and supporting services especially: (a) flood attenuation; (b) streamflow regulation; (c) sediment trapping; (d) phosphate assimilation; (e) nitrate assimilation; (f) toxicant assimilation; (g) erosion control; (h) carbon storage?</p>		
<p>2.5.6 How will the proposed development impact community composition (numbers and density of species and integrity (condition, viability predator-prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site.</p>		
<p>2.6 In addition to the above, where applicable, impact to the frequency of estuary mouth closure should be considered, in relation to: (a) size of the estuary; (b) availability of sediment; (c) wave action in the mouth; (d) protection of the mouth; (e) beach slope; (f) volume of mean annual runoff; and (g) extent of saline intrusion (especially relevant to permanently open systems).</p>	<p>Not applicable</p>	
<p>2.7 The findings of the specialist assessment must be written up in an Aquatic Biodiversity Specialist Assessment Report that contains as a minimum, the following information:</p>		
<p>2.7.1 Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;</p>	<p>Front Page;</p>	<p>As mentioned, proof of SACNASP registration and updated CV will be included (as an appendix) within this letter.</p>

		Declaration of Consultant's Independence (Pg. 5)	
2.7.2	A signed statement of independence by the specialist;	Declaration of Consultant's Independence (Pg. 5)	Also refer to Declaration of Specialist's Independence included in this letter.
2.7.3	A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Not addressed within original wetland report.	Will be addressed in Section 2.
2.7.4	The methodology used to undertake the site inspection and the specialist assessment, including equipment and modelling used, where relevant;	Section 3 (Pg. 11-22)	
2.7.5	A description of the assumptions made, any uncertainties or gaps in knowledge or data;	Section 1.5 (Pg. 8-9)	
2.7.6	The location of areas not suitable for development which are to be avoided during construction, and operation, where relevant;	Not applicable	No aquatic sensitive areas have been identified within the development site and as such no "No-Go" areas have been identified within the project site.
2.7.7	Additional environmental impacts expected from the proposed development;	Section 6 (Pg. 69-81)	
2.7.8	Any direct, indirect and cumulative impacts of the proposed development on site;	Section 6 (Pg. 69-81)	Cumulative impacts were not addressed within the Wetland Report and will subsequently be addressed in Section 2 below.
2.7.9	The degree to which impacts and risks can be mitigated;	Not addressed within original wetland report.	Will subsequently be addressed in Section 2 below.
2.7.10	The degree to which the impacts can be reversed;	Not addressed within original wetland report.	Will subsequently be addressed in Section 2 below.
2.7.11	The degree to which the impacts and risks can cause loss of irreplaceable resources;	Not addressed within original wetland report.	Will subsequently be addressed in Section 2 below.
2.7.12	A suitable construction and operational buffer for the aquatic ecosystems, using accepted methodologies	Section 5.5 (Pg. 62)	

2.7.13 Proposed impact management actions and Impact management outcomes for inclusion in the Environmental Management Programme (EMPr)	Section 6 (Pg. 69-81)	
2.7.14 A motivation must be provided if there were development footprints identified as per paragraph 2.4 above that were identified as having a “low” aquatic biodiversity sensitivity and that were not considered appropriate;	Not applicable	No aquatic features were identified within the development site and this site is furthermore located well outside of the recommended aquatic buffer area (for the wetland feature located to the south of the development site) and as such the development site is located within a low sensitive area and as such does not necessitate the identification of an alternative site.
2.7.15 A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability or not of the proposed development and if the proposed development should receive approval or not;	Section 7 (Pg. 82-92)	
2.7.16 Any conditions to which this statement is subjected.	Section 7 (Pg. 82-92)	

2. ASPECTS/REQUIREMENTS THAT NEEDS TO ADDRESSED

2.1. National web based environmental screening tool

Introduction and summary of the Screening Tool and the link between this tool and the newly gazetted Protocols for specialists.

The Screening Tool, developed by the Department of Environmental Affairs (“DEA”), now Department Forestry and Fisheries of Environment, (DFFE), is a geospatial web-enabled application that aims to provide readily available information, known as ‘spatial datasets’, which enables applicants for Environmental Authorisation to screen their proposed site for environmental sensitivities.

The Screening Tool provides site specific information to assist an applicant throughout the EIA process. The information provided includes, for example, zoning identification, applicable Environmental Management Frameworks or bio-regional plans, project specific requirements such as specialist studies, and the minimum information to be included in the EIA report.

On 5 July 2019, the Minister of Environment, Forestry and Fisheries, Barbara Dallas Creecy, published a notice requiring that when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014 (as amended) (the “EIA Regulations”), the applicant must submit the report generated by the National Web Based Screening Tool (the “Screening Tool”) with the application. This notice came into effect in October 2019.

The South African National Biodiversity Institute (SANBI), through its Biodiversity and Land Use (BLU) Project and the Council for Scientific and Industrial Research (CSIR) has, since 2017, been supporting the Department of Environment Forestry and Fisheries (DEFF) in integrating biodiversity information into DEFF’s web-based National Environmental Screening Tool (hereafter referred to as ‘screening tool’) and developing a set of biodiversity related protocols that an applicant needs to adhere to in the Environmental Authorisation (EA) process.

On 20 March 2020 the Minister of Forestry, Fisheries and the Environment gazetted Terrestrial and Aquatic Biodiversity Protocols for national implementation purposes.

The Screening Tool consists of a number of themes including agriculture, avifauna, terrestrial and aquatic biodiversity, plant and animal species, noise, defence and civil aviation. Each of the themes consists of spatial datasets that correspond to the respective theme. Each dataset within the respective theme has been assigned a sensitivity level. Most of the themes within the Screening Tool make use of a four-tier sensitivity system,

where delineated areas and features are assigned a sensitivity level of either “low (L)”, “medium (M)”, “high (H)” or “very high (VH)”. Table below describes the four sensitivity classes and their definitions.

Table 2: Summary of the sensitivity classes.

Assessment	Description
VERY HIGH	Area is rated as being extremely sensitive to development and the risk of finding sensitive biodiversity features at the site is very high. Consequently, the area will either have very high conservation or socio-economic value.
High	Area is rated as being highly sensitive to development and the risk of finding sensitive biodiversity features at the site is high. Consequently, the area will either have high conservation or socio-economic value.
Medium	Area is rated as being of medium sensitivity to development and there is a medium to moderate risk of finding sensitive biodiversity features at the site. Consequently, the area will either have medium conservation or socio-economic value.
Low	Area is considered to have low levels of sensitivity and there is low risk of finding sensitive biodiversity features at the site. Consequently, the area has a low conservation or socio-economic value.

A number of datasets were used for the biodiversity related themes. Table identifies the datasets that underpin the various biodiversity related themes in the Screening Tool. For the Aquatic and Terrestrial Biodiversity Themes, all features that have known mapped features of sensitive biodiversity features are assigned a “very high” sensitivity. Where there are no known sensitive biodiversity features, a “low” sensitivity is assigned. Subsequently a two-tier sensitivity system has been applied to the Terrestrial Biodiversity Themes (“very high” and “low”) and are based on the presence or absence of known sensitive biodiversity features respectively. In essence the “very high” and “low” sensitivity ratings should be interpreted as there being a greater and lower risk of finding important biodiversity in these areas respectively. It is important to note that all the “very high” delineated areas and features are sensitive but the degree to which these areas can be impacted upon is different for the different “very high” delineated areas and features, depending on the development type. The degree of impact on these areas can only be assessed with the EIA process.

Table 3: Summary of the datasets used to underpin the aquatic and terrestrial biodiversity themes and the sensitivity rating of these features.

Terrestrial & Aquatic Biodiversity Themes Datasets Used	Sensitivity
Protected Areas (Terrestrial)	Very High
Critical Biodiversity Areas – CBAs (Terrestrial and Aquatic)	Very High
Ecological Support Areas – ESAs (Terrestrial and Aquatic)	Very High
Strategic Water Source Areas (Terrestrial & Aquatic)	Very High
National Freshwater Priority Areas (FEPA) catchments (Terrestrial & Aquatic)	Very High
Priority Areas for Protected Area Expansion (Terrestrial)	Very High
Indigenous Forest (Terrestrial)	Very High
Rivers (Aquatic)	Very High

Wetlands (Aquatic)	Very High
Estuaries (Aquatic)	Very High
Absence of above listed features	Low

As for the Animal and Plant Species Themes, the four-tier sensitivity system have been implemented to the various data layers underpinning these themes, namely “Low”, “Medium”, “High” and “Very High”. Species data have been separated from ecosystem/ landscape level data to provide for huge complexities in the species data, in addition to the high numbers of threatened species within South Africa that would need to be processed for inclusion into the screening tool. As such, it was decided to keep the species data separate for simpler integration within the Screening Tool. It should also be noted that the species guilds that will be covered in the Animal Species Protocol include mammals, reptiles, amphibians, butterflies and birds. A summary of the datasets used to underpin the Animal and Plant themes and their sensitivity rating are provided in Table below.

Table 4: Summary of the datasets used to underpin animal and plant themes and the sensitivity rating of these features.

Plant and/or Animal Species Theme Data Sets Used	Sensitivity
Critical habitat for range restricted species of conservation concern that have a global range of less than 10km ² .	Very High
Confirmed habitat for species of conservation concern.	High
Suspected habitat for species of conservation concern based either on there being records for this species collected in the past prior to 2020 or being a natural area included in a habitat suitability model.	Medium
Areas where no natural habitat remains.	Low

2.1.1. Description/discussion of the sensitive features found within the project site, as identified within the screening tool and based on the findings of a site visit.

According to the Screening Report generated on the 09th of November 2022 (10:30:12) the following sensitivities (pertaining to terrestrial biodiversity) were identified within the project area:

Table 5: Summary of the development site’s environmental sensitivities.

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Aquatic Biodiversity Theme				X
Animal Species Theme		X		
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

A description of the themes relating to the aquatic environment of the study area, and their sensitivities are provided below as well the confirmation or refute of these sensitivities within the project site based on the findings of the site visit. Take note that this study and report addresses the aquatic themes, however some of the terrestrial biodiversity themes within the screening report relate to aquatic features such Strategic Water Source Areas and as such these aspects are addressed to some extent where relevant.

Aquatic Biodiversity Theme: Sensitivity

Feature	Sensitivity
Low Sensitivity	Low Sensitivity



DISCUSSION OF SENSITIVITY FEATURES BASED ON ON-SITE FINDINGS

During the site visit back in 2017 it was also confirmed that no sensitive aquatic features are present within the project site and the site was confirmed as of low aquatic sensitivity. A recent survey of the latest available satellite imagery supported these findings.

Terrestrial Biodiversity Theme: Sensitivity



Feature	Sensitivity
Critical Biodiversity Area 1	Very High Sensitivity
Strategic Water Source Areas	Very High Sensitivity

DISCUSSION OF SENSITIVITY FEATURES BASED ON ON-SITE FINDINGS

The Critical Biodiversity Area 2 (CBA 2) relates to terrestrial features and as such will not be discussed with in this letter.

In terms of the Strategic Water Source Areas, even though the Environmental Screening Tool classified the site as Very High Sensitivity due to the fact that the site falls within a Strategic Water Source Area (SWSA); upon interrogating the SWSA (2017) spatial data it was determined that the project site is located quite a distance from any SWSA with the nearest SWSA located approximately 12.5 km to the north of the project site (Refer to Figure 1).

2.2. Conservation Planning Context

2.2.1. National Freshwater Ecosystem Priority Areas (2011) Database

The National Freshwater Ecosystems Priority Areas (NFEPA) (2011) database provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports the sustainable use of water resources. The spatial priority areas are known as Freshwater Ecosystem Priority Areas (FEPAs).

FEPAs were identified based on:

- » Representation of ecosystem types and flagship free-flowing rivers.
- » Maintenance of water supply areas in areas with high water yield.
- » Identification of connected ecosystems.
- » Preferential identification of FEPAs that overlapped with"
 - Any free-flowing river
 - Priority estuaries identified in the National Biodiversity Assessment 2011.
 - Existing protected areas and focus areas for protected area expansion identified in the National Protected Area Expansion Strategy.

FEPA maps show various different categories, each with different management implications. The categories include river FEPAs and associated sub-quaternary catchments, wetland FEPAs, wetland clusters, Fish Support Areas (FSAs) and associated sub-quaternary catchments, fish sanctuaries, phase 2 FEPAs and associated sub-quaternary catchments, and Upstream Management Areas (UMAs).

A review of the NFEPA coverage for the study area (**Error! Reference source not found.**) revealed that no FEPA1 priority quaternary catchments will be impacted (as stated within the Wetland Report).

Furthermore, no FEPA river traverse the project site, or are located in close proximity to the project site. As such no such FEPA priority rivers will be impacted by the proposed development (as stated within the Wetland Report).

The entire project site is located within an Upstream sub-quaternary catchment also known as an "Upstream Management Area" (UMA). Such UMAs represent sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream river FEPAs and Fish Support Areas but do not include management areas for wetland FEPAs, which need to be determined at a finer scale (Nel, *et al.*, 2011). This UMA is fairly large and due to the small size of the development relative to the size of the UMA and due to the location of the project site, away from any wetland features and watercourses, this development will not significantly impact this UMA and its associated freshwater resource features.

A number of freshwater wetlands have been listed within the region (Figure 1), according to the NFEPA spatial coverage (Nel, et al., 2011). Almost all of these wetlands have been classified as artificial wetland flats or seepages. A number of natural wetland features are also found within the region and are typically channelled valley-bottom wetlands. No such wetlands, according to the spatial data are present within the development site, whilst the closest natural wetland feature is located approximately 682 m to the south east of the project site (FEPA priority channelled valley-bottom wetland). Subsequently the proposed development will not impact any priority wetland features.

2.2.2. Strategic Water Source Areas (SWSAs)

Strategic Water Source Areas (SWSAs) are defined as areas of land that either:

- » supply a disproportionate (i.e. relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important;
- » have high groundwater recharge and where the groundwater forms a nationally important resource;
- » areas that meet both criteria mentioned above.

They include transboundary Water Source Areas that extend into Lesotho and Swaziland.

The project site is located well outside of any SWSA (Figure 1) and as such will not impact such areas.

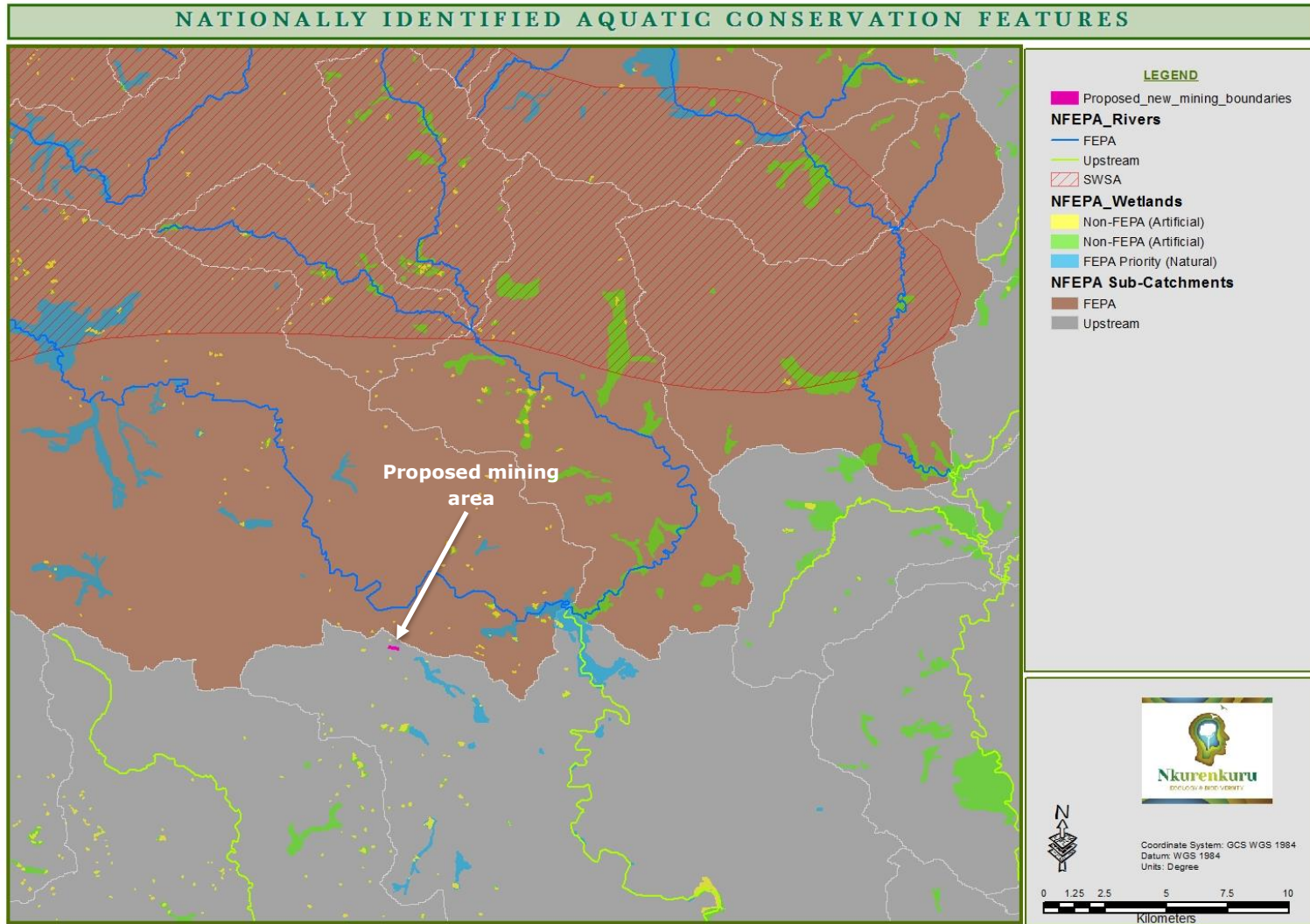


Figure 1: Nationally identified aquatic conservation features.

2.3. A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment

The site was inspected on 2nd of January 2017 (wet and active growing season). During the inspections the vegetation was in an optimal survey condition, with the majority of plants being easily identifiable. Furthermore, two of the hydrological zones were saturated (permanent and seasonally saturated zones), whilst portions of the permanent saturated zones were inundated with shall water (e.g. most of the channels). Furthermore, most of the dam features within the area were slightly inundated (>80% capacity) during the time of the inspection. However, the presence of inundation is not a prerequisite for the accurate delineation of freshwater resource features as other indicators were used.

As such the findings and outcome of the survey can be regarded as acceptable.

2.4. Aspects relating to the assessment of impacts that need to be addressed

No.	Phases	Activity	Aspect	Impact	Without Mitigation					With Mitigation					
					Status	Reversibility	Irreplaceable loss of resources	Significance	Risk Rating	Degree to which the impacts can be mitigated	Status	Reversibility	Irreplaceable loss of resources	Significance	Risk Rating
1	Site Preparation and Construction Phase	Site establishment and clearing of vegetation within proposed development footprint area (approximately 170m from wetland features)	Removal or excessive damage to vegetation	<p><u>WITHIN DEVELOPMENT FOOTPRINT AREA:</u> 1) Loss/alteration of vegetation cover and habitats, 2) possible invasion and settling of alien plant species, 3) general increase in runoff from bare areas and associated accelerated erosion</p> <p><u>WITHIN WETLAND:</u> 1) Increase in volume and velocity of surface water flow into wetlands, 2) potential acceleration in erosion, 3) loss of wetland vegetation and habitat, 4) altered vegetation cover, 5) increase in sediment load into wetland, 6) reduced ability to attenuate flooding, 7) possible contamination of surface as well as ground water with pollutants, 8) loss of buffering ability to protect downstream habitats from the adverse effects caused during extreme weather events (e.g. increased flooding, sever erosion or sedimentation)</p>	Negative	Low	No irreplaceable loss of aquatic resources	50	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	25	Low
			Compaction of topsoil		Negative	Low	No irreplaceable loss of	33	Low	Very High	Neutral	High	No irreplaceable loss of	8	Low
			Creation of runoff zones		Negative	Moderate	No irreplaceable loss of aquatic resources	27	Low	High	Neutral	High	No irreplaceable loss of aquatic resources	2	Low

2	Upgrading of existing access road, construction of smaller internal roads, Maintenance of roads	Removal and/or disturbance of vegetation	<p><u>WITHIN DEVELOPMENT FOOTPRINT AREA:</u></p> <p>1) Loss of vegetation, 2) increase in runoff and erosion, 3) possible distribution of alien invasive plants, 4) possible change of natural runoff and drainage patterns.</p> <p><u>WITHIN WETLAND AREA:</u></p> <p>1) Localised channelling and increase in velocity of surface water flow, 2) potential acceleration of erosion, 3) loss of wetland vegetation, 4) increase in sediment and nutrient load into wetland, 5) reduced ability to attenuate localised flooding,</p>	Negative	Low	No irreplaceable loss of aquatic resources	16.25	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	6.25	Low
		Stockpiling of construction material and topsoil storage		Negative	High	No irreplaceable loss of aquatic resources	21	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	11	Low
		Redistribution and concentration of runoff from hard/impenetrable surfaces		Negative	Moderate	No irreplaceable loss of aquatic resources	21	Low	High	Neutral	High	No irreplaceable loss of aquatic resources	11	Low

3	Establishment of infrastructure and the occupancy and operation thereof	Alteration of soil surface properties		Negative	Moderate	No irreplaceable loss of aquatic resources	15	Low	High	Neutral	High	No irreplaceable loss of aquatic resources	5	Low
		Removal of vegetation		Negative	Low	No irreplaceable loss of aquatic resources	17.5	Low	Very high	Neutral	High	No irreplaceable loss of aquatic resources	7.5	Low
		Compaction and alteration of topsoil	<p><u>WITHIN DEVELOPMENT FOOTPRINT AREA:</u></p> <p>1) Loss/alteration of vegetation cover and habitats, 2) Accelerated erosion. 3) potential contamination by chemical and organic waste products, 4) contamination of soil with hydrocarbons and other hazardous pollutants.</p>	Negative	Low	No irreplaceable loss of aquatic resources	17.5	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	7.5	Low
		Creation of runoff zone	<p><u>WITHIN WETLAND:</u></p> <p>1) Altered surface runoff patterns into wetland, 2) increase in concentrated runoff patterns, 3) erosion, 4) increase of chemicals and organic waste products, 5) increase in toxic heavy metal contaminants, 6) potential contamination of downstream water resources</p>	Negative	Low	No irreplaceable loss of aquatic resources	17.5	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	7.5	Low
		Redistribution and concentration of runoff from sealed surfaces		Negative	Low	No irreplaceable loss of aquatic resources	17.5	Low	High	Slightly negative	High	No irreplaceable loss of aquatic resources	7.5	Low

6	Construction and maintenance of storm water and dirty water runoff from the mine area	Vehicle transport and access to the site	Accidental hazardous substances spillage during construction may spread into downstream freshwater habitats and may cause a reduction in water quality and threaten downstream habitats and biota.	Negative	Moderate	No irreplaceable loss of aquatic	50	Low	Very High	Neutral	High	No irreplaceable loss of aquatic	25	Low	
7		Dirty water runoff	Dirty water runoff from the mining area carried into the downstream freshwater resource resulting in a reduction of local surface water quality, including a change in the pH of the water, as well as a potential increase in turbidity.	Negative	Moderate	No irreplaceable loss of aquatic resources	58.5	Medium	Very High	Neutral	High	No irreplaceable loss of aquatic resources	36	Low	
8		Construction of structures responsible for the removal of dirty water runoff from the mining area.	Removal of Mean Annual Precipitation from the catchment, as this runoff will now be considered dirty water and will be contained within the mining area.	Negative	Moderate	No irreplaceable loss of aquatic resources	66	Medium	High	Slightly negative	High	No irreplaceable loss of aquatic resources	40	Low	
9	Operational Phase	Stormwater management	Poor maintenance of stormwater management infrastructure	Reduced ability to contain dirty water within the mining area resulting in contaminated water entering the downstream freshwater resources subsequently impacted downstream water quality.	Negative	Low	No irreplaceable loss of aquatic resources	70	Moderate	Very High	Neutral	High	No irreplaceable loss of aquatic resources	50	Low

10	Mining (quarrying) for aggregate (including all activities associated with quarrying namely, blasting, excavation, transporting of aggregate	Alteration in catchment morphology, resulting in an alteration in surface/ground water flow, altered distribution of rainfall	<p><u>WITHIN DEVELOPMENT FOOTPRINT:</u></p> <ol style="list-style-type: none"> 1) Loss/alteration of vegetation cover and habitats, 2) increase in concentrated runoff from specific localities, 3) higher accelerated erosion, 4) invasion with alien plants, <p><u>WITHIN WETLAND:</u></p> <ol style="list-style-type: none"> 1) Alteration in surface water flow into wetlands (flow pattern, frequency, amount & velocity) and subsequently also into channels and downstream, 2) Alteration in groundwater flow, 3) alteration in water quality (increase in sediment load, heavy metal contaminants & organic contaminants suspended solids), 4) loss of wetland vegetation, 5) accelerated effects of erosion (locally and downstream), 6) alien plant invasion, 7) reduce ability of the wetland to buffer downstream habitats from the adverse effects extreme weather conditions 	Negative	Low	No irreplaceable loss of aquatic resources	74.75	Moderate	Moderate	Slightly negative	Low	No irreplaceable loss of aquatic resources	19.75	Low
11		Removal of or damage to vegetation		Negative	Low	No irreplaceable loss of aquatic resources	42	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	17	Low
12		Compaction of soils		Negative	Low	No irreplaceable loss of aquatic resources	24.5	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	14.5	Low

13	Crushing and stockpiling	Presence of hydrocarbons and other hazardous chemicals	<p>WITHIN DEVELOPMENT FOOTPRINT AREA: 1) Site specific altered distribution of rainfall and resultant runoff patterns, 2) increase in runoff from bare areas and associated accelerated erosion, 3) establishment of alien invasive plants.</p> <p>WITHIN WETLAND: 1) Increase sediment input, 2) alteration in flow pattern, 3) erosion</p>	Negative	Moderate	No irreplaceable loss of aquatic resources	21	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	11	Low
14		Reduced buffering capacity of the landscape during extreme weather events		Negative	Moderate	No irreplaceable loss of aquatic resources	49	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	24	Low
15		Stockpiling of aggregate		Negative	High	No irreplaceable loss of aquatic resources	36.75	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	11.75	Low

16			Stockpiling of topsoil		Negative		No irreplaceable loss of aquatic resources	38.5	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	13.5	Low
17			Compaction of soil		Negative		No irreplaceable loss of aquatic resources	13	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	3	Low
18			Creation of runoff zone		Negative		No irreplaceable loss of aquatic resources	27.5	Low	Very High	Neutral	High	No irreplaceable loss of aquatic resources	2.5	Low
19			Redistribution and concentration of runoff		Negative		No irreplaceable loss of aquatic resources	27.5	Low	High	Slightly negative	Low	No irreplaceable loss of aquatic resources	2.5	Low

2.4.1. Cumulative Impacts

Existing mining projects that are in an approximate 30 km radius of the proposed aggregate mining area have been considered. Due to the fact that this proposed development is located outside of any freshwater resource features the contribution of this development on cumulative impacts will be very low to insignificant.

Cumulative Impact 1: Compromised broad-scale ecological processes associated with the Sundays River and associated tributaries

Impact Nature: Transformation of intact freshwater resource habitat could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potential disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement		
	Overall impact of the proposed project considered in isolation	Cumulative impact of the project and other projects within the area
Extent	Local (1)	Regional (3)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (2)	Moderate (6)
Probability	Very Improbable (1)	Probable (3)
Significance	Low (7)	Moderate (39)
Status	Neutral to slightly negative	Negative
Reversibility	High	Moderate to Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation	<ul style="list-style-type: none"> » The recommended buffer areas between the delineated freshwater resource features and proposed project activities should be maintained. » All freshwater resource features and their associated buffer areas should be regarded as NO-GO areas. » The potential stormwater impacts of the proposed developments should be mitigated on-site to address any erosion or water quality impacts. 	

- » Good housekeeping measures as stipulated in the EMPr for the project should be in place where construction activities take place to prevent contamination of any freshwater features.
- » Disturbed areas should be rehabilitated through reshaping of the surface and the re-instatement of a stable vegetation cover with suitable local indigenous vegetation.

3. CONCLUSIONS

The results and finding provided within the original Wetland Impact Assessment Report are still applicable.

Based on the latest satellite imagery and new available spatial data no fatal flaws could be identified.

Subsequently objections or motives for the project not to be allowed, could not be determined, and thus the development may occur within the proposed development boundaries.

Yours sincerely



Gerhard Botha Pr.Sci.Nat 400502/14 (Botanical and Ecological Science)

Date: Thursday, 01 November 2022

Field of expertise: Wetland ecology, aquatic and wetland fauna & flora, terrestrial biodiversity, aquatic biomonitoring and wetland habitat evaluations.

4. APPENDICES:

4.1. Appendix 2. SACNASP REGISTRATION



4.2. Appendix 2. Curriculum Vitae and Experience



CURRICULUM VITAE:

Gerhard Botha

Name:	:	Gerhardus Alfred Botha
Date of Birth	:	11 April 1986
Identity Number	:	860411 5136 088
Postal Address	:	PO Box 12500 Brandhof 9324
Residential Address	:	3 Jock Meiring Street Park West Bloemfontein 9301
Cell Phone Number	:	084 207 3454
Email Address	:	gabotha11@gmail.com
Profession/Specialisation	:	Ecological and Biodiversity Consultant
Nationality:	:	South African
Years Experience:	:	8
Bilingualism	:	Very good – English and Afrikaans

Professional Profile:

Gerhard is a Managing Director of Nkurenkuru Ecology and Biodiversity (Pty) Ltd. He has a BSc Honours degree in Botany from the University of the Free State Province and is currently completing a MSc Degree in Botany. He began working as an environmental specialist in 2010 and has since gained extensive experience in conducting ecological and biodiversity assessments in various development field, especially in the fields of conventional as well as renewable energy generation, mining and infrastructure development. Gerhard is a registered Professional Natural Scientist (Pr. Sci. Nat.)

Key Responsibilities:

Specific responsibilities as an Ecological and Biodiversity Specialist include, inter alia, professional execution of specialist consulting services (including flora, wetland and fauna studies, where required), impact assessment reporting, walk through surveys/ground-truthing to inform final design, compilation of management plans, compliance monitoring and audit reporting, in-house ecological awareness training to on-site personnel, and the development of project proposals for procuring new work/projects.

Skills Base and Core Competencies

- Research Project Management

- Botanical researcher in projects involving the description of terrestrial and coastal ecosystems.
- Broad expertise in the ecology and conservation of grasslands, savannahs, karroid wetland, and aquatic ecosystems.
- Ecological and Biodiversity assessments for developmental purposes (BAR, EIA), with extensive knowledge and experience in the renewable energy field (Refer to Work Experiences and References)
- Over 3 years of avifaunal monitoring and assessment experience.
- Mapping and Infield delineation of wetlands, riparian zones and aquatic habitats (according to methods stipulated by DWA, 2008) within various South African provinces of KwaZulu-Natal, Mpumalanga, Free State, Gauteng and Northern Cape Province for inventory and management purposes.
- Wetland and aquatic buffer allocations according to industry best practice guidelines.
- Working knowledge of environmental planning policies, regulatory frameworks, and legislation
- Identification and assessment of potential environmental impacts and benefits.
- Assessment of various wetland ecosystems to highlight potential impacts, within current and proposed landscape settings, and recommend appropriate mitigation and offsets based on assessing wetland ecosystem service delivery (functions) and ecological health/integrity.
- Development of practical and achievable mitigation measures and management plans and evaluation of risk to execution
- Qualitative and Quantitative Research
- Experienced in field research and monitoring
- Working knowledge of GIS applications and analysis of satellite imagery data
- Completed projects in several Provinces of South Africa and include a number of projects located in sensitive and ecological unique regions.

Education and Professional Status

Degrees:

- 2015: Currently completing a M.Sc. degree in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- 2009: B.Sc. Hons in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- 2008: B.Sc. in Zoology and Botany, University of the Free State, University of the Free State, Bloemfontein, RSA.

Courses:

- 2013: Wetland Management (ecology, hydrology, biodiversity, and delineation) – University of the Free State accredited course.
- 2014: Introduction to GIS and GPS (Code: GISA 1500S) – University of the Free State accredited course.

Professional Society Affiliations:

- The South African Council of Natural Scientific Professions: Pr. Sci. Nat. Reg. No. 400502/14 (Botany and Ecology).

Employment History

- December 2017 – Current: Nkurenkuru Ecology and Biodiversity (Pty) Ltd

- 2016 – November 2017: ECO-CARE Consultancy
- 2015 - 2016: Ecologist, Savannah Environmental (Pty) Ltd
- 2013 – 2014: Working as ecologist on a freelance basis, involved in part-time and contractual positions for the following companies
 - Enviroworks (Pty) Ltd
 - GreenMined (Pty) Ltd
 - Eco-Care Consultancy (Pty) Ltd
 - Enviro-Niche Consulting (Pty) Ltd
 - Savannah Environmental (Pty) Ltd
 - Esicongweni Environmental Services (EES) cc
- 2010 - 2012: Enviroworks (Pty) Ltd

Publications

Publications:

- Botha, G.A. & Du Preez, P.J. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. *S. Afr. J. Bot.*, **98**: 172-173.

Congress papers/posters/presentations:

- Botha, G.A. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. 41st Annual Congress of South African Association of Botanists (SAAB). Tshipise, 11-15 Jan. 2015.
- Botha, G.A. 2014. A description of the vegetation of the Nxamasere floodplain, Okavango Delta, Botswana. 10th Annual University of Johannesburg (UJ) Postgraduate Botany Symposium. Johannesburg, 28 Oct. 2014.

Other

- Guest speaker at IAIAasa Free State Branch Event (29 March 2017)
- Guest speaker at the University of the Free State Province: Department of Plant Sciences (3 March 2017):

References:

- Christine Fouché
 Manager: GreenMined (Pty) LTD
 Cell: 084 663 2399
- Professor J du Preez
 Senior lecturer: Department of Plant Sciences
 University of the Free State
 Cell: 082 376 4404

WORK EXPERIENCES & References

Gerhard Botha

ECOLOGICAL RELATED STUDIES AND SURVEYS

Date Completed	Project Description	Type of Assessment/Study	Client
2019	Sirius Three Solar PV Facility near Upington, Northern Cape	Ecological Assessment (Basic Assessment)	Aurora Power Solutions
2019	Sirius Four Solar PV Facility near Upington, Northern Cape	Ecological Assessment (Basic Assessment)	Aurora Power Solutions
2019	Lichtenburg 1 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Lichtenburg 2 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Lichtenburg 3 100MW Solar PV Facility, Lichtenburg, North-West Province	Ecological Assessment (Scoping and EIA Phase Assessments)	Atlantic Renewable Energy Partners
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Ecological Assessment (Basic Assessment)	Moeding Solar
2019	Expansion of the Raunmix Aliwal North Quarry, Eastern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	GreenMined
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Fauna and Flora Rescue and Protection Plan	Zevobuzz
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Zevobuzz
2018	Proposed Kruisvallei Hydroelectric Power Generation Scheme in the Ash River, Free State Province	Ecological Assessment (Basic Assessment)	Zevobuzz
2018	Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province	Ecological Assessment (Basic Assessment)	Eskom
2018	Clayville Thermal Plant within the Clayville Industrial Area, Gauteng Province	Ecological Comments Letter	Savannah Environmental
2018	Iziduli Emoyeni Wind Farm near Bedford, Eastern Cape Province	Ecological Assessment (Re-assessment)	Emoyeni Wid Farm Renewable Energy
2018	Msenge Wind Farm near Bedford, Eastern Cape Province	Ecological Assessment (Re-assessment)	Amakhala Emoyeni Renewable Energy
2017	H2 Energy Power Station near Kwamhlanga, Mpumalanga Province	Ecological Assessment (Scoping and EIA phase assessments)	Eskom
2017	Karusa Wind Farm (Phase 1 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province)	Ecological Assessment (Re-assessment)	ACED Renewables Hidden Valley
2017	Soetwater Wind Farm (Phase 2 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province)	Ecological Assessment (Re-assessment)	ACED Renewables Hidden Valley

2017	S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province	Ecological Assessment	Savannah Environmental
2016 - 2017	Noupoort CSP Facility near Noupoort, Northern Cape Province	Ecological Assessment (Scoping and EIA phase assessments)	Cresco
2016	Buffels Solar 2 PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Kabi Solar
2016	Buffels Solar 1 PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Kabi Solar
2016	132kV Power Line and On-Site Substation for the Authorised Golden Valley II Wind Energy Facility near Bedford, Eastern Cape Province	Ecological Assessment (Basic Assessment)	Terra Wind Energy
2016	Kalahari CSP Facility: 132kV Ferrum–Kalahari–UNTU & 132kV Kathu IPP–Kathu 1 Overhead Power Lines, Kathu, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Kathu Solar Park
2016	Kalahari CSP Facility: Access Roads, Kathu, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Kathu Solar Park
2016	Karoshhoek Solar Valley Development – Additional CSP Facility including tower infrastructure associated with authorised CSP Site 2 near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Karoshhoek Solar Valley Development –Ilanga CSP 7 and 8 Facilities near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Karoshhoek Solar Valley Development –Ilanga CSP 9 Facility near Upington, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Emvelo
2016	Lehae Training Academy and Fire Station, Gauteng Province	Ecological Assessment	Savannah Environmental
2016	Metal Industrial Cluster and Associated Infrastructure near Kuruman, Northern Cape Province	Ecological Assessment (Scoping Assessment)	Northern Cape Department of Economic Development and Tourism
2016	Semonkong Wind Energy Facility near Semonkong, Maseru District, Lesotho	Ecological Pre-Feasibility Study	Savannah Environmental
2015 - 2016	Orkney Solar PV Facility near Orkney, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Genesis Eco-Energy
2015 - 2016	Woodhouse 1 and Woodhouse 2 PV Facilities near Vryburg, North West Province	Ecological Assessment (Scoping and EIA phase assessments)	Genesis Eco-Energy
2015	CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province	Ecological Assessment (Basic Assessment)	CAMCO Clean Energy
2015	CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province	Ecological Assessment (Basic Assessment)	CAMCO Clean Energy
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Aurora Power Solutions
2015	Sirius 2 Solar PV Project near Upington, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Invasive Plant Management Plan	Aurora Power Solutions
2015	Sirius 2 Solar PV Project near Upington, Northern Cape Province	Invasive Plant Management Plan	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Plant Rehabilitation Management Plan	Aurora Power Solutions
2015	Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province	Plant Rehabilitation Management Plan	Aurora Power Solutions
2015	Sirius 1 Solar PV Project near Upington, Northern Cape Province	Plant Rescue and Protection Plan	Aurora Power Solutions
2015	Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province	Plant Rescue and Protection Plan	Aurora Power Solutions
2015	Expansion of the existing Komsberg Main Transmission Substation near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ESKOM
2015	Karusa Wind Farm near Sutherland, Northern Cape Province)	Invasive Plant Management Plan	ACED Renewables Hidden Valley

2015	Proposed Karusa Facility Substation and Ancillaries near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ACED Renewables Hidden Valley
2015	Eskom Karusa Switching Station and 132kV Double Circuit Overhead Power Line near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ESKOM
2015	Karusa Wind Farm near Sutherland, Northern Cape Province)	Plant Search and Rescue and Rehabilitation Management Plan	ACED Renewables Hidden Valley
2015	Karusa Wind Energy Facility near Sutherland, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	ACED Renewables Hidden Valley
2015	Soetwater Facility Substation, 132kV Overhead Power Line and Ancillaries, near Sutherland, Northern Cape Province	Ecological Assessment (Basic Assessment)	ACED Renewables Hidden Valley
2015	Soetwater Wind Farm near Sutherland, Northern Cape Province)	Invasive Plant Management Plan	ACED Renewables Hidden Valley
2015	Soetwater Wind Energy Facility near Sutherland, Northern Cape Province	Fauna and Flora Pre-Construction Walk-Through Assessment	ACED Renewables Hidden Valley
2015	Soetwater Wind Farm near Sutherland, Northern Cape Province	Plant Search and Rescue and Rehabilitation Management Plan	ACED Renewables Hidden Valley
2015	Expansion of the existing Scottburgh quarry near Amandawe, KwaZulu-Natal	Botanical Assessment (for EIA)	GreenMined Environmental
2015	Expansion of the existing AFRIMAT quarry near Hluhluwe, KwaZulu-Natal	Botanical Assessment (for EIA)	GreenMined Environmental
2014	Tshepong 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Nyala 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Eland 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Ecological Assessment (Basic Assessment)	BBEnergy
2014	Transalloys circulating fluidised bed power station near Emalahleni, Mpumalanga Province	Ecological Assessment (for EIA)	Trans-Alloys
2014	Umbani circulating fluidised bed power station near Kriel, Mpumalanga Province	Ecological Assessment (Scoping and EIA)	Eskom
2014	Gihon 75MW Solar Farm: Bela-Bela, Limpopo Province	Ecological Assessment (for EIA)	NETWORX Renewables
2014	Steelpoort Integration Project & Steelpoort to Wolwekraal 400kV Power Line	Fauna and Flora Pre-Construction Walk-Through Assessment	Eskom
2014	Audit of protected <i>Acacia erioloba</i> trees within the Assmang Wrenchville housing development footprint area	Botanical Audit	Eco-Care Consultancy
2014	Rehabilitation of the N1 National Road between Sydenham and Glen Lyon	Peer review of the ecological report	EKO Environmental
2014	Rehabilitation of the N6 National Road between Onze Rust and Bloemfontein	Peer review of the ecological report	EKO Environmental
2011	Illegally ploughed land on the Farm Wolwekop 2353, Bloemfontein	Vegetation Rehabilitation Plan	EnviroWorks
2011	Rocks Farm chicken broiler houses	Botanical Assessment (for EIA)	EnviroWorks
2011	Botshabelo 132 kV line	Ecological Assessment (for EIA)	CENTLEC
2011	De Aar Freight Transport Hub	Ecological Scoping and Feasibility Study	EnviroWorks
2011	The proposed establishment of the Tugela Ridge Eco Estate on the farm Kruisfontein, Bergville	Ecological Assessment (for EIA)	EnviroWorks
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Vegetation Rehabilitation Plan for illegally cleared areas	NEOTEL
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Invasive Plant Management Plan	NEOTEL
2010 - 2011	National long-haul optic fibre infrastructure network project, Bloemfontein to Beaufort West	Protected and Endangered Species Walk-Through Survey	NEOTEL
2011	Optic Fibre Infrastructure Network, Swartland Municipality	Botanical Assessment (for EIA) - Assisted Dr. Dave McDonald	Dark Fibre Africa
2011	Optic Fibre Infrastructure Network, City of Cape Town Municipality	Botanical Assessment (for EIA) - Assisted Dr. Dave McDonald	Dark Fibre Africa
2010	Construction of an icon at the southernmost tip of Africa, Agulhas National Park	Botanical Assessment (for EIA)	SANPARKS
2010	New boardwalk from Suiderstrand Gravel Road to Rasperpunt, Agulhas National Park	Botanical Assessment (for EIA)	SANPARKS

2010	Farm development for academic purposes (Maluti FET College) on the Farm Rosedale 107, Harrismith	Ecological Assessment (Screening and Feasibility Study)	Agri Development Solutions
2010	Basic Assessment: Barcelona 88/11kV substation and 88kV loop-in lines	Botanical Assessment (for EIA)	Eskom Distribution
2011	Illegally ploughed land on the Farm Wolwekop 2353, Bloemfontein	Vegetation Rehabilitation Plan	EnviroWorks

WETLAND DELINEATION AND HYDROLOGICAL ASSESSMENTS

Date Completed	Project Description	Type of Assessment/Study	Client
In progress	Steynsrus PV 1 & 2 Solar Energy Facilities near Steynsrus, Free State Province	Wetland Assessment	Cronimet Mining Power Solutions
2019	Lichtenburg 1 100MW Solar PV Facility, Lichtenburg, North-West Province	Surface Hydrological Assessment (Scoping and EIA Phase)	Atlantic Renewable Energy Partners
2019	Lichtenburg 2 100MW Solar PV Facility, Lichtenburg, North-West Province	Surface Hydrological Assessment (Scoping and EIA Phase)	Atlantic Renewable Energy Partners
2019	Lichtenburg 3 100MW Solar PV Facility, Lichtenburg, North-West Province	Surface Hydrological Assessment (Scoping and EIA Phase)	Atlantic Renewable Energy Partners
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Wetland Assessment (Basic Assessment)	Moeding Solar
2018	Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province	Wetland Assessment (Basic Assessment)	Zevobuzz
2017	Nyala 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Wetland Assessment	BBEnergy
2017	Eland 5MW PV facility within Harmony Gold's mining rights areas, Odendaalsrus	Wetland Assessment	BBEnergy
2017	Olifantshoek 10MVA 132/11kV Substation and 31km Power Line	Surface Hydrological Assessment (Basic Assessment)	Eskom
2017	Expansion of the Elandspruit Quarry near Ladysmith, KwaZulu-Natal Province	Wetland Assessment	Raumix
2017	S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province	Aquatic Assessment & Flood Plain Delineation	Savannah Environmental
2017	Noupoort CSP Facility near Noupoort, Northern Cape Province	Surface Hydrological Assessment (EIA phase)	Cresco
2016	Wolmaransstad Municipality 75MW PV Solar Energy Facility in the North West Province	Wetland Assessment (Basic Assessment)	BlueWave Capital
2016	BlueWave 75MW PV Plant near Welkom Free State Province	Wetland Delineation	BlueWave Capital
2016	Harmony Solar Energy Facilities: Amendment of Pipeline and Overhead Power Line Route	Wetland Assessment (Basic Assessment)	BBEnergy

AVIFAUNAL ASSESSMENTS

Date Completed	Project Description	Type of Assessment/Study	Client
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2019	Sirius Three Solar PV Facility near Upington, Northern Cape	Avifauna Assessment (Basic Assessment)	Aurora Power Solutions
2019	Sirius Four Solar PV Facility near Upington, Northern Cape	Avifauna Assessment (Basic Assessment)	Aurora Power Solutions
2019	Moeding Solar PV Facility near Vryburg, North-West Province	Avifauna Assessment (Basic Assessment)	Moeding Solar
2018	Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province	Avifauna Assessment (Basic Assessment)	Eskom
2017	Olifantshoek 10MVA 132/11kV Substation and 31km Power Line	Avifauna Assessment (Basic Assessment)	Eskom
2016	TEWA Solar 1 Facility, east of Upington, Northern Cape Province	Wetland Assessment (Basic Assessment)	Tewa Isitha Solar 1
2016	TEWA Solar 2 Facility, east of Upington, Northern Cape Province	Wetland Assessment	Tewa Isitha Solar 2

ENVIRONMENTAL IMPACT ASSESSMENT

- Barcelona 88/11kV substation and 88kV loop-in lines – BA (for Eskom).
- Thabong Bulk 132kV sub-transmission inter-connector line – EIA (for Eskom).
- Groenwater 45 000 unit chicken broiler farm – BA (for Areemeng Mmogo Cooperative).
- Optic Fibre Infrastructure Network, City of Cape Town Municipality – BA (for Dark Fibre Africa (Pty) Ltd).
- Optic Fibre Infrastructure Network, Swartland Municipality – BA (for Dark Fibre Africa).
- Construction and refurbishment of the existing 66kV network between Ruigtevallei Substation and Reddersburg Substation – EMP (for Eskom).
- Lower Kruisvallei Hydroelectric Power Scheme (Ash river) – EIA (for Kruisvallei Hydro (Pty) Ltd).
- Construction of egg hatchery and associated infrastructure – BA (For Supreme Poultry).
- Construction of the Klipplaatdrif flow gauging (Vaal river) – EMP (DWAF).

ENVIRONMENTAL COMPLIANCE AUDITING AND ECO

- National long haul optic fibre infrastructure network project, Bloemfontein to Laingsburg – ECO (for Envioworks (Pty) Ltd.).
- National long haul optic fibre infrastructure network project, Wolmaransstad to Klerksdorp – ECO (for Envioworks (Pty) Ltd.).
- Construction and refurbishment of the existing 66kV network between Ruigtevallei Substation and Reddersburg Substation – ECO (for Envioworks (Pty) Ltd.).
- Construction and refurbishment of the Vredefort/Nooitgedacht 11kV power line – ECO (for Envioworks (Pty) Ltd.).
- Mining of Dolerite (Stone Aggregate) by Raumix (Pty) Ltd. on a portion of Portion 0 of the farm Hillside

2830, Bloemfontein – ECO (for GreenMined Environmental (Pty) Ltd.).

- Construction of an Egg Production Facility by Bainsvlei Poultry (Pty) Ltd on Portions 9 & 10 of the farm, Mooivlakte, Bloemfontein – ECO (for Enviro-Niche Consulting (Pty) Ltd.).
- Environmental compliance audit and botanical account of Afrisam’s premises in Bloemfontein – Environmental Compliance Auditing (for Enviroworks (Pty) Ltd.).

OTHER PROJECTS:

- Keeping and breeding of lions (*Panthera leo*) on the farm Maxico 135, Ficksburg – Management and Business Plan (for Enviroworks (Pty) Ltd.)
- Keeping and breeding of lions (*Panthera leo*) on the farm Mooihoek 292, Theunissen – Management and Business Plan (for Enviroworks (Pty) Ltd.)
- Keeping and breeding of wild dogs (*Lycaon pictus*) on the farm Mooihoek 292, Theunissen – Management and Business Plan (for Enviroworks (Pty) Ltd.)
- Existing underground and aboveground fuel storage tanks, TWK AGRI: Pongola – Environmental Management Plan (for TWK Agricultural Ltd).
- Existing underground fuel storage tanks on Erf 171, TWK AGRI: Amsterdam – Environmental Management Plan (for TWK Agricultural Ltd).
- Proposed storage of 14 000 L of fuel (diesel) aboveground on Erf 32, TWK AGRI: Carolina – Environmental Management Plan (for TWK Agricultural Ltd).
- Proposed storage of 23 000 L of fuel (diesel) above ground on Portion 10 of the Farm Oude Bosch, Humansdorp – Environmental Management Plan (for TWK Agricultural Ltd).
- Proposed storage of 16 000 L of fuel (diesel) aboveground at Panbult Depot – Environmental Management Plan (for TWK Agricultural Ltd).
- Existing underground fuel storage tanks, TWK AGRI: Mechanisation and Engineering, Piet Retief – Environmental Management Plan (for TWK Agricultural Ltd).
- Existing underground fuel storage tanks on Portion 38 of the Farm Lothair, TWK AGRI: Lothair – Environmental Management Plan (for TWK Agricultural Ltd).