
DRAFT BASIC
ASSESSMENT REPORT
FOR PISTACHIO
PROCESSING PLANT OF
19.8HA ON PTN 18 (PTN
OF PTN 15) OF THE
FARM UITDRAAI NO. 33,
PRIESKA

PREPARED FOR

PRIESKA PISTACHIO COMPANY (PTY) LTD

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This report has been prepared exclusively for **Prieska Pistachio Company (Pty) Ltd** and for submission to the Competent Authority. It may not be used for any other purpose without written consent.

BASIC ASSESSMENT



agriculture, environmental affairs,
rural development and land reform

Department:
agriculture, environmental affairs,
rural development and land reform .
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Basic Assessment Report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

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Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of 07 April 2017. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of “not applicable” in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
 11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
 12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
 13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

Section A: Activity Information

Has a specialist been consulted to assist with the completion of this section?

YES

NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

Activity Description

a) Describe the project associated with the listed activities applied for

The proposed development involves the establishment of a pistachio processing facility on approximately 19.8 hectares on Portion 18 (Ptn of Ptn 15) of the Farm Uitdraai No. 33, Siyathemba Municipality.

The facility will receive pistachio nuts harvested from local and regional orchards, where they will be cleaned, dried, graded and packaged before distribution. The development is intended to support the expanding pistachio industry in the Northern Cape and surrounding areas by providing the infrastructure needed to process locally produced nuts and improve the efficiency of the regional supply chain.

Below are illustrations of what the facility could look like and one example of a facility already built in the USA:

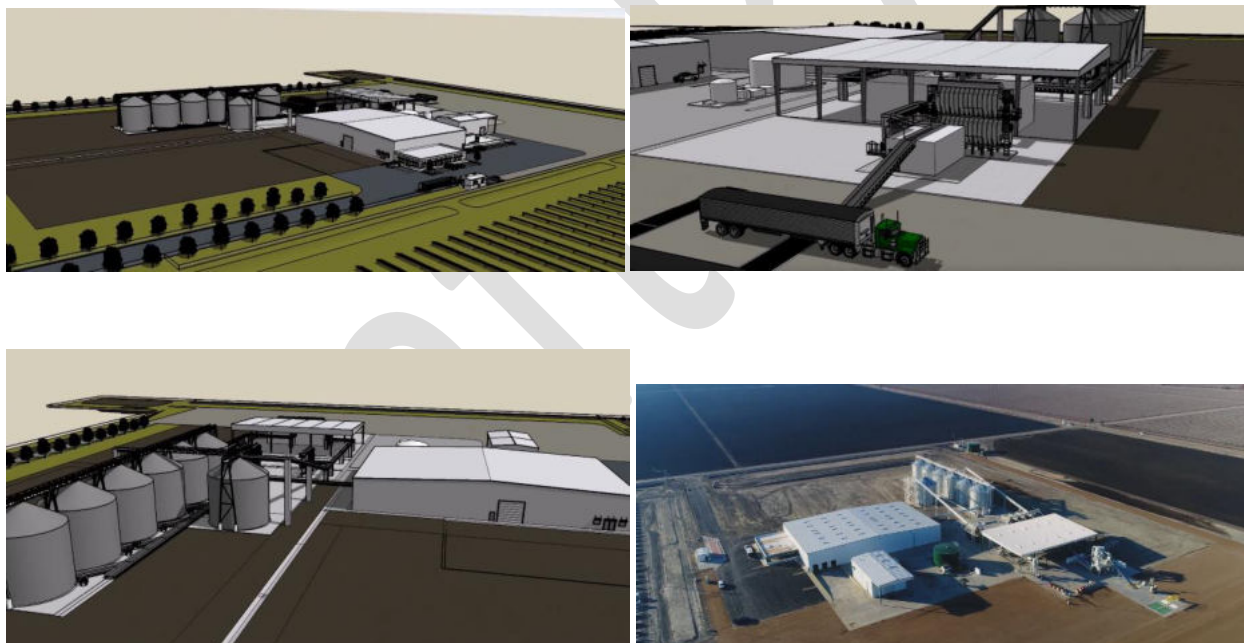


Figure 1: Illustrations of the facility and a visual representation of an overseas facility.

Pistachio Processing Plant Component

The proposed development entails the establishment and operation of a pistachio nut receiving, processing, packing and storage facility, including associated bulk handling areas, internal roads, parking, services infrastructure, stormwater management, and ancillary buildings. The facility will receive pistachios primarily

during the harvest season and process the product into market-ready formats (e.g., in-shell and/or kernels), with final products stored under controlled conditions prior to dispatch.

Typical processing objectives are to (i) remove the outer hull promptly after harvest to limit quality degradation and contamination risk, (ii) reduce nut moisture to levels suitable for safe storage, (iii) sort/grade to required specifications, and (iv) package for distribution.

Processing Infrastructure

The processing plant will include:

- Receiving and intake area: Pistachios delivered from orchards are weighed, sampled, and offloaded into receiving hoppers. Debris (leaves, twigs, stones) are removed using scalpels, aspirators, or screens before processing. Rapid postharvest handling is important because fresh pistachios have high moisture and a perishable outer hull.
- De-hulling machinery: The facility removes the soft outer hull mechanically (huller/dehuller). Some systems include washing/fluming to remove residual hull material and reduce adhering soil/organic matter prior to drying and sorting. (Washing is facility-specific; some plants emphasise “dry” approaches depending on technology and water strategy.)
- Washing lines
- Drying tunnels or mechanical dryers: After hulling, nuts are dried to reach moisture levels suitable for storage and further processing. Industry extension guidance describes a commonly used two-stage drying approach, with hulled nuts first dried to around 12–13% moisture in a heated-air column/belt dryer (about 3 hours at ~82°C air temperature), followed by further drying/conditioning to a stable storage moisture. For longer-term storage and to limit mould growth risk, literature commonly reports drying to approximately 5–7% moisture for storage/consumption, with dryers typically operating in the approximate 50–93°C range for several hours depending on system design and incoming moisture.
- Sorting and grading lines (mechanical and/or optical): Processed nuts are sorted and graded to remove defects (e.g., stained shells, insect damage, foreign matter) and to meet size/quality specifications. Sorting trains typically include screens, air separation, gravity tables, and optical/manual sorting (facility

dependent). Sorting is also a key control point in reducing contaminated fractions (e.g., mould-damaged nuts).

- Shelling equipment: Shelling (kernel production); Roasting/salting, and/or Pasteurisation/validated lethality treatment (particularly relevant because low-moisture foods (including nuts) can carry pathogens such as *Salmonella* if controls are inadequate).
- Packaging facility
- Cold storage and/or dry storage warehouses
- Quality control laboratory
- Administrative offices
- Staff facilities (ablutions, change rooms, canteen)
- Parking and loading bays for trucks

Processing Capacity and Throughput

Finished product is packed into bulk bins/bags or retail formats, palletised, labelled, and transferred to the finished goods warehouse for dispatch.

Indicative processing capacity:

- $\pm 1,500 - 3,000$ tonnes of in-shell pistachios per annum (scalable depending on industry growth).
- Daily peak intake during harvest season: $\pm 20-40$ tonnes per day (seasonal operation).

Primary outputs:

- Dried and graded in-shell pistachios
- Pistachio kernels
- Packaged retail and bulk export products

By-products:

- Pistachio hulls and shells (which may be reused as mulch, compost input, or biomass fuel where feasible)

Associated Infrastructure

The development will also include:

- Internal gravel or paved access roads
- Stormwater management systems (attenuation and drainage channels)
- Solid waste storage area
- Effluent management system for wash water (settlement tanks and recycling where feasible)
- Electrical infrastructure (Eskom connection and/or on-site solar PV system)
- Security fencing and controlled access gate
- Fire protection infrastructure

Employment and Operational Aspects

Construction Phase

- Temporary employment for civil works, building construction, and installation of processing equipment.
- Estimated 370 employment opportunities during the construction phase.

Operational Phase

- Processing plant operators
- Quality control personnel
- Administration and logistics staff
- Seasonal labour during harvest processing peak

Estimated employment:

- ±230 permanent positions
- Additional seasonal employment during peak harvest processing periods

Operational Characteristics

- The processing plant will operate seasonally during harvest (typically late summer to autumn), with potential off-season maintenance and packaging operations.
- Vehicle movements will include light delivery vehicles, staff vehicles, and medium to heavy trucks transporting harvested nuts and finished product.

The proposed development by Prieska Pistachio Company (Pty) Ltd comprises an integrated agricultural and agro-processing facility that will strengthen the pistachio value chain in the Northern Cape. By combining agricultural support services with value-added processing at a single location, the development will improve the efficiency of the production chain while supporting the continued growth of the regional pistachio industry. The project is also expected to contribute to agricultural diversification, create employment opportunities, and stimulate local economic development.

In terms of the site sensitivity, during the project planning phase, two potential sites for the proposed pistachio processing facility were investigated from a terrestrial biodiversity perspective. The initial preferred site was assessed by a terrestrial botanist and was found to contain vegetation of relatively high ecological sensitivity, including important natural habitat and protected plant species. In accordance with the mitigation hierarchy and the principle of avoiding impacts where reasonably possible, the Applicant investigated an alternative site for the proposed development. The alternative site was subsequently assessed and found to have a substantially lower overall ecological sensitivity, with a greater degree of existing disturbance and fewer biodiversity constraints. Consequently, the current preferred development footprint has been selected as it represents the environmentally preferable alternative and is expected to result in significantly reduced impacts on terrestrial biodiversity.

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The terrestrial vegetation assessment was undertaken by Sparaxis Environmental (May 2026) to determine the ecological characteristics and sensitivity of the proposed preferred development site. The approximately 19.2 ha site is situated within the Nama Karoo Biome, specifically the Northern Upper Karoo vegetation type, which is classified as Least Threatened.

Two vegetation units were identified, namely a near-natural Shrubland Vegetation Unit (approximately 18.65 ha) with a medium ecological sensitivity, and a severely disturbed Gwarrie Vegetation Unit (approximately 0.55 ha) with a low ecological sensitivity. Several provincially protected plant species were recorded within the shrubland unit, including *Aizoon plinthoides*, *Aloe claviflora* and *cf. Nerine* sp., although no Red Data plant species were identified. The site is located within an area classified as Other Natural in the Northern Cape Biodiversity Spatial Plan, and the overall conservation value and ecological sensitivity of the site were assessed as low to medium.

The report recommends that permits be obtained should protected plant species require removal, and that invasive alien plant species be controlled as part of the development.

Overall, the proposed development has been planned to minimise environmental impacts through the careful selection of the preferred site and development footprint. The specialist investigations undertaken to date indicate that the preferred site represents the environmentally preferable alternative, with the remaining potential impacts capable of being assessed and appropriately managed through the implementation of the recommended mitigation measures.

- b) Provide a detailed description of the listed activities associated with the project as applied for

Listed activity as described in GN 327, 325 and 324	Description of project activity
GNR 327 Activity 27: The clearance of an area of 1Ha or more, but less than 20Ha of indigenous vegetation.	19.8Ha of indigenous vegetation will be cleared for the establishment of the pistachio processing plant.
GNR 327 Activity 8: The development and related operation of agri-industrial facilities outside industrial complexes where the development footprint covers an areas of 2000m ² or more.	A processing plant will be established for the packaging of the pistachios.

Feasible and Reasonable Alternatives

“alternatives”, in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h), Regulation 2014. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the, competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site Alternatives

Alternative 1 (co-ordinates are the central point of the proposed site)		
Description	Lat (DDMMSS)	Long (DDMMSS)
19.8Ha of indigenous vegetation will be cleared for the establishment of the pistachio processing plant.	29° 41' 45.72"	22° 51' 08.26"
Alternative 2 (Preferred Alternative - co-ordinates are the central point of the proposed site)		
Description	Lat (DDMMSS)	Long (DDMMSS)
19.8Ha of indigenous vegetation will be cleared for the establishment of the pistachio processing plant.	29° 41' 41.41"	22° 52' 48.28"



Figure 2: Site locations: Alternative Site 1 and Alternative Site 2 (preferred site)

Two alternative sites were considered for the proposed pistachio processing facility. The assessment of alternative sites was informed by the findings of the terrestrial flora and fauna findings.

The initial preferred location (Alternative 1) was assessed through a detailed botanical investigation. The assessment found that the site comprises predominantly near-natural shrubland vegetation with limited existing disturbance and a relatively high ecological value. The vegetation is characterised by a well-developed shrub layer, scattered trees, naturally occurring grasses and herbs, and contains several protected plant species, including *Boscia albitrunca* (Shepherd's Tree), *Aizoon plinthoides*, *Aizoon sericeum*, *Nerine* sp., *Aloe claviflora*, and *Euphorbia inaequilatera*. Of particular importance is the extensive occurrence of *Boscia albitrunca*, which was identified by the specialist as a nationally protected keystone species in arid ecosystems. The site also falls within a Critical Biodiversity Area and is surrounded by intact natural vegetation, resulting in high ecological connectivity. Consequently, the specialist concluded that the site has a medium-high conservation value and medium ecological sensitivity, with high biodiversity importance that should be taken into consideration when evaluating development proposals.

Following the findings of the botanical assessment, the proposed development footprint was relocated to an alternative site approximately 2 km east of the original location. Although the alternative site also supports predominantly natural vegetation within the Northern Upper Karoo vegetation type, the ecological assessment identified a substantially lower conservation value. The site comprises two vegetation units, namely a Shrubland vegetation unit and a Gwarrie vegetation unit. The Gwarrie vegetation unit is highly disturbed, dominated by pioneer grasses and alien invasive species, with no protected plant species recorded. While the Shrubland vegetation unit contains a limited number of protected species, including *Aizoon plinthoides*, *Nerine* sp. and *Aloe claviflora*, these occur in relatively low numbers. Importantly, the specialist confirmed that *Boscia albitrunca*, which was a key ecological constraint on Alternative 1, is absent from the preferred site. The overall conservation value of the site was therefore assessed as Medium-Low, with a Medium-Low ecological sensitivity, and no Red Data plant species were recorded.

In terms of the terrestrial animal specialist assessment, although it was undertaken for the preferred site, the specialist also evaluated the previously considered alternative site. The assessment notes that, while the alternative site was relocated due to the botanical constraints associated with the presence of extensive populations of the protected keystone species *Boscia albitrunca*, both the original and preferred sites received the same High sensitivity rating under the DFFE Relative Animal Species Theme. This is due to the potential occurrence of the same Species of Conservation Concern, namely the Lanner Falcon (*Falco biarmicus*) and Ludwig's Bustard (*Neotis ludwigii*). Given that the two sites are located approximately 2 km apart within the same landscape, the

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specialist concluded that the terrestrial faunal species composition is expected to be comparable and that the relocation does not materially alter the conclusions of the faunal assessment. Accordingly, the selection of the preferred site was driven primarily by the significant reduction in botanical sensitivity rather than differences in faunal sensitivity.

Thus, the relocation of the proposed development therefore represents an environmentally preferable alternative (Alternative Site 2), as it avoids an area of higher ecological importance, reduces the potential impact on protected species, avoids extensive populations of the nationally protected *Boscia albitrunca*, and selects a site with a lower overall ecological sensitivity and conservation value. The preferred site is consequently considered the most suitable location for the proposed development from a botanical perspective.

In the case of linear activities: **N/A**

Alternative:

Latitude (S):

Longitude (E):

Alternative S1 (preferred)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

activity Alternative S2

(if any)

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

Alternative S3 (if any) – There is no third alternative for the pre-negotiated routes

- Starting point of the activity
- Middle/Additional point of the activity
- End point of the activity

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

b) Lay-out alternatives

No layout alternatives are applicable to this project

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)

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Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

c) Technology alternatives

No technology alternatives are applicable to this project

Alternative 1 (preferred alternative)
Alternative 2
Alternative 3

d) Other alternatives (e.g. scheduling, demand, input, scale and design alternatives)

No other alternatives are applicable to this project

Alternative 1 (preferred alternative)
Alternative 2
Alternative 3

e) No-go alternative

The No-Go Alternative assumes that the proposed pistachio processing facility will not be established and that the site will remain in its current undeveloped state. Under this scenario, the existing natural vegetation and associated ecological processes would be retained, and there would be no direct loss of indigenous vegetation, habitat modification, disturbance to fauna, or impacts on protected plant species associated with the proposed development. Existing ecological functioning and biodiversity values of the site would therefore remain unchanged.

From a socio-economic perspective, however, implementation of the No-Go Alternative would result in the loss of an opportunity to strengthen the developing pistachio industry within the Northern Cape. The proposed facility has

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been designed to provide both upstream support through the propagation of certified planting material and downstream value-added processing of harvested pistachio nuts. Without the facility, growers would remain dependent on processing facilities located further afield, increasing transport distances, operational costs and logistical inefficiencies. The opportunity to establish regional processing capacity, create employment during both the construction and operational phases, stimulate local economic development, and support agricultural diversification within the Pixley ka Seme District would therefore not be realised.

Although the No-Go Alternative would avoid the environmental impacts associated with the proposed development, the specialist investigations have demonstrated that the selected development site represents the environmentally preferred alternative following the relocation of the proposed footprint from a more sensitive site. The preferred site was specifically selected to minimise impacts on protected plant species and areas of higher ecological sensitivity while allowing the proposed development to proceed in a manner that can be effectively managed through the implementation of the Environmental Management Programme (EMPr) and specialist mitigation measures.

The No-Go Alternative is therefore not considered the preferred option, as it would prevent the realisation of the project's agricultural and socio-economic benefits, while the residual environmental impacts associated with the preferred development alternative are considered capable of being reduced to acceptable levels through the prescribed mitigation measures.

Paragraphs 3–13 below should be completed for each alternative. –Please note all alternatives have the same start and end point coordinates.

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2. Physical size of the activity

- a) *Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):*

Alternative:

Alternative A1¹

Alternative A2 (preferred activity alternative)

Alternative A3 (if any)

Size of the activity:

	19.8Ha
	19.8Ha
	m ²

or, for linear activities:

Alternative: N/A

Alternative A1 (preferred activity alternative)

Alternative A2 (if any)

Alternative A3 (if any)

Length of the activity:

	m
	m
	m

- b) *Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):*

Alternative:

Alternative A1

Alternative A2 (preferred activity alternative)

Alternative A3 (if any)

Size of the site/servitude:

	19.8 ha
	19.8 ha
	m ²

3. Site Access

Does ready access to the site exist?

If NO, what is the distance over which a new access road will be built

YES	NO
m	

Describe the type of access road planned:

Access to the proposed development areas can be directly obtained from the R357 onto the farm dirt road.



Figure 3: Sites are access via farm roads leading from the R357 tar road.

Access to the proposed development will be obtained from the existing R357 provincial tar road via a new access intersection. The Department of Roads and Public Works Northern Cape Province indicated that they have no objection to the proposed development, provided that a set of conditions are met (See Appendix J1).

The proposed access road will be an all-weather gravel road suitable for heavy vehicle traffic associated with the operation of the pistachio processing facility, including the transport of raw pistachios, packaging materials and finished products.

The access road will connect the R357 to the internal road network of the facility, providing safe access to the processing plant, storage areas, parking facilities and loading zones. The final design will incorporate appropriate drainage and stormwater management measures and will be aligned to minimise impacts on surrounding natural vegetation.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

4. Locality Map

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- indication of all the alternatives identified;
- closest town(s);
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and

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- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection).

¹ “Alternative A..” refer to activity, process, technology or other alternatives.

5. Layout/Route Plan

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

- the property boundaries and numbers of all the properties within 50 metres of the site;
- the current land use as well as the land use zoning of the site;
- the current land use as well as the land use zoning each of the properties adjoining the site or sites;
- the exact position of each listed activity applied for (including alternatives);
- servitude(s) indicating the purpose of the servitude;
- a legend; and
- a north arrow.

6. Sensitivity Map

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

- watercourses;
- the 1:100 year flood line (where available or where it is required by DWS);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or infested with alien species); and
- critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in Appendix A.

7. Site Photographs

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this report. It must be supplemented with additional photographs of relevant features on the site, if applicable.

8. Facility Illustration

A detailed illustration of the activity must be provided at a scale of at least 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. Activity Motivation

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?	YES	NO	Please explain
The proposed development area is currently zoned as Agricultural Zone and is currently being used for grazing farm activities and the proposed development will be a continuation of agricultural activities in the form of crop processing.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	YES	NO	Please explain

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The proposed development is considered to be generally consistent with the objectives of the Northern Cape Provincial Spatial Development Framework (PSDF) (2020).

The proposed pistachio processing facility is considered to be aligned with the objectives and spatial planning principles of the Northern Cape Provincial Spatial Development Framework (PSDF), which seeks to promote sustainable economic development, responsible use of natural resources, rural development, infrastructure investment and employment creation within the Province.

The proposed development is directly linked to the agricultural sector by providing infrastructure for the processing, packaging and storage of pistachio nuts produced within the Northern Cape and surrounding regions. The facility will strengthen the regional agricultural value chain through downstream value addition and support the continued growth and diversification of the agricultural economy within the Province.

The proposed development is located adjacent to the existing R357 provincial road and utilises existing transport infrastructure, thereby limiting the need for new regional infrastructure investment. Furthermore, the site selection process incorporated environmental considerations, with the proposed development footprint being relocated from a more environmentally sensitive site to an alternative location of lower ecological sensitivity following specialist investigations. This approach is consistent with the PSDF's principles of directing development to appropriate locations while promoting the responsible use and protection of natural resources.

The proposal is also expected to contribute to local employment opportunities during both the construction and operational phases, support investment within the Pixley ka Seme District Municipality, and contribute to the diversification of the regional agricultural economy through the establishment of a value-added agro-processing facility.

Accordingly, the proposed development is considered to be aligned with the strategic objectives and planning principles of the Northern Cape Provincial Spatial Development Framework, particularly those relating to:

- Sustainable rural development;
- Responsible use and management of natural resources;
- Agricultural development and economic diversification;
- Investment in productive economic infrastructure;
- Local economic development and employment creation; and
- Environmentally responsible spatial planning through the avoidance of environmentally sensitive areas.

(b) Urban edge / Edge of Built environment for the area	YES	NO	Please explain
The proposed development is located outside the existing urban edge (edge of the built environment) associated with the town of Prieska. The development does not constitute urban expansion, nor is it intended to establish a new residential, commercial or urban industrial node. The proposed facility is an agricultural support and agro-processing development that is directly associated with the regional agricultural economy and is appropriately located within a rural agricultural setting adjacent to the R357 provincial road. Its location enables efficient access to surrounding pistachio			

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orchards while avoiding the need to locate heavy vehicle traffic and agricultural processing activities within the urban area.

The development therefore does not undermine the purpose of the urban edge, which is to contain urban sprawl and direct urban growth to appropriate areas. Instead, the proposal represents a rural agricultural land use that is functionally dependent on its location within the agricultural landscape and is consistent with the role of land outside the urban edge.

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES	NO	Please explain
The approval of the proposed pistachio nut processing facility is not expected to compromise the integrity of the approved Siyathemba Local Municipality Integrated Development Plan (IDP) or its Spatial Development Framework (SDF). On the contrary, the proposed development is broadly aligned with the municipality's stated economic development priorities, particularly those relating to agricultural expansion, agro-processing, private-sector investment and employment creation. The Siyathemba Municipality IDP identifies economic growth and local development as one of its strategic pillars and specifically promotes investment in the agricultural sector to create employment and improve local livelihoods. The IDP also identifies the expansion of agriculture and agro-processing industries as a significant development opportunity within the municipal area. The proposed facility is directly relevant to these objectives, as it will support the agricultural value chain through the propagation of pistachio trees and the local processing, grading, packaging and storage of harvested pistachio nuts. The IDP expressly recognises that local beneficiation of crops can generate valuable local revenue, encourages agricultural diversification into higher-value products, and identifies the establishment of an agro-processing plant as a development opportunity for Prieska. It further records that agro-processing is the main manufacturing activity within Siyathemba and that opportunities exist to beneficiate locally produced agricultural products. The proposed development is also expected to generate temporary employment during construction and permanent and seasonal employment during operation, thereby responding positively to the high levels of unemployment identified in the municipal area. The project will also attract private investment and contribute to the diversification and strengthening of the local agricultural economy. The project description anticipates approximately 370 construction-phase employment opportunities, approximately 230 permanent operational positions and additional seasonal employment during peak processing periods. From a spatial planning perspective, the development is proposed on an existing agricultural property outside the urban settlement of Prieska. It is therefore not intended to constitute outward urban expansion or the establishment of a new urban residential or commercial node. Rather, it is a rural agricultural and agro-processing land use that is functionally associated with agricultural production in the surrounding region. Its location adjacent to the R357 provincial road provides access to the regional road network and supports the transportation of agricultural inputs, harvested produce and processed products. The development will, however, require the necessary municipal land-use approval. The 19.8 ha development area is proposed to be rezoned from Agriculture Zone I to Agriculture Zone II to lawfully accommodate the processing facility. The agricultural authority has indicated that the development is in			

line with agricultural practices in the region, will not affect existing livestock and irrigation farming practices and has raised no objection to the proposed rezoning.

The site-selection process also supports the spatial sustainability principles reflected in the IDP and SDF. The initially considered site was replaced following specialist investigation, and the development was relocated to a site with a lower botanical sensitivity and fewer protected plant constraints. This demonstrates that environmental considerations were incorporated into the spatial placement of the facility rather than development proceeding at the initially identified, more sensitive location.

Accordingly, the proposed development is considered to be consistent with the strategic intent of the municipal IDP and SDF, particularly in relation to:

- agricultural development and diversification;
- local beneficiation and agro-processing;
- private-sector investment;
- job creation and local economic development;
- the productive use of rural agricultural land; and
- environmentally informed and sustainable spatial planning.

The approval of the application would therefore not compromise the integrity of the existing municipal IDP and SDF, provided that the necessary municipal rezoning and land-use approvals are obtained and that the development complies with the applicable environmental authorisation, road-access, service-provision and specialist mitigation requirements.

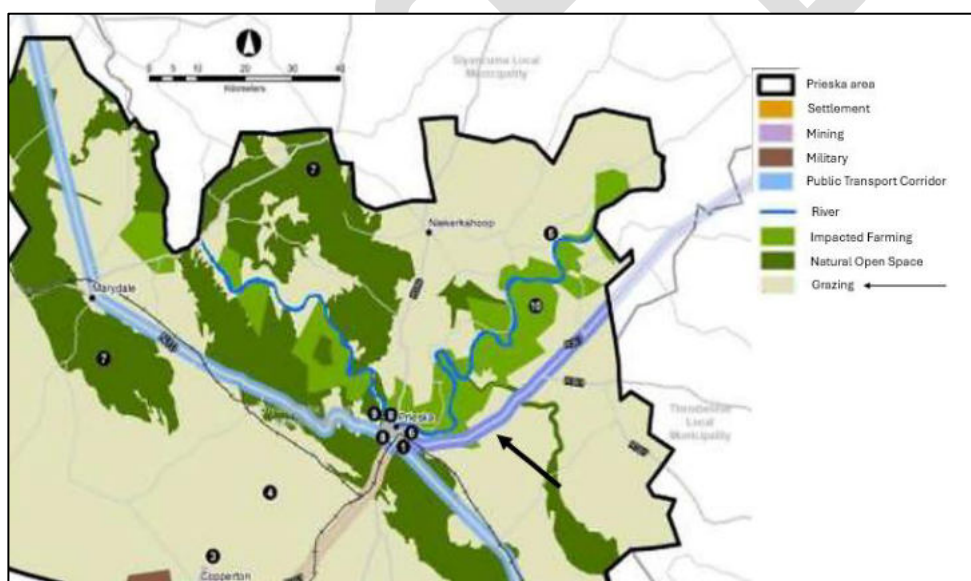


Figure 4: Siyathemba Spatial Framework (IDP 2025/26). The site is allocated by the black arrow which is considered grazing area.

(d) Approved Structure Plan of the Municipality	YES	NO	Please explain
No separate approved Structure Plan applicable to the site could be identified. Spatial planning and land use management within the Siyathemba Local Municipality are currently guided by the Siyathemba			

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Spatial Development Framework (SDF 2030) and the Siyathemba Land Use Scheme (2022), which have effectively replaced the function historically performed by Structure Plans.

The proposed agricultural development has therefore been assessed against the applicable SDF and municipal planning policies. As the proposed activity comprises agricultural cultivation within a predominantly agricultural landscape and does not constitute urban expansion or an incompatible land use, it is not expected to conflict with the spatial planning objectives of the municipality.

(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES	NO	Please explain
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The Siyathemba municipal area falls within the broader Pixley ka Seme District Environmental Management Framework (EMF). Municipal and district planning documents indicate that the EMF identifies different environmental sensitivity categories associated with the district's veld types and provides management guidelines intended to guide development and the sustainable use of environmentally sensitive areas.

However, it could not confirm from the available information whether the Pixley ka Seme District EMF was formally adopted or gazetted by the competent environmental authority in terms of the applicable EMF Regulations. It should therefore be referred to as a relevant environmental planning and decision-support instrument, unless formal confirmation of its adoption is obtained from the Department.

The proposed development would result in the transformation of natural vegetation and associated faunal habitat. Its approval would therefore have some effect on the environmental resources that the EMF seeks to manage. Nevertheless, the project is not considered likely to compromise the overall integrity of the environmental management priorities for the area, primarily because the site-selection process has already responded to the identified environmental sensitivities.

The initially considered development site was found to have a higher botanical conservation value and contained a significant occurrence of the nationally protected *Boscia albitrunca*. The development was consequently relocated to the preferred site, which was assessed as having a lower botanical sensitivity and conservation value. Although the preferred site still supports natural vegetation and potential habitat for faunal Species of Conservation Concern, the fauna specialist found that the faunal sensitivity of the two alternatives was broadly comparable. The relocation therefore reduced the botanical impacts without creating an additional faunal disadvantage.

The preferred site falls within the Northern Upper Karoo vegetation type, which is not classified as a threatened ecosystem. No Red Data plant species were recorded within the preferred development footprint, although certain protected plant species occur and will require appropriate management and, where applicable, permits prior to removal or relocation. The development must therefore be implemented strictly in accordance with the specialist recommendations and the Environmental Management Programme.

The potential effects on the environmental management priorities of the area are considered justifiable in terms of sustainability considerations because:

- a more environmentally sensitive site was avoided;
- the preferred site has a lower botanical conservation value;

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- the proposed facility is directly linked to agricultural production and agro-processing in the region;
- the project will support agricultural diversification, value addition and employment creation; and
- the remaining environmental impacts can be reduced through footprint control, pre-construction searches, protected-species permitting, rescue and relocation where required, erosion and stormwater management, rehabilitation and ongoing implementation of the EMP.

Accordingly, approval of the proposed development is not expected to compromise the overall integrity of the environmental management priorities identified for the area, provided that development is restricted to the assessed footprint and all specialist mitigation, permitting and environmental management requirements are implemented. The proposed development represents a balance between environmental protection and the socio-economic benefits associated with agricultural value addition and regional economic development.

(f) Any other Plans (e.g. Guide Plan)	YES	NO	Please explain
No approved Guide Plan applicable to the site could be identified. The area is currently guided by the Siyathemba SDF, Land Use Scheme and IDP, which have effectively replaced the role historically performed by Guide Plans			

3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES	NO	Please explain
The proposed land use is considered to fall within the development timeframe and strategic intent of the approved Siyathemba Local Municipality Spatial Development Framework (SDF) and Integrated Development Plan (IDP). Although the proposed pistachio processing facility is not specifically identified as an individual municipal project, it directly supports the long-term development priorities and programmes identified within these planning instruments. The Siyathemba IDP identifies agriculture and agro-processing as key economic drivers and specifically recognises the beneficiation of agricultural products, value addition, private-sector investment and employment creation as priorities for stimulating local economic development. The proposed facility will establish regional processing infrastructure for pistachio production, enabling the local cleaning, drying, grading, packaging and storage of pistachio nuts produced within the Northern Cape and surrounding areas. This directly supports the municipality's objective of expanding agricultural beneficiation and strengthening the local agricultural economy. The proposed development is located within an existing agricultural area outside the urban edge and will not result in inappropriate urban expansion or conflict with the municipality's spatial planning objectives. The site selection process also demonstrates alignment with the environmental sustainability principles of the SDF, as the preferred site was selected following specialist investigations that avoided a more environmentally sensitive alternative. Accordingly, the proposed land use is consistent with the municipality's envisaged spatial and economic development trajectory and is considered to be in line with the timeframe and strategic priorities of the approved SDF and credible IDP. The development represents the type of private-sector agricultural investment and agro-processing initiative that the municipality seeks to encourage in support of sustainable rural development, economic diversification and long-term employment creation.			

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4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	YES	NO	Please explain
The proposed development is considered to address a societal need at both the strategic and local levels. Agriculture is one of the primary economic sectors within the Northern Cape and the Siyathemba Local Municipality, and the continued expansion of value-added agricultural industries is recognised as an important driver of economic growth, employment creation and rural development. The proposed pistachio processing facility will provide the regional infrastructure required to clean, dry, grade, package and store pistachio nuts produced within the Northern Cape and surrounding areas. At present, limited local processing capacity exists for this emerging agricultural sector, resulting in increased transport costs, logistical inefficiencies and reduced opportunities for local beneficiation. By establishing a regional processing facility, the development will strengthen the pistachio value chain and support the long-term viability and expansion of the industry. At a strategic level, the development aligns with national, provincial and municipal objectives relating to agricultural beneficiation, agro-processing, private-sector investment, rural economic development and employment creation. The National Development Plan 2030, the Northern Cape Provincial Spatial Development Framework, and the Siyathemba Local Municipality IDP all promote investment in agriculture and value-added processing industries as mechanisms to stimulate economic growth and improve livelihoods. At the local level, the project is appropriately located within an agricultural area adjacent to the R357 provincial road, allowing efficient access to surrounding orchards and the regional transport network. The development will create significant employment opportunities during both the construction and operational phases, support local businesses through increased economic activity, and encourage further investment in the agricultural sector. The facility is expected to create approximately 370 temporary construction jobs, approximately 230 permanent operational positions, and additional seasonal employment during the annual harvest period. Although the proposed development will result in the clearance of indigenous vegetation, the environmental assessment process has ensured that environmental considerations have been integrated into the planning of the project. The preferred site was selected following specialist investigations which demonstrated that it has a lower botanical sensitivity than the originally proposed location, thereby avoiding areas of greater ecological importance and reducing potential impacts on protected plant species. The remaining environmental impacts are considered capable of being effectively managed through the implementation of the Environmental Management Programme (EMPr) and specialist mitigation measures. Considering the substantial socio-economic benefits, the promotion of agricultural beneficiation, the contribution to regional economic diversification, and the environmentally informed site selection process, the proposed activity is regarded as a societal priority that is appropriate within both the local and broader strategic context.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix J.)	YES	NO	Please explain

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The necessary services required for the proposed pistachio processing facility are available and can adequately accommodate the proposed development without the need for additional municipal infrastructure.

Water required for the operation of the facility will not be supplied by the municipality. The Applicant holds a valid Water Use Licence (WUL) for the existing farming operation, and water will be transferred from the existing lawful agricultural water supply on the farm to the processing facility. No additional municipal water supply will therefore be required.

Electricity will primarily be supplied through an on-site solar photovoltaic (PV) system, supplemented by the existing agricultural electricity network serving the farm, which is supplied by Eskom. The development will therefore utilise existing electrical infrastructure and is not expected to require significant upgrades to the existing electricity network.

Access to the site will be obtained from the R357 provincial road. The Northern Cape Department of Roads and Public Works has confirmed that it has no objection to the proposed development, subject to specified conditions, including the submission of a detailed access layout plan prior to construction.

Domestic sewage generated by the staff facilities will be managed by means of an appropriately designed on-site French drain system. The volume of sewage generated is expected to be relatively low and will not require connection to the municipal sewer network. Solid waste generated during operation will be managed in accordance with the approved waste management measures and disposed of at an authorised waste disposal facility.

As the proposed development will rely predominantly on existing private infrastructure and self-supplied services, it is not expected to place a material burden on municipal service delivery or require the creation of additional municipal service capacity.

6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix E.)	YES	NO	Please explain
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No, the proposed development is not specifically identified as a municipal infrastructure project within the Siyathemba Local Municipality's infrastructure planning. However, this does not create a conflict with the municipality's infrastructure planning or service delivery objectives.

The proposed pistachio processing facility will primarily rely on existing private infrastructure and services associated with the Applicant's farming enterprise. Water will be supplied from the Applicant's existing lawful agricultural water allocation under an approved Water Use Licence and transferred to the processing facility. Electricity will be generated primarily through an on-site solar photovoltaic (PV) system, supplemented by the existing agricultural electricity network serving the farm. Domestic sewage will be managed by means of an appropriately designed on-site French drain system, while access to the site will be obtained from the existing R357 provincial road, for which the Northern Cape Department of Roads and Public Works has confirmed that it has no objection to the proposed development, subject to specified conditions.

As the proposed development is largely self-sufficient in terms of essential services, it is not expected to require significant new municipal infrastructure or place a material demand on existing municipal service capacity. Consequently, approval of the development is not expected to affect the municipality's

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infrastructure planning, alter the priority or placement of municipal services, or result in significant opportunity costs for the municipality.

On the contrary, the proposed development represents private-sector investment that is expected to contribute positively to the local economy by supporting agricultural beneficiation, creating employment opportunities, and strengthening the regional agricultural value chain, without imposing a significant burden on municipal infrastructure or public finances.

Accordingly, although the proposed development is not specifically identified as a municipal infrastructure project, it is considered compatible with the municipality's infrastructure planning and is not expected to adversely affect existing or future municipal infrastructure programmes.

7. Is this project part of a national programme to address an issue of national concern or importance?	YES	NO	Please explain
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The proposed development does not form part of a specific national programme, Strategic Infrastructure Project (SIP), or government initiative established to address a particular issue of national concern or importance.

However, the proposed activity is aligned with a number of broader national development objectives relating to agricultural production, rural development, economic growth, and job creation.

8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	YES	NO	Please explain
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The location is considered highly suitable for the proposed pistachio processing facility, as it is situated within an established agricultural area where pistachio production is expanding and where the facility can efficiently serve surrounding orchards. The development is functionally dependent on its location within the agricultural landscape, as it is intended to receive, process, package and store pistachio nuts produced on the Applicant's farm and from other producers within the region.

The site is strategically located adjacent to the R357 provincial road, providing efficient access for the transport of raw agricultural products, packaging materials and finished products and is fairly close to the town Prieska. The Northern Cape Department of Roads and Public Works has confirmed that it has no objection to the proposed development, subject to specified conditions relating to road access.

The proposed development will also benefit from existing agricultural infrastructure already established on the property. As previously indicated, water will be supplied from the Applicant's existing lawful water allocation under an approved Water Use Licence, electricity will be supplied primarily through an on-site solar photovoltaic (PV) system supplemented by the existing agricultural Eskom supply, and other supporting infrastructure associated with the farming operation can be utilised. This reduces the need for new infrastructure and improves the overall sustainability and efficiency of the development.

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From an environmental perspective, the suitability of the location was confirmed through the assessment of alternatives. The originally proposed site was found to have a higher botanical conservation value, including extensive populations of the nationally protected *Boscia albitrunca*. The development footprint was subsequently relocated to the current preferred site, which has a lower overall ecological sensitivity and conservation value while remaining operationally suitable for the proposed facility. The selected site therefore reflects the application of the mitigation hierarchy by avoiding a more environmentally sensitive location where reasonably possible.

Furthermore, the proposed facility is located outside the urban edge and does not introduce an incompatible land use into the surrounding area. Agro-processing facilities of this nature are appropriately located within rural agricultural areas where they can directly support agricultural production and minimise unnecessary transportation between farms and processing facilities.

Accordingly, the location strongly favours the proposed land use, as it combines operational efficiency, existing infrastructure, excellent transport accessibility, compatibility with the surrounding agricultural landscape, and an environmentally informed site selection process that minimises ecological impacts.

9. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	YES	NO	Please explain
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Yes, the proposed development will result in several unavoidable environmental impacts, the most significant of which are the permanent loss of approximately 19.8 ha of indigenous vegetation, the loss and fragmentation of terrestrial habitat, disturbance to fauna during construction, the potential removal of protected plant species (subject to the necessary permits), and visual changes associated with the establishment of the processing facility. However, these impacts have been comprehensively assessed through specialist investigations and the Basic Assessment process.

Importantly, the Applicant has demonstrated the application of the mitigation hierarchy by first avoiding impacts where reasonably possible. During project planning, the originally proposed site was found to have a higher botanical conservation value, including extensive populations of the nationally protected *Boscia albitrunca*. The development footprint was subsequently relocated to the preferred site, which has a lower botanical sensitivity and fewer ecological constraints. As a result, the proposed development has already substantially reduced its potential biodiversity impacts before mitigation measures are applied. The remaining impacts can be further reduced through compliance with the specialist recommendations, implementation of the EMPr, protection of retained natural vegetation, rehabilitation of disturbed areas, erosion and stormwater management, and the control of invasive alien plant species.

Against these residual environmental impacts, the proposed development will provide substantial long-term socio-economic benefits. The facility will establish regional processing infrastructure for the expanding pistachio industry within the Northern Cape, allowing locally produced pistachios to be cleaned, dried, graded, packaged and stored closer to the point of production. This will strengthen the regional agricultural value chain, reduce transport requirements to distant processing facilities, promote agricultural beneficiation, encourage further investment in the sector, and improve the long-term competitiveness of pistachio production within the region.

The development is also expected to generate significant employment during both the construction and operational phases, stimulate local economic activity, and support the strategic objectives of the National Development Plan, the Northern Cape Provincial Spatial Development Framework, and the Siyathemba Local Municipality Integrated Development Plan, all of which promote agricultural diversification, agro-processing, rural development, and private-sector investment.

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Having considered the findings of the specialist studies, the environmentally informed site selection process, the implementation of appropriate mitigation measures, and the significant economic and social benefits associated with the proposed development, it is concluded that the benefits of the proposed land use are expected to outweigh the residual negative environmental impacts. The proposed development is therefore considered to represent a sustainable and appropriate form of development within the receiving environment.

10. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	YES	NO	Please explain
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No, the approval of the proposed pistachio processing facility is not expected to establish an undesirable precedent for similar developments within the Siyathemba Local Municipality.

Environmental authorisation decisions are based on the specific environmental characteristics, planning context, specialist findings and potential impacts associated with each individual application. The proposed development has been informed by a comprehensive Basic Assessment process, including specialist investigations, the consideration of feasible alternatives and the application of the mitigation hierarchy to avoid and minimise environmental impacts where reasonably possible.

The proposed facility is directly associated with the surrounding agricultural landscape and has been specifically designed to support the expanding pistachio industry within the Northern Cape. Its location adjacent to the R357, together with access to existing agricultural infrastructure, lawful water resources and electricity supply, makes the site particularly suitable for this type of agro-processing development. Furthermore, the preferred site was selected following specialist investigations that identified it as having a lower botanical sensitivity than the originally proposed location, thereby reducing potential impacts on biodiversity.

The approval of this application would therefore not create an automatic entitlement for similar developments elsewhere within the municipality. Any future proposals would remain subject to their own environmental authorisation processes and would need to demonstrate compliance with the applicable environmental legislation, municipal planning policies, specialist requirements and site-specific environmental constraints.

Accordingly, the approval of the proposed development would not establish an undesirable planning or environmental precedent but would instead represent a site-specific decision based on the unique characteristics, suitability and merits of the proposed development.

11. Will any person's rights be negatively affected by the proposed activity/ies?	YES	NO	Please explain
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Based on the findings of the Basic Assessment process, the proposed development is not expected to result in the unreasonable infringement of any person's rights, provided that the development is implemented in accordance with the conditions of the Environmental Authorisation and the Environmental Management Programme (EMPr).

The proposed development will be undertaken on privately owned land with the consent of the Applicant and landowner. The activity will not restrict lawful public access, interfere with existing public infrastructure, or result in the loss of legally protected rights relating to neighbouring properties. Access

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to surrounding farms and existing agricultural activities will be maintained throughout both the construction and operational phases.

Potential impacts on neighbouring landowners, including noise, dust, traffic and visual impacts, are expected to be localised and can be effectively managed through the implementation of the prescribed mitigation measures. The nearest neighbouring residence is located approximately 1 km from the proposed development, reducing the likelihood of significant nuisance impacts.

Interested and Affected Parties have been afforded an opportunity to participate in the environmental assessment process in accordance with the Environmental Impact Assessment Regulations, and all comments and concerns received will be considered and addressed as part of the decision-making process.

Accordingly, the proposed development is not expected to unreasonably prejudice the rights or legitimate interests of any person.

12. Will the proposed activity/ies compromise the “urban edge” as defined by the local municipality?	YES	NO	Please explain
The proposed activity will not compromise the urban edge as defined by the Siyathemba Local Municipality, as it comprises Agro-processing facilities within an existing agricultural landscape and does not constitute urban expansion.			
13. Any other need and desirability considerations related to the proposed activity?			Please explain
The proposed development represents an important investment in the long-term growth of the pistachio industry within the Northern Cape by establishing regional agro-processing infrastructure that is currently limited. The facility will not only support the Applicant's farming operations but will also provide processing capacity for other producers as the industry expands, thereby strengthening the regional agricultural value chain and encouraging further agricultural investment. An important consideration is that the project has been planned in accordance with the principles of sustainable development. During the planning phase, specialist investigations identified that the originally proposed site was environmentally more sensitive. Rather than proceeding with that option, the Applicant relocated the development to an alternative site with a lower overall botanical sensitivity, thereby demonstrating the application of the mitigation hierarchy by avoiding impacts where reasonably possible before considering mitigation measures. Furthermore, the proposed facility will utilise existing agricultural infrastructure, a lawful water allocation, existing electrical infrastructure supplemented by renewable energy, and an approved access from the R357, thereby reducing the need for significant new infrastructure and limiting demands on municipal services. The proposed development therefore represents an appropriate balance between environmental protection and socio-economic development and is considered to be a sustainable form of rural agro-industrial development that is compatible with the character and long-term planning objectives of the area.			
14. How does the project fit into the National Development Plan for 2030?			Please explain

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The proposed development aligns with the National Development Plan (NDP) 2030, particularly Chapter 6: An Integrated and Inclusive Rural Economy, which identifies agriculture as a key sector for stimulating rural economic growth, creating employment opportunities, and enhancing food security.

The proposed expansion of agricultural production on Portion 18 (Ptn of Ptn 15) of the Farm Uitdraai No. 33 will contribute to productive land use, local economic activity, and employment creation within the Siyathemba Local Municipality.

The project further supports the NDP's objective of promoting sustainable rural development through investment in agricultural production while balancing environmental considerations through the implementation of specialist recommendations and mitigation measures.

10. Applicable Legislation, Policies and/or Guidelines

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)	Provides the constitutional right to an environment that is not harmful to health or well-being and forms the basis for environmental management in South Africa.	Government of South Africa	1996
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA)	The application for Environmental Authorisation is being undertaken in terms of NEMA and the EIA Regulations.	Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR).	1998
Environmental Impact Assessment Regulations, 2014 (as amended)	Regulates the environmental authorisation process applicable to the proposed vegetation clearance.	Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR).	2014, as amended
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA)	Relevant to biodiversity conservation, threatened ecosystems, protected species and invasive species management	DAEARDLR	2004
Alien and Invasive Species Regulations	Applicable to the management and control of alien invasive species identified on site.	DAEARDLR	2014 (as amended)

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National Environmental Management: Protected Areas Act, 2003 (Act 57 of 2003)	Provides for the protection and management of protected areas and conservation priorities.	DAEARDLR	2003
National Water Act, 1998 (Act 36 of 1998)	Relevant to drainage features, wetland-related features and any potential water uses associated with the development.	Department of Water and Sanitation (DWS)	1998
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	Applicable to the conservation of soil resources, veld management and control of invasive species.	Department of Agriculture	1983
National Heritage Resources Act, 1999 (Act 25 of 1999)	Applicable due to the extent of the proposed development and heritage screening requirements.	South African Heritage Resources Agency (SAHRA)	1999
Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) (SPLUMA)	Provides the framework for spatial planning and land use management.	Department of Land Reform and Rural Development	2013
National Development Plan (NDP) 2030	Provides strategic national development objectives relating to agriculture, employment creation and rural development.	The Presidency	2012
Northern Cape Provincial Spatial Development Framework (PSDF)	Provides the provincial spatial planning framework applicable to development within the Northern Cape.	Northern Cape Office of the Premier	2020
Northern Cape Biodiversity Spatial Plan (NCBSP) / Northern Cape Biodiversity Sector Plan	Identifies Critical Biodiversity Areas and Ecological Support Areas applicable to the site.	Northern Cape Department of Environment and Nature Conservation / SANBI	2024
Northern Cape Critical Biodiversity Area (CBA) Map	Used to assess biodiversity sensitivities associated with the proposed development footprint.	SANBI / Northern Cape Government	2024
Siyathemba Local Municipality Integrated Development Plan (IDP)	Provides the municipality's strategic development priorities and objectives.	Siyathemba Local Municipality	2025/2026
Siyathemba Spatial Development Framework (SDF 2030)	Guides spatial planning, land use management and future development within the municipality.	Siyathemba Local Municipality	2030 Planning Framework

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Siyathemba Land Use Scheme	Regulates land use rights and zoning within the municipal area.	Siyathemba Municipality	Local	2022
Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity	Required for the terrestrial biodiversity assessment undertaken for the application	DDFE		2020
Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Plant Species	Required for the plant species assessment undertaken for the application.	DDFE		2020
Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Animal Species	Required for the animal species assessment undertaken for the application.	DDFE		2020
Environmental Screening Tool and Environmental Assessment Protocols	Used to determine environmental sensitivities and specialist assessment requirements	DDFE		2020

11. Waste, Effluent, Emission and Noise Management

a) Solid Waste Management

Will the activity produce solid construction waste during the construction/initiation phase?

If YES, what estimated quantity will be produced per month?

YES	NO
Currently the quantity of construction waste is unknown.	

How will the construction solid waste be disposed of (describe)?

Construction of the proposed pistachio processing facility will generate typical construction-related solid waste, including surplus concrete, bricks, steel off-cuts, timber, packaging materials, plastics, scrap metal, cable off-cuts, empty cement bags, pallets, insulation materials and general domestic waste generated by construction personnel.

All construction waste will be managed in accordance with the waste management hierarchy by minimising waste generation, reusing materials where practicable, and separating recyclable materials such as steel, cardboard, plastic and timber for collection by appropriately authorised recycling contractors. General construction waste that cannot be reused or recycled will be collected in designated waste skips or containers and removed regularly by a registered waste contractor for disposal at a licensed municipal landfill or other authorised waste disposal facility.

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No construction waste will be buried, burned or disposed of on site. Waste storage areas will be clearly demarcated and maintained in a clean and orderly condition to prevent windblown litter and pollution of the surrounding environment. The contractor will be responsible for implementing good housekeeping practices throughout the construction period and ensuring that all waste is managed in accordance with the Environmental Management Programme (EMPr), the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), and applicable municipal waste management requirements.

Where will the construction solid waste be disposed of (describe)?

Construction-related solid waste will not be disposed of on site. Waste generated during the construction phase will be collected and temporarily stored in designated waste receptacles before being transported by the contractor or an approved waste service provider to the nearest licensed municipal landfill site or authorised waste disposal facility serving the Prieska area.

Recyclable materials, where feasible, will be separated and taken to an appropriate recycling facility. All disposal will be undertaken in accordance with applicable waste management legislation and

Will the activity produce solid waste during its operational phase?

If YES, what estimated quantity will be produced per month?

YES	NO
Currently the quantity of operational waste is unknown.	

How will the solid waste be disposed of (describe)?

During the operational phase, solid waste will be managed in accordance with the principles of the waste management hierarchy by prioritising waste avoidance, reduction, reuse and recycling before disposal.

General domestic waste generated from offices, staff facilities and the canteen will be collected in designated waste receptacles and removed regularly by an appropriately authorised waste contractor for disposal at a licensed municipal landfill.

Processing-related waste streams will include pistachio hulls, shells, rejected nuts, packaging materials (such as cardboard, plastic wrapping and pallets), and maintenance waste. Where feasible, organic by-products such as pistachio hulls and shells will be beneficially reused, for example as compost, mulch, animal bedding or biomass fuel, subject to operational requirements and applicable legislation.

Recyclable materials, including cardboard, plastics, paper, scrap metal and timber pallets, will be separated at source and collected by appropriately authorised recycling contractors.

Small quantities of hazardous waste, such as waste oil, used filters, oily rags, spent absorbent material, fluorescent tubes, batteries and empty chemical containers generated during equipment maintenance, will be stored separately in appropriately labelled, secure containers within a designated hazardous waste storage area. These waste streams will be removed by a suitably authorised hazardous waste contractor and disposed of at a licensed hazardous waste disposal facility in accordance with the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008).

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No waste will be buried, burned or disposed of on site. Waste storage areas will be maintained in a clean and orderly condition to prevent litter, odour, vermin and pollution of the surrounding environment. All waste management activities will be undertaken in accordance with the Environmental Management Programme (EMPr) and applicable waste management legislation.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

Construction and operational waste that cannot be reused or recycled will be transported to the existing permitted municipal landfill site serving Prieska, operated by the Siyathemba Local Municipality.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

Not applicable to this site.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM:WA?

YES	NO
-----	----

If YES, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO
-----	----

If YES, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM:WA must also be submitted with this application.

b) Liquid Effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO
-----	----

If YES, what estimated quantity will be produced per month?

m³

Will the activity produce any effluent that will be treated and/or disposed of on site?

YES	NO
-----	----

If YES, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility? If

YES	NO
-----	----

YES, provide the particulars of the facility:

Facility name:

Contact person:

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Postal address:

Postal code:

Telephone:

E-mail:

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

This is not applicable to the proposed development.

c) Emissions into the Atmosphere

Will the activity release emissions into the atmosphere other than exhaust emissions and dust associated with construction phase activities?

YES	NO
YES	NO

If YES, is it controlled by any legislation of any sphere of government?

If YES, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

During the construction phase, emissions will consist mainly of dust (particulate matter) generated by vegetation clearing, soil preparation, vehicle movement on unpaved surfaces, and the installation of irrigation infrastructure. Minor exhaust emissions from construction vehicles and machinery, including carbon dioxide (CO₂), carbon monoxide (CO), nitrogen oxides (NO_x), sulphur dioxide (SO₂), and particulate matter, may also occur. These emissions will be temporary, localised, and of low concentration due to the small scale and short duration of the construction activities.

There are no close receptors to the site, with the closest neighbour is more than 3km away from the site.

During the operational phase, emissions are expected to be negligible and will be limited to occasional dust generation from farm vehicles travelling on existing access roads and exhaust emissions from agricultural machinery used during routine farming activities. No industrial processes, combustion facilities, or significant point-source emissions are proposed. Consequently, emission concentrations are expected to remain low, localised, and well within typical levels associated with agricultural activities in the area.

d) Waste Permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM:WA?

YES	NO
-----	----

If YES, please submit evidence that an application for a waste permit has been submitted to the competent authority

BASIC ASSESSMENT

e) Generation of Noise

Will the activity generate noise?

YES	NO
YES	NO

If YES, is it controlled by any legislation of any sphere of government?

Describe the noise in terms of type and level:

Noise will be limited to typical agricultural and construction-related noise.

During the construction phase, noise will be generated by typical construction activities, including vegetation clearance, earthworks, excavation, the construction of buildings and infrastructure, and the movement of construction vehicles and heavy machinery. Noise sources will include excavators, graders, concrete mixers, cranes, trucks and other construction equipment. These activities will be temporary, intermittent and restricted to normal daytime working hours.

During the operational phase, noise will be associated with the receiving and unloading of pistachios, conveyors, de-hulling equipment, washing lines, mechanical dryers, grading and sorting equipment, shelling machinery, packaging equipment, forklifts, refrigeration and ventilation systems, pumps, and the movement of light and heavy vehicles delivering raw product and transporting finished products. These noise sources are typical of agricultural processing facilities and will occur primarily during normal operating hours, with seasonal increases during the pistachio harvest period.

The proposed development is located within a rural agricultural area where agricultural machinery and farming operations already contribute to the existing acoustic environment. The nearest neighbouring residence is located more than 3 km from the proposed development, and the site is situated adjacent to the R357 provincial road, where existing traffic already contributes to background noise levels. Consequently, operational noise is expected to be localised and is unlikely to result in significant disturbance to surrounding receptors.

No blasting, pile driving or other exceptionally high-noise activities are proposed. Equipment will be maintained in good working order, unnecessary idling of vehicles and machinery will be avoided, and loading and unloading activities will be managed to minimise unnecessary noise. Subject to the implementation of these measures, the anticipated noise impacts are expected to be of low significance and consistent with the existing rural agricultural character of the area.

12. Water Use

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	Other	The activity will not use water
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BASIC ASSESSMENT

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

About 100–150
kL per day

Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?

YES

NO

If YES, please provide proof that the application has been submitted to the Department of Water Affairs.

The Applicant already has Water Use License.

The precise operational water requirement will be confirmed during the detailed engineering and equipment-design phase. Based on the proposed processing capacity and anticipated water requirements for de-hulling, washing, equipment cleaning and staff facilities, the facility is preliminarily estimated to require approximately 100–150 kL of water per operational day during the peak harvest-processing period. A conservative peak design allowance of up to approximately 190 kL/day should be provided until the final processing technology and water-recycling arrangements have been confirmed.

Water demand will be reduced through the selection of water-efficient processing equipment, the recirculation and reuse of wash water where technically and hygienically feasible, dry cleaning before wash-down, leak detection and metering of the principal water-using processes.

The Applicant must confirm that the volume and purpose of water use associated with the processing facility are accommodated by the existing Water Use Licence or obtain any necessary amendment or additional authorisation from the Department of Water and Sanitation before operation commences.

13. Energy Efficiency

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The proposed pistachio processing facility has been designed to promote energy efficiency through the incorporation of modern processing equipment, efficient building design and the use of renewable energy where feasible.

Energy-efficient processing equipment, including conveyors, de-hulling machinery, sorting and grading systems, pumps and mechanical dryers, will be selected to minimise electricity consumption while maintaining operational efficiency. Electric motors and pumps will be correctly sized for their intended duties and fitted with variable speed drives (where appropriate) to optimise energy use and reduce unnecessary power consumption.

The processing facility will maximise the use of natural daylight and natural ventilation where practicable, thereby reducing the reliance on artificial lighting and mechanical ventilation. Energy-efficient LED lighting will be installed throughout the facility, together with occupancy sensors and automatic controls in offices, ablutions and low-occupancy areas where appropriate.

The facility layout has been designed to optimise the movement of raw materials and finished products, reducing unnecessary vehicle movements and internal handling requirements. Processing activities have also been integrated

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into a single facility to minimise energy consumption associated with transporting products between different locations.

Routine maintenance of processing equipment, pumps, refrigeration systems and electrical installations will be undertaken to ensure that equipment operates at optimum efficiency throughout its operational life. Water-efficient equipment and the reuse or recirculation of process water, where technically and operationally feasible, will further reduce the energy associated with water abstraction and pumping.

Collectively, these measures will reduce the overall energy demand of the facility and improve operational efficiency while supporting the principles of sustainable development and resource conservation.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

The proposed development will make use of an on-site solar photovoltaic (PV) system as the primary source of electricity. The solar installation will be supplemented by the existing agricultural Eskom electricity supply serving the farm to ensure a reliable power supply during periods of high demand or reduced solar generation.

By incorporating renewable energy into the design of the facility, the development will reduce its reliance on grid electricity, lower greenhouse gas emissions associated with electricity consumption, and improve the long-term sustainability and resilience of the operation. The electrical infrastructure has been designed to accommodate the integration of both solar generation and the existing Eskom supply, allowing the facility to operate efficiently while reducing its environmental footprint.

Section B: Site/Area/Property Description

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):

A1: Alternative 1

Central point: 29°41'46.29" S 22°51'08.37" E

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?

YES

NO

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If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property Description/

Physical address

Province	Northern Cape
District Municipality	Pixley Ka Seme District Municipality
Local Municipality	Siyathemba Municipality
Ward Number(s)	3
Farm name and number	Uitdraai No 33
Portion number	Portion 18 (Ptn of Ptn 15)
SG Code	C06000000000003300018

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning

as per local municipality

Agriculture Zone 1

IDP/records:

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

YES	NO
-----	----

It is likely that rezoning from Agriculture Zone I to Agriculture Zone II is the appropriate planning route, unless the municipality specifically confirms that the proposed processing facility can be approved as a consent use under Agriculture Zone I.

Section B Copy No. (e.g. A):

A2: Alternative 2 (Preferred site)

Central point: 29°41'41.35" S 22°52'47.45" E

1. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?

YES	NO
-----	----

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

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**Property description/
physical address:**

Province	Northern Cape
District Municipality	Pixley Ka Seme District Municipality
Local Municipality	Siyathemba Municipality
Ward Number(s)	3
Farm name and number	Uitdraai No 33
Portion number	Portion 18 (Ptn of Ptn 15)
SG Code	C06000000000003300018

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

**Current land-use zoning
as per local municipality**

Agriculture Zone 1

IDP/records:

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?

YES	NO
------------	-----------

It is likely that rezoning from Agriculture Zone I to Agriculture Zone II is the appropriate planning route, unless the municipality specifically confirms that the proposed processing facility can be approved as a consent use under Agriculture Zone I.

1. Gradient of the Site

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S2 (preferred):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
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Alternative S3 (if any): N/A

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
------	-------------	-------------	-------------	--------------	-------------	------------------

2. Location in Landscape

Indicate the landform(s) that best describes the site:

2.1 Ridgeline

2.2 Plateau

2.3 Side slope of hill/mountain

2.10 At sea

☐
☐
☐
☐

2.4 Closed valley

2.5 Open valley

2.6 Plain

☐
☐
☒

2.7 Undulating plain / low hills

2.8 Dune

2.9 Seafront

☐
☐
☐

3. Groundwater, Soil and Geological Stability of the Site

Is the site(s) located on any of the following?

Shallow water table (less than 1.5m deep)

Dolomite, sinkhole or doline areas

Seasonally wet soils (often close to water bodies)

Unstable rocky slopes or steep slopes with loose soil

Dispersive soils (soils that dissolve in water)

Soils with high clay content (clay fraction more than 40%)

Any other unstable soil or geological feature

An area sensitive to erosion

Alternative S1:

Alternative S2:

~~Alternative S3 (if any):~~

YES	NO
YES	NO
YES	NO
YES	NO
YES	NO

YES	NO
YES	NO
YES	NO
YES	NO
YES	NO

YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO
YES	NO

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If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. Groundcover

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Alternative S1:

Natural veld - good condition ^E	Natural veld with scattered aliens^E	Natural veld with heavy alien infestation^E	Veld dominated by alien species^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

Alternative S2:

Natural veld - good condition^E	Natural veld with scattered aliens ^E	Natural veld with heavy alien infestation^E	Veld dominated by alien species^E	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "E" is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

Dr. van Aardt from Sparaxis Environmental Pty (Ltd) was appointed as a SACNASP registered scientist who conducted the botanical and ecological survey.

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5. Surface Water

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River (both sites)	YES	NO	UNSURE
Non-Perennial River	YES	NO	UNSURE
Permanent Wetland	YES	NO	UNSURE
Seasonal Wetland	YES	NO	UNSURE
Artificial Wetland	YES	NO	UNSURE
Estuarine / Lagoonal wetland	YES	NO	UNSURE

If any of the boxes marked YES or UNSURE is ticked, please provide a description of the relevant watercourse.

The proposed development area is situated within the broader Orange River catchment and is influenced by the Orange River and an unnamed tributary/drainage system associated with the river.

Alternative Site 1 is located south of the R357 and approximately 250–180 m south of an unnamed drainage line. The drainage line forms part of the wider Orange River drainage network and ultimately discharges into the Orange River. The site itself is located outside the mapped watercourse and no direct encroachment into the drainage feature is proposed.

Alternative Site 2 (preferred site) is located adjacent to an unnamed drainage line that may traverses the north-western boundaries of the proposed development area before flowing northwards into the Orange River. The Orange River is more than 2.5km north of the preferred site. Although the proposed development footprint does not extend into the Orange River channel, the drainage line constitutes a watercourse in terms of the National Water Act and forms an important component of the local drainage system.

The drainage line is expected to convey episodic stormwater runoff typical of the arid Nama Karoo environment and provides an ecological linkage between the surrounding landscape and the Orange River. While flow is likely to be seasonal or event-driven, the feature performs important hydrological and ecological functions, including the conveyance of stormwater, sediment transport and the support of riparian vegetation.

No direct infilling, diversion, canalisation or permanent modification of the identified drainage line or the Orange River is proposed. The processing facility has been positioned outside these watercourses, and appropriate stormwater management measures will be implemented to ensure that clean and dirty water are managed separately, erosion is prevented, and no contaminated runoff is discharged into the drainage line or the Orange River.

Subject to the implementation of the recommended mitigation measures contained in the Environmental Management Programme (EMPr), the proposed development is not expected to result in significant impacts on the hydrological functioning or ecological integrity of the identified watercourses.

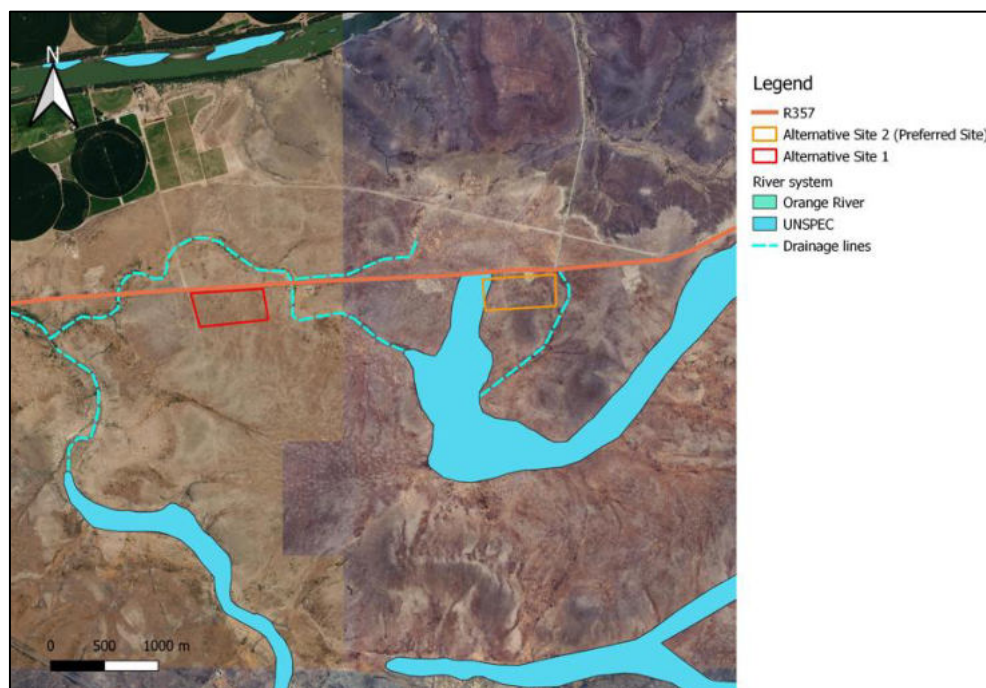


Figure 5: Both Alternative sites in relation to water features.

6. Land Use Character of Surrounding Area

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

Natural area	Dam or reservoir	Polo fields
Low density residential	Hospital/medical centre	Filling station ^N
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential	Church	Agriculture
Retail commercial & warehousing	Old age home	River, stream or wetland
Light industrial	Sewage treatment plant ^A	Nature conservation area
Medium industrial ^{AN}	Train station or shunting yard ^N	Mountain, koppie or ridge
Heavy industrial ^{AN}	Railway line ^N	Museum
Power station	Major road (4 lanes or more) ^N	Historical building
Office/consulting room	Airport ^N	Protected Area
Military or police base/station/compound	Harbour	Graveyard
Spoil heap or slimes dam ^A	Sport facilities	Archaeological site
Quarry, sand or borrow pit	Golf course	Other land uses (describe)

If any of the boxes marked with an "N" are ticked, how this impact will / be impacted upon by the proposed activity? Specify and explain:

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N/A

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity?
Specify and explain:

N/A

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity?
Specify and explain:

N/A

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan) (Alternative 2 – Preferred Site)	YES	NO
Core area of a protected area?	YES	NO
Buffer area of a protected area?	YES	NO
Planned expansion area of an existing protected area?	YES	NO
Existing offset area associated with a previous Environmental Authorisation?	YES	NO
Buffer area of the SKA?	YES	NO

If the answer to any of these questions was YES, a map indicating the affected area must be included in Appendix A.

7. Cultural/Historical Features

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If YES, explain:

YES

NO

Uncertain

Although there are no cultural or historical features near the proposed site, Dr. Lloyd was the appointed specialist that conducted the heritage and palaeontology study.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

The Heritage Impact Assessment found no culturally or historically significant heritage resources within the proposed development footprint. No graves, burial grounds, historical structures or infrastructure older than 60 years were identified. Although a small number of isolated Stone Age artefacts were

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recorded, these occur as sparse, disturbed surface finds with low to negligible archaeological significance and are not associated with intact archaeological deposits.

The site is therefore considered to have a Generally Protected C (low) heritage rating, and no further archaeological mitigation or monitoring is required. A standard Chance Find Procedure should nevertheless be implemented during construction should previously unknown archaeological or palaeontological material be uncovered.

Will any building or structure older than 60 years be affected in any way?

YES	NO
YES	NO

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If YES, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. Socio-Economic Character

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated. Level of unemployment:

The IDP reports that the unemployment rate in Siyathemba Municipality was estimated at 34.7%, based on the municipality's Local Economic Development (LED) Strategy (Quantec Research, 2012). Although the data is historical, the IDP continues to use it as the baseline for describing the municipality's socio-economic conditions. The document notes that the unemployment rate is slightly higher than the Pixley ka Seme District average and has steadily increased over the past decade.

The IDP further indicates that:

- 1) The number of jobs declined in Siyathemba between 2000 and 2009, despite employment growth nationally, provincially and within the district.
- 2) The labour force participation rate increased from 53.2% to 57.4%, indicating that a greater proportion of the working-age population is seeking employment.
- 3) Only 10.3% of the workforce is classified as highly skilled, while more than 52% of workers are regarded as semi-skilled or unskilled, highlighting the municipality's dependence on labour-intensive sectors and the need for employment creation.

The municipality recognises unemployment as a key development challenge and has prioritised job creation through its Local Economic Development Strategy, including Expanded Public Works Programme (EPWP) initiatives, support for SMMEs, and investment in agriculture, renewable energy and agro-processing industries.

Given these socio-economic conditions, the proposed pistachio processing facility is expected to make a positive contribution by creating both construction and permanent operational employment, while

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supporting agricultural beneficiation and strengthening the local economy within the Siyathemba Municipality.

Economic profile of local municipality:

The economy of Siyathemba Local Municipality is predominantly rural in nature and is strongly dependent on the agricultural sector. Agriculture remains one of the municipality's primary economic drivers and is supported by extensive irrigation farming along the Orange River. Key agricultural activities within the municipality include the cultivation of maize, wheat, lucerne, grapes, pecan nuts and other irrigated crops, together with livestock farming. Other important economic sectors include mining, manufacturing, wholesale and retail trade, transport, finance and community services. In recent years, renewable energy developments and mining-related activities have also contributed to economic growth within the broader municipal area.

The proposed project entails the clearing of approximately 19.8 hectares of vegetation for the development of a pistachio nut processing plant. The development is therefore directly aligned with the dominant agricultural character of the municipality and supports a sector identified by both the Siyathemba Local Municipality and the Pixley ka Seme District Municipality as a key economic driver. The project will contribute to agricultural production, strengthen the local agricultural economy and create employment opportunities during both the establishment and operational phases.

The proposed development is expected to generate approximately 120 skilled and 250 unskilled employment opportunities during the construction phase, as well as 80 skilled and 150 unskilled employment opportunities during the operational phase. The project is anticipated to have a capital investment value of approximately R230 million and generate an annual income of approximately R12 00 million. These benefits will greatly contribute positively to the local economy and support employment creation within an area where job opportunities remain limited.

Level of education:

According to the Siyathemba Municipality IDP (2025/2026) the area experiences relatively low skills levels within its labour force, with only approximately 10.3% of workers classified as highly skilled and more than 52% regarded as semi-skilled or unskilled. The municipality has identified skills development as an important priority and has highlighted the need for educational and training initiatives, including the establishment of an agricultural training institution, to support local economic development and employment creation.

b) Socio-economic value of the activity

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What is the expected capital value of the activity on completion?	About R230 000 000	
What is the expected yearly income that will be generated by or as a result of the activity?	R1 200 000 000 per annum	
Will the activity contribute to service infrastructure?	YES	NO
Is the activity a public amenity?	YES	NO
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	370	
What is the expected value of the employment opportunities during the development and construction phase?	R25 000 000	
What percentage of this will accrue to previously disadvantaged individuals?	50%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	230	
What is the expected current value of the employment opportunities during the first 10 years?	R250 000 000	
What percentage of this will accrue to previously disadvantaged individuals?	50%	

9. Biodiversity

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult <http://bgis.sanbi.org> or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix A4 to this report.

- a) *Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)*

Systematic Biodiversity Planning Category	If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan
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Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	No Natural Area Remaining (NNR)	The preferred site is mapped as an Other Natural Area (ONA). These areas consist of natural or near-natural vegetation that is not required to meet biodiversity targets as CBAs or ESAs but nevertheless contributes to the natural landscape and ecological functioning. The specialist reports note that the site falls within a Least Threatened Northern Upper Karoo vegetation type, with overall low to medium ecological sensitivity, making it the environmentally preferable alternative to the original site.
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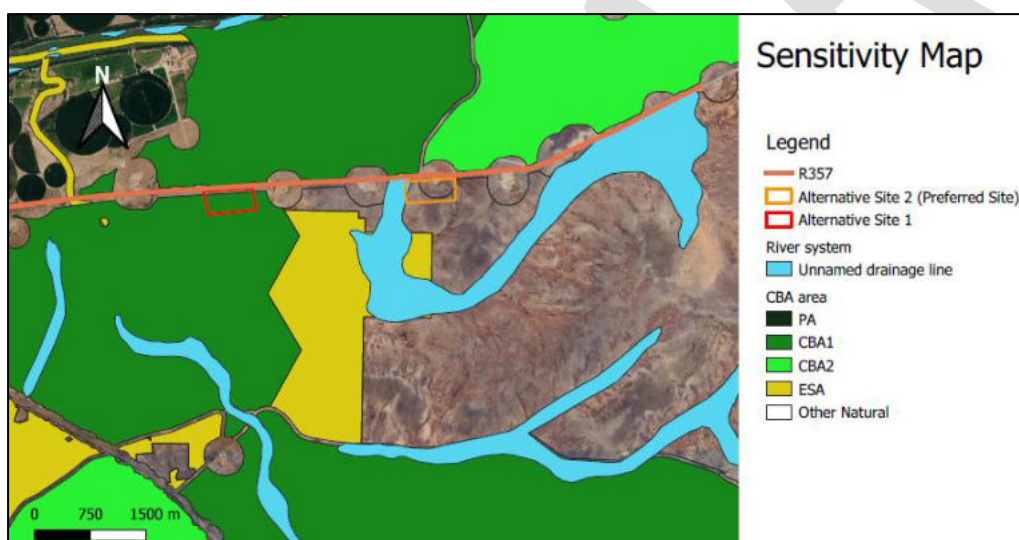


Figure 6: Site Sensitivity Map

b) *Indicate and describe the habitat condition on site*

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	0%	No areas were identified as pristine natural habitat. The site has experienced historical grazing and minor disturbance.
Near Natural (includes areas with low to moderate levels of alien invasive plants)	97%	The majority of the site (approximately 18.65 ha) comprises a near-natural Shrubland Vegetation Unit within the Northern Upper Karoo vegetation type. The vegetation retains its natural structure and ecological functioning, with a well-developed shrub layer and indigenous grasses and herbs. Several provincially protected plant species occur within this unit. Alien invasive plants are limited and the area remains suitable habitat for indigenous fauna.

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		Current land use is extensive livestock grazing.
Degraded (includes areas heavily invaded by alien plants)	3%	Approximately 0.55 ha comprises a severely disturbed Gwarrie Vegetation Unit with low ecological sensitivity. The area has been previously disturbed and exhibits reduced indigenous vegetation cover. Although degraded, it is not heavily invaded by alien plants and can be rehabilitated if appropriately managed.
Transformed (includes cultivation, dams, urban, plantations, roads, etc.)	0%	No cultivated lands, dams, urban development, plantations or other transformed land uses occur within the proposed development footprint. The site consists of natural veld used for grazing.

c) Complete the table to indicate:

- (i) the type of vegetation, including its ecosystem status, present on the site; and
- (ii) whether an aquatic ecosystem is present on site.

Terrestrial Ecosystems		Aquatic Ecosystems							
Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Critical	Wetland (including rivers, depressions, channelled and unchannelled wetlands, flats, seeps pans, and artificial wetlands)			Estuary		Coastline		
	Endangered								
	Vulnerable								
	Least Threatened								
		YES	NO	UNSURE	YES	NO	YES	NO	

Provide reasons:

The proposed development site falls within the Northern Upper Karoo (NKu3) vegetation type of the Nama Karoo Biome, which is classified as Least Threatened in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). Although the site contains near-natural shrubland vegetation and several provincially protected plant species, the vegetation type itself is not listed as Threatened under the National List of Threatened Ecosystems.

No wetlands, rivers, drainage lines, pans, seeps, depressions or artificial wetlands were identified within the proposed development footprint by the flora or fauna specialists. The site comprises terrestrial shrubland vegetation on gently undulating terrain adjacent to the R357 and does not contain any aquatic ecosystems.

The site is situated approximately 13–14 km east of Prieska in the inland Northern Cape and is not associated with an estuary or coastline. Consequently, estuarine and coastal ecosystems are absent from the site.

- d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

The proposed development site is situated within the Nama Karoo Biome, specifically within the Northern Upper Karoo (NKu3) vegetation type, which is classified as Least Threatened in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). The vegetation on the preferred site is predominantly characterised by a near-natural Shrubland Vegetation Unit (approximately 18.65 ha) with a medium ecological sensitivity, while a small portion (approximately 0.55 ha) comprises a Gwarrie Vegetation Unit with low ecological sensitivity that has been previously disturbed.

The shrubland vegetation retains a well-developed indigenous shrub layer with scattered grasses, forbs and succulents and provides suitable habitat for a range of indigenous fauna. Several provincially protected plant species were recorded within the development footprint, including *Aizoon plinthoides*, *Aloe claviflora* and *cf. Nerine sp.* No Red Data plant species were identified during the botanical survey. The specialist recommended that the necessary permits be obtained should any protected plant species require removal and that invasive alien plant species be controlled during the development.

The fauna assessment identified the site as supporting typical Nama Karoo fauna and providing habitat for several Species of Conservation Concern (SCC), particularly birds. The DFFE Screening Tool identified the potential occurrence of the Lanner Falcon (*Falco biarmicus*) and Ludwig's Bustard (*Neotis ludwigii*), while suitable habitat may also occur for several mammal and reptile Species of Conservation Concern. However, the study concluded that the preferred site does not contain unique faunal habitat or critical breeding areas, and the predicted impacts on fauna can be effectively managed through the implementation of the recommended mitigation measures.

No aquatic ecosystems were identified within the proposed development footprint. The specialist investigations confirmed the absence of wetlands, rivers, drainage lines, pans or other aquatic habitats on the site. Consequently, the development is not expected to directly impact aquatic ecosystems.

Section C: Public Participation

1. Advertisement and Notice

Publication name	Noordwes Karoo Nuusblad	
Date published	11 September 2026	
Site notice position	Latitude	Longitude
	29°41'35.07"S	22° 52'41.79"E
Date placed	11 September 2026	

Include proof of the placement of the relevant advertisements and notices in Appendix E1.

2. Determination of Appropriate Measures

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of

GN 733. Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733:

Potential Interested and Affected Parties (I&APs) were identified through a review of the property ownership records, surrounding land uses, municipal information, specialist inputs and regulatory requirements.

The hard copy application was couriered to the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform on 18 August 2026 and a digital copy of the application was submitted on 17 August 2026.

A notice board was erected at the site and a notice will be placed in The Noordwes Karoo Nuusblad newspaper on 11 September 2026 to notify potential I&AP's to register and/or comment on the proposed project on or before 12 October 2026. If any person expresses their desire to be registered as an Interested and/or Affected Party (I&AP), their name and contact details will be recorded in the I&AP register and they will be allowed to comment until the end of this 30day public participation process.

Written notices will be sent via email to the registered I&AP's:

- A written notice with a background information document will be sent via email to the municipal councillor of Ward 3 (which is the ward in which the site is situated), the Siyathemba Local Municipality, the Pixley Ka Seme District Municipality, and the organs of the state that have jurisdiction in respect of any activity on the site, and all directly abutting neighbours.
- All I&AP's will be provided the mandatory 30 Day comment period on the Draft BAR.
- The DBAR will be made available via Digital Soils Africa Website for download.
- All comments received will be submitted in the Public Participation Report and if required, amendments to the BAR will be made.
- Recording and consideration of all comments received during the public participation process;
- Ongoing notification of registered I&APs regarding the availability of reports and opportunities to comment.
- These measures were undertaken to ensure compliance with the public participation requirements contained in Regulations 41(2)(e) and 41(6) of the Environmental Impact Assessment Regulations, 2014 (as amended).
- The Draft BAR was placed on the Digital Soils Africa website for public access. It will remain on the website for the duration of the commenting period.
- No public meeting will be held, unless requested.

Once the public participation is completed, a public participation report will be completed and submitted with the Final BAR to the DEDEAT.

Include proof that the key stakeholder received written notification of the proposed activities as Appendix E2. This proof may include any of the following:

- e-mail delivery reports;
- registered mail receipts;
- courier waybills;
- signed acknowledgements of receipt; and/or
- or any other proof as agreed upon by the competent authority.

3. Issues raised by Interested and Affected Parties

Summary of main issues raised by I&APs	Summary of response from EAP
This will be completed upon conclusion of the PPP for the project.	

4. Comments and Response Report

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E3.

5. Authority Participation

Authorities and organs of state identified as key stakeholders:

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Mr. B. Fisher	The Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform	Bfisher@ncpg.gov.za
Mr. D. Khakhane		dkakhane@ncpg.gov.za
Ms. Madisa		Madisa.agriculture@gmail.com
Ms A Hlengani	Department of Water and Sanitation	hlengania@dws.gov.za
Mr. D. Moleko	Northern Cape Department of Agriculture	dmoleko@ncpg.gov.za
Ms. N. Higgitt	South African Heritage Resources Agency	nhiggitt@sahra.org.za
Ms. R.A. Timothy	Northern Cape Heritage Resources Authority (NCHRA)	rtimothy@nbkb.org.za
Mr. K. Nogwili	Northern Cape Department of Roads and Public Works	ncorns@ncpg.gov.za
Ms. C Robertson		CRobertson@ncpg.gov.za
Ms. N. Abrahams	South African National Roads Agency (SANRAL)	abrahamsn@nra.co.za
Environmental Division	Ms Civil Aviation Authority	environment@caa.co.za

BASIC ASSESSMENT

Lt. Col. Zondi	Military Integrated Environmental Management	kebasenosi@yahoo.com
Mr. Thomas van Staden	Siyathemba Local Municipality	mmvstaden@siyathemba.gov.za
Mr. I. Visser	Pixley Ka Seme District Municipality	mm@pksgm.gov.za
Mr. W. Pieterse	Ward Councillor – Ward 3	willonpieterse@gmail.com debbielottering28@gmail.com

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix E4. In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

6. Consultation with Other Stakeholders

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of registered I&APs must be included as appendix E5.

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

Section D: Impact Assessment

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. Impacts that may result from the Planning and Design, Construction, Operational, Decommissioning and Closure Phases as well as Proposed Management of identified Impacts and Proposed Mitigation Measures

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

The potential environmental and socio-economic impacts associated with the proposed development and its alternatives were assessed using a qualitative impact assessment methodology. The assessment considers impacts associated with the planning and design, construction and operational phases of the proposed activity, as applicable.

Each identified impact or risk is assessed for the applicable development alternatives, including the No-Go Alternative, with consideration given to both the unmitigated impact and the residual impact following implementation of appropriate mitigation and management measures.

The following assessment criteria are applied:

Nature of the impact

The nature of the impact describes the environmental or socio-economic effect that may result from the proposed activity. The impact is identified as either positive, negative or neutral and describes what environmental aspect or resource may be affected and the manner in which it may be affected.

Extent of the impact

The spatial extent of the impact is considered in terms of whether the effect is:

- Site-specific – restricted to the development footprint or site;
- Local – extending beyond the site into the immediate surrounding area;
- Regional – affecting a broader geographical area; or
- National or greater – where impacts extend beyond the regional scale.

Duration of the impact

The anticipated duration of the impact is assessed as:

- Short-term – generally 0–5 years;

- Medium-term – approximately 5–15 years;
- Long-term – approximately 16–30 years; or
- Permanent – where the impact is expected to remain for the foreseeable future or cannot reasonably be reversed.

Consequence of the impact or risk

The consequence describes the likely environmental or socio-economic outcome should the identified impact occur. Consideration is given to the sensitivity and importance of the affected resource, the magnitude of the potential change and the implications for ecological functioning, environmental quality, land use or socio-economic conditions.

Probability of occurrence

The likelihood of the impact occurring is assessed as:

- Improbable – unlikely to occur;
- Probable – there is a distinct possibility that the impact may occur;
- Highly probable / high probability – the impact is considered likely to occur; or
- Definite – the impact will occur as a consequence of the activity.

Degree of irreplaceable loss of resources

Consideration is given to the extent to which the impact may result in the permanent or irreplaceable loss of an environmental resource, habitat, ecological function, heritage resource or other valued feature. The potential for irreplaceable loss is rated qualitatively from Very Low to High, or regarded as Not Applicable where relevant.

Reversibility of the impact

The degree to which the affected environment or resource could reasonably return to its pre-impact condition is assessed. Reversibility is rated qualitatively from Very Low to High depending on the nature of the affected resource and the ability for natural recovery, rehabilitation or restoration to occur.

Indirect impacts

Indirect or secondary impacts that may arise as a consequence of the primary impact are identified and considered as part of the assessment. These may include, for example, habitat fragmentation, displacement of fauna, erosion, downstream impacts, increased pressure on surrounding resources or secondary socio-economic effects.

Cumulative impacts

Potential cumulative impacts are considered in the context of the proposed development together with existing and reasonably foreseeable activities within the surrounding environment. Cumulative impacts may be positive or negative and are assessed both before and following mitigation.

Significance of the impact prior to mitigation

An overall significance rating is assigned to each impact before mitigation, taking into consideration the nature, extent, duration, consequence, probability, reversibility, potential for irreplaceable loss and cumulative effects of the impact.

Significance is expressed qualitatively as:

Very Low, Low, Medium-Low, Medium, Medium-High, High or Very High, with the impact identified as positive (+), negative (-) or neutral where appropriate.

Degree to which the impact can be avoided, managed and mitigated Following determination of the unmitigated significance, consideration is given to the extent to which the impact can reasonably be:

- avoided through changes to the location, layout, design or implementation of the activity;
- managed through appropriate environmental controls and management measures; and/or
- mitigated to reduce the magnitude, duration, probability or consequence of the impact.

The effectiveness of avoidance, management and mitigation is qualitatively rated according to the circumstances of each impact.

Residual impacts

Residual impacts are those impacts that are expected to remain following the effective implementation of the recommended avoidance, management and mitigation measures. Residual impacts are described to provide an indication of the environmental effect that cannot reasonably be eliminated.

Cumulative impact following mitigation

The cumulative impact is reconsidered following implementation of the proposed mitigation measures in order to determine whether the contribution of the proposed development to cumulative environmental effects would be reduced.

Significance of the impact after mitigation

A final significance rating is assigned after consideration of the proposed mitigation measures and residual impacts. The post-mitigation significance therefore represents the anticipated significance of the impact provided that the prescribed mitigation and management measures are effectively implemented.

The significance ratings presented in the Impact Assessment therefore represent the professional judgement of the EAP, informed by the findings and recommendations of the relevant specialist studies, the sensitivity of the receiving environment, the characteristics of the proposed development and the effectiveness of the proposed mitigation measures. The same assessment approach has been applied consistently to the applicable alternatives to allow for comparison between the development options.

Assessment of each impact and risk identified for each alternative

Below is the table representing the summary of the significant impact ratings, after mitigation, which is discussed in Appendix F.

Significance colour legend:

Very High	High	Medium-High	Medium	Medium-Low	Low	Very Low
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	Alternative 1:	Alternative 2 (preferred site)	No-Go
PLANNING, DESIGN AND DEVELOPMENT PHASE			
Failure to obtain and comply with all applicable statutory approvals and associated conditions could lead to delays in project implementation, increased financial costs and potential legal consequences arising from regulatory non-compliance.	Medium-High (-)	Low (-)	N/A
CONSTRUCTION PHASE			
Loss of indigenous vegetation & protected plant species due to vegetation clearing and site preparation.	High (-)	Medium (-)	N/A
Spread of alien invasive plants Spread and establishment of alien invasive plant species following vegetation clearing, soil disturbance and movement of construction vehicles and materials.	Medium-Low (-)	Medium-Low (-)	Very Low / Neutral
Loss of fauna habitat and disturbance of fauna resulting from vegetation clearing, machinery movement and human activity	High (-)	Medium-High (-)	Very Low / Neutral

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Disturbance, displacement and mortality of fauna Construction noise, lighting, personnel, vehicles, excavations and machinery may disturb, displace, injure or kill fauna.	Medium-High (-)	Medium (-)	N/A
Impacts on drainage lines due to vegetation removal, earthworks and increased sedimentation risk	Low (-)	Medium-Low (-)	N/A
Soil erosion and soil degradation associated with vegetation clearing, soil disturbance and earthworks.	Low (-)	Low (-)	N/A
Soil contamination from fuels and hazardous substances Leaks or spills of fuel, oils, cement, chemicals and hazardous substances may contaminate soil.	Low (-)	Low (-)	N/A
Dust emissions Clearing, excavation, stockpiling and vehicle movement may generate nuisance dust.	Low (-)	Low (-)	N/A
Noise disturbance Construction machinery, vehicles, drilling and general activity will increase ambient noise	Medium-Low (-)	Low (-)	N/A
Waste generation Construction will generate general, recyclable, hazardous and building waste.	Low (-)	Low (-)	N/A
Heritage chance finds resulting from ground disturbance during site preparation and cultivation establishment.	Very Low (-)	Very Low (-)	N/A
Temporary traffic impacts and road safety Construction vehicles and delivery trucks may increase traffic, turning movements, road deterioration and collision risk on the R357 and site access.	Low (-)	Low (-)	N/A

BASIC ASSESSMENT

Temporary employment and local economic benefits (positive)			
Creation of temporary construction employment, procurement opportunities and local expenditure.	Medium (+)	Medium-High (+)	Medium-Low (-)
OPERATIONAL PHASE			
Spread and establishment of alien invasive plants in operational areas and adjoining natural veld through ongoing vehicle movement, landscaping, disturbed soils and stormwater infrastructure.	Medium-Low (-)	Low (-)	Low (-)
Permanent occupation and operation of the facility would maintain the loss of approximately 19.2 ha of near-natural shrubland and reduce local habitat permeability.	High (-)	Medium-High (-)	N/A
Routine human presence, trucks, machinery, security activity, noise and lighting would disturb and displace fauna from the developed footprint and immediate surroundings.	Medium-High (-)	Medium-Low (-)	N/A
Fauna may be killed or injured by operational vehicles, machinery, fencing, pest-control practices or entrapment in infrastructure.	Medium-Low (-)	Low (-)	N/A
Processing machinery, dryers, ventilation, loading, trucks, alarms and maintenance activities would increase ambient noise levels.	Medium-Low (-)	Low (-)	N/A
Night lighting for security, processing, yards and vehicle movements may disturb nocturnal fauna and alter the local dark environment.	Medium-Low (-)	Low (-)	N/A

BASIC ASSESSMENT

Operational traffic, product and by-product handling, loading and dry windy conditions may generate dust.	Low (-)	Low (-)	N/A
Roofs, roads and hardstand surfaces would increase runoff and may cause erosion or sediment movement if stormwater infrastructure is inadequate.	Medium-Low (-)	Low (-)	Neutral / Very Low (-)
Leaks, spills or poor storage of oils, cleaning agents, refrigerants, pesticides and maintenance chemicals may contaminate soil.	Low (-)	Very Low (-)	N/A
Contaminated stormwater, wash water, sewage, chemicals, or waste may pollute soil and groundwater and potentially migrate to off-site surface-water receptors.	Low (-)	Low (-)	N/A
Operational solid waste generation affecting the receiving environment.	Low (-)	Very Low (-)	N/A
Operational visual impact affecting the receiving environment.	Low (-)	Low (-)	N/A
Increased traffic and road safety affecting the receiving environment.	Low (-)	Low (-)	N/A
Contribution to local and regional agricultural development.	High (+)	High (+)	Medium-High (-)
Cumulative ecological impacts affecting the receiving environment.	Medium (-)	Low (-)	N/A
DECOMMISSIONING AND CLOSURE PHASE			
Not assessed at this stage.			

2. Environmental Impact Statement

BASIC ASSESSMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative 2 (preferred alternative site)

The environmental impact assessment undertaken for the proposed Prieska Pistachio Processing Facility considered the potential impacts associated with the Planning and Design Phase, Construction Phase and Operational Phase of the proposed development for Alternative 1, Alternative 2 (Preferred Alternative) and the No-Go Alternative. The assessment was informed by the specialist botanical, fauna and heritage studies and evaluated the nature, extent, duration, probability, reversibility, cumulative effects and overall significance of each identified impact before and after the implementation of appropriate mitigation measures.

The assessment confirms that the principal environmental risks associated with the proposed development relate to the permanent loss of indigenous vegetation, fragmentation of fauna habitat, disturbance and displacement of fauna, operational disturbance associated with noise, lighting and traffic, as well as the cumulative ecological impacts arising from the transformation of natural habitat.

Secondary impacts include the potential spread of alien invasive plant species, erosion, stormwater management, soil and water contamination, waste generation, visual impacts and increased traffic along the R357. These impacts are predominantly site-specific to local in extent, with durations ranging from short-term during construction to long-term or permanent for habitat transformation associated with the operational phase.

Alternative 1 is associated with significantly greater environmental impacts because it occurs within a more ecologically sensitive area containing higher-value indigenous vegetation, protected Shepherd's Trees (*Boscia albitrunca*), and habitat of greater conservation importance. Although mitigation measures would reduce a number of impacts, the permanent loss and fragmentation of higher-quality habitat would remain significant, resulting in several residual impacts remaining of Medium-High to High significance. The specialist investigations therefore concluded that Alternative 1 is not environmentally preferable.

Alternative 2 was specifically selected following the specialist investigations to avoid the most environmentally sensitive portions of the site. The preferred site is located within an area of comparatively lower ecological sensitivity, outside the identified Critical Biodiversity Area, while still accommodating the operational requirements of the proposed development. Although approximately 19.2 ha of near-natural Nama Karoo vegetation would be permanently transformed, the specialist studies concluded that the impacts on vegetation, fauna and ecological functioning can be effectively reduced through the implementation of the recommended mitigation and management measures contained in the Environmental Management Programme (EMPr).

Following the implementation of mitigation, the majority of construction-related impacts are reduced to Low or Medium significance and are considered acceptable, temporary and readily manageable. During the operational phase, residual impacts associated with habitat loss, fauna disturbance, visual change and cumulative ecological effects remain due to the permanent nature of the development; however, these impacts are generally reduced to Low or Medium significance and are considered acceptable within the receiving environment. The probability of the majority of identified impacts occurring is reduced from

probable or highly probable to low or moderate through effective environmental management, while impacts associated with pollution, waste, stormwater, traffic, noise, lighting and invasive species are considered highly manageable and reversible where appropriate management measures are consistently implemented.

The No-Go Alternative would avoid all direct environmental impacts associated with the proposed development and would retain the existing ecological character of the site. However, it would also result in the loss of the significant socio-economic benefits associated with the project, including investment in agricultural infrastructure, employment creation, skills development, downstream agricultural beneficiation, and long-term economic opportunities within the Siyathemba Local Municipality.

The impact assessment demonstrates that the Preferred Alternative (Alternative 2) provides the most appropriate balance between environmental protection and socio-economic development. It avoids the highly sensitive ecological features identified on Alternative 1 while enabling the establishment of an agricultural processing facility that supports regional economic growth. Provided that all mitigation measures contained in the EMP are implemented throughout the planning, construction and operational phases, the residual environmental impacts are considered acceptable and can be managed to an acceptable level.

The proposed development is therefore regarded as environmentally acceptable, and Alternative 2 is recommended as the preferred development option from an environmental perspective.

No-go alternative (compulsory)

The No-Go Alternative would prevent all direct environmental impacts associated with the construction and operation of the proposed pistachio processing facility. No indigenous vegetation would be cleared, no permanent habitat loss or fragmentation would occur, and no additional disturbance to fauna, heritage resources, soils or the receiving environment would arise as a result of the proposed development. Existing ecological processes, biodiversity, landscape character and ecosystem functioning would therefore remain largely unchanged, with only the baseline impacts associated with the current agricultural land use continuing.

However, the No-Go Alternative would also result in the loss of the substantial socio-economic benefits associated with the proposed development. These include the establishment of a strategically important agricultural processing facility to support the emerging pistachio industry in the Northern Cape, the creation of temporary and permanent employment opportunities, local skills development, increased procurement opportunities for local businesses, agricultural beneficiation, and long-term investment within the Siyathemba Local Municipality. The project would also contribute to regional economic diversification and strengthen the agricultural value chain by providing processing, packaging and propagation infrastructure for the expanding pistachio industry.

While the No-Go Alternative represents the environmentally least damaging option from a purely biophysical perspective, it does not achieve the project's objectives or contribute to regional socio-economic development. Furthermore, the impact assessment demonstrates that the preferred development alternative (Alternative 2) avoids the most environmentally sensitive areas identified during the specialist investigations and that, with the implementation of the recommended mitigation and management measures contained in the EMP, the residual environmental impacts are generally of Low to Medium significance and are considered acceptable.

BASIC ASSESSMENT

Consequently, although the No-Go Alternative would preserve the existing environmental baseline, it is not considered the preferred option when the need for sustainable economic development is balanced against the manageable environmental impacts of the preferred alternative.

Section E: Recommendation of Practitioner

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?

YES

NO

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

Should Environmental Authorisation be granted for the proposed development on Portion 18 (Ptn of Ptn 15) of the farm Uitdraai No. 33, the following conditions should be included in the Authorisation:

GENERAL CONDITIONS

1. The development shall be undertaken strictly in accordance with the approved layout plan, Environmental Management Programme (EMPr) and all specialist recommendations.
2. The authorised development footprint shall not exceed the approved footprint assessed during the Basic Assessment process.
3. No expansion of the authorised footprint shall occur without obtaining any additional environmental authorisation that may be required.

BIODIVERSITY AND VEGETATION MANAGEMENT

4. Development shall be restricted to the approved development footprint and no unnecessary disturbance of surrounding indigenous vegetation shall be permitted.
5. All environmentally sensitive areas and no-go areas shall be clearly demarcated prior to construction and shall remain protected throughout the life of the development.
6. Protected plant species occurring outside the approved development footprint shall not be damaged or removed.
7. Where protected plant species cannot reasonably be avoided, all permits required in terms of applicable biodiversity legislation shall be obtained prior to any disturbance.

8. An Alien Invasive Plant Control Programme shall be implemented for the duration of construction and operation, with regular monitoring and removal of listed invasive species.
9. Disturbed areas not required for permanent infrastructure shall be rehabilitated using indigenous vegetation as soon as practicable after construction.

Fauna

10. A suitably qualified fauna specialist shall undertake a pre-construction walk-through immediately prior to vegetation clearing where required by the EMP.
11. Any tortoises, reptiles or other fauna encountered during construction shall be relocated by suitably qualified personnel to appropriate adjacent habitat.
12. Excavations shall be inspected daily for trapped fauna and escape ramps shall be provided where excavations remain open overnight.
13. Hunting, trapping, poisoning, intentional killing or collection of fauna by contractors or operational staff shall be strictly prohibited.
14. Operational speed limits shall be implemented on internal roads to reduce wildlife collisions.
15. Integrated pest management practices shall be implemented and the use of secondary anticoagulant rodenticides shall be avoided wherever reasonably practicable to minimise secondary poisoning of predators and scavengers.
16. External lighting shall be limited to operational requirements and designed to minimise light spill into surrounding natural habitat by using downward-directed, shielded luminaires and warm-colour lighting.

Heritage Resources

17. A Chance Find Procedure shall be implemented throughout all earthworks.
18. Should archaeological material, fossils, graves or any heritage resources be discovered during construction, all work within the immediate vicinity shall cease immediately and the relevant heritage authority shall be notified before work resumes.
19. No heritage resources may be removed or disturbed without the necessary approvals required in terms of the National Heritage Resources Act.

Stormwater and Pollution Control

20. Stormwater shall be managed to prevent erosion, sedimentation and the concentration of runoff onto adjacent natural areas.
21. Clean and dirty stormwater shall be managed separately where applicable.
22. All fuels, oils, chemicals and hazardous substances shall be stored within bunded, impermeable areas capable of containing spills.
23. Spill kits shall be available on site at all times and all spills shall be cleaned immediately.

Waste Management

BASIC ASSESSMENT

24. Waste shall be separated, stored and disposed of at appropriately authorised waste disposal or recycling facilities.
25. No waste shall be burned or buried on site.
26. Waste storage areas shall be maintained to prevent windblown litter and access by wildlife.

Air Quality, Noise and Traffic

27. Dust suppression measures shall be implemented during construction and operation whenever dust becomes excessive.
28. Operational noise shall be limited through routine maintenance of equipment and restriction of unnecessary noise-generating activities.
29. Access to the R357 shall comply with the requirements of the relevant roads authority.
30. Appropriate traffic warning signage shall be installed where required by the roads authority.
31. Heavy vehicle movements shall be managed to minimise risks to other road users.

Environmental Compliance

32. An Environmental Control Officer (ECO) shall monitor compliance with the Environmental Authorisation and EMPr during construction.
33. Environmental awareness training shall be provided to all contractors prior to commencing work.
34. Records of environmental incidents, complaints, corrective actions and monitoring shall be maintained and made available to the Competent Authority upon request.
35. The holder of the Environmental Authorisation shall ensure that all mitigation measures contained in the specialist reports and the approved EMPr are implemented throughout the construction and operational phases.

Is an EMPr attached?

The EMPr must be attached as Appendix G

YES	NO
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The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

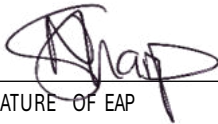
If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

BASIC ASSESSMENT

Natalie Sharp

NAME OF EAP


SIGNATURE OF EAP

10 September 2026

DATE

Draft BAR

Section F: Appendixes

Appendix A: Maps

Appendix A1: Locality Map

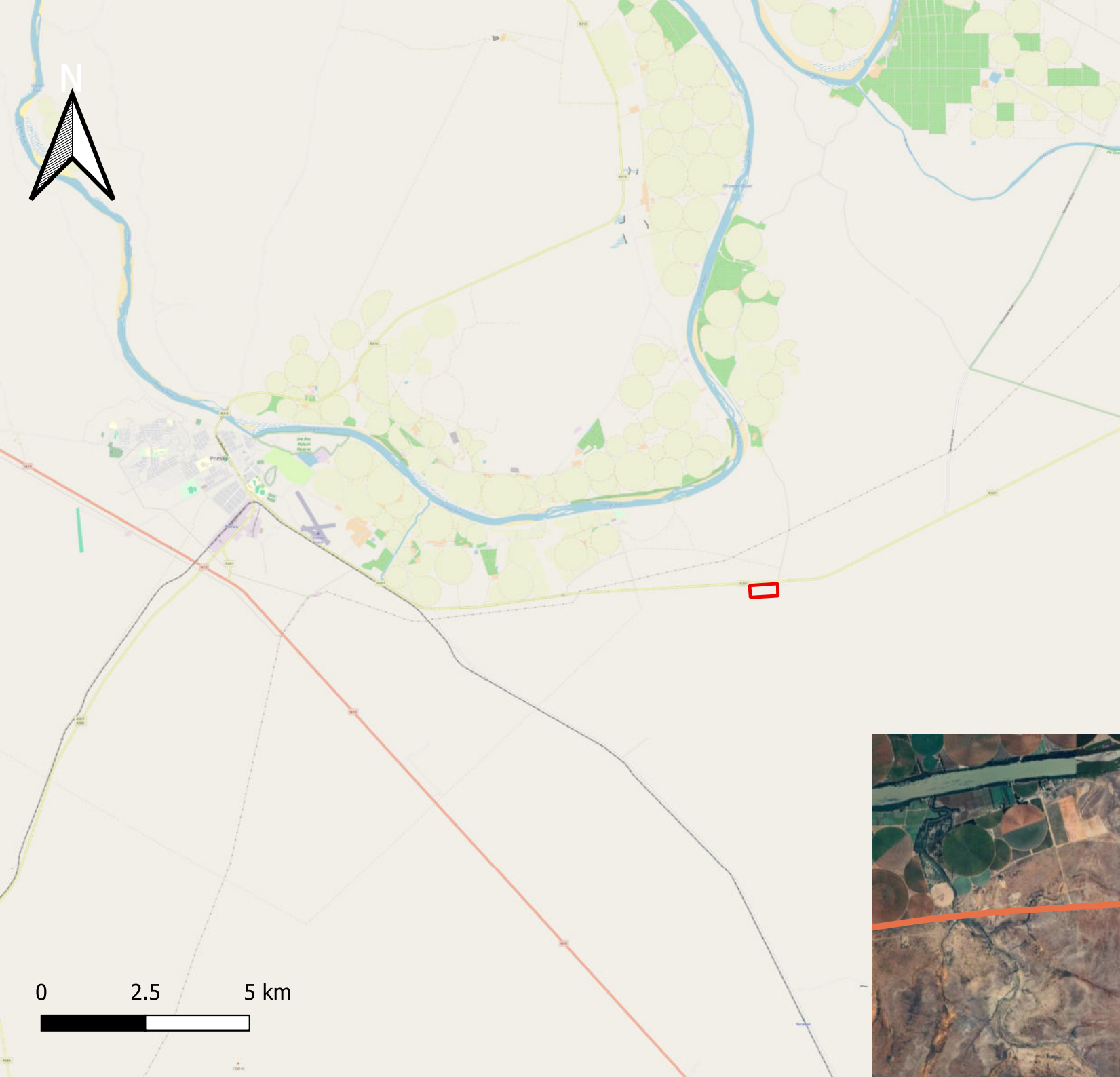
Draft BAR

Locality Map

Legend

R357

Prieska Pistachio Company Site



Appendix A3: Sensitivity Map

Draft BAR

Sensitivity Map



Legend

R357

Alternative Site 2 (Preferred Site)

Alternative Site 1

River system

Unnamed drainage line

CBA area

PA

CBA1

CBA2

ESA

Other Natural

BASIC ASSESSMENT

Appendix B: Photographs

Alternative Site 1:



BASIC ASSESSMENT

Alternative Site 2: Preferred Site



BASIC ASSESSMENT



BASIC ASSESSMENT



BASIC ASSESSMENT



BASIC ASSESSMENT



Draft B

Appendix C: Facility illustration(s)

Below is an AI-generated conceptual facility illustration of the proposed pistachio processing facility. It is intended solely to provide a visual representation of the potential appearance of the proposed development and should not be interpreted as the final architectural design. The final layout, building design, dimensions, colours, materials, and appearance may differ, as detailed engineering design and architectural plans have not yet been prepared or approved. The image is therefore illustrative only and forms no part of the final development plans.



BASIC ASSESSMENT

Appendix D: Specialist reports (including terms of reference)

Appendix D1 – Paleontology and Heritage Impact Assessment Report

The purpose of the Palaeontological and Heritage Impact Assessment (PIA/HIA) was to identify, assess and evaluate any archaeological, palaeontological and other heritage resources that may be affected by the proposed establishment of the pistachio nursery and processing facility, in accordance with the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), the SAHRA Minimum Standards for Archaeological and Palaeontological Impact Assessments (2007), and the Environmental Impact Assessment Regulations.

The assessment was undertaken to:

- Conduct a Heritage Impact Assessment (HIA) to identify, map and assess the significance of archaeological, historical, cultural and other heritage resources that may occur within the proposed development footprint.
- Conduct a Palaeontological Impact Assessment (PIA) using available geological information, the SAHRIS PalaeoSensitivity Map, desktop studies and a field investigation to identify and assess any palaeontological resources or fossil-bearing formations within the study area.
- Determine the nature, extent and significance of potential impacts that the proposed development may have on identified heritage resources.
- Evaluate the significance of any identified heritage resources in accordance with the grading system prescribed in Section 7 of the National Heritage Resources Act.
- Assess whether the proposed development would result in the loss of heritage resources and evaluate such impacts relative to the anticipated social and economic benefits of the development.
- Consider feasible alternatives where significant heritage resources may be affected.
- Recommend appropriate avoidance, mitigation and management measures to minimise impacts on heritage resources, including the implementation of a Chance Find Procedure where required.
- Provide recommendations regarding the heritage acceptability of the proposed development and whether the project may proceed from an archaeological and palaeontological perspective.

The assessment included a desktop review of existing literature, geological and heritage databases, historical aerial imagery and mapping, followed by a field survey of the proposed development area to verify desktop findings and identify any heritage resources present. The findings and recommendations were prepared in accordance with Section 38(3) of the National Heritage Resources Act.

PALAEONTOLOGICAL AND HERITAGE IMPACT
ASSESSMENT FOR A NEW 19.8 HA NURSERY AND
PISTACHIO PROCESSING PLANT, PRIESKA, SIYATHEMBA
LM, NORTHERN CAPE PROVINCE.



Report prepared for

Digital Soils Africa
www.dsafrica.co.za

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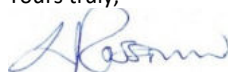
Specialist Info

Lloyd Rossouw previously led the Archaeology and Florisbad Quaternary Research Departments at the National Museum in Bloemfontein and has more than 30 years of fieldwork experience in South African archaeology and Quaternary palaeontology. He earned a BA degree in Archaeology, completed an Honours programme in Stone Age Archaeology at the University of Stellenbosch, and received training in osteology and Quaternary palaeontology for his MSc at the Bernard Price Institute of Palaeontology (Wits). He also undertook instruction in human anatomy at Duke University in Durham, North Carolina, USA. For his PhD at the University of the Free State, he developed a palaeobotanical method that uses plant silica remains to reconstruct past environmental conditions. His fieldwork includes participation in various excavations and surveys, such as historical built environments and farmsteads (including Keerweder, Zomerlust, Boekenhoutskloof, Bien Donne, Sterhuis, Fredericksberg, Aurora), rock art surveys (Ceres, Vanrhynsdorp, Clanwilliam, Piketberg), industrial projects (coastal section for Moss gas Pipeline Project, Molenaars River crossing for Du Toitskloof Pass Tunnel Project), Stone Age sites (Hoedjiespunt, Klasies River Mouth, Erfkroon, Damvlei, Thyspunt, Sunnyside, Baden Baden, Florisbad, Cornelia), and palaeontological localities (Langebaanweg, Zwartklip, Besaanskop, Boesmansfontein, Spitskop, Cango Valley, Braamhoek, Gladysvale, Taung). He has surveyed and mapped multiple open sites in the central interior region, including the northern Karoo, lower Orange, Vaal, Modder, Vet and Sand River basins as well as the central Makgadikgadi basin.

Declaration of Independence

Paleo Field Services remains financially independent, with no vested interest in project activities or outcomes except for professional fees. Its sole remuneration comes from agreed-upon services for each project. Paleo Field Services accepts client-provided information as accurate.

Yours truly,

A handwritten signature in blue ink, appearing to read "L Rossouw".

April 2026

SUMMARY

A Phase 1 Palaeontological and Heritage Impact Assessment (PIA/HIA) was undertaken for the proposed establishment of a 19.8 ha nursery and pistachio processing facility on Portion 18 of the Farm Uitdraai No. 33 (Erf 1), situated adjacent to the R357 provincial road approximately 10 km east-southeast of Prieska, Northern Cape. From a palaeontological perspective, the site is characterised by a deflationary, clast-rich gravel veneer developed on a relict terrace surface, underlain by an indurated hardpan calcrete. Dwyka Group mudrocks/tillites are present only at depth and locally exposed in historic borrow-pit cuttings. No fossil material or fossil-bearing horizons were observed at surface or within accessible exposures. Consequently, the area is assessed as having low palaeontological sensitivity, with no anticipated direct or cumulative impacts on fossil heritage. The site is assigned a Generally Protected C (low) palaeontological field rating, subject to implementation of a standard Chance Find Protocol. From an archaeological perspective, Stone Age artefacts occur very sparsely as isolated surface finds scattered among quartz pebbles and gravel. These materials are interpreted as secondary, time-averaged palimpsests lacking stratigraphic integrity, with no in situ features, discrete concentrations, or associated activity areas identified. No graves, burial grounds, or historical structures or infrastructure older than 60 years were recorded within the development footprint. The archaeological significance of the site is therefore assessed as low to negligible, and it is assigned a Generally Protected C field rating in terms of the NHRA. No further archaeological investigation or monitoring is required, provided that development remains within the assessed footprint. Overall, the assessment concludes that the proposed nursery and pistachio processing development will not result in unacceptable impacts on palaeontological or archaeological heritage resources. Subject to adherence to the Chance Find Protocol, the development is regarded as acceptable from both a palaeontological and archaeological perspective.

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INTRODUCTION

A Phase 1 Palaeontological and Heritage Impact Assessment (PIA/HIA) was undertaken for the proposed establishment of a new 19.8 Ha Nursery and Pistachio processing plant on the farm Uitdraai 33, located next to the R357 provincial road about 10 km directly east-southeast of Prieska (**Fig. 1 & 2**).

Map Reference: 1:50 000 scale topographic map 2922DB Prieska Oos and 1:250 000 scale geological map 2922 Prieska.

Farm Reference: Portion 18 of the farm Uitdraai no 33 / Erf 1

Coordinates

- A) 29°41'35.89"S 22°52'34.46"E
- B) 29°41'34.58"S 22°52'59.42"E
- C) 29°41'43.73"S 22°52'59.61"E
- D) 29°41'45.02"S 22°52'35.26"E



Figure 1. Study area marked on portion of 1:50 000 scale topographic map 2922DB Prieska Oos (above), aerial view below.

LEGAL FRAMEWORK

The assessment is required as a prerequisite for new development in terms of the National Heritage Resources Act (NHRA) 25 of 1999. The NHRA identifies what is defined as a heritage resource, the criteria for establishing its significance and lists specific activities for which a heritage specialist study may be required. The NHRA prescribes a system of grading of

places/objects via Section 7 and makes provision for the general protection of heritage resources via Sections 34, 35, 36, and 37 (in respect of the built environment, archaeology/palaeontology, burial grounds/graves and monuments/memorials, respectively), while Section 38 sets out guidelines under which heritage impact assessments are required when new developments may impact upon heritage resources.

Section 38(1) applies when a development triggers heritage assessment requirements but does not require an environmental authorisation from another regulatory authority, including:

1. Construction of a road, powerline or pipeline, canal or other similar form of linear development or barrier longer than 300m.
2. Construction of a bridge or similar structure exceeding 50 m.
3. Development exceeding 5,000 m².
4. Rezoning of land exceeding 10,000 m², or
5. Any development that may impact recognized heritage resources (e.g., archaeological sites, graves, buildings older than 60 years).

Section 38(3) of the NHRA sets the minimum information requirements for a Heritage Impact Assessment report: the responsible heritage resources authority must ensure that any report submitted includes, at least, the core elements listed in Section 38(3)(a)–(g), namely identification and mapping of heritage resources, significance assessment, impact assessment, evaluation against socio-economic benefits, consultation outcomes, consideration of alternatives (where impacts occur), and mitigation planning.

DISCLAIMER, ASSUMPTIONS AND LIMITATIONS

Information provided by the Client and/or Environmental Assessment Practitioner (EAP) was assumed to be accurate and complete for the purposes of this assessment. Observations presented in this report are based solely on aboveground visibility of features and outcrops as encountered during field survey. The reliability and completeness of these observations are subject to several inherent limitations:

- Fossiliferous outcrops are often limited to exposed lithologies and may be obscured by colluvium, vegetation, or soil mantling; the degree of weathering affects the preservation and visibility of fossil material, with heavily weathered surfaces

potentially masking fossil content or fragmenting specimens; stratigraphic context is inferred from visible lithologies only; subsurface fossil-bearing horizons may remain undetected without trenching or coring; access limitations may restrict inspection of key geological exposures, particularly in rugged terrain or areas with restricted land access.



Figure 2. General view of the site, which lies on low – relief terrain covered by a deflationary gravel lag underlain by an indurated hardpan calcrete.

- The surface visibility of archaeological remains is variable and may be significantly reduced by vegetation cover, soil accumulation, or recent land disturbance (e.g., ploughing, erosion, construction); subsurface archaeological remains (e.g., buried structures, features, or artefact scatters) may not be detectable without excavation or remote sensing; weathering and exposure can obscure diagnostic features such as stone alignments, midden deposits, or low-relief structures, especially in areas with high sedimentation or seasonal vegetation growth; accessibility constraints (e.g., fenced properties, steep terrain, or dense bush) may prevent systematic coverage, resulting in partial or biased spatial data.

METHODOLOGY

The site assessment was carried out in line with the National Heritage Resources Act (Act No. 25 of 1999) and the 2007 SAHRA Minimum Standards for Archaeological and Palaeontological Impact Assessments. Initial site ratings were based on existing field data, relevant databases, and published literature. Topographic, aerial, and geological maps were used for illustrative purposes and to identify potential fossil-bearing formations. Fieldwork involved direct observation through foot surveys, with vehicle access where possible. A Garmin Etrex Vista handheld GPS (set to the WGS 84 datum) and a digital camera were used to record spatial and visual data throughout the survey. GPS coordinates are presented in *Degrees, Minutes, Seconds* format in the report.

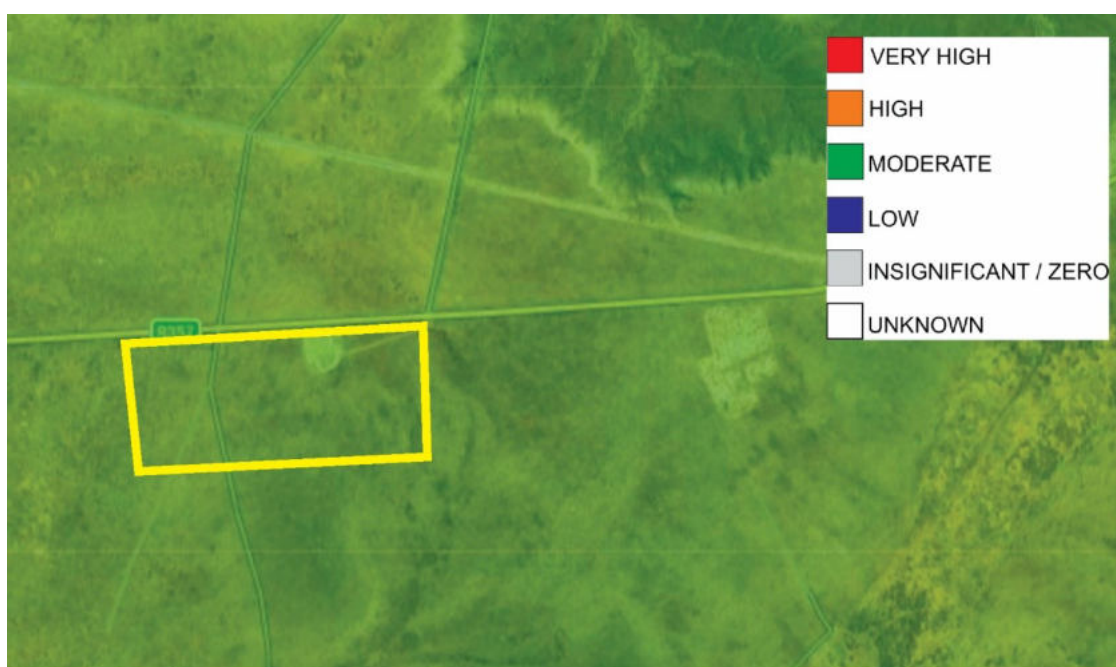


Figure 3. Study areas marked by yellow polygon on portion of SAHRIS palaeosensitivity map.

TERMS OF REFERENCE

The Terms of Reference outlines the scope and objectives for assessing potential impacts on heritage resources—both tangible and intangible—arising from the proposed development, in accordance with relevant legislative standards.

1. Conduct site investigation for a Heritage *Impact Assessment (HIA)* to identify and map heritage sites and occurrences in the affected area(s) and provide an assessment of their significance. This must be done regardless of the sensitivity indicated on the *DESTEA National Web Based Environmental Screening Tool*, as the Department of Environmental Affairs and its entities make no warranty—express or implied—regarding the accuracy, reliability, usefulness, or completeness of the *archaeological and cultural heritage theme layer*.

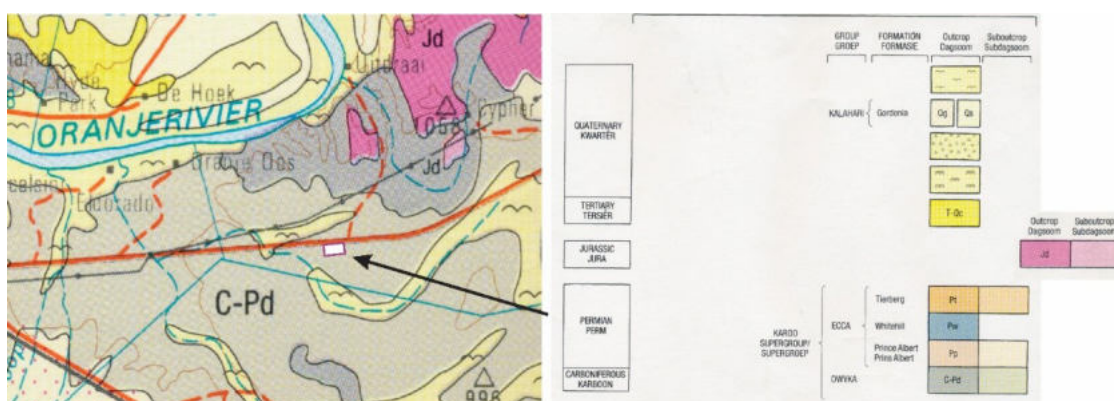


Figure 4. According to the 1:250 000 scale geological map 2922 Prieska, the site and surrounding areas are underlain by Late Carboniferous-Early Permian Dwyka sediments (C-Pd), Jurassic volcanic rocks (Jd) and widespread Late Tertiary to Quaternary calcretes (T-Qc), aeolian sands (Qs) and other superficial deposits.

2. Conduct a site investigation for a Palaeontological Impact Assessment (PIA) using the SAHRIS PalaeoSensitivity Map (**Fig. 3**), regardless of the sensitivity indicated on the *DESTEA National Web Based Environmental Screening Tool*. Identify and map fossils or exposures in the area and assess their significance. This is required as the Department of Environmental Affairs does not guarantee the accuracy or completeness of the *palaeontology theme layer*.
3. Assess impacts of the proposed development on heritage resources relative to the sustainable social and economic benefits to be derived from the development *if planned impacts will result in the loss of any resources*.
4. Provide a system of grading of places and objects which form part of the national estate, and which distinguishes between at least the categories as prescribed under Section 7 of the NHRA (**Table 1**).

Table 1. Description of Field Rating categories as prescribed in Section 7(1) of the NHRA where SAHRA must by regulation establish a system of grading of places and objects which form part of the national estate, and which distinguishes between at least the categories— (a) Grade 1: Heritage resources with qualities so exceptional that they are of special national significance; (b) Grade 2: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; (c) Grade 3: Heritage resources which can be considered to have special qualities which make them locally significant; and Generally Protected: Other heritage resources which may require mitigation before destruction.

Field Rating	Grade (NHRA No. 25 of 1999, Section 7)	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation: national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation: provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation: mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A	-	High/medium significance	Mitigation before destruction
Generally Protected B	-	Medium significance	Recording before destruction
Generally Protected C	-	Low significance	Destruction

PALAEONTOLOGICAL BACKGROUND

From oldest to youngest, the Prieska area is underlain by Transvaal Supergroup lithologies dominated by banded ironstone / banded iron formation (BIF) units, localised Early Permian Dwyka sediments (C-Pd), widespread Late Tertiary to Quaternary calcrete\’s (T-Qc), aeolian sand (Qs) and other superficial deposits (**Fig. 4**).

The BIF component is specifically linked to the Kuruman Formation (Asbestos Hills Subgroup) in the wider Prieska region where palaeontological significance is expressed through preservation of microbially induced sedimentary structures (MISS) and related sedimentary textures rather than conventional body fossils. Older strata lower in the regional facies (e.g., Campbell Rand Subgroup) are exposed along the Orange River north–northwest of Prieska and include stromatolite- and microfossil-bearing dolomite, dolomitic limestone and chert members formed in shallow marine environments. Localised Dwyka-aged (Late Carboniferous–Early Permian) palaeovalleys preserve evidence of glaciation, including glaciated pavements with polished, striated basement surfaces, tillites and Dwyka mudrocks are noted as having yielded trace fossils (including fish and invertebrate trackways), microfossil remains (foraminifera, bryozoans, sponge spicules and radiolaria), and fossil plant material including lycopods, Glossopterids, fossilised wood and plant micro-remains (spores and pollen). In younger deposits, Late Cenozoic duricrusts and eluvium include calcretes (T–Qc), surface gravels and reworked calcretes, aeolian sand. Rare Florisian-type vertebrate fossil remains are known from old calcrete quarries in the area.

FIELD ASSESSMENT – PALAEONTOLOGY

The ground surface is a clast-rich gravel veneer consisting of pebble-sized material commonly including quartz pebbles and banded ironstone within a gravel lag, consistent with a relict terrace that has been reworked by deflation and runoff. The gravel lag is underlain by a hardpan duricrust (T–Qc) with olive-grey Dwyka Group mudrocks/tillites present at depth (C–Pd) and locally exposed in old borrow pit cuttings. In both cases, field inspection confirmed the absence of fossil material at surface level or cuttings (**Fig. 5**).

As a result, the proposed development is not expected to result in direct or cumulative impacts on fossil heritage, and the palaeontological significance assessed as low conditional on adherence to a standard Chance Find Protocol. The site is assigned a Generally Protected C (low) palaeontological field rating). Subject to these conditions, the proposed development is considered acceptable from a palaeontological perspective.



Figure 5. The site is underlain by a reworked, clast-rich gravel lag (A, B) developed on a hardpan calcrete (C, D), with olive-grey Dwyka Group mudrocks/tillites occurring only at depth and locally exposed in historic borrow pit cuttings (E, F).

Scale 1 = 10 cm

PALAEONTOLOGICAL IMPACT AND RECOMMENDATIONS (NHRA SECTION 38(3))

a) Identification and mapping of heritage resources in the area affected

The site is underlain by a reworked, clast-rich gravel lag developed on a hardpan calcrete (T–Qc), with olive-grey Dwyka Group mudrocks/tillites (C–Pd) occurring only at depth and locally exposed in historic borrow pit cuttings. No fossil material or fossil-bearing horizons were identified at surface or in accessible exposures within the development footprint.

b) Assessment of the significance of heritage resources

No palaeontological heritage resources were identified within the development footprint, and the exposed geological units—comprising a reworked gravel lag over hardpan calcrete with Dwyka Group mudrocks/tillites only present at depth or in historic cuttings—are assessed as having low fossil preservation potential; the site is therefore of low palaeontological significance and is assigned a Generally Protected C (low) field rating, subject to implementation of a standard Chance Find Protocol.

c) Assessment of the impact of the development on such heritage resources

Given the absence of fossil material and the low fossil preservation potential of the identified geological units at surface, no direct or cumulative palaeontological impacts are anticipated. Overall palaeontological impact significance is assessed as low.

d) Evaluation of impacts relative to social and economic benefits

In the absence of identified palaeontological heritage resources, the proposed development entails no heritage trade-off and is not outweighed by any loss of fossil heritage. The socio-economic benefits of the development are therefore not compromised by palaeontological considerations.

e) Consultation outcomes with interested and affected parties

No concerns relating specifically to fossil heritage were raised during stakeholder engagement, and no information indicating the presence of palaeontological resources within the footprint was provided by interested or affected parties.

f) Consideration of alternatives where heritage resources are affected

As no palaeontological resources were identified and the assessed sensitivity is low, consideration of layout alternatives is not required from a palaeontological perspective.

g) Mitigation measures and management recommendations

No mitigation or monitoring is required under the current scope of development due to the low palaeontological sensitivity and absence of finds. A standard Chance Find Protocol must, however, be implemented, requiring that all work cease in the immediate area should fossil material be exposed, the find be secured, and a qualified palaeontologist and the relevant heritage authority be notified for further guidance and permitting if necessary. The site is assigned a Generally Protected C (low) palaeontological field rating.

ARCHAEOLOGICAL BACKGROUND

The wider Prieska region preserves a well-defined Stone Age footprint together with historical period remains, with Early, Middle and Later Stone Age sites recorded particularly in association with pan and mountain plateau environments, while open plains are characterised by low-density surface scatters. Isolated ESA and MSA artefact scatters are also recorded within Orange River overbank sediments between Douglas and Prieska, with named occurrences including Marksdrift, Kliphuis, Elswater, Brakfontein, Holsloot and Nuwejaarskraal, and stone tool surface scatters have been recorded in the Prieska Townlands to the southwest. Rock art occurs along the steep slopes of the Asbes and Doringberge to the north and south of Prieska, with noted examples including Wonderdraai, Omdraaisvlei and Sandfontein, and rock engravings have been recorded in younger valley fills along steeper slopes at Sandfontein north of Prieska.

Archaeological and historical accounts describe precolonial occupation by Bushman hunter-gatherers and Khoi pastoralists, with early travellers encountering Koranna, Griqua and Bushman groups in the region, and the place-name “Prieska” is derived from a Koranna term meaning “place of the lost she-goat”; the Middle Orange River context is further described in

terms of Khoikhoi group distributions and later movements of Xhosa-speaking groups into the Pramberg and Karreeberg regions south of Prieska.

Historical-period heritage includes remnants dating to the Anglo-Boer War and its aftermath, including a stone fort on top of the Prieska Koppie overlooking the town, and other listed historical buildings and burial places in Prieska (including the Dutch Reformed Church in Church Street and an old graveyard near the Prieska Golf Club). The regional historical landscape also includes ruins and graveyards linked to the early 20th-century asbestos mining industry at multiple localities north and south of Prieska, including occurrences associated with Karabee and Keikams Poort, as well as Kliphuis on the Orange River northwest of Prieska, and wider distributions of stone-walled ruins on farms in the surrounding district.

FIELD ASSESSMENT - ARCHAEOLOGY

The site lies on low – relief terrain covered by a deflationary gravel lag underlain by an indurated hardpan calcrete. Stone tools appear very sparsely, scattered among quartz pebbles and gravel (**Fig. 6**). These collections are considered to be time-averaged palimpsests rather than undisturbed open sites, and no *in situ* features or specific concentrations were found. Other than the presence of a few isolated stone tool scatters, no surface evidence of graves, burial grounds, nor any historical structures or infrastructure exceeding 60 years in age, were identified within the designated development footprint. The site is assigned a Generally Protected C field rating in terms of the NHRA. No further archaeological investigation or monitoring is required, provided that development activities remain within the defined footprint. Subject to this condition, the proposed development is considered acceptable from an archaeological perspective.

ARCHAEOLOGICAL IMPACT & RECOMMENDATIONS (NHRA S38(3))

The results of the site investigation are presented under the minimum information requirements set out in Section 38(3)(a)–(g) of the National Heritage Resources Act (NHRA):

a) Identification and mapping of heritage resources in the area affected

The site occurs on low-relief terrain characterised by a deflationary gravel lag developed on indurated hardpan calcrete. Archaeological material is limited to very sparse, isolated stone tools scattered among quartz pebbles and gravel. These occurrences represent secondary, time-averaged palimpsests rather than intact or undisturbed open sites. No in situ features, concentrations, graves, burial grounds, or historical structures older than 60 years were identified within the development footprint.



Figure 6. Sparse stone tools recorded as very low-density surface scatters that are spatially diffuse and dispersed among quartz pebbles and gravel lag.

b) Assessment of the significance of heritage resources

The identified archaeological material comprises very sparse, isolated stone tools occurring in a secondary, deflationary context as time-averaged palimpsests with no stratigraphic integrity or associated features and is therefore assessed as being of low to negligible archaeological significance.

c) Assessment of the impact of the development on heritage resource

Any potential impacts would be limited to further disturbance or displacement of already reworked surface material. As no unique, intact, or in situ archaeological deposits are present, the overall impact significance is assessed as low to negligible.

d) Evaluation of impacts relative to social and economic benefits

The development is considered acceptable from an archaeological perspective, as it entails no disproportionate heritage cost and does not result in the loss of scientifically irreplaceable or significant archaeological resources when weighed against the anticipated social and economic benefits.

e) Consultation outcomes with interested and affected parties

The landowner supports the proposed development in accordance with the EAP's stakeholder engagement process, and no archaeological concerns were raised by interested or affected parties.

f) Consideration of alternatives where heritage resources are affected

Because the archaeological material is of low significance and occurs in a secondary context, layout or design alternatives are not required from an archaeological perspective.

g) Mitigation measures and management recommendations

No additional mitigation, monitoring, or further archaeological investigation is recommended, as no intact or significant archaeological deposits were identified. The site is assigned a **Generally Protected C (low)** field rating in terms of the NHRA, and development may proceed provided activities remain within the defined footprint.

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APPENDIX 1 – CHANCE FIND PROTOCOL

PALAEONTOLOGY

Identification of anomalous / irregular shapes or forms within exposed, sediments is a first step in recognizing potential fossil remains in the field. Fossil remnants to look out for when orchard development occurs are may resemble modern-looking long bones, horn cores, and teeth (**Fig. 7**).



Figure 7. Fossil remnants to look out for may resemble cylindrical and elongated, stone-like objects with odd-looking patterns, shapes and surfaces.

Procedural Steps

- If potential fossil material is encountered, halt all activity in the immediate area.

- The Environmental Control Officer (ECO) / authority on-site should photograph the remains, note GPS coordinates, and leave it undisturbed if possible.
- If material is significant, a palaeontologist must be able to confirm the finds as soon as possible.
- Newly excavated fossil remains must be stored in a safe place if it is portable. The material should not be washed or cleaned in any way.
- Intact remains must be kept in place and protected from further damage by covering it with a light but rigid object like a box, bucket, or metal sheet if possible and the area must be avoided by implementing a no-go buffer zone until further confirmation by a palaeontologist.
- Await Specialist Confirmation
- If material proves significant, a Phase 2 rescue operation may be required under SAHRA permit.
- If material proves to be significant, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. In this case it is advised that the developer should, subject to SAHRA permit approval, appoint a professional palaeontologist to remove and transport the fossil material.

BASIC ASSESSMENT

Appendix D2 – Terrestrial Ecological and Flora Assessment Report

D2a: Terrestrial Ecological and Flora Assessment Report for **Alternative Site 1 (NOT preferred site)**

The purpose of the Flora Specialist Assessment was to identify and evaluate the botanical sensitivity of the proposed development site and determine the potential impacts of the proposed development on indigenous vegetation, plant species and ecological processes.

The assessment was undertaken to:

- Characterise and describe the vegetation occurring within the study area.
- Identify, describe and map the vegetation units present within the proposed development footprint.
- Assess the ecological condition and conservation importance of the vegetation communities.
- Identify protected plant species, Species of Conservation Concern (SCC), endemic species and suitable habitat for these species.
- Identify and record the presence of alien invasive plant species in accordance with the National Environmental Management: Biodiversity Act (Act 10 of 2004).
- Determine the ecosystem classification and conservation status of the vegetation type.
- Assess the site's location relative to Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and other biodiversity planning categories.
- Assess the ecological sensitivity of the site and prepare a botanical sensitivity map to inform site planning.
- Evaluate the potential direct, indirect and cumulative impacts of the proposed development on flora and vegetation.
- Identify botanical constraints that may influence the layout and feasibility of the proposed development.
- Recommend measures to avoid, minimise or mitigate impacts on indigenous vegetation and protected plant species.
- Provide an independent opinion on the suitability of the proposed site from a botanical perspective and identify the environmentally preferred development alternative.

Scope of Work

The assessment comprised:

- A desktop review of available literature, vegetation maps, biodiversity plans and conservation databases.

BASIC ASSESSMENT

- A detailed field survey undertaken during the growing season to maximise the likelihood of identifying plant species.
- Classification of vegetation using the Braun-Blanquet vegetation survey technique.
- Compilation of a comprehensive plant species list.
- Identification of protected and alien invasive plant species.
- Delineation and mapping of vegetation units.
- Assessment of ecological sensitivity and conservation priority of each vegetation unit.
- Preparation of recommendations to inform the Environmental Impact Assessment and Environmental Management Programme (EMPr).

January 2026

AN ECOLOGICAL REPORT ON THE FLORA: ON THE FARM UITDRAAI BOERDERY IN THE NORTHERN CAPE

A report commissioned by Digital Soils Africa

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CONDITIONS RELATING TO THIS REPORT

Declaration of interest

Sparaxis Environmental PTY (Ltd) and its members/co-workers:

- Have no vested interest in the property studied, nor is it affiliated with any other person/body involved with the property and/or proposed development.
- Is not a subsidiary, legally or financially, of the proponent.
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA).
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- Undertake to disclose, to the 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.
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field.
- Is committed to biodiversity conservation but concomitantly recognise the need for economic development. We reserve the right to form and hold our own opinions within the constraints of our specialities and experience and, therefore, will not submit willingly to the interests of other parties or change our statements to appease them

The study was undertaken by Dr AC van Aardt (PhD UFS) who is registered as a Professional Natural Scientist (Reg. No. 131584 - Ecological Sciences and Botanical Sciences) and Mr M Muller (MSc Botany).

They have the following qualifications

SPECIALIST	QUALIFICATION
Dr A.C. van Aardt	PhD – Botany MSc – Botany BSc Hons (Botany) BSc (Botany & Zoology)
M Muller	MSc – Botany BSc Hons Environmental Science BSc (Geography and Environmental Sciences)

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Although Sparaxis Environmental Pty (Ltd) exercises due care and diligence in rendering services and preparing documents, the client takes full responsibility for this report and its implementation in terms of the National Environmental Management Act of 1998, and exempts Sparaxis Environmental Pty (Ltd) and its associates and their sub-contractors from any legal responsibility based on the timing of the assessment, the result and the duration thereof, which has an influence on the credibility and accuracy of this report. Sparaxis Environmental Pty (Ltd) accepts no liability, and the client, by receiving this document, indemnifies Sparaxis Environmental Pty (Ltd) and its directors, managers, agents and employees all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by Sparaxis Environmental Pty (Ltd) and by the use of the information contained in this report.

Factors limiting the quality of this report

The formal site visit was undertaken on 17 December 2025. This was during the rainy season, which also permits the flowering and growth of plants. Although some plants had flowers, inflorescences and seeds, it was not the case for all. Grass identification was particularly challenging since most did not have inflorescences or leaves sufficient for identification. Plants that had flowers or had remnants of flowers at the time of the visit could be identified. Some of the more rare and cryptic species may have been overlooked due to their inconspicuous growth forms. Many of the rare and endangered succulent species can only be distinguished (in the veld) from their very similar relatives on the basis of their reproductive parts. These plants flower at different times of the year. Multiple visits to any site during the different seasons of the year could, therefore, increase the chances to record a larger portion of the total species complex associated with the area. The survey of the study site is, however, considered as successful with a correct identification of the vegetation units and their ecological sensitivity.

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- The technology described in any report;
- Recommendations delivered to the Client.

Approach

Conclusions reached, and recommendations made, are based not only on the occurrence of individual species, but more appropriately on habitats and ecosystem processes. Planning must, therefore, allow for the maintenance of species, habitats and ecosystem processes, even if Red Data or endemic plant or animal species are absent.



Dr A.C. van Aardt

Sparaxis Environmental Pty (Ltd)

INTRODUCTION

The Nama-Karoo is a complex of extensive plains with dwarf shrubs, grasses, succulents, geophytes and annual forbs, while trees occur along drainage lines or rocky outcrops. Although the area has a low floristic diversity there is a high diversity of plant life forms. This biome is however known for its low vegetation cover that is associated with aridity. These karoo and karoo-like environments such as Griqualand West, are harsh environments that are unpredictable with indigenous plants and animals that were selected over hundreds of thousands of years. This area occurs in the north-central parts of South Africa, mainly in the Northern Cape, although it also includes parts of the North-West and the Free State Provinces. The Griqualand West area is semi-arid with a few perennial rivers; however, the most prominent is the Orange River. Furthermore, the Griqualand West area has a lack of knowledge in terms of its vegetation, although it was known since the mid-20th century that this area has a high floristic diversity. Knowledge of this extraordinary ecosystem will enable better management and decision-making about sustainable development.

Vegetation forms the most obvious external feature that ecosystems are classified and defined on. Uncontrolled and ill-planned development is one of the biggest threats to naturally evolved life on earth. Development worldwide in the past and at present is responsible for the destruction of various plant and animal species as well as the habitats in which they occur. The lack of knowledge about the vegetation of the Griqualand West area, therefore, makes it vulnerable to uninformed development. Therefore, a balance needs to be developed between the needs of humans and the conservation of natural habitats or resources. This balance is one of the biggest challenges faced by decision-makers in the country.

Preventing the destruction of any ecosystem requires a need for systematic planning and co-ordination of human activities and development should be prioritised. The planning should include studies of the natural environment which include soil, water, vegetation, animals and cultural as well as historical aspects.

The plant community is seen as an important unit in any ecosystem and, therefore, forms the basis for environmental planning and the compiling of environmental

management plans. Plant species assemblages is an indication of the habitat, ecosystem health, and rarity of the ecosystem, and are an important part of an Environmental Impact Assessment.

AIMS OF THE STUDY

This report aims to present ecological information on the flora that are present on the farm Uitdraai Boerdery, approximately 11 km east of Prieska on the Douglas road, which was covered with natural vegetation when visited in the Northern Cape, South Africa (hereafter referred to as the study area).

The objectives of this study were to:

- Identify, describe, and delineate the different vegetation units present on the property
- Compile a map of the vegetation units present in the area
- Indicate the presence of protected plant species or suitable habitat
- Identify alien invasive plant species
- Provide a sensitivity map of the study area (where applicable).

STUDY AREA

Location

The study site is located east of Prieska on the R357 towards Douglas. Except for the road on the northern side of the site, it is surrounded by natural vegetation similar to that found at the study site (Figure 1).

The study area falls within the Nama Karoo Biome of Mucina and Rutherford (2006), when looking at the vegetation types the study area forms part of the least threatened Northern Upper Karoo (NKu 3). The size of the study area is approximately 19.8 ha.



Figure 1: Locality of the study area (red outlines indicate the study area) (Source: Google Maps)

METHODS

VEGETATION

Principles of the Braun-Blanquet survey technique were used to do the survey and describe plant communities as ecological units. Relevant literature was used to obtain an overview of the vegetation of the site. The ecological sensitivity of the plant communities was assessed and categorised according to the habitat and plant species assemblages. Aerial photographs were used to study the site, and a preliminary delineation of the possible different vegetation units was done. These vegetation units were verified on foot at the site, and vegetation sample plots were placed in each.

Data recorded included:

Data gathered included the physiognomy and floristic composition (species richness and canopy cover) of each species. A list of plant species present, including trees, shrubs, grasses, forbs, geophytes and succulents, was compiled. All identifiable plant species were listed. Additional notes were made of any features that might be of ecological significance.

Red data and protected species

An investigation was carried out on rare and protected plants that might possibly occur in the region. The National Red List of Threatened Plants of South Africa, Lesotho and Swaziland, compiled by the Threatened Species Programme, South African National Biodiversity Institute (SANBI), was used. The Northern Cape Nature Conservation Act (No. 9 of 2009) was also consulted, as well as The Red List of South African Plants compiled by SANBI (2020). The New Plants of South Africa (SANBI 2016) was also used.

The presence of rare and protected species or suitable habitat was recorded during the field visit.

Data processing

Vegetation data were classified to identify, describe, and map vegetation units. Description of the vegetation units includes tree, shrub, and herbaceous layers. Conservation priority for each vegetation unit was assessed by evaluating plant species composition in terms of the present knowledge of the vegetation of the Nama Karoo Biome of South Africa. Five conservation priority categories were used for the different vegetation units:

High:	Area with natural vegetation with a high species richness and habitat diversity; presence of viable populations of red data plant species OR suitable habitat for such species; presence of unique habitats; less than 5% pioneer/alien plant species present. These areas are ecologically valuable and important for ecosystem functioning. This land should be conserved and managed and is not suitable for development purposes.
Medium-high:	Natural area with a relatively high species richness and diversity; not a threatened or unique ecosystem; moderate habitat diversity; between 5-10% pioneer/alien plant species present; that would need low financial input and management to improve its current condition; and where low-density development could be considered with limited

	impact on the vegetation / ecosystem. It is recommended that larger sections of the vegetation are maintained.
Medium:	An area with a relatively natural species composition; not a threatened or unique ecosystem; moderate species diversity; between 11-20% pioneer/alien plant species present; that would need moderate to major financial input to rehabilitate to an improved condition; and where medium density development could be considered with limited impact on the vegetation / ecosystem. Where possible certain sections of the vegetation could be maintained.
Low-medium:	Area with relatively natural vegetation, though a common vegetation type; moderate to low species and habitat diversity; previously or currently degraded or in secondary successional phase; between 20-40% pioneer and/or alien plant species; low ecosystem functioning; low rehabilitation potential.
Low:	A totally degraded and transformed area with a low habitat diversity and ecosystem functioning; no viable populations of natural plants; >40% pioneer and/or alien plant species present; very low habitat uniqueness; whose recovery potential is extremely low; and on which development could be supported with little to no impact on the natural vegetation / ecosystem.

RESULTS OF THE VEGETATION SURVEY

Vegetation units

The area studied falls within undisturbed vegetation that can be seen as near natural (Figure 1). Only the R357 located on the northern boundary of the study area can be regarded as a disturbance.

The study area is composed of a single vegetation unit (Figure 2) that covers the whole of the area.

1. Shrubland vegetation unit

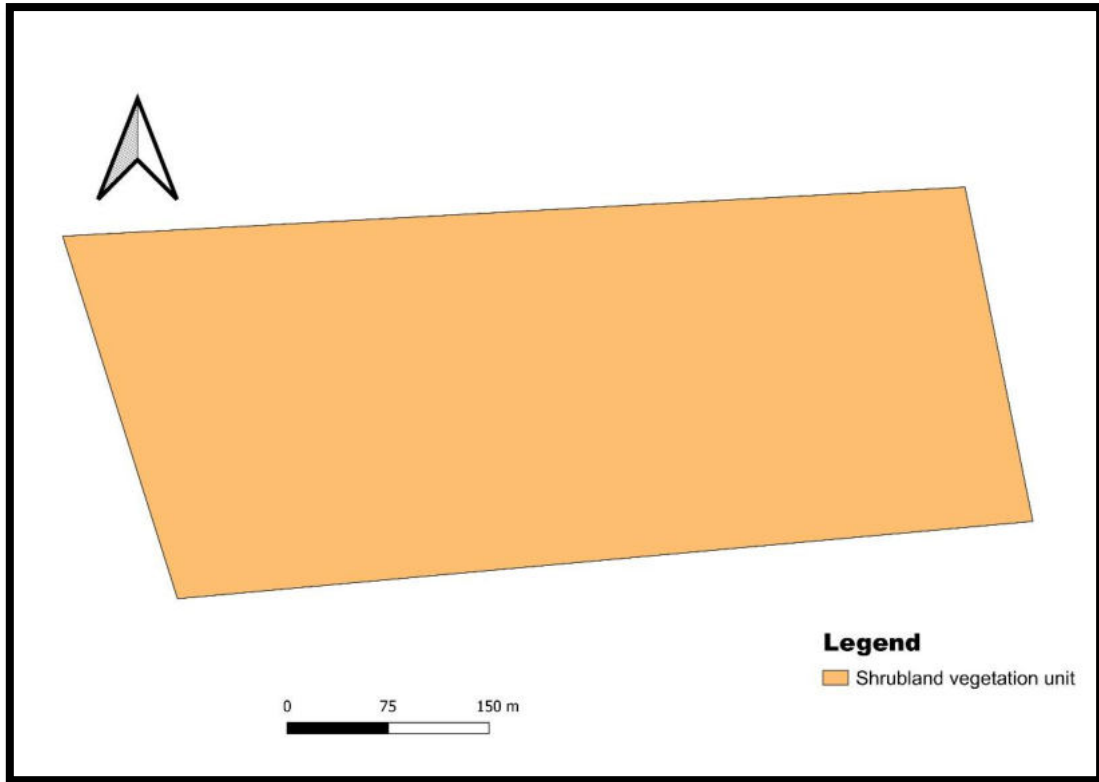


Figure 2: The shrubland vegetation unit identified in the study area.

1. Shrubland vegetation unit



Figure 3: Shrubland vegetation unit indicating the dominance of shrubs with scattered trees as well as grasses and forbs as limited ground cover.

Status	Near Natural
Vegetation structure	The vegetation is composed of shrubs with scattered trees. Ground cover is limited, but contains grasses and herbs.
Topography	Sloping in a northerly and easterly direction towards the drainage lines.
Rock cover	Rocks of various sizes cover the whole study area.
Conservation priority	High because the area is near natural.

This vegetation unit (Figure 3) covers the whole 19.8 ha of the area studied. The slope of this unit is northerly or north-easterly, depending on where the drainage line is positioned in terms of the site. Protected species include *Aizoon plinthoides*, *A. sericeum*, cf. *Nerine* sp. (Figure 4B), *Aloe claviflora*. These species are listed as protected species by the Northern Cape Ordinance, Schedule 2, because of the families in which they occur. *Euphorbia inaequilatera* is listed as a protected species by the Northern Cape Ordinance, Schedule 2, because of the genus in which it occurs. Furthermore, various individuals of the tree *Boscia albitrunca* (Figure 5) were also found. This species is protected by both the Northern Cape Ordinance and the National Forest Act of 1998.

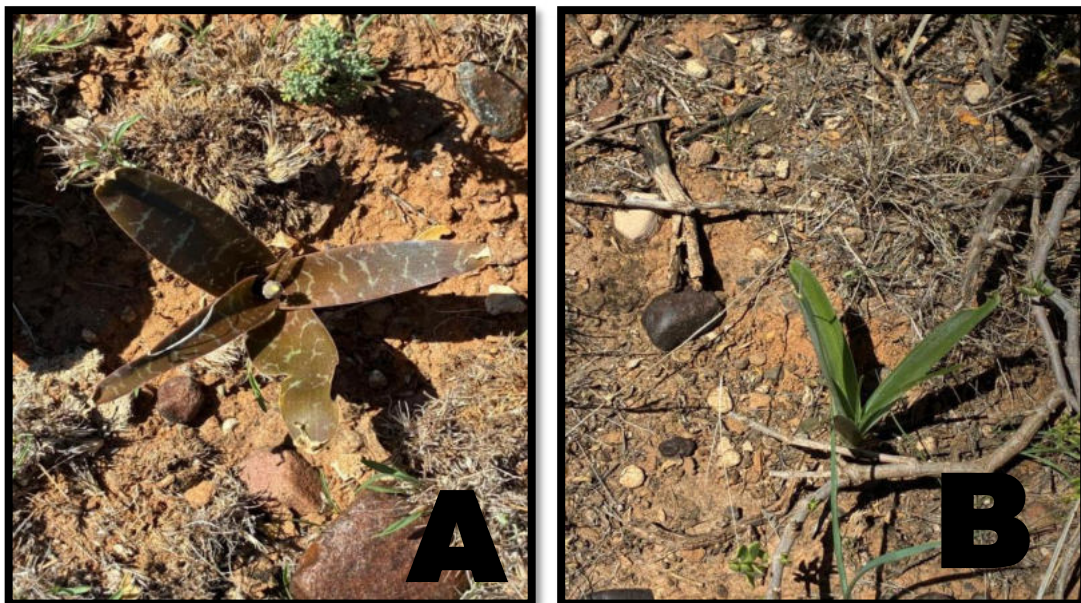


Figure 4: Bulbs found during the study that could not be identified to species level. A) *Ledebouria* sp and B) *Nerine* sp.

The vegetation at the study site is mostly dominated by the shrubs *Roepera pubescens*, *Rhigozum trichotomum* and *Pentzia incana* with scattered trees such as *Boscia albitrunca* and *Senegalia mellifera*. With regards to the grasses, *Enneapogon desvauxii* is dominant while *Eragrostis echinochloidea*, *Stipagrostis obtusa* and *S. ciliata* were also found. Some of the bulbs found during the study were difficult to identify without flowers. These include *Ledebouria* (Figure 4A) and *Nerine* (Figure 4B).



Figure 5: Various individuals of *Boscia albitrunca* found at the study site. At some locations more than one individual was noted.

Protected species:

Family	Species	Growth form
Aizoaceae	<i>Aizoon plinthoides</i>	Dwarf shrub
Aizoaceae	<i>Aizoon sericeum</i>	Dwarf shrub
Amaryllidaceae	cf. <i>Nerine</i> sp.	Bulb
Asphodelaceae	<i>Aloe claviflora</i>	Succulent
Capparaceae	<i>Boscia albitrunca</i>	Tree
Euphorbiaceae	<i>Euphorbia inaequilatera</i>	Herb

Invasive Alien plant species

Family	Species	Growth form
Amaranthaceae	<i>Chenopodium *album</i>	Herb
Amaranthaceae	<i>Salsola kali</i>	Herb
Fabaceae	<i>*Neltuma glandulosa</i> [<i>*Prosopis glandulosa</i>]	Tree/shrub

List of species found during the study:

The following is a list of plant species identified during the survey, where * indicates alien invasive species:

Family	Species	Growth form
Acanthaceae	<i>Barleria rigida</i>	Shrub
Aizoaceae	<i>Aizoon plinthoides</i>	Dwarf shrub
Aizoaceae	<i>Aizoon sericeum</i>	Dwarf shrub
Amaranthaceae	<i>Chenopodium *album</i>	Herb
Amaranthaceae	<i>Salsola kali</i>	Herb
Amaryllidaceae	cf <i>Nerine</i> sp	Bulb
Asphodelaceae	<i>Aloe claviflora</i>	Succulent
Asteraceae	<i>Berkheya pinnatifida</i>	Herb
Asteraceae	<i>Eriocephalus ericoides</i>	Shrub
Asteraceae	<i>Geigeria ornativa</i>	Herb
Asteraceae	<i>Helichrysum herniarioides</i>	Herb
Asteraceae	<i>Nidorella resedifolia</i>	Herb
Asteraceae	<i>Pentzia incana</i>	Shrub
Asteraceae	<i>Pteronia glauca</i>	Shrub
Begoniaceae	<i>Rhigozum trichotomum</i>	Shrub
Boraginaceae	<i>Ehretia alba</i>	Shrub
Capparaceae	<i>Boscia albitrunca</i>	Tree
Euphorbiaceae	<i>Euphorbia inaequilatera</i>	Herb
Fabaceae	<i>*Neltuma glandulosa</i> [<i>*Prosopis glandulosa</i>]	Tree/shrub
Fabaceae	<i>Senegalia mellifera</i>	Tree/shrub
Fabaceae	<i>Lotononis tenella</i>	Herb
Hyacinthaceae	<i>Ledebouria</i> sp.	Bulb
Limeaceae	<i>Limeum aethiopicum</i>	Herb
Loranthaceae	<i>Tapinanthus oleifolius</i>	Parasite
Malvaceae	<i>Hermannia coccocarpa</i>	Herb
Poaceae	<i>Aristida congesta</i>	Grass
Poaceae	<i>Enneapogon desvauxii</i>	Grass
Poaceae	<i>Eragrostis echinocloidea</i>	Grass
Poaceae	<i>Eragrostis trichophora</i>	Grass
Poaceae	<i>Cenchrus ciliaris</i>	Grass
Poaceae	<i>Setaria verticillata</i>	Grass
Poaceae	<i>Sporobolus ioclados</i>	Grass
Poaceae	<i>Stipagrostis ciliata</i>	Grass
Poaceae	<i>Stipagrostis obtusa</i>	Grass

Family	Species	Growth form
Portulacaceae	<i>Portulaca quadrifida</i>	Herb
Scrophulariaceae	<i>Aptosimum indivisum</i>	Dwarf shrub
Scrophulariaceae	<i>Aptosimum marlothii</i>	Dwarf shrub
Scrophulariaceae	<i>Aptosimum spinescens</i>	Dwarf shrub
Solanaceae	<i>Lycium cinereum</i>	Shrub
Solanaceae	<i>Lycium hirsutum</i>	Shrub
Zygophyllaceae	<i>Roepera pubescens</i>	Shrub
Zygophyllaceae	<i>Tetraena microcarpa</i>	Shrub
Zygophyllaceae	<i>Tribulus cristatus</i>	Herb

DISCUSSION

VEGETATION

Vegetation types

The vegetation type present in the study area falls within the Nama Karoo Biome, namely the Northern Upper Karoo (NKu 3) considered as **least threatened**.

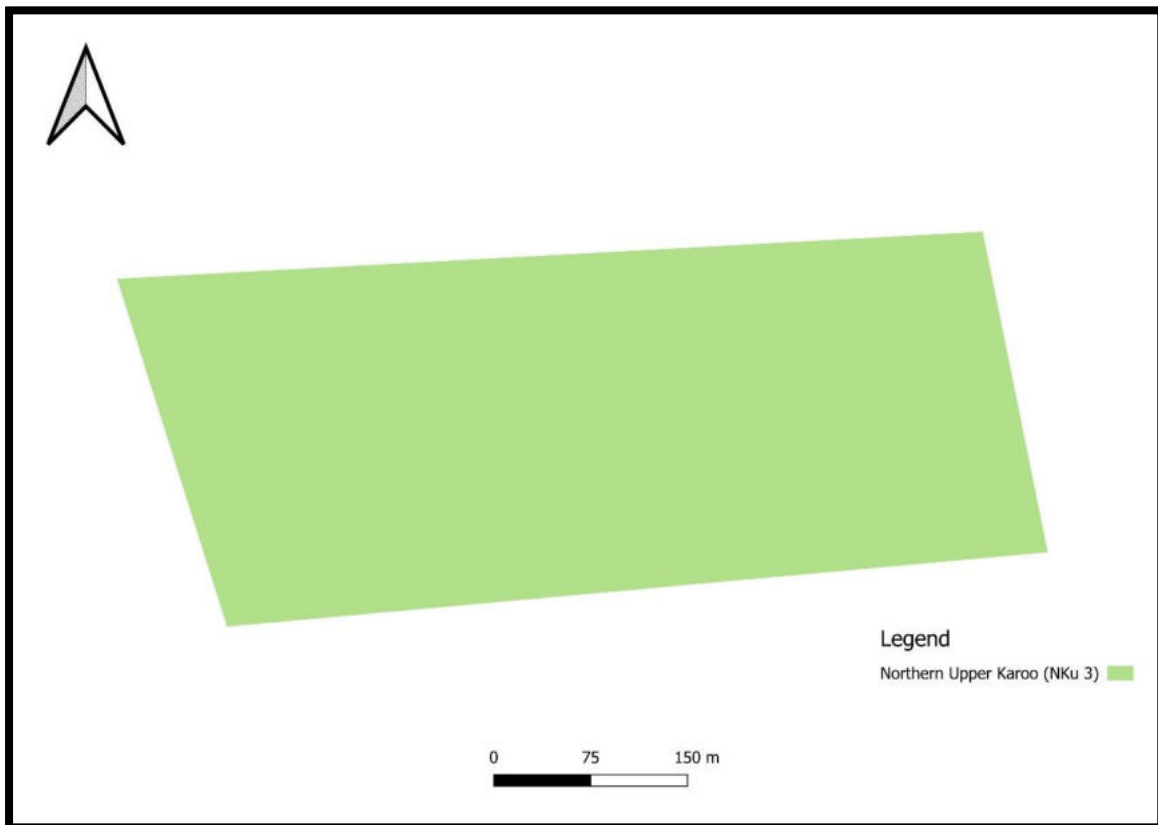


Figure 6: Location of the study area within the Northern Upper Karoo (NKu 3) vegetation type after Mucina and Rutherford (2006).

The Northern Upper Karoo (NKu 3) (Figure 6) is considered **least threatened**; however, there are no statutory conserved areas in this vegetation type. Around 4% has been cleared for cultivation or irreversibly transformed by the building of dams. There is also an increase in human settlements in the north-eastern parts of the vegetation type. **Neltuma glandulosa* [**Prosopis glandulosa*], one of the 12 agriculturally most important invasive alien plants in South Africa, is widely distributed in this vegetation type.

Important taxa according to Mucina and Rutherford (2006) include Small Trees: *Acacia mellifera* subsp. *detinens*, *Boscia albitrunca*. Tall Shrubs: *Lycium cinereum*, *Lycium horridum*, *L. oxycarpum*, *L. schizocalyx*, *Rhigozum trichotomum*. Low shrubs: *Chrysocoma ciliata*, *Lasiosiphon polycephalus* [*Gnidia polycephala*], *Pentzia calcarea*, *P. globosa*, *P. incana*, *P. spinescens*, *Rosenia humilis*, *Amphiglossa triflora*, *Aptosimum marlothii*, *A. spinescens*, *Asparagus glaucus*, *Barleria rigida*, *Berkheya annectens*, *Eriocephalus ericoides* subsp. *ericoides*, *E. glandulosus*, *E. spinescens*, *Euryops asparagoides*, *Filicia muricata*, *Helichrysum lucilioides*, *Hermannia spinosa*, *Leucas capensis*, *Limeum aethiopicum*, *Melolobium candicans*, *Microloma armatum*, *Osteospermum leptolobum*, *O. spinescens*, *Pegolettia retrofracta*, *Pentzia lantana*, *Phyllanthus maderaspatensis*, *Aizoon plinthoides* [*Plinthus karoicus*], *Petronia glauca*, *P. sordida*, *Selago geniculata*, *S. saxatilis*, *Tetragonia arbuscula*, *Roepera lichtensteiniana* [*Zygophyllum lichtensteinianum*]. Succulent shrubs: *Hertia pallens*, *Salsola calluna*, *S. glabrescens*, *S. rabieana*, *S. tuberculata*, *Zygophyllum flexuosum*. Semiparasitic shrubs: *Thesium hystrix*. Herbs: *Euphorbia inaequilatera* [*Chamaesyce inaequilatera*], *Convolvulus sagittatus*, *Dicoma capensis*, *Gazania krebsiana*, *Hermannia comosa*, *Indigofera alternans*, *Lessertia pauciflora*, *Radyera urens*, *Sesamum capense*, *Sutera pinnatifida*, *Tribulus terrestris*, *Vahlia capensis*. Succulent herb: *Mesembryanthemum coriarium* [*Psilocaulon coriarium*]. Geophytic herb: *Moraea pallida*. Graminoids: *Aristida adscensionis*, *A. congesta*, *A. diffusa*, *Enneapogon desvauxii*, *Eragrostis lehmanniana*, *E. obtusa*, *E. truncata*, *Sporobolus fimbriatus*, *Stipagrostis obtusa*, *Eragrostis bicolor*, *E. porosa*, *Fingerhuthia africana*, *Heteropogon contortus*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koeleroides*, *T. racemosus*

Biogeographically Important Taxa: Herb: *Convolvulus boedeckerianus*. Tall Shrub: *Gymnosporia szyszylowiczii* subsp. *namibiensis*.

Endemic Taxa: Succulent shrubs: *Lithops hookeri*, *Stomatium pluridens*. Low shrubs: *Atriplex spongiosa*, *Galenia exigua*. Herb: *Manulea deserticola*

Vegetation units

This shrubland vegetation unit has a well-developed shrub layer dominated by *Roepera pubescens*, *Rhigozum trichotomum* and *Pentzia incana*. These shrubs are well established in the study area. The alien invasive **Neltuma glandulosa* [**Prosopis glandulosa*] is also present either as shrubs or trees and is known as a category 3 invader in the Northern Cape. Prominent grasses in this vegetation unit are *Enneapogon desvauxii*, *Eragrostis echinocloidea*, *Stipagrostis ciliata* and *S. obtusa*. Ecologically, this vegetation unit and thus the study area can be seen as near natural with limited human disturbance. The area is also surrounded by natural vegetation that is similar in composition to that found in the study area. The only possible disturbance at the moment is the influence of the R357 that runs between Prieska and Douglas. A limited number of alien invasive species were found, namely *Chenopodium *album*, *Salsola kali* (regarded as a problem plant by NEMBA) and **Neltuma glandulosa* [**Prosopis glandulosa*].

Declared Alien Invasive Plant species (AIP's)

Family	Species	NEMBA
Amaranthaceae	<i>Salsola kali</i>	1b
Fabaceae	<i>*Neltuma glandulosa</i> [<i>*Prosopis glandulosa</i>]	3

Alien species pose a risk to the natural environment, locally as well as in the surrounding areas. These species are indicative of degraded conditions in the areas where they occur. Alien plant species outperform the indigenous plant species in terms of reproduction and establishment; furthermore, they also cause deterioration of the habitat in terms of soil water content, soil pH and erosion. The species found during this study are mainly from NEMBA's category 1b that must be controlled or eradicated where possible. Category 3 species is also present. These species are proven invaders and must be controlled (Henderson, 2020).

Protected and specially protected species

A list of possible protected species that were recorded in the larger region is listed below

(Please note that the list is confidential and may not be made available for public perusal)

Species	Conservation status	Comments
<i>Nerine</i> sp	Amaryllidaceae family is protected	Found
<i>Boschia albitrunca</i>	Least concern	Found
<i>Aizoon plinthoides</i>	Aizoaceae family is protected	Found
<i>Aizoon sericeum</i>	Aizoaceae family is protected	Found
<i>Aloe claviflora</i>	Asphodelaceae family is protected	Found
<i>Euphorbia inaequilatera</i>	Species in the <i>Euphorbia</i> genus are protected	Found

Ecosystem classification

The study area falls within the greater Griqualand West Centre of Endemism (Frisby, 2016; Frisby *et al.*, 2019; van Staden *et al.*, 2020). The focus areas of the centre of endemism are the core areas with higher numbers of endemic and restricted flora. The core areas include the Northern Ghaap Plateau and Kuruman Hills sub-centre, the Southern Kalahari and the Langeberg sub-centre and the Southern Ghaap Plateau and the Kimberley-Prieska valley sub-centre. The area of study does not fall within either of these regions (Frisby, 2016; Frisby *et al.*, 2019; van Staden *et al.*, 2020).

Critical Biodiversity Areas

The Northern Cape identified different Critical Biodiversity areas, and the study area falls within Critical Biodiversity Area 2 (Figure 7). Critical Biodiversity Area 2 are areas that is required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure. These areas need to be maintained in a functional, natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

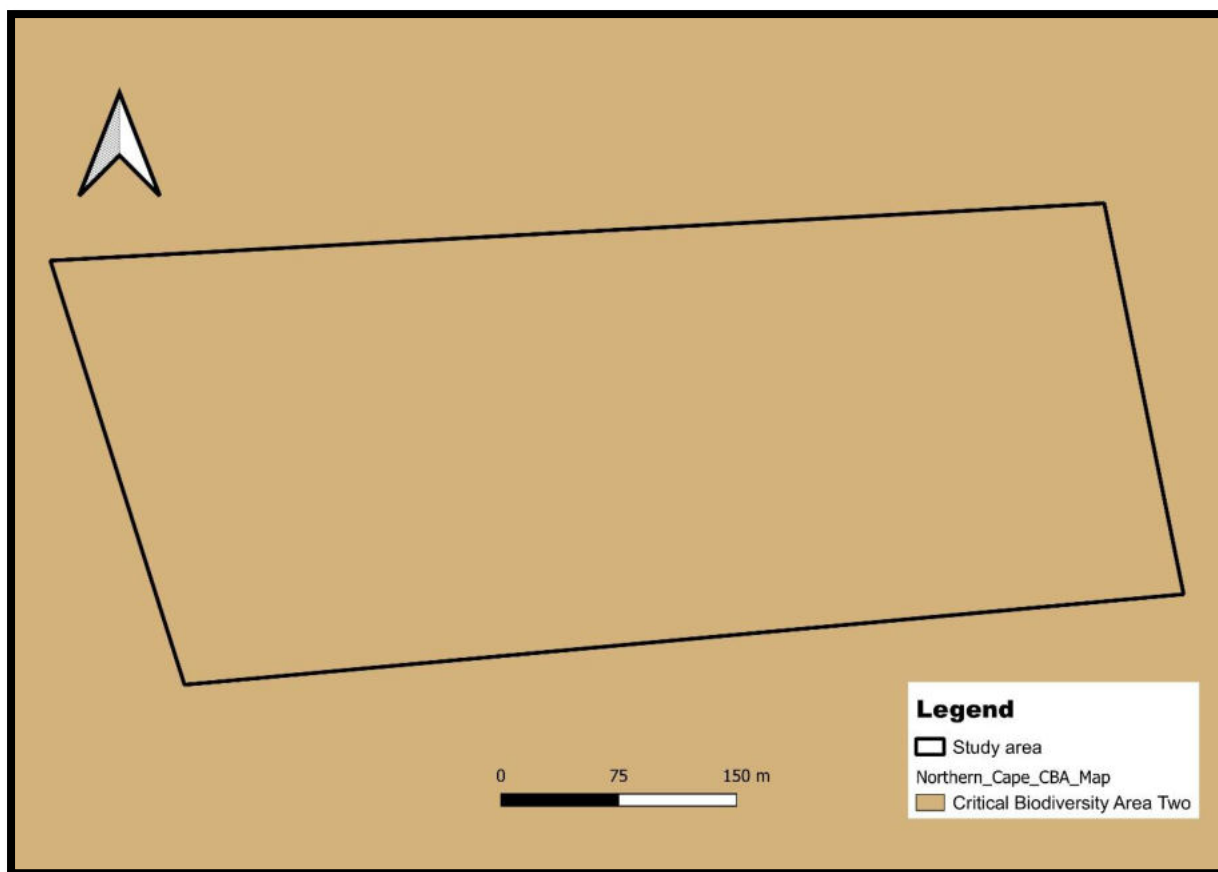


Figure 7: Study area falling with the Critical Biodiversity Areas identified by the Northern Cape in 2016.

CONCLUSION AND RECOMMENDATIONS

The study is located east of Prieska along the R357 toward Douglas. The study area is bound by natural vegetation to the east, south and west, while the R357 form the northern boundary.

The study area comprises one vegetation unit that is dominated by various shrubs with scattered trees while grasses, and herbs form the ground cover. The vegetation in the area can be seen as near natural, with only some alien invasive vegetation, with limited cover. There are various protected species found in the area which include *Aizoon plinthoides*, *A. sericeum*, cf. *Nerine* sp., *Aloe claviflora* and *Euphorbia inaequilatera*. *Boscia albitrunca* a nationally protected species occurs extensively in the study area it is important to note that this species is a keystone species in arid southern Africa (Alias and Milton, 2003). The conservation value of the study area can therefore be seen as medium high with a medium sensitivity, which should be taken into account

when development does occur. Permits will be required for the removal of all the protected species listed. No Red Data species were found in the study area.

Although the study area falls within the Critical Biodiversity Areas 2. Based on the results of this study, the vegetation of the study site is regarded as being in a near natural state, with a moderate species richness consisting of climax and secondary successional species mostly. The study area is therefore regarded as having a high biodiversity importance and meet the criteria to be classified as a CBA. The few alien invasive *Prosopis glandulosa* species present should be removed as a high priority to prevent them from encroaching into the area and displacing the native vegetation. The high conservation value of this area is further emphasized due to the high number of medium to tall, protected trees *Boscia albitrunca*. Furthermore, this area is surrounded by open natural vegetation and thus has a high connectivity to similar vegetation.

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BASIC ASSESSMENT

D2b: Terrestrial Ecological and Flora Assessment Report for **Alternative Site 2 (Preferred site)**

The Terms of Reference for the Flora Specialist Assessment were to:

- Conduct a desktop review of available botanical literature, biodiversity databases, vegetation maps and conservation planning information relevant to the study area.
- Undertake a detailed field survey of the proposed development site to identify and describe the vegetation communities present.
- Delineate and map the vegetation units occurring within the study area.
- Assess the ecological condition, conservation importance and sensitivity of each vegetation unit.
- Identify plant species occurring on the site, including trees, shrubs, grasses, geophytes, succulents and forbs.
- Identify any protected plant species, Species of Conservation Concern (SCC), endemic species, or suitable habitat for such species.
- Identify and record the occurrence of alien and invasive plant species in accordance with the National Environmental Management: Biodiversity Act (Act 10 of 2004).
- Determine the ecosystem classification and conservation status of the vegetation present.
- Assess the study area's relationship to Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and other biodiversity planning categories.
- Prepare a botanical sensitivity map identifying areas of differing conservation importance.
- Assess the likely direct, indirect and cumulative impacts of the proposed development on flora and vegetation.
- Recommend practical mitigation measures to avoid, minimise or offset impacts on indigenous vegetation and protected plant species.
- Provide an independent opinion on the environmental suitability of the proposed development site from a botanical perspective.

May 2026

AN ECOLOGICAL REPORT ON THE FLORA: ON THE FARM UITDRAAI BOERDERY IN THE NORTHERN CAPE

A report commissioned by Digital Soils Africa

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CONDITIONS RELATING TO THIS REPORT

Declaration of interest

Sparaxis Environmental PTY (Ltd) and its members/co-workers:

- Have no vested interest in the property studied, nor is it affiliated with any other person/body involved with the property and/or proposed development.
- Is not a subsidiary, legally or financially, of the proponent.
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- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field.
- Is committed to biodiversity conservation but concomitantly recognise the need for economic development. We reserve the right to form and hold our own opinions within the constraints of our specialities and experience and, therefore, will not submit willingly to the interests of other parties or change our statements to appease them

The study was undertaken by Dr AC van Aardt (PhD UFS) who is registered as a Professional Natural Scientist (Reg. No. 131584 - Ecological Sciences and Botanical Sciences).

They have the following qualifications

SPECIALIST	QUALIFICATION
Dr A.C. van Aardt	PhD – Botany MSc – Botany BSc Hons (Botany) BSc (Botany & Zoology)

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The formal site visit was undertaken on 18 April 2026. This was after the rainy season; however, the area has received late rainfall during 2026. There were thus still plants flowering during this time. Although some plants had flowers, inflorescences and seeds, it was not the case for all. Plants that had flowers or had remnants of flowers at the time of the visit could be identified. Some of the more rare and cryptic species may have been overlooked due to their inconspicuous growth forms. Many of the rare and endangered succulent species can only be distinguished (in the veld) from their very similar relatives based on their reproductive parts. These plants flower at different times of the year. Multiple visits to any site during the different seasons of the year could, therefore, increase the chances to record a larger portion of the total species complex associated with the area. The survey of the study site is, however, considered as successful with a correct identification of the vegetation units and their ecological sensitivity.

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Conclusions reached, and recommendations made, are based not only on the occurrence of individual species, but more appropriately on habitats and ecosystem processes. Planning must, therefore, allow for the maintenance of species, habitats and ecosystem processes, even if Red Data or endemic plant or animal species are absent.



Dr A.C. van Aardt

Sparaxis Environmental Pty (Ltd)

INTRODUCTION

The Nama-Karoo has a low floristic diversity with a high diversity of plant life forms. On the complex of extensive plains, one can find dwarf shrubs, grasses, succulents, geophytes and annual forbs, while trees occur along drainage lines or rocky outcrops. Aridity that is a common phenomenon in this biome is mostly responsible for the low vegetation cover. These karoo and karoo-like environments such as Griqualand West, are harsh environments that are unpredictable with indigenous plants and animals that were selected over hundreds of thousands of years. Harsh environments as described above occupy the north-central parts of South Africa, mainly in the Northern Cape, although it also includes parts of the North-West and the Free State Provinces. The Griqualand West area is semi-arid with a few perennial rivers; however, the most prominent is the Orange River. Furthermore, the Griqualand West area has a lack of knowledge in terms of its vegetation, although it was known since the mid-20th century that this area has a high floristic diversity. Knowledge of this extraordinary ecosystem will enable better management and decision-making about sustainable development.

Vegetation forms is the most physical representation of ecosystems used for classification and defining areas. Uncontrolled and ill-planned development is one of the biggest threats to naturally evolved life on earth. Development worldwide in the past and at present is responsible for the destruction of various plant and animal species as well as the habitats in which they occur. The lack of knowledge about the vegetation of the Griqualand West area, therefore, makes it vulnerable to uninformed development. Therefore, a balance needs to be developed between the needs of humans and the conservation of natural habitats or resources. This balance is one of the biggest challenges faced by decision-makers in the country.

Preventing the destruction of any ecosystem requires a need for systematic planning and co-ordination of human activities when development is taking place. The planning should include studies of the natural environment (soil, water, vegetation, animals), cultural as well as historical aspects.

The plant community is seen as an important unit in any ecosystem and, therefore, forms the basis for environmental planning and the compiling of environmental

management plans. Plant species assemblages is an indication of the habitat, ecosystem health, and rarity of the ecosystem, and are an important part of an Environmental Impact Assessment.

AIMS OF THE STUDY

This report aims to present ecological information on the flora that are present on the farm Uitdraai Boerdery, approximately 14 km east of Prieska on the Douglas Road (R357), which was covered with natural vegetation when visited in the Northern Cape Province, South Africa (hereafter referred to as the study area).

The objectives of this study were to:

- Identify, describe, and delineate the different vegetation units present on the property
- Compile a map of the vegetation units present in the area
- Indicate the presence of protected plant species or suitable habitat
- Identify alien invasive plant species
- Provide a sensitivity map of the study area (where applicable).

STUDY AREA

Location

The study site is located east of Prieska on the R357 towards Douglas. The northern boundary of the study site is the R357, with natural vegetation on the eastern, southern and western sides of the study area (Figure 1).

The study area falls within the Nama Karoo Biome of Mucina and Rutherford (2006). When looking at the vegetation types the study area forms part of the least threatened Northern Upper Karoo (NKu 3). The size of the study area is approximately 19.2 ha.

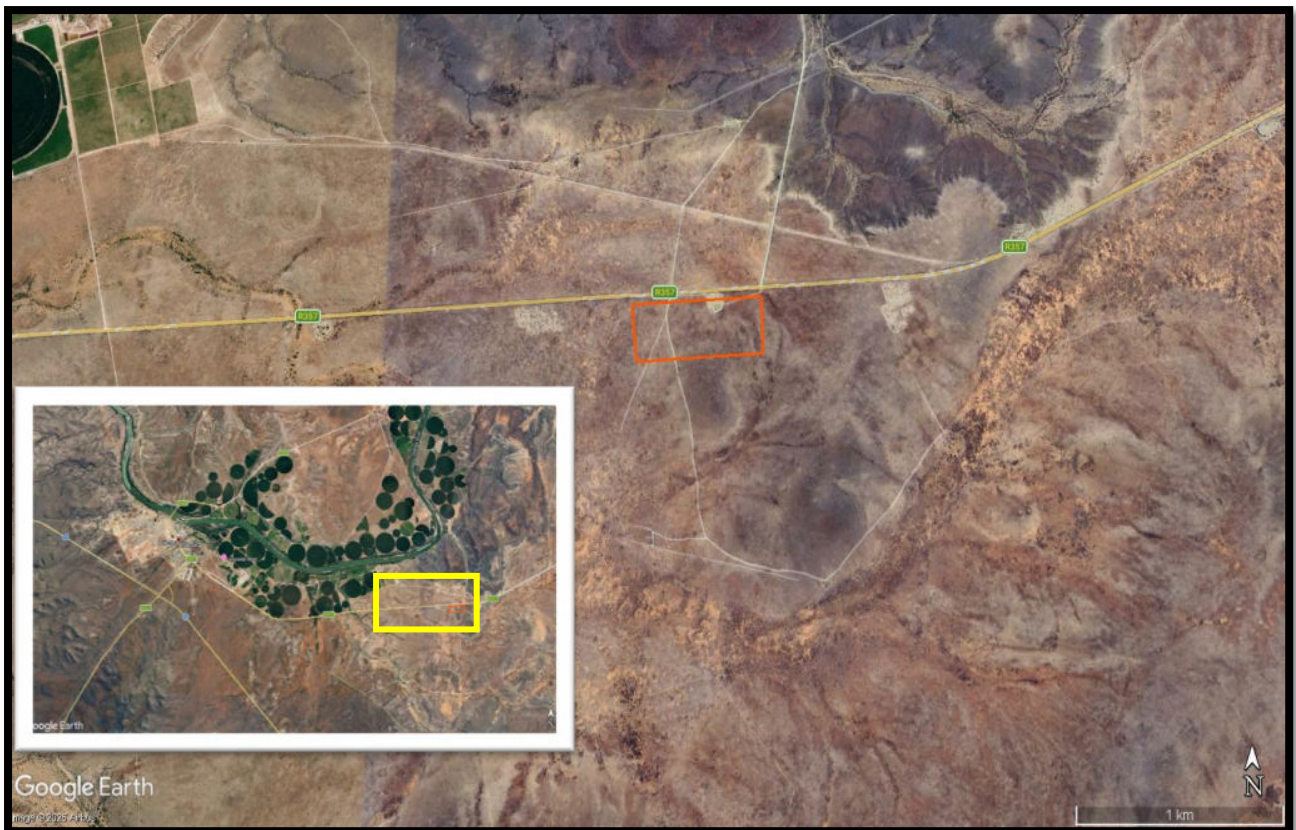


Figure 1: Locality of the study area (orange outlines indicate the study area) (Source: Google Maps)

METHODS

VEGETATION

Principles of the Braun-Blanquet survey technique were used to do the survey and describe plant communities as ecological units. Relevant literature was used to obtain an overview of the vegetation of the site. The ecological sensitivity of the plant communities was assessed and categorised according to the habitat and plant species assemblages. Aerial photographs were used to study the site, and a preliminary delineation of the possible different vegetation units was done. These vegetation units were verified on foot at the site, and vegetation sample plots were placed in each.

Data recorded included:

Data gathered included the physiognomy and floristic composition (species richness and canopy cover) of each species. A list of plant species present, including trees, shrubs, grasses, forbs, geophytes and succulents, was compiled. All identifiable plant species were listed. Additional notes were made of any features that might be of ecological significance.

Red data and protected species

An investigation was carried out on rare and protected plants that might possibly occur in the region. The National Red List of Threatened Plants of South Africa, Lesotho and Swaziland, compiled by the Threatened Species Programme, South African National Biodiversity Institute (SANBI), was used. The Northern Cape Nature Conservation Act (No. 9 of 2009) was also consulted, as well as The Red List of South African Plants compiled by SANBI (2020). The New Plants of South Africa (SANBI 2016) was also used.

The presence of rare and protected species or suitable habitat was recorded during the field visit.

Data processing

Vegetation data were classified to identify, describe, and map vegetation units. Description of the vegetation units includes tree, shrub, and herbaceous layers. Conservation priority for each vegetation unit was assessed by evaluating plant species composition in terms of the present knowledge of the vegetation of the Nama Karoo Biome of South Africa. Five conservation priority categories were used for the different vegetation units:

High:	Area with natural vegetation with a high species richness and habitat diversity; presence of viable populations of red data plant species OR suitable habitat for such species; presence of unique habitats; less than 5% pioneer/alien plant species present. These areas are ecologically valuable and important for ecosystem functioning. This land should be conserved and managed and is not suitable for development purposes.
Medium-high:	Natural area with a relatively high species richness and diversity; not a threatened or unique ecosystem; moderate habitat diversity; between 5-10% pioneer/alien plant species present; that would need low financial input and management to improve its current condition; and where low-density development could be considered with limited

	impact on the vegetation / ecosystem. It is recommended that larger sections of the vegetation are maintained.
Medium:	An area with a relatively natural species composition; not a threatened or unique ecosystem; moderate species diversity; between 11-20% pioneer/alien plant species present; that would need moderate to major financial input to rehabilitate to an improved condition; and where medium density development could be considered with limited impact on the vegetation / ecosystem. Where possible certain sections of the vegetation could be maintained.
Low-medium:	Area with relatively natural vegetation, though a common vegetation type; moderate to low species and habitat diversity; previously or currently degraded or in secondary successional phase; between 20-40% pioneer and/or alien plant species; low ecosystem functioning; low rehabilitation potential.
Low:	A totally degraded and transformed area with a low habitat diversity and ecosystem functioning; no viable populations of natural plants; >40% pioneer and/or alien plant species present; very low habitat uniqueness; whose recovery potential is extremely low; and on which development could be supported with little to no impact on the natural vegetation / ecosystem.

RESULTS OF THE VEGETATION SURVEY

Vegetation units

The area studied falls within undisturbed vegetation that can be seen as near natural (Figure 1). The presence of the R357, located on the northern boundary of the study area, can be regarded as a disturbance together with the gwarrie in the north-easter part of the study area.

The study area is composed of two-vegetation units (Figure 2) that covers the study area.

1. Shrubland vegetation unit
2. Gwarrie vegetation unit

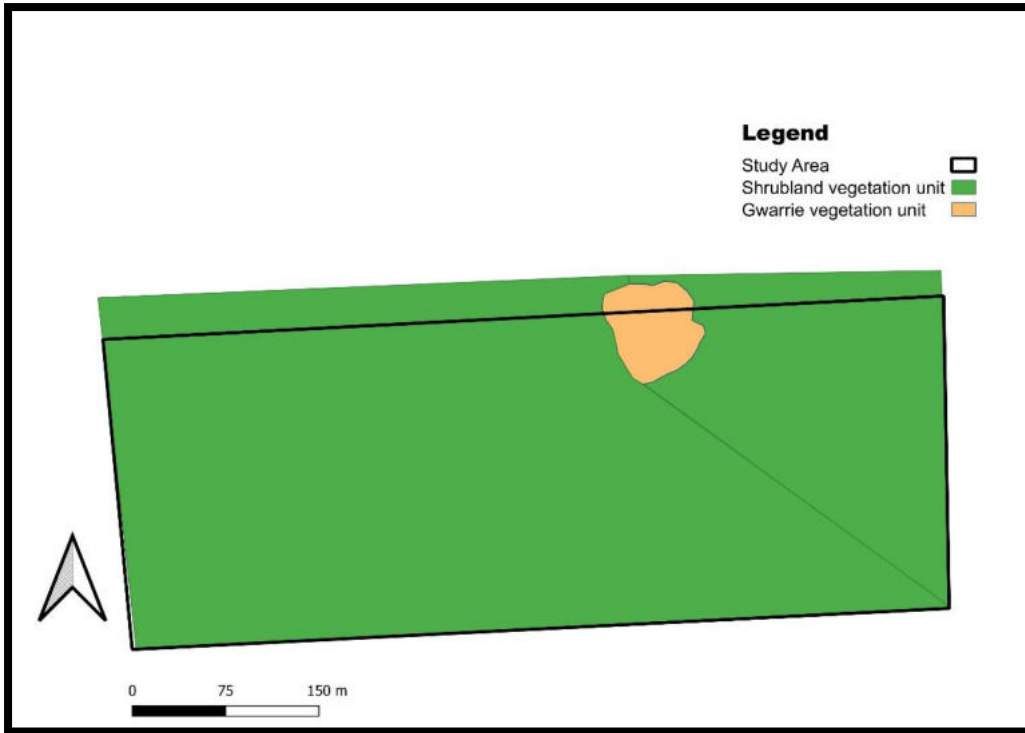


Figure 2: The different vegetation units identified in the study area.

1. Shrubland vegetation unit



Figure 3: Shrubland vegetation unit indicating the dominance of shrubs and grasses with limited forbs as ground cover.

Status	Near Natural
Vegetation structure	The vegetation is mostly dominated by shrubs and grasses with some herbs. Ground cover is limited.
Topography	Sloping in a northerly and westerly direction.
Rock cover	Rocks of various sizes cover the whole study area.
Conservation priority	Medium, because of the relative low species richness.

This vegetation unit (Figure 3) covers 18.65 ha of the study area. The area is sloping in a northerly and westerly direction. Specially protected species under the Northern Cape Ordinance, Schedule 2, because of the families in which they occur include *Aizoon plinthoides*, *Aloe claviflora* (Figure 4) and cf. *Nerine* sp. (Figure 5A). Various individuals of the bulbs (Figure 5) were found during the study; however, identification was difficult due to the absence of flowers. The protected succulent *Aloe claviflora* was found on the southern boundary of the study site.



Figure 4: *Aloe claviflora* found on the southern boundary of the study site.



Figure 5: Bulbs found during the study that could not be identified to species level. A) cf. *Nerine* sp and B) *Ledebouria* sp.

Vegetation in this unit is dominated by the succulent shrub *Tetraena rigida*, the woody shrub *Rhigozum trichotomum* and the grasses *Stipagrostis ciliata*, *S. uniplumis* and *S. obtusa*. These mentioned species vary in their dominance in certain areas of the study area. In some areas the grasses are dominant (Figure 3), while in other areas the woody shrub *Rhigozum trichotomum* (Figure 6) are dominant.



Figure 6: *Rhigozum trichotomum* dominating in certain areas of the study site.

In other instances, the succulent shrub *Tetraena rigida* dominate the vegetation (Figure 7). Although there are different species that dominate in different areas, one

cannot map them as separate entities since the species composition of these areas are similar. On the southern boundary of the study area the category 3 alien invasive **Neltumia glandulosa* is also present.



Figure 7: *Tetraena rigida* dominated vegetation in the study area.

Protected species:

Family	Species	Growth form
Aizoaceae	<i>Aizoon plinthoides</i>	Dwarf shrub
Amarylidaceae	cf <i>Nerine</i> sp.	Bulb
Asphodelaceae	<i>Aloe claviflora</i>	Succulent

Invasive Alien plant species

Family	Species	Growth form
Fabaceae	<i>*Neltumia glandulosa</i>	Tree/shrub

List of species found during the study:

The following is a list of plant species identified during the survey, where * indicates alien invasive species:

Family	Species	Growth form
Acanthaceae	<i>Barleria rigida</i>	Shrub
Acanthaceae	cf <i>Pogonospermum incanum</i>	Dwarf shrub
Aizoaceae	<i>Aizoon plinthoides</i>	Dwarf shrub
Amaranthaceae	* <i>Alternanthera pungens</i>	Herb
Amaranthaceae	<i>Cyphocarpa angustifolia</i>	Herb
Amaryllidaceae	cf <i>Nerine</i> sp.	Bulb
Asphodelaceae	<i>Aloe claviflora</i>	Succulent
Asteraceae	<i>Dicoma capensis</i>	Herb
Asteraceae	<i>Eriocephalus ambiguus</i>	Shrub
Asteraceae	<i>Pentzia incana</i>	Shrub
Asteraceae	<i>Oedera humilis</i>	Shrub
Begoniaceae	<i>Rhigozum trichotomum</i>	Shrub
Fabaceae	<i>Senegalia mellifera</i>	Tree/shrub
Fabaceae	<i>Argyrolobium</i> sp	Herb
Fabaceae	<i>Indigofera alternans</i>	Herb
Fabaceae	* <i>Neltumia glandulosa</i>	Tree/shrub
Geraniaceae	<i>Pelargonium</i> sp.	Herb
Hyacinthaceae	<i>Ledebouria</i> sp.	Bulb
Limeaceae	<i>Limeum aethiopicum</i>	Herb
Malvaceae	<i>Hermannia coccocarpa</i>	Herb
Malvaceae	<i>Hermannia spinosa</i>	Dwarf shrub
Poaceae	<i>Aristida congesta</i> subsp <i>barbicollis</i>	Grass
Poaceae	<i>Enneapogon cenchroides</i>	Grass
Poaceae	<i>Enneapogon desvauxii</i>	Grass
Poaceae	<i>Enneapogon scaber</i>	Grass
Poaceae	<i>Eragrostis annulata</i>	Grass
Poaceae	<i>Eragrostis echinochloidea</i>	Grass
Poaceae	<i>Eragrostis lehmanniana</i>	Grass
Poaceae	<i>Fingerhuthia africana</i>	Grass
Poaceae	<i>Stipagrostis ciliata</i>	Grass
Poaceae	<i>Stipagrostis obtusa</i>	Grass
Poaceae	<i>Stipagrostis uniplumis</i>	Grass
Scrophulariaceae	<i>Aptosimum spinescens</i>	Dwarf shrub
Zygophyllaceae	<i>Tribulus zeyheri</i>	Herb
Zygophyllaceae	<i>Tetraena rigida</i>	Shrub

2. Gwarrie vegetation unit



Figure 8: Gwarrie vegetation unit with very limited vegetation cover present.

Status	Severely disturbed
Vegetation structure	There is not much vegetation growing here. The vegetation is limited with various pioneer and alien invasive species dominating this vegetation unit.
Topography	Concave area that differs from the surrounding relative flat terrain.
Rock cover	Not much rocks present, however the soil is gravelly.
Conservation priority	Low, because of limited vegetation with very low species richness.

Figure 8 indicate the Gwarrie vegetation unit that covers approximately 0.55 ha of the study area. This unit forms a concave shape in the surrounding landscape where there is evidence of severe disturbance in the form of excavations. The vegetation is dominated by *Enneapogon cenchroides* a pioneer grass, and the presence of the

woody shrub **Neltumia glandulosa*, and alien invasive listed by NEMBA as a category 3 invasive species.

Protected species:

No protected species were found in this vegetation unit.

Invasive Alien plant species

Family	Species	Growth form
Amaranthaceae	<i>Salsola kalii</i>	Herb
Fabaceae	<i>*Neltuma glandulosa</i>	Tree/shrub
Papaveraceae	<i>*Argemone ochroleuca</i>	Herb

List of species found during the study:

The following is a list of plant species identified during the survey, where * indicates alien invasive species:

Family	Species	Growth form
Acanthaceae	<i>Barleria rigida</i>	Shrub
Amaranthaceae	<i>*Alternanthera pungens</i>	Herb
Amaranthaceae	<i>Salsola kalii</i>	Herb
Asteraceae	<i>Dicoma capensis</i>	Herb
Asteraceae	<i>Felicia muricata</i>	Shrub
Asteraceae	<i>Hertia pallens</i>	Shrub
Asteraceae	<i>Pentzia incana</i>	Shrub
Caryophyllaceae	<i>Pollichia campestris</i>	Herb
Fabaceae	<i>Indigofera alternans</i>	Herb
Fabaceae	<i>*Neltuma glandulosa</i>	Tree/shrub
Malvaceae	<i>Radyera urens</i>	Shrub
Nyctaginaceae	<i>Boerhavia *cordobensis</i>	Herb
Papaveraceae	<i>*Argemone ochroleuca</i>	Herb
Poaceae	<i>Aristida congesta</i>	Grass
Poaceae	<i>Enneapogon cenchroides</i>	Grass
Poaceae	<i>Enneapogon desvauxii</i>	Grass
Poaceae	<i>Enneapogon scaber</i>	Grass
Poaceae	<i>Eragrostis echinocloidea</i>	Grass
Poaceae	<i>Eragrostis trichophora</i>	Grass
Poaceae	<i>Fingerhuthia africana</i>	Grass
Poaceae	<i>Stipagrostis obtusa</i>	Grass
Zygophyllaceae	<i>Tetraena rigida</i>	Shrub

DISCUSSION

VEGETATION

Vegetation types

According to Mucina and Rutherford (2006) the vegetation type present in the study area falls within the Nama Karoo Biome. The vegetation type present is the Northern Upper Karoo (NKu 3) considered as **least threatened**.

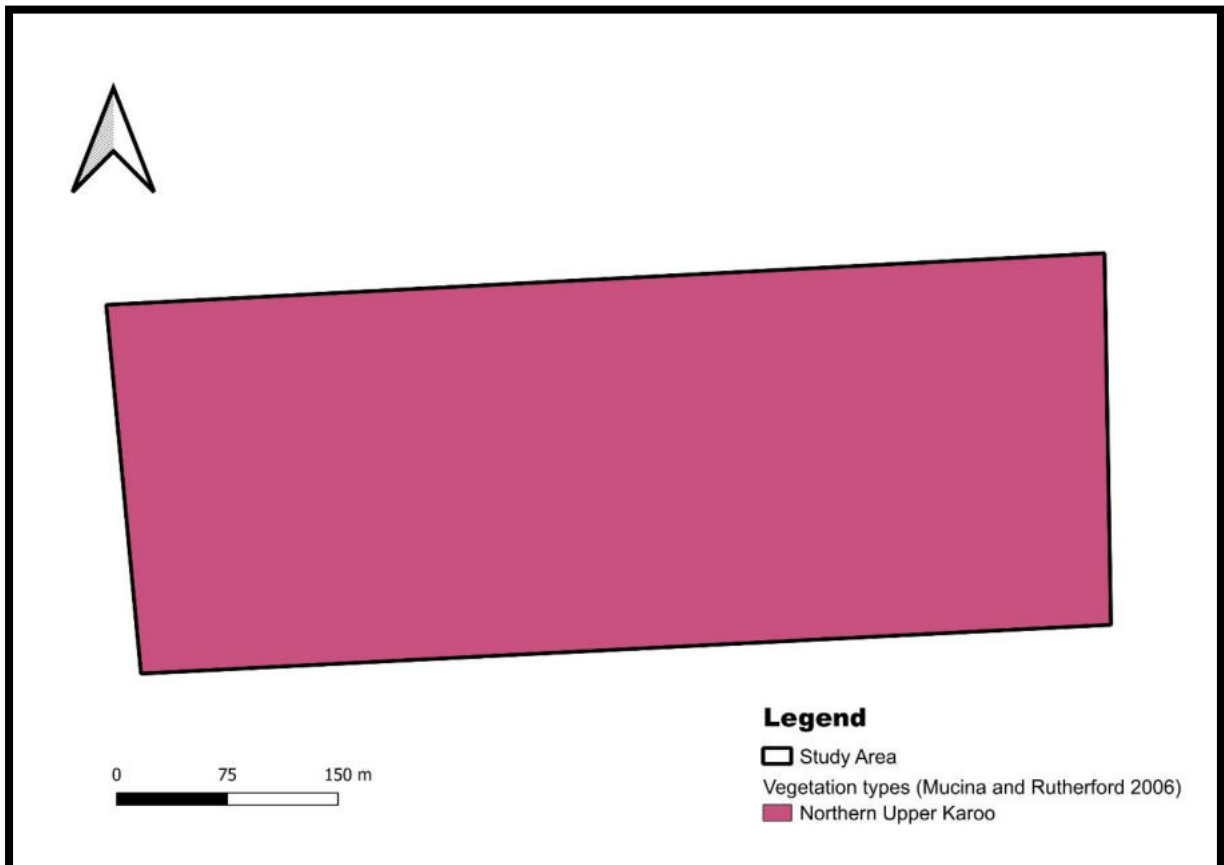


Figure 9: Location of the study area within the Northern Upper Karoo (NKu 3) vegetation type after Mucina and Rutherford (2006).

The Northern Upper Karoo (NKu 3) (Figure 9) is considered **least threatened**; however, there are no statutory conserved areas in this vegetation type. Around 4% has been cleared for cultivation or irreversibly transformed by the building of dams. There is also an increase in human settlements in the north-eastern parts of the vegetation type. **Neltuma glandulosa* [**Prosopis glandulosa*], one of the 12 agriculturally most important invasive alien plants in South Africa, is widely distributed in this vegetation type.

Important taxa according to Mucina and Rutherford (2006) include Small Trees: *Acacia mellifera* subsp. *detinens*, *Boscia albitrunca*. Tall Shrubs: *Lycium cinereum*, *Lycium horridum*, *L. oxycarpum*, *L. schizocalyx*, *Rhigozum trichotomum*. Low shrubs: *Chrysocoma ciliata*, *Lasiosiphon polycephalus* [*Gnidia polycephala*], *Pentzia calcarea*, *P. globosa*, *P. incana*, *P. spinescens*, *Rosenia humilis*, *Amphiglossa triflora*, *Aptosimum marlothii*, *A. spinescens*, *Asparagus glaucus*, *Barleria rigida*, *Berkheya annectens*, *Eriocephalus ericoides* subsp. *ericoides*, *E. glandulosus*, *E. spinescens*, *Euryops asparagoides*, *Filicia muricata*, *Helichrysum lucilioides*, *Hermannia spinosa*, *Leucas capensis*, *Limeum aethiopicum*, *Melolobium candicans*, *Microloma armatum*, *Osteospermum leptolobum*, *O. spinescens*, *Pegolettia retrofracta*, *Pentzia lantana*, *Phyllanthus maderaspatensis*, *Aizoon plinthoides* [*Plinthus karooicus*], *Petronia glauca*, *P. sordida*, *Selago geniculata*, *S. saxatilis*, *Tetragonia arbuscula*, *Roepera lichtensteiniana* [*Zygophyllum lichtensteinianum*]. Succulent shrubs: *Hertia pallens*, *Salsola calluna*, *S. glabrescens*, *S. rabieana*, *S. tuberculata*, *Zygophyllum flexuosum*. Semiparasitic shrubs: *Thesium hystrix*. Herbs: *Euphorbia inaequilatera* [*Chamaesyce inaequilatera*], *Convolvulus sagittatus*, *Dicoma capensis*, *Gazania krebsiana*, *Hermannia comosa*, *Indigofera alternans*, *Lessertia pauciflora*, *Radyera urens*, *Sesamum capense*, *Sutera pinnatifida*, *Tribulus terrestris*, *Vahlia capensis*. Succulent herb: *Mesembryanthemum coriarium* [*Psilocaulon coriarium*]. Geophytic herb: *Moraea pallida*. Graminoids: *Aristida adscensionis*, *A. congesta*, *A. diffusa*, *Enneapogon desvauxii*, *Eragrostis lehmanniana*, *E. obtusa*, *E. truncata*, *Sporobolus fimbriatus*, *Stipagrostis obtusa*, *Eragrostis bicolor*, *E. porosa*, *Fingerhuthia africana*, *Heteropogon contortus*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koeleroides*, *T. racemosus*.

Biogeographically Important Taxa: Herb: *Convolvulus boedeckerianus*. Tall Shrub: *Gymnosporia szyszylowiczii* subsp. *namibiensis*.

Endemic Taxa: Succulent shrubs: *Lithops hookeri*, *Stomatium pluridens*. Low shrubs: *Atriplex spongiosa*, *Galenia exigua*. Herb: *Manulea deserticola*

Vegetation units

Vegetation unit 1, the shrubland vegetation unit has a well-developed shrub layer dominated by *Tetraena rigida* and *Rhigozum trichotomum*, which are well established shrubs in the study area. The category 3 alien invasive **Neltuma glandulosa* [**Prosopis glandulosa*] occur as a shrub on the southern boundary of the study area. Prominent grasses found in the vegetation unit include *Stipagrostis ciliata*, *S. uniplumis* and *S. obtusa*. From an ecological perspective the vegetation can be seen as natural with climax and sub-climax grasses dominating the grassy layer. The vegetation surrounding the area is natural and similar to the vegetation of the study area. The R357 and the gwarrie on the northern side of the site is the only form of disturbance currently found. Various protected species such as cf *Nerine* sp, *Aloe claviflora* and *Ledebouria* sp were found, however in limited numbers.

Vegetation unit 2, the gwarrie vegetation unit is dominated by the grass *Enneapogon cenchroides* and the shrub **Neltuma glandulosa* [**Prosopis glandulosa*] (a category 3 alien invasive species). Other alien invasive species include *Salsola kalii* and **Argemone ochroleuca*. Vegetation cover is sparse and disturbance evident. Ecologically this vegetation unit is severely disturbed with a low value. No protected species were found in this vegetation unit.

Declared Alien Invasive Plant species (AIP's)

Family	Species	NEMBA
Amaranthaceae	<i>Salsola kalii</i>	1b
Fabaceae	<i>*Neltuma glandulosa</i>	3
Papaveraceae	<i>*Argemone ochroleuca</i>	1b

Alien invasive species pose a risk to the natural environment, locally as well as in the surrounding areas. These species are indicative of degraded conditions in the areas where they occur. Alien plant species outperform the indigenous plant species in terms of reproduction and establishment; furthermore, they also cause deterioration of the habitat in terms of soil water content, soil pH and erosion. The species found during this study are mainly from NEMBA's category 1b that must be controlled or irradiated

where possible. Category 3 species is also present. These species are proven invaders and must be controlled (Henderson, 2020).

Protected and specially protected species

A list of possible protected species that were recorded in the larger region is listed below

(Please note that the list is confidential and may not be made available for public perusal)

Species	Conservation status	Comments
cf <i>Nerine</i> sp	Amaryllidaceae family is protected	Found
<i>Aizoon plinthoides</i>	Aizoaceae family is protected	Found
<i>Aloe claviflora</i>	Asphodelaceae family is protected	Found

Ecosystem classification

Research indicated that the study area falls within the greater Griqualand West Centre of Endemism (Frisby, 2016; Frisby *et al.*, 2019; van Staden *et al.*, 2020). Core areas or Centre of Endemism include the Northern Ghaap Plateau and Kuruman Hills sub-centre, the Southern Kalahari and the Langeberg sub-centre and the Southern Ghaap Plateau and the Kimberley-Prieska valley sub-centre that contain high numbers of endemic and restricted flora. The study area does not fall within these core areas identified by researchers (Frisby, 2016; Frisby *et al.*, 2019; van Staden *et al.*, 2020).

Critical Biodiversity Areas

The Northern Cape identified different Critical Biodiversity areas, and a large part of the study area falls within the Other Natural vegetation (Figure 10).

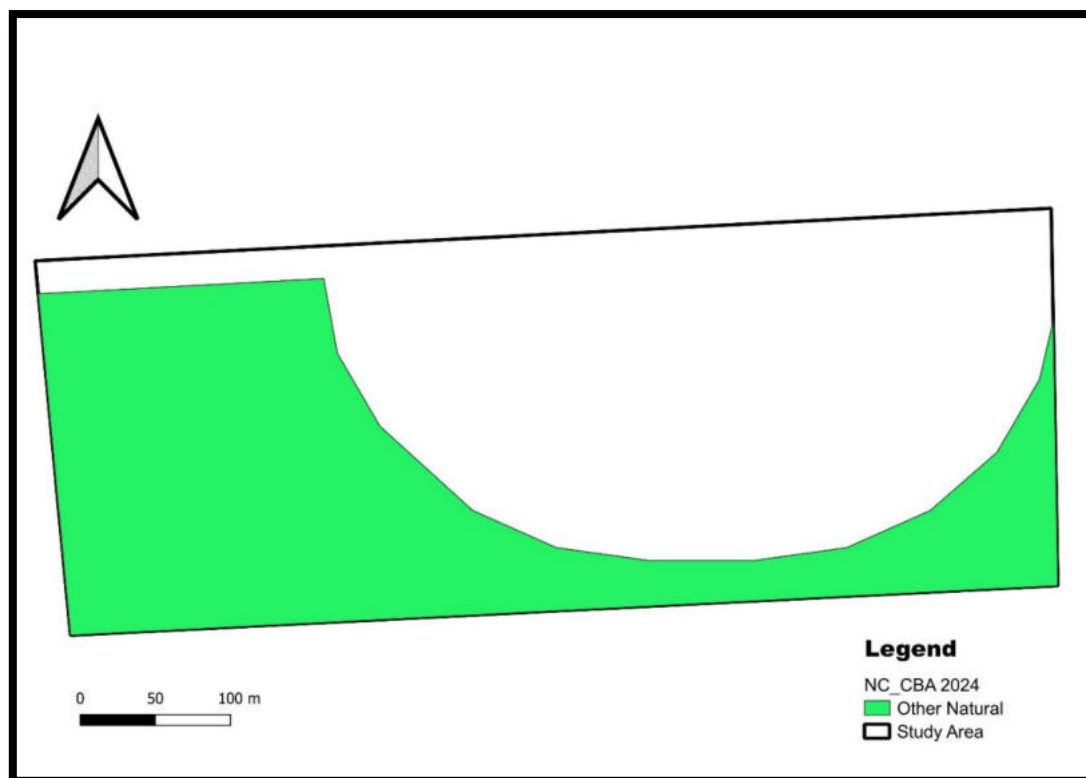


Figure 10: Study area falling with the Critical Biodiversity Areas identified by the Northern Cape in 2024.

CONCLUSION AND RECOMMENDATIONS

Natural vegetation forms the border on the eastern, southern and northern sides of the study area. The area is located east of Prieska along the R357 toward Douglas.

The study area comprises two vegetation units. The Shrubland vegetation unit, which is mostly dominated by shrubs and grasses, which are naturally occurring in this vegetation type. Disturbance at this site is low, with some protected species such as *Aizoon plinthoides*, cf. *Nerine* sp. and *Aloe claviflora*. The Gwarrie vegetation unit is mostly dominated by pioneer grasses and the alien invasive **Neltuma glandulosa*. Disturbance within this vegetation unit is high as indicated by the dominance of pioneers and alien invasives. No protected species were found in this vegetation unit.

Protected species found within the study area include *Aizoon plinthoides*, cf. *Nerine* sp. and *Aloe claviflora*. The conservation value of the study area can therefore be seen as low-medium with a low-medium sensitivity. Permits will be required for the removal of all the protected species listed. No Red Data species were found in the study area.

From a critical biodiversity perspective, the area is regarded as Other Natural by the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform. The shrubland vegetation unit contains climax and sub climax species, with a medium species richness and biodiversity, as well as a medium ecological sensitivity. The Gwarrie vegetation unit contains various pioneers and alien invasives due to severe disturbance, thus having a low species richness and biodiversity, as well as low ecological sensitivity. Alien invasive such as **Neltuma glandulosa* [**Prosopis glandulosa*], *Salsola kallii* and **Argemone ochroleuca* should be removed as a high priority to prevent them from encroaching surrounding native vegetation. Lastly the vegetation surrounding the study site can be seen as natural vegetation of the Northern Upper Karoo vegetation type.

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BASIC ASSESSMENT

Appendix D3 – Terrestrial Fauna Assessment Report

The purpose of the Terrestrial Fauna Specialist Assessment was to identify and assess the terrestrial animal species and habitats that may be affected by the proposed establishment of the pistachio nursery and processing facility, in accordance with the Protocols for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes (Government Notice 320 of 20 March 2020, as amended by Government Notice 3717 of 28 July 2023), the National Environmental Management Act (Act 107 of 1998), and the Environmental Impact Assessment Regulations.

The assessment was undertaken to:

- Identify Species of Conservation Concern (SCC) that occur, or have the potential to occur, within the study area.
- Verify the presence of Species of Conservation Concern through desktop investigations and field surveys, including photographic evidence where species were observed.
- Assess the distribution, abundance, habitat requirements, conservation status and long-term viability of Species of Conservation Concern occurring within the study area.
- Evaluate the suitability of habitats present within the proposed development footprint for terrestrial vertebrate species, including birds, mammals, reptiles and amphibians.
- Assess the potential direct, indirect and cumulative impacts of the proposed development on terrestrial fauna and their habitats during both the construction and operational phases.
- Determine the conservation importance of identified Species of Conservation Concern using available national and international conservation databases and relevant legislation.
- Assess the potential impacts of the proposed development on habitat availability, ecological processes and ecological connectivity within the broader landscape.
- Identify breeding, nesting, roosting, foraging and movement areas that may be affected by the proposed development.
- Review relevant literature, conservation plans and species management plans applicable to Species of Conservation Concern and determine whether the proposed development is consistent with these requirements.
- Assess the adequacy of ecological buffers and identify opportunities to avoid or minimise impacts through site planning and layout optimisation.
- Verify the environmental sensitivity identified by the DFFE Environmental Screening Tool through detailed field investigations.
- Identify areas of comparatively lower ecological sensitivity within the site that may be preferable for development where practicable.
- Recommend appropriate mitigation and management measures to avoid, minimise or offset impacts on terrestrial fauna and their habitats.
- Provide an opinion regarding the ecological acceptability of the proposed development from a terrestrial fauna perspective.

The assessment comprised a comprehensive desktop review of available biodiversity databases and conservation literature, followed by field investigations involving habitat assessments, pedestrian transects, direct observations, recording of animal signs, deployment of camera traps, and verification of the environmental sensitivity of the study area. The findings were used to inform the environmental impact assessment and Environmental Management Programme (EMPr).



BioBase Environmental Pty Ltd

Reg. No: K2024104397

ANIMAL SPECIES SPECIALIST ASSESSMENT REPORT:

Nursery and Pistachio processing plant of 19.2Ha on Portion 15 of the farm Uitdraai No. 33,
Siyathemba Local Municipality, Pixley ka Seme District Municipality.

Commissioned by Digital Soils Africa (Pty) Ltd

Compiled by:

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DECLARATION OF SPECIALIST INDEPENDENCE

We, Dr Hennie JB Butler and Prof. Edward Netherlands hereby declare that:

- we are acting as independent specialists regarding this application;
- we do not have any interest, hidden or otherwise, in the outcome of this application, apart from financial compensation for the work done to survey the proposed development area and compile this report;
- surveying the site for this faunal compliance statement was done objectively, and that this report and the facts therein contained (regardless of its impact on the application approval process) will not be affected by any outside factors;
- we have the required expertise to perform surveys and produce compliance statements as it pertains to the faunal aspect of this proposed development;
- we will comply with the relevant Acts, regulations and legislation;
- we have not, and will not, engage in conflicting interests while performing our duties for this activity, and have no influence over the decision-making authorities regarding their accepting or rejecting of this proposed development;
- we undertake to disclose to the applicant and competent authority all material and information within my possession that may influence the decision-making process regarding the proposed development;
- all particulars furnished by us in this form are true and correct, and that it is an offense to present a false declaration, and that such a false declaration is punishable in terms of Section 24F of the Act; and that
- this document is to be viewed as a whole and not misquoted out of context.

Date:

22 JULY 2026

Date:

Date	Status	Prepared by	Checked and approved by
22 July 2026	Approved for submission	Dr HJB Butler	Prof. E Netherlands (SACNASP Registration Nr. 126419)

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DETAILS OF THE SPECIALISTS

Both specialists that compiled this document have experience in faunal species identification, and the identification of suitable habitats for terrestrial animals including birds, mammals, reptiles and frogs. Their details are in the table below.

Table 1. *The details and experience of the specialists involved with this report.*

Specialist and contact details	Qualifications	SACNASP Registration	Experience
Dr Hennie JB Butler E mail: hennie.butler@gmail.com Mobile: 0827718101	PhD (Zoology) UFS	Not registered	25 Years' experience in faunal ecology and behaviour in both the private and tertiary education sector. Current position: Lecturer in the Department Zoology & Entomology, University of the Free State
Prof. Edward C Netherlands E mail: ec.netherlands@gmail.com Mobile: 0791922833	PhD (Biology) KU Leuven & NWU	126419	More than 10 years' experience in reptiles and amphibians in both the private and tertiary education sector. Current position: Associate professor in the Department Zoology & Entomology, University of the Free State

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1 INTRODUCTION

BioBase Environmental was appointed by Digital Soils Africa (Pty) Ltd to provide Terrestrial Animal Specialist inputs for the proposed establishment of a pistachio tree nursery and associated pistachio processing facility on approximately 19.2 hectares close to the town Prieska on the farm Uitdraai (Siyathemba Local Municipality) in the Pixley ka Seme District Municipality. The facility will serve both ends of the pistachio value chain, supplying certified planting material to new and existing orchards, and processing harvested nuts through cleaning, drying, grading, and packaging operations. It is positioned to meet the needs of the expanding pistachio sector across the Northern Cape and neighbouring regions. Natural vegetation which is currently used as grazing, will be altered.

1.1 Alternative Site Considered

An alternative site of similar size (19.8 ha), located approximately 2 km west of the current site and adjacent to the R357, was initially identified for this development. The DFFE Screening Tool classified this alternative site as **Very High** (CBA 1) sensitivity under the Relative Terrestrial Biodiversity Theme, primarily due to the presence of Shepherd's Trees (*Boscia albitrunca*), a documented keystone species supporting more than 60 arthropod and vertebrate species across arid southern Africa (Alias and Milton, 2003), whose removal would represent a disproportionate loss of structural habitat value relative to its stem density on that site. In response to this finding, the applicant relocated the proposed development footprint to the current site, described below as the New Site location. Under the Relative Animal Species Theme, the DFFE Screening Tool identified the same **High** sensitivity rating for both the alternative and current sites, based on the possible occurrence of the same two bird species of conservation concern namely the Lanner Falcon (*Falco biarmicus*, **High sensitivity**) and Ludwig's Bustard (*Neotis ludwigii*, **Medium sensitivity**). Given the sites' close proximity (2 km) and equivalent screening tool ratings under the Animal Species Theme, the terrestrial faunal species composition of the two sites is expected to be comparable; the relocation therefore does not materially change the findings or conclusions of this animal species specialist assessment. The Screening Tool results, cadastral details (Table 2) and species list (Table 3) presented below refer to the current New Site location.

1.2 New Site location

The study area is located on the farm Uitdraai Erf No. 33 (portion 15) located approximately 13 km east of Prieska, next to the R357 road leading to Douglas (Fig. 1). According to Mucina and Rutherford (2006), the study area falls within the Northern Upper Karoo Vegetation (Nku3) (Fig. 2).



Figure 1. Locality of the study area next to the R357 and east of Prieska in the Northern Cape Province of South Africa. (Modified from Google Earth).



Figure 2. Locality of the study area within the Northern Upper Karoo Vegetation according to Mucina & Rutherford (2006).

1.3 Development Layout

According to the DFFE Screening Tool, the study area is located on the farm Uitdraai (Erf No. 33) as listed in Table 2.

Table 2. Cadastral details of the study area at the farm Uitdraai in the Prieska district (Northern Cape Province, South Africa) according to the DFFE screening tool.

No	Farm Name	Farm/Erf No	Portion	Latitude	Longitude	Property Type
1	UITDRAAI	33	0	29°38'46.67S	22°55'30.51E	Farm
2	UITDRAAI	33	15	29°40'31.3S	22°53'5.61E	Farm Portion

2 TERMS OF REFERENCE

The objective of this report is to provide ecological information regarding the terrestrial fauna that may be present in the study area on a portion of the farm Uitdraai near Prieska in the Northern Cape Province, South Africa (hereafter referred to as the study area). As per the "Protocols for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes" (hereafter called "the Protocols"), as promulgated in Government Gazette Notice 320 (Government Gazette 43110, 20 March 2020), and amended in Government Gazette Notice 3717 (Government Gazette 49028, 28 July 2023), the Protocols must be adhered to for all new applications for Environmental Authorisation.

As per the Protocols, the objectives of this study were to:

- a) identify the SCC which were found, observed or are likely to occur within the study area;
 - b) provide evidence (photographs or sound recordings) of each SCC found or observed within the study area;
 - c) identify the distribution, location, viability and provide a detailed description of the population size of the SCC identified within the study area;
 - d) identify the nature and extent of the potential impact of the development on the population of the SCC located within the study area;
 - e) determine the importance of the conservation of the population of the SCC identified within the study area, based on the information available in national and international databases;
 - f) determine the potential impact of the proposed development on the habitat of the SCC located within the study area;
 - g) include a literature review of the SCC population sizes, the conservation interventions, and any national or provincial management plans for the SCC. This should also indicate whether the development is compliant with the applicable species management plans;
 - h) identify dynamic ecological processes (e.g. fire in fire-prone ecosystems) occurring within the broader landscape that might be disrupted by the development and result in negative impacts on the identified SCC;
 - i) identify any potential impact of ecological connectivity in relation to the broader landscape, resulting in impacts on the identified SCC and its long-term viability;
 - j) determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;
 - k) discuss the presence (or likely occurrence) of additional SCC not identified by the screening tool, as well as undescribed species, or roosting and breeding and foraging areas used by migratory species (where these species show significant congregations) occurring in the vicinity;
- and

- l) identify any alternative development footprints within the preferred site that would be of “low” or “medium” sensitivity as identified by the screening tool and verified through site sensitivity verification.
- m) A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

2.1 Screening Tool

Based on the screening tool (performed on 16 April 2026) of The Department of Forestry, Fisheries and the Environment (DFFE), the study area was identified as having a **High sensitivity** for in terms of the animal species theme (Fig. 3). This is due to the possible occurrence of two bird species of conservation concern (SCC) namely the Lanner Falcon (*Falco biarmicus*) and Ludwig's Bustard (*Neotis ludwigii*). These SCC (and their associated sensitivities) are listed in Table 3.

Table 3. Species of Conservation Concern (SCC) as listed by the DFFE Screening Tool.

Class	Common name	Genus & species	Sensitivity
Aves	Lanner Falcon	<i>Falco biarmicus</i>	High
	Ludwig's Bustard	<i>Neotis ludwigii</i>	Medium



Figure 3. Sensitivity map for relative animal species theme on the farm Uitdraai (Erf No. 33, Portion 15) according to the DFFE screening tool.

3 ASSESSMENT OF STUDY AREA

The findings of this report are based on:

- 1) a desktop study to determine the potential presence of the SCC identified by the DFFE screening tool report and any SCC not identified in the report at the study site;
- 2) two site visits to the study area to determine the presence of, and habitat suitability for the SCC highlighted by the DFFE screening tool report, and any SCC not flagged by the screening tool report.
- 3) deployment of four camera traps for seven consecutive days in the study area.

3.1 Methodology

3.1.1 Desktop assessment

A desktop study was undertaken to confirm and/or identify any species of conservation concern (SCC) near the study area. Information of such SCC was extracted from the Global Biodiversity Information Framework (GBIF) and iNaturalist. Bird species recorded in the pentad 2940_2250, where the study area is located, was obtained from the Southern African Bird Atlas Project 2 (SABAP2) and BirdLife International (The IUCN Red List of Threatened Species 2025). Possible mammal species and the conservation status thereof was obtained from the EWT Regional Mammal Red List (2025). The conservation status of Reptiles was obtained from the Conservation status of the reptiles of South Africa, Eswatini and Lesotho, Suricata 10 (Tolley et al. 2023). The conservation status of frog species was listed according to the assessment of SANBI as well as the South African Frog Re-Assessment Group (SA-FRoG).

3.1.2 Field assessment

Two field assessments of the study area were done the first on 18 April 2026 and the second on 26 April 2026. During both field assessments, temperatures were cool without any clouds in the sky and the visibility for observations of terrestrial vertebrates was good.

During field assessments, a walk through the study area was done and any live vertebrate observed, sounds of animals, signs including tracks, burrows and even nests of birds were logged onto Fulcrum, a field all-in-one data collection platform to collect accurate, real-time data on mobile devices. Transects that were walked in during both site assessments as well as the localities of observed vertebrate species are shown in Figure 4.

In addition to the walk through during the first site visit on 18 April 2026, four camera traps were deployed. Camera trapping uses fixed cameras triggered by infra-red sensors to 'trap' images of

passing animals. It is a quantitative technique that has relatively low labour costs, is non-invasive, incurs minimal environmental disturbance, is robust to variation in ground conditions and climate and, most importantly, can be used to gain information on highly cryptic species and in difficult terrain where other field methods are likely to fail. Camera traps were removed during the second site assessment on 26 April 2026. Data recorded on Fulcrum and on the camera traps were downloaded and captured in an Excel spreadsheet. Farm animals were not included in the data sheet.

In addition to the walk throughs, road kills of vertebrates that were encountered on the R357 road between Douglas and Prieska was also documented. Only road kills that were observed 30 km from the study area in both directions were considered.



Figure 4. Transects walked on the farm Uitdraai (Erf No. 33, Portion 15) during the first (yellow line) and second (white line) site assessment.

3.2 Assumptions and Limitations

Although public platforms like GBIF, iNaturalist and even SABAP2 can be regarded as reliable platforms of species distribution, these platforms include sightings of vagrant or passing animals upon which an assessment cannot reasonably be based. Expert interpretation is therefore applied to the full list of SCC identified by the various public platforms and some species are then excluded from further assessment due to the project area clearly lacking suitable habitat or the species clearly representing a vagrant or transient animal outside its normal range. Another limitation to the study is the outdated evaluation of some species. The SCC assessed in this report therefore represent those which may reasonably occur on site. However, some animal

species are elusive and difficult to detect even with modern technology while other species have large Areas Of Occupancy (AOO), home ranges or are seasonal migrants and do not occupy such areas constantly. Although two days of active field assessments were done on foot at the study site and additional data from seven days of camera trapping at the study site, there is always the possibility that some SCC are overlooked in this process.

A further limitation is the temporal scope of the field survey: both site visits were conducted within a single short field season (18–26 April 2026) rather than across multiple seasons. While this desktop-study-plus-two-visit approach is standard practice for specialist assessments of this scope, it means species with strong seasonal detectability windows, or those primarily active outside this period, may not have been recorded during the survey and could be under-represented in the findings above.

3.3 Results

3.3.1 Class Aves

A combined list of bird species that might occur as listed by GBIF, iNaturalist and SABAP2 for pentad 2940_2250, as well as the Regional Red Data Book Assessment of each species and species that were observed during the field survey is summarised in Table A1 (Appendix 1). Of the 127 bird species that might occur in the study area, a total of only 27 species, were observed while three additional bird species were confirmed to be present in the study site. A juvenile Lanner Falcon, listed by the DFFE screening tool as a **High** sensitivity species for this area, was observed during the field assessment. No photographic record of the Lanner Falcon could be obtained as the bird was viewed from a distance with the aid of binoculars. The presence of Kori Bustard, listed as **Near Threatened** regionally, was observed during another field assessment 19 km from the study site on the farm Muis Hoek. The record of this species was reported on the iNaturalist website (<https://www.inaturalist.org/observations/351691276>). In addition, the applicant for this study, Mr David Muller, did confirm the presence of Verreaux's Eagle (listed as regional **Vulnerable**) in the area.

The regional Red List status, habitat requirements as well as breeding and feeding behaviour of the four identified bird SCC is summarised in Table 4. The Regional Red list status of SCC of the class Aves that occurred or might likely occur in the study area, suitability of habitat, likelihood of occurrence as well as reasons for occurrence are listed in Table 5. The habitat of the study area

is suitable for all four identified bird SCC. No Critically Endangered species were recorded in this pentad.

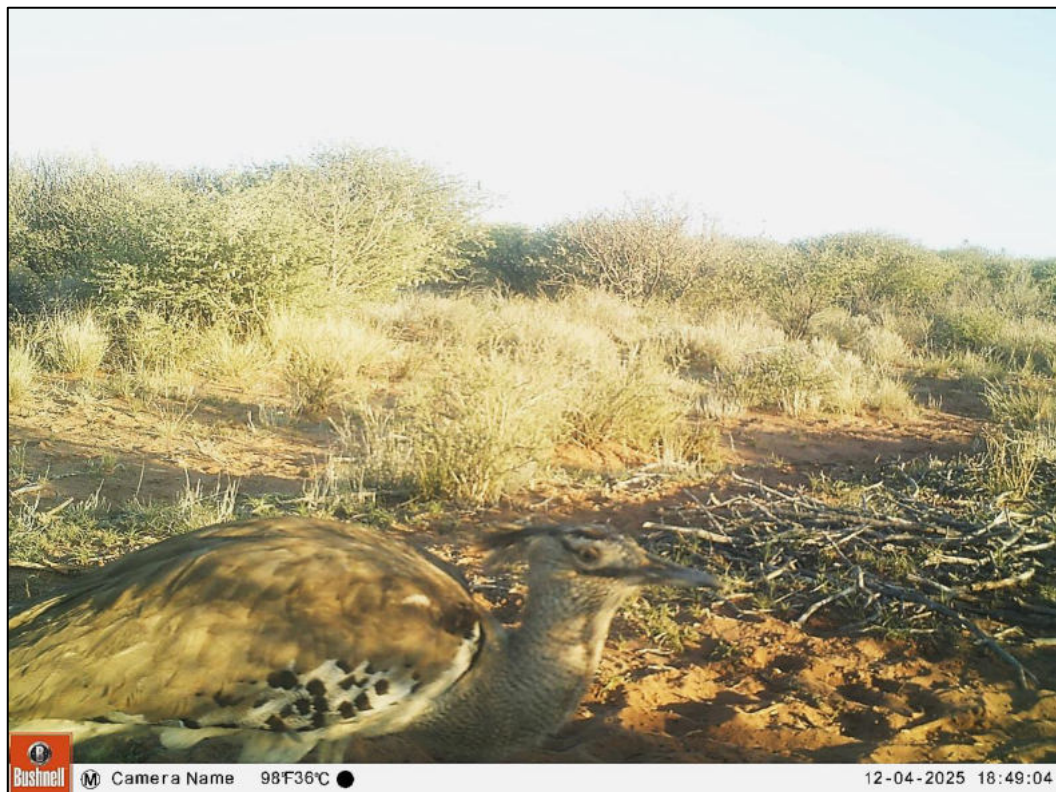


Figure 5. A Kori Bustard (*Ardeotis kori*) captured on a camera trap in natural veld on the farm Muis Hoek close to the study area. (<https://www.inaturalist.org/observations/351691276>)

The status of the four SCC that were identified and as listed by SANBI, BirdLife South Africa (2025), IUCN, TOPS (Threatened or Protected Species under NEMBA Act 10 of 2004 (GN R151 of 2008, as amended 2023), CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) as well as their migratory status are listed in Table 6. Only three species, the Verreaux's Eagle, Lanner Falcon and Kori Bustard are listed under Appendix II (international trade regulated by permit) of CITES. All four species are resident to the area (Table 6).

Table 4. The regional Red List status, habitat requirements as well as breeding and feeding behaviour of SCC of the class Aves in the study area.

EN, Endangered; **VU**, Vulnerable; **NT**, Near Threatened.

Species	Regional Red list status	Habitat	Breeding	Feeding
Ludwig's Bustard (<i>Neotis ludwigii</i>)	EN	Near-endemic to southern Africa; restricted to arid and semi-arid Karoo shrubland, Namib desert fringes, and Bushmanland. Strongly associated with flat, open gravel plains and sparse low shrubland. Avoids mountainous terrain, dense vegetation, and transformed habitats. Core distribution in the Northern Cape, Namibia, and marginally into the Western Cape and Free State.	Polygynous display system similar to other bustards. Females raise chicks alone. Nests are minimal or absent; eggs are laid directly in a shallow scrape on open ground, often in sparse vegetation. Lays 1–2 eggs. Incubation approximately 24 days. Chicks are precocial. Breeding season spans August to December. Highly sensitive to disturbance at nesting sites.	Omnivorous. Diet consists primarily of large invertebrates (beetles, locusts, termites, caterpillars) and plant material (seeds, berries, flowers). Also takes small lizards, rodents, and other vertebrates opportunistically. Forages by walking through open scrubland. Does not need free water if food moisture is adequate.
Verreaux's Eagle (<i>Aquila verreauxii</i>)	VU	Restricted to mountainous and rocky terrain, particularly kopjes, cliff faces, and rocky gorges with escarpments. Found from sea level to high-altitude ranges. Strongly associated with areas where Rock Hyrax (<i>Procavia capensis</i>) is abundant. Occurs in the Cape Fold Mountains, Drakensberg, and the arid rocky hills of the Karoo and Namaqualand.	Monogamous, with long-term pair bonds. Breeds from April to September. Nests are large stick structures (eyries) built on cliff ledges or in large trees on rocky hillsides; the same nest may be used for many years, growing very large over time. Lays 1–2 eggs (usually 2); incubation takes approximately 45 days. The second chick is almost always killed by the	Highly specialised predator; Rock Hyrax typically comprises 90% or more of the diet. Will occasionally take other prey including small antelopes (e.g., young klipspringer), hares, dassies, birds, and monitor lizards. Hunts by fast, contour-hugging flight over rocky terrain, surprising hyrax in the open.

			first (Cainism). Fledging occurs at approximately 95–99 days.	
Lanner Falcon (<i>Falco biarmicus</i>)	NT	Occupies open to semi-open habitats including arid and semi-arid shrubland, grassland, savanna, farmland, and rocky escarpments. Avoids dense forest. Common across the Karoo, Bushmanland, and Kalahari biomes. Often nests on cliff faces but also uses old stick nests of other large birds on pylons or tall trees. Highly adaptable to a range of arid environments.	Monogamous. Does not build its own nest; uses cliff ledges, old stick nests of other species (eagles, crows), or cavities in rock faces and buildings. Breeds from July to November. Lays 2–5 eggs; incubation lasts approximately 32–35 days. Both sexes incubate and provision chicks. Fledging occurs at approximately 35–40 days. May raise 1–2 broods per season under good conditions.	An agile aerial predator. Prey consists mainly of medium-sized birds (up to the size of doves and francolins), large insects (especially termite alates and beetles), and small mammals and lizards. Hunts by high-speed pursuit in open airspace, often cooperating in pairs to flush and catch prey. Also stoops at prey from height. Foraging activity peaks at dawn and dusk.
Kori Bustard (<i>Ardeotis kori</i>)	NT	Inhabits open arid and semi-arid grassland, Karoo shrubland, open savanna, and lightly wooded areas. Strongly avoids tall, dense vegetation and heavily cultivated land. Favours areas with short to medium grass cover interspersed with bare patches. Common in the Kalahari, Karoo, and dry open savanna of southern and East Africa. Requires large, unfragmented open landscapes.	Polygynous; males display at traditional lekking grounds during the breeding season (August–November). Females perform all parental duties alone. Nests are shallow scrapes in open ground, often with minimal cover. Lays 1–2 eggs; incubation approximately 23–24 days. Chicks are precocial and follow the female shortly after hatching. Juveniles remain with the female for several months.	Omnivorous and opportunistic. Diet includes insects (especially locusts, beetles, grasshoppers, and termite alates), small vertebrates (lizards, snakes, small rodents), plant matter (seeds, berries, flowers, and roots), and carrion. Takes advantage of invertebrate prey flushed by grass fires. Forages by walking slowly and deliberately through open habitat.

Table 5. Habitat suitability and likelihood of occurrence of Species of Conservation Concern of the class Aves that occurred or might likely occur in the study area. **EN**, Endangered; **VU**, Vulnerable; **NT**, Near Threatened.

Species	Regional Red list status	Observed	Suitable habitat	Likelihood of occurrence	Reason
Ludwig's Bustard (<i>Neotis ludwigii</i>)	EN	No	Yes	High	Ludwig's Bustards are likely to be seen in transformed habitats with the preference of these birds to feed on pastures but they also utilise crops, stubbles or ploughed/fallow fields.
Verreaux's Eagle (<i>Aquila verreauxii</i>)	VU	Yes	No	Confirmed	This SCC is confirmed to be present by the farmer. Confirmed presence likely reflects incidental use of the wider landscape rather than reliance on the site.
Lanner Falcon (<i>Falco biarmicus</i>)	NT	Yes	Yes	Confirmed	This SCC is confirmed to be present on the study area.
Kori Bustard (<i>Ardeotis kori</i>)	NT	Yes	Yes	Confirmed	This SCC is confirmed to be present via camera trap data on a neighbouring farm.

Table 6. Conservation status summary of bird SCC in pentad 2940_2250 (Prieska, Northern Cape Province, South Africa).

EN, Endangered; **VU**, Vulnerable; **NT**, Near Threatened; **LC**, Least Concern; —, Not listed.

Common Name / Scientific Name	SANBI Status	BirdLife SA Status (2025)	IUCN Status	TOPS (NEMBA)	CITES	Migratory Status
Ludwig's Bustard <i>Neotis ludwigii</i>	EN	EN	EN	EN	—	Resident / nomadic
Verreaux's Eagle <i>Aquila verreauxii</i>	VU	VU	LC	VU	App. II	Resident (breeding)
Lanner Falcon <i>Falco biarmicus</i>	NT	NT	LC	VU	App. II	Resident (breeding)
Kori Bustard <i>Ardeotis kori</i>	NT	NT	NT	Protected	App. II	Resident (breeding)

Notes: SANBI status reflects the most recent regional Red List assessment from speciesstatus.sanbi.org. BirdLife SA status reflects the 2025 Red Data Book of Birds of South Africa, Lesotho and Eswatini (birdlife.org.za/red-list). IUCN status is the current global assessment (iucnredlist.org); where regional and global statuses differ, the more severe regional status is operative for this assessment. TOPS = Threatened or Protected Species under NEMBA Act 10 of 2004 (GN R151 of 2008, as amended 2023): EN = Endangered; VU = Vulnerable; Protected = Schedule 3 Protected Species. CITES App. II = international trade regulated by permit.

3.3.2 Class Mammalia

No mammal species was listed as a SCC by the DFFE screening tool. However, results from the desktop study revealed the possibility of 60 mammal species that might occur in or on the study area (Appendix 2, Table A2). This includes species from the Order Cetartiodactyla belonging to the families Bovidae and Giraffidae which are “game” species that are not regarded as part of the survey. The Common duiker and Steenbok were however included in the survey. Of 60 possible mammal species, only the Yellow Mongoose, Slender Mongoose, Cape Porcupine and Common Duiker were observed during site visits to the study area while the Steenbok was captured on a camera trap and the dung of Greater Kudu was also found in the study area (Appendix 2, Table A2). The presence of Black-backed Jackal, Aardvark (camera traps), Bat-eared Fox, Striped Polecat/Zorilla, Southern Small-spotted Genet (road kills), and Vervet Monkey (Road observations) were confirmed to be in the vicinity of the study area.

Of the listed mammal species that might occur in the study area, only six species are of conservation concern. This includes the Black-footed Cat (*Felis nigripes*), Brown Hyaena (*Parahyaena brunnea*), African Striped Weasel (*Poecilogale albinucha*), Damara Horseshoe Bat (*Rhinolophus damarensis*), Southern African Hedgehog (*Atelerix frontalis*), and Aardvark (*Orycteropus afer*). The regional Red list Status, habitat requirements, as well as the breeding and feeding behaviours of these species are listed in Table 7. The habitat suitability and likelihood of occurrence for the mammal SCC is listed in Table 8. Although not in the study area itself, only the Aardvark was confirmed to be present in the area. The only other mammal species that has a high probability of occurrence to be present in the study area is the Southern African Hedgehog which was recorded between the year 2013 and 2024 (Smith & da Silva, 2025).

Table 7. The regional Red List status, habitat requirements as well as breeding and feeding behaviour of SCC of the class Mammalia in the study area.

VU, Vulnerable; **NT**, Near Threatened.

Species	Regional Red list status	Habitat	Breeding	Feeding
Black-footed Cat (<i>Felis nigripes</i>)	VU	Restricted to arid and semi-arid open habitats in southern Africa, including Karoo shrubland, dry savanna, open grassland with sparse shrub cover, and dry riverbeds. Strongly avoids dense bush and transformed agricultural land. Closely associated with open, flat terrain with short vegetation cover. Found mainly in the Karoo, Kalahari, and adjacent areas of South Africa and Botswana.	Solitary and nocturnal. Females raise kittens alone. Does not construct its own den; uses burrows of aardvark, springhare, or porcupine, and termite mounds. Breeds year-round with peaks in summer. Litter size 1–3 kittens (typically 1–2). Gestation approximately 63–68 days. Kittens begin accompanying their mother on hunts at about 6 weeks; independent at approximately 5–6 months.	The most lethal hunter relative to body size of all wild cats. Diet comprises predominantly small mammals (gerbils, mice, shrews), small birds, reptiles (lizards, skinks), insects, and arachnids. Has been documented killing prey heavier than itself, including Cape Hare. Hunts almost exclusively at night using acute hearing to locate prey in darkness. Requires no free water — all moisture obtained from prey.
Damara Horseshoe Bat (<i>Rhinolophus damarensis</i>)	VU	Restricted to arid and semi-arid environments in northern Namibia and adjacent north-western South Africa (Northern Cape). Found in rocky terrain with caves, mine shafts, and rocky overhangs which serve as roost sites. Associated with sparse dry bushveld and desert-adjacent shrubland. A near-endemic of the arid western subregion.	Colonial rooster; maternity colonies form in caves or abandoned mining tunnels. Gives birth to a single pup once per year, typically in spring or early summer (October–December). Pups are born naked and altricial and cling to the mother until capable of independent flight.	Insectivorous; forages by low, slow flight close to vegetation and rock surfaces, using high-frequency echolocation to detect insects. Prey includes moths, beetles, flies, and other flying and resting invertebrates. Often hunts from a perch (perch-hunting), sallying out to

			Sexual maturity reached at approximately 1–2 years.	catch prey and returning to the same spot.
Brown Hyaena <i>(Parahyaena brunnea)</i>	NT	Occupies a wide range of arid and semi-arid habitats including open Karoo shrubland, desert fringes, dry savanna, grassland, and open woodland. Found throughout much of southern Africa, including the Karoo, Kalahari, and coastal zones. More tolerant of arid conditions than the Spotted Hyaena. Requires access to rocky areas or dense thickets for denning. Avoids densely forested areas.	Solitary or in small family groups (clan sizes much smaller than Spotted Hyaena). Dens typically located in rock crevices, aardvark holes, or dense thicket. Litters of 1–3 cubs born after a gestation of approximately 90–92 days. Cubs remain at or near the den for several months and are nursed for up to 12–16 months. Both parents (in pair-bonded groups) contribute to cub provisioning.	Primarily a scavenger; forages over very large home ranges (up to 1,000 km ²) in search of carcasses. Diet includes carrion of all sizes, supplemented by invertebrates (dung beetles, moths, locusts), wild fruits (especially tsamma melons for moisture), eggs, small vertebrates, and refuse near human habitation. Capable of crushing and digesting bones. Rarely kills large prey but will take small livestock, eggs, and injured animals.
African Striped Weasel <i>(Poecilogale albinucha)</i>	NT	Inhabits grassland, moist savanna, open woodland, and forest edges across eastern and southern Africa. Associated with areas of rank grass cover, reed beds, or dense ground vegetation near water. In South Africa found mainly in KwaZulu-Natal, Mpumalanga, Limpopo, and parts of the Northern Cape. Requires dense ground cover for foraging and shelter. Rarely encountered in open arid environments.	Solitary. Dens in grass clumps, dense vegetation, burrows, or beneath rocks and logs. Litter size 1–3 young, born after a gestation of approximately 32–33 days. Young are altricial (helpless at birth). Eyes open at approximately 6 weeks. Independence reached at about 10–12 weeks. Breeding may occur year-round but peaks in spring and summer.	Almost exclusively a predator of snakes, including venomous species (e.g., mambas, cobras) — one of the very few mammals specialised for this. Also takes lizards, small rodents, frogs, and invertebrates. Kills snakes by delivering a precise bite to the back of the skull. Has some immunity to snake venom. A relentless and ferocious hunter relative to its small body size.

Southern African Hedgehog <i>(Atelerix frontalis)</i>	NT	Occupies a range of habitats including open savanna, semi-arid shrubland, grassland with sparse bush, and mixed bushveld. Avoids dense forest and very arid desert. In South Africa found across the Northern Cape, Northwest, Gauteng, and Limpopo provinces. Requires areas with loose soil for foraging, and access to dense vegetation or rocky outcrops for shelter and hibernation sites.	Solitary; males and females associate only during the brief mating season. Breeds from August to March. Litter size typically 2–6 young after a gestation of approximately 35–40 days. Young are born blind and helpless; the first set of spines (soft, white) emerges within hours of birth beneath a membrane. Eyes open at approximately 18 days. Weaning occurs at 4–6 weeks. Enters torpor or hibernation during cold, dry months.	Omnivorous and opportunistic. Diet includes beetles, termites, crickets, millipedes, worms, caterpillars, small vertebrates (lizards, frogs, small rodents), bird eggs, fungi, and plant material such as seeds and berries. Has limited immunity to some toxins. Forages nocturnally by rooting through leaf litter and soil. Uses a highly developed sense of smell to detect prey.
Aardvark <i>(Orycteropus afer)</i>	NT	Occurs in a wide range of habitats including grassland, savanna, open woodland, bushveld, Karoo shrubland, and semi-arid environments. Avoids dense forest and very rocky terrain that prevents burrowing. Requires areas with suitable sandy or loamy soil for digging burrows and abundant termites and ants as food. Widespread across sub-Saharan Africa wherever suitable soil and ant/termite colonies exist.	Solitary and nocturnal. Breeds year-round, with a peak in spring and summer. Gives birth to a single young (rarely twins) after a gestation of approximately 7 months. The calf is born in the burrow and remains underground for the first few weeks. At approximately 2 weeks it begins to follow the mother on foraging trips. Weaning at 3–4 months; independent at 6 months. The young may share the burrow for up to 6 months after weaning.	Highly specialised ant and termite eater (myrmecophage). Diet consists almost exclusively of ants and termites, particularly harvester ants (<i>Messor spp.</i>) and termites (<i>Trinervitermes spp.</i>, <i>Macrotermes spp.</i>). Uses powerful foreclaws to excavate termite mounds and ant nests, and a long, sticky tongue (up to 30 cm) to extract insects. May consume up to 50,000 ants and termites in a single night. Also eats the wild Aardvark Cucumber (<i>Cucumis humifructus</i>) for water.

Table 8. Habitat suitability and likelihood of occurrence of Species of Conservation Concern of the class Mammalia that occurred or might likely occur in the study area. **VU**, Vulnerable; **NT**, Near Threatened.

Species	Regional Red list status	Observed	Suitable habitat	Likelihood of occurrence	Reason
Black-footed Cat (<i>Felis nigripes</i>)	VU	No	Yes	Low	The Black-footed Cat is a semi-arid specialist inhabiting Nama Karoo, open savannah, and grassland habitats with sparse shrub and tree cover. The last recorded observation of this species in the study area was between 2000 and 2012.
Damara Horseshoe Bat (<i>Rhinolophus damarensis</i>)	VU	No	Yes	Low	The study area falls on the periphery of the Area Of Occupation (AOO) of this species. This species was last recorded in the area before 2000.
Brown Hyaena (<i>Parahyaena brunnea</i>)	NT	No	Yes	Low	Persecution of these animals by stock farmers as well as game farmers, almost exterminated the brown Hyaena from this area.
African Striped Weasel (<i>Poecilogale albinucha</i>)	NT	No	No	Low	Associated with areas of rank grass cover, reed beds, or dense ground vegetation near water. Although the study area is located on the edge of the distribution of this species, no African Striped Weasel was recently recorded in this area.
Southern African Hedgehog (<i>Atelerix frontalis</i>)	NT	No	Yes	High	Records of this species were documented in the area between 2013 and 2024.
Aardvark (<i>Orycteropus afer</i>)	NT	Yes	Yes	High	This SCC is confirmed to be present in adjacent areas.

A summary of the regional conservation status of mammal SCC in the study area is listed in Table 9. Only the Black-footed Cat, Brown Hyaena and Southern African Hedgehog are listed under the Threatened or Protected Species (TOPS) Regulations (Government Notice R. 151 of 2007, as revised in Government Gazette No. 47984 of 3 February 2023) promulgated under NEMBA (Act 10 of 2004). All three species are listed as **Protected** under **Schedule 3** (Indigenous species facing a high risk of extinction in the wild in the medium-term future). Of the six mammal SCC, only the Black-footed Cat (Appendix I) and Damara Horseshoe Bat (Appendix II) are listed by CITES (Table 9). Appendix I prohibits the commercial trade of species while Appendix II permits the commercial trade of species only with valid permits.

Table 9. Summary of the regional conservation status of mammal SCC in the study area (Prieska, Northern Cape Province, South Africa). **VU**, Vulnerable; **NT**, Near Threatened; **LC**, Least Concern.

Common Name / Scientific Name	EWT SA Status (2025)	SANBI Status (2016)	IUCN Status	TOPS (NEMBA)	CITES
Black-footed Cat (<i>Felis nigripes</i>)	VU	VU	VU	Protected (Sch 3)	App I
Damara Horseshoe Bat (<i>Rhinolophus damarensis</i>)	VU	LC	LC	—	App II
Brown Hyaena (<i>Parahyaena brunnea</i>)	NT	NT	NT	Protected (Sch 3)	—
African Striped Weasel (<i>Poecilogale albinucha</i>)	NT	LC	LC	—	—
Southern African Hedgehog (<i>Atelerix frontalis</i>)	NT	NT	LC	Protected (Sch 3)	—
Aardvark (<i>Orycteropus afer</i>)	NT	LC	LC	—	—

Notes: SANBI status reflects speciesstatus.sanbi.org (2016 Regional Red List of Mammals of South Africa — the most recent SANBI mammal assessment prior to the 2025 revision). EWT SA 2025 status reflects the 2025 Regional Mammal Red List coordinated by the Endangered Wildlife Trust and SANBI (ewt.org/2025-red-mammal-list/); '(uplisted)' denotes species whose status worsened in the 2025 revision. IUCN status is the current global assessment. TOPS = Threatened or Protected Species under NEMBA GN R151 of 2007 (as amended 2023); Schedule 3 = Protected Species. CITES listings: *Felis nigripes* = Appendix I (trade prohibited); *Rhinolophus damarensis* = Appendix II (trade regulated through a permit system); '—' = not listed under CITES or TOPS.

3.3.3 Class Reptilia

No reptile species was listed as a SCC by the DFFE screening tool. However, results from the desktop study revealed the possibility of 40 reptile species that might occur in or on the study area (Appendix 3, Table A3). Only one species, the Spotted Sandveld Lizard was observed. Two additional reptiles, a Puff Adder and a Cape cobra were however observed as road kills approximately 20 km before Prieska on the R357 road from the town Douglas on a previous visit to the area.

Of the 40 reptile species as listed in Table A3, only the Tent Tortoise (*Psammobates tentorius*) is listed as a SCC. Restricted to South Africa and Namibia, three subspecies are recognised, though their distribution ranges overlap and there remains some uncertainty about their exact limits and therefore, the boundary zones should be treated with some caution in formal assessments. The sub species that is listed is probably *P. t. verroxii* (Northern Tent Tortoise) which has a wide distribution throughout the Nama Karoo in the Northern Cape and penetrates the Western Cape and possibly the Eastern Cape peripherally (Hofmeyr et al. 2023). Its range extends across the Orange River into Namibia, as far north as Mariental. The other two subspecies are unlikely to occur near Prieska: *P. t. tentorius* (Southern Tent Tortoise) occurs considerably further south, ranging through the Eastern Cape and southern Western Cape, well away from Prieska. *P. t. trimeni* (Western Tent Tortoise) is restricted to the Namaqualand Sandveld and Richtersveld to the west (Hofmeyr et al. 2023), a distinctly different habitat and bioregion to the Nama Karoo around Prieska. *P. t. verroxii* is currently assessed as Least Concern by SANBI, making it a lower-priority taxon regionally at the subspecies level; however, the IUCN lists the species *Psammobates tentorius* as Vulnerable. It also occurs within a population that is part of the broader *P. tentorius* **Near Threatened** species-level assessment, meaning ongoing habitat degradation, overgrazing, road mortality, livestock fence electrocution, and Pied Crow predation in the Prieska area are all relevant threat factors to consider. The species' naturally sparse occurrence and low population densities across the Nama Karoo mean that even localised habitat loss carries proportionate significance.

The habitat requirements as well as breeding and feeding behaviour of the Tent Tortoise is listed in Table 10 and the habitat suitability and likelihood of occurrence as well as a summary of the regional conservation status of the sub-species *Psammobates tentorius verroxii* that occur in the area is listed in Table 11 and Table 12 respectively.

Table 10. The regional Red List status, habitat requirements as well as breeding and feeding behaviour of reptile SCC in the study area.

NT, Near Threatened

Species	Regional Red list status	Habitat	Breeding	Feeding
Tent Tortoise (<i>Psammobates tentorius</i>)	NT (species)	Restricted to the arid and semi-arid succulent Karoo and Nama Karoo of South Africa (Northern Cape, Western Cape, Eastern Cape) and marginally into southern Namibia. Inhabits low succulent shrubland, quartz gravel plains, and open Karoo flats. Requires areas with abundant low-growing succulents. Three subspecies recognised, each occupying slightly different habitat facies within the broader Karoo biome.	Oviparous. Mating occurs in late summer to autumn (February–April). Females lay small clutches of typically 1–3 eggs in shallow nests scraped in soft soil, concealed beneath shrubs. Incubation period approximately 150–200 days (dependent on temperature). Hatchlings emerge in late summer of the following year (December–February). Sexual maturity reached at approximately 5–8 years.	Strictly herbivorous. Diet consists almost entirely of succulent plant material including leaves and flowers of Karoo succulents (especially members of the families Aizoaceae, Crassulaceae, and Asteraceae). Also consumes dry plant material and occasionally fungi. Obtains water entirely from food. Forages during cooler parts of the day (morning and late afternoon) and becomes inactive during extreme heat.

Table 11. Habitat suitability and likelihood of occurrence of Species of Conservation Concern of the class Reptilia that occurred or might likely occur in the study area. **LC**, Least Concern.

Species	Regional Red list status	Observed	Suitable habitat	Likelihood of occurrence	Reason
Northern Tent Tortoise (<i>Psammobates tentorius verroxii</i>)	LC	No	Yes	High	The study area is situated on the Orange River in the central Northern Cape, within the Nama Karoo biome which is the core range of this species.

Table 12. Summary of the regional conservation status of reptile SCC in the study area (Prieska, Northern Cape Province, South Africa).
VU, Vulnerable; **LC**, Least Concern.

Common Name / Scientific Name	SANBI Status (2016)	IUCN Status	TOPS (NEMBA)	CITES
Northern Tent Tortoise (<i>Psammobates tentorius verroxii</i>)	LC	VU (species)	Protected under provincial nature conservation ordinances and biodiversity legislation in South Africa.	App II

3.3.4 Class Amphibia

No frog species was listed as a SCC by the DFFE screening tool. However, results from the desktop study revealed the possibility of 14 frog species that might occur in or on the study area (Appendix 4, Table A4). All identified frog species that might occur in the study area, are listed as Least Concern. No frogs were encountered in the study area.

4 SITE SENSITIVITY VERIFICATION

The DFFE screening tool identified the study area as having a **High sensitivity** (vide Fig. 3) for the animal species theme, due to the potential presence of two Species of Conservation Concern (SCC) as listed in Table 3. The site visit, and site sensitivity verification report confirmed that this property as a whole has a **High sensitivity**, due to:

- The confirmed presence of other SCC which was not listed by the DFFE screening tool namely the Kori Bustard (*Ardeotis kori*), Aardvark (*Orycteropus afer*) and Verreaux's Eagle (*Aquila verreauxii*). The confirmed on-site presence of the Lanner Falcon (*Falco biarmicus*), already flagged by the DFFE screening tool, further reinforces the High sensitivity rating.
- The likely presence of Ludwig's Bustard (*Neotis ludwigii*), Black-footed Cat (*Felis nigripes*), Brown Hyena (*Parahyaena brunnea*), African Striped Weasel (*Poecilogale albinucha*), Damara Horseshoe Bat (*Rhinolophus damarensis*), Southern African Hedgehog (*Atelerix frontalis*) and the Tent Tortoise (*Psammobates tentorius verroxii*).

5 IMPACT BY THE DEVELOPMENT

5.1 Development Description and Cumulative Impact Framework

The **Nursery component infrastructure** comprises nine elements: shade-net structures and/or greenhouse tunnels; hardening-off areas; mother block orchards for scion and rootstock material; potting and grafting areas; drip/micro irrigation infrastructure; water storage tanks; substrate storage areas; fertiliser and agrochemical storage (regulated); and internal access roads and loading areas. Production capacity is estimated at ±80 000–150 000 grafted pistachio trees per annum, with a 12–18 months production cycle per tree.

Processing plant component infrastructure comprises the following facilities: a receiving and intake area (weighing, sampling, offloading hoppers, scalpers, aspirators and screens); de-hulling machinery (mechanical huller/dehuller); washing lines; drying tunnels or mechanical

dryers (two-stage drying to approximately 5–7% moisture, operating at 50–93°C for several hours); sorting and grading lines (mechanical and optical, including screens, air separation and gravity tables); shelling equipment (shelling, roasting/salting and/or pasteurisation); packaging facility; cold storage and dry storage warehouses; quality control laboratory; administrative offices; staff facilities (ablutions, change rooms, canteen); and parking and loading bays for trucks. Associated infrastructure includes internal gravel or paved access roads, stormwater management systems, solid waste storage area, effluent management system for wash water, electrical infrastructure (Eskom connection and/or on-site solar PV), security fencing and controlled access gate, and fire protection infrastructure. The combined infrastructure footprint of 19.2 hectares covers the full extent of the near-natural Northern Upper Karoo (NKu 3) shrubland vegetation.

Five primary impact pathways arise from the combined nursery and processing plant infrastructure: (1) direct vegetation clearing and permanent land transformation; (2) food source, prey base and foraging habitat disruption; (3) chemical contamination through pesticides, fungicides, rodenticides, herbicides, fertilisers and processing effluent; (4) sustained noise, artificial lighting and human disturbance from processing plant machinery, refrigeration equipment, vehicle traffic and 230+ permanent staff; and (5) water regime alteration from irrigation abstraction, drip system operation and wash-water management. These pathways are assessed per taxonomic class below.

Although certain incidental benefits may arise, including elevated perches for Lanner Falcon on processing plant structures, and moist soil microhabitat along irrigation lines for hedgehog, these are marginal and do not materially offset the primary negative impacts on any SCC. Consistent with Shaw et al. (2016), Ludwig's Bustard may occasionally utilise margins of transformed land, but the operational intensity of the combined nursery and processing plant complex substantially exceeds any disturbance threshold compatible with this Endangered species.

5.2 Class Aves

The impact of the proposed nursery and pistachio processing plant on bird Species of Conservation Concern is assessed in Table 13 below. Four impact pathways are evaluated: (1) habitat loss and infrastructure footprint; (2) food source and foraging; (3) chemical use; and (4) noise, artificial lighting and human disturbance. The fourth pathway is specific to the bird assessment, reflecting the acute sensitivity of the two open-habitat bustard SCC, one Endangered and one Near Threatened, to the operational disturbance generated by the processing plant component.

Neotis ludwigii (Ludwig's Bustard, EN) carries an overall significance of **HIGH**. This near-endemic is the world's most frequently power-line-killed bird, and all electrical infrastructure required for the processing plant, including cables to greenhouse tunnels, drying equipment (operating at up to 93°C), cold storage compressors, security lighting, and processing machinery, must comply with bird-safe design standards as a non-negotiable condition of environmental authorisation. The 19.2 ha footprint directly converts core foraging terrain during the August–December breeding season, and processing plant noise from de-hulling machinery, dryers, optical sorting equipment and refrigeration compressors sustained throughout harvest season constitutes a high-significance disturbance impact within the species' known sensitivity radius.

Ardeotis kori (Kori Bustard, NT) carries an overall significance of **HIGH**. Confirmed 19 km from the site on the farm Muis Hoek via camera trap, this species uses the broader open landscape including the farm Uitdraai surrounds as foraging and potentially lekking terrain. The combined noise, traffic and structural footprint of the processing plant, particularly seasonal peak truck traffic through the internal access road and loading bay network, represents a sustained disturbance impact at spatial scales relevant to this species' territorial requirements.

Aquila verreauxii (Verreaux's Eagle, VU) carries an overall significance of **LOW**. The study area does not contain or adjoin rocky outcrops, kopjes, cliffs or escarpments, and no Rock Hyrax (*Procavia capensis*), the species' near-exclusive prey, typically comprising 90% or more of its diet, occur on or near the site. The primary impact pathway associated with this species elsewhere in its range, namely loss of hyrax prey habitat, is therefore not applicable to this development. The species confirmed presence in the area (reported by the farmer) most likely reflects incidental use of the wider landscape while foraging or commuting over its very large home range, rather than reliance on the study area itself. A minor residual secondary-poisoning risk remains via the species' opportunistic use of other small vertebrate prey exposed to rodenticides, but at a substantially reduced likelihood given the absence of a local hyrax population to serve as the primary contamination vector.

Falco biarmicus (Lanner Falcon, NT) carries an overall significance of **MODERATE**. Confirmed as a juvenile on site during the April 2026 field survey, this adaptable species may benefit marginally from processing plant infrastructure as nesting and perching sites, and from pest bird concentrations near organic waste in the receiving and sorting areas. However, pesticide and

fungicide bioaccumulation through the insectivorous prey food chain remains a chronic sublethal concern that must be addressed in the development's integrated pest management protocol.

Table 13. Impact of Nursery and Pistachio processing plant development on bird Species of Conservation Concern. (Impact Rating Key: **HIGH** — Significant, mitigation and permit conditions required; **MODERATE-HIGH** — Notable, targeted mitigation essential; **MODERATE** — Manageable with good-practice mitigation; **LOW-MODERATE** — Limited, standard management adequate.). **EN**, Endangered; **VU**, Vulnerable; **NT**, Near Threatened.

Species / Status	Habitat Loss & Infrastructure Footprint	Food Source / Foraging	Chemical Use (Pesticides, Fungicides, Herbicides)	Noise, Light & Human Disturbance	Overall Significance
Ludwig's Bustard <i>Neotis ludwigii</i> Regional Status: EN	HIGH — direct clearance of flat open Nama Karoo shrubland across the full 19.2 ha footprint; shade-net structures and greenhouse tunnels create permanent visual barriers in open foraging terrain; mother block orchards introduce woody exotic pistachio cover incompatible with open-habitat requirements; receiving and intake area hardstanding, drying tunnels, sorting/grading buildings, cold storage warehouses and internal access roads compound the	MODERATE — omnivorous; residual invertebrate foraging possible on uncleared margins; dehulling operations and receiving areas generate organic waste (hulls, fruit pulp) that may temporarily attract invertebrate prey, but pest management will neutralise this; quality control laboratory and staff canteen waste attracts pest bird competitors	MODERATE — fungicides, pesticides and herbicides applied to mother block orchards and nursery beds reduce large invertebrate prey (beetles, locusts, termites) in surrounding landscape; agrochemical storage facility (regulated) increases point-source spill risk adjacent to natural veld during rain events; wash water from washing lines and de-hulling machinery contains organic chemical residues directed to settlement tanks but with residual diffuse risk	HIGH — processing plant operations generate continuous mechanical noise (de-hulling machinery, dryers operating at 50–93°C, sorting/grading lines, optical sorters, shelling equipment, refrigerated cold storage compressors, packaging lines, heavy truck loading bays); operations during August–December coincide directly with bustard breeding season; artificial lighting of greenhouse tunnels, drying area and loading bays extends disturbance into crepuscular and nocturnal periods; ±370	HIGH

	total impermeable or structurally altered surface			construction workers and ±230 permanent operational staff create sustained human presence across the full site perimeter	
Kori Bustard <i>Ardeotis kori</i> Regional Status: NT	HIGH — confirmed 19 km from site; ground-nesting lekking species cannot persist in proximity to the industrial-agricultural infrastructure complex; receiving hoppers, scalpers and pre-processing areas introduce machinery noise and organic waste across the northern site boundary closest to natural open terrain; internal access roads and truck loading bays create permanent open terrain fragmentation	MODERATE — opportunistic; hull and organic processing waste in receiving and intake areas may temporarily increase arthropod activity at site margins, but this will be suppressed by pest management; quality control laboratory effluent and packaging waste streams create localised attractants for scavengers that increase human–wildlife conflict near the site boundary	MODERATE — insecticides applied in nursery hardening-off areas and mother block orchards reduce large invertebrate prey density throughout the surrounding landscape; herbicide use in internal road margins and substrate storage areas creates chemical boundary around natural veld; heat emissions from drying tunnels create localised thermal plumes that may affect atmospheric insect density	HIGH — processing plant generates continuous mechanical and acoustic disturbance throughout the harvest season (late summer to autumn); cold storage, quality control laboratory and administrative office operations extend this disturbance beyond harvest season into the species' August–November lekking and nesting period; seasonal peak truck traffic on internal access roads and loading bays represents a major disturbance source within 1 km sensitivity radius	HIGH

Verreaux's Eagle <i>Aquila verreauxii</i> Regional Status: VU	LOW — the site does not contain or adjoin rocky outcrops, kopjes or cliff terrain used for nesting or as Rock Hyrax habitat; the development footprint therefore does not remove or fragment habitat this species depends on regionally	LOW — extreme prey specialisation on Rock Hyrax (>90% of diet) means the site was never significant foraging habitat for this species in the absence of a local hyrax population; occasional opportunistic use of the site for other small vertebrate prey cannot be excluded but is not a primary pathway	LOW — secondary poisoning via contaminated hyrax carcasses is not applicable in the absence of a local hyrax population; residual risk via other rodenticide-exposed prey taken opportunistically is low given the species' strong preference for hyrax where available	LOW — forages over very large territories and can readily avoid the footprint; no cliff or rocky nesting substrate occurs on or near the site, so eyrie disturbance is not anticipated; general construction and operational noise and lighting are unlikely to materially affect this wide-ranging species' use of the broader landscape	LOW
Lanner Falcon <i>Falco biarmicus</i> Regional Status: NT	LOW to MODERATE — highly adaptable; confirmed juvenile on site during field survey; shade-net structure frames, water storage tanks, processing plant rooflines, cold storage warehouse structures, administrative office buildings and security fencing all provide elevated perching, roosting and potential nesting	LOW to MODERATE — adaptable diet; pest birds (sparrows, doves, starlings) attracted to hull waste, grain residues in receiving and intake areas, and packaging waste increase small prey density near the development; de-hulling and sorting area	MODERATE — fungi/insecticide bioaccumulation through insectivorous prey documented; mother block orchard chemical spray programme and nursery pesticide applications represent chronic sublethal exposure pathway; wash water from de-hulling and washing lines contains residual organic acids that may affect prey quality near settlement tanks; chemical	LOW to MODERATE — highly tolerant of human activity at processing plant scale; confirmed resident species on the study area; operational noise from processing plant machinery unlikely to displace this species; however, electrical infrastructure required for the processing plant must comply with bird-safe design	MODERATE

	opportunities; construction of electrical infrastructure to service processing plant provides additional pylon perching sites	organic waste temporarily increases arthropod density before pest management protocols suppress invertebrates	storage facility spill risk is the most acute point-source exposure	standards given the species' confirmed use of pylons for nesting	
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5.3 Class Mammalia

The impact of the proposed development on mammal Species of Conservation Concern is assessed in Table 14 below. Three impact pathways are evaluated: (1) habitat loss and infrastructure footprint; (2) food source and prey base disruption; and (3) rodenticide and insecticide exposure. Six mammal SCC are assessed, with overall significance ratings ranging from HIGH to LOW–MODERATE.

The rodenticide management programme is identified as the most critical cumulative impact pathway for mammals. The processing plant component specifically creates concentrated rodent attraction in product storage areas. dry storage and cold storage warehouses receiving up to 3 000 tonnes of pistachio per annum, receiving and intake hoppers, sorting and grading areas, and packaging facilities all provide rodent food and shelter. Standard practice deploys rodenticide bait stations in and around these enclosed spaces. The use of second-generation anticoagulant rodenticides (SGARs) within or adjacent to Nama Karoo habitat is incompatible with the confirmed and likely presence of Black-footed Cat, African Striped Weasel and Southern African Hedgehog. A binding SGAR prohibition must be included as a condition of environmental authorisation, with specification of first-generation or non-anticoagulant alternatives as the only permissible rodent control agents across the entire site.

Felis nigripes (Black-footed Cat, VU), ***Poecilogale albinucha*** (African Striped Weasel, NT) and ***Orycteropus afer*** (Aardvark, NT) all carry **HIGH** overall significance ratings. The Aardvark is confirmed present by camera trap in adjacent areas; a pre-construction aardvark burrow survey covering the full 19.2 ha footprint and a 200 m buffer must be completed before any soil preparation, processing plant foundation work, or internal road construction commences. Active burrows intersecting the development footprint require an agreed translocation and management protocol developed in consultation with the relevant authority and a qualified wildlife veterinarian.

Atelerix frontalis (Southern African Hedgehog, NT) is assessed as **MODERATE–HIGH**. This species has confirmed records in the study area between 2013 and 2024 (Smith & da Silva, 2025) and is the mammal SCC most likely to be directly harmed by insecticide use in the nursery propagation areas and around the processing plant external areas. The drip/micro irrigation

network partially compensates through supporting moist-soil invertebrate prey, but direct insecticide ingestion through treated invertebrates remains a specific risk at the site boundary with natural veld.

Rhinolophus damarensis (Damara Horseshoe Bat, VU) is assessed as **MODERATE**. Processing plant lighting, security floodlights and drying area illumination operating through the night extends the zone of artificial light pollution beyond the physical footprint into flight corridors used by this bat between roost sites in rocky terrain and foraging areas over the surrounding Nama Karoo. ***Parahyaena brunnea*** (Brown Hyaena, NT) is assessed as **LOW**. The 19.2 ha footprint is negligible relative to this species' home range.

Table 14. Impact of Nursery and Pistachio processing plant development on mammal Species of Conservation Concern. (Impact Rating Key: **HIGH** — Significant, mitigation and permit conditions required; **MODERATE-HIGH** — Notable, targeted mitigation essential; **MODERATE** — Manageable with good-practice mitigation; **LOW** — Negligible, no specific mitigation required). **VU**, Vulnerable; **NT**, Near Threatened.

Species / Status	Habitat Loss & Infrastructure Footprint	Food Source / Prey Base Disruption	Rodenticide / Insecticide Exposure	Overall Significance
Black-footed Cat <i>Felis nigripes</i> Regional Status: VU	HIGH — open Karoo short-grass habitat converted across the full 19.2 ha footprint; shade-net structures, greenhouse tunnels, hardening-off areas, mother block orchards, processing plant buildings (receiving area, de-hulling facilities, drying tunnels, sorting and grading lines, shelling equipment, packaging facility, cold storage warehouses, quality control laboratory, administrative offices, staff ablutions and canteen) and parking/loading areas collectively eliminate all available hunting terrain; loss of open structure and low vegetation cover makes hunting by pursuit impossible within the footprint and adjacent to any infrastructure	HIGH — rodenticides deployed in substrate storage areas, potting and grafting areas, dry storage warehouses, packaging facility and cold storage to control rodents attracted by pistachio product eliminate small mammal prey base (gerbils, mice, shrews) entirely; no prey-switching capacity; second-generation anticoagulant rodenticides documented as primary mortality cause in Black-footed Cat across the Northern Cape	HIGH — nursery potting/grafting areas and product storage zones in the processing plant require sustained rodent control; SGAR bait stations in enclosed storage buildings are directly accessible to this small felid; processing plant effluent from washing lines and settlement tanks may contaminate rodent populations adjacent to natural veld	HIGH

African Striped Weasel <i>Poecilogale albinucha</i> Regional: NT	HIGH — rank grass and structurally complex ground cover habitat eliminated by the full nursery and processing plant footprint; hardening-off areas, internal access roads, loading bays, parking areas, stormwater drainage channels and security fencing perimeter all remove the dense low vegetation required for foraging and denning; only 7 138 km² of natural habitat remains regionally; the site contributes to cumulative regional habitat loss	HIGH — rodenticides in potting and grafting areas, substrate storage and all product storage buildings of the processing plant eliminate rodent and snake prey base; obligate specialist predator with no dietary alternatives; high metabolic rate means prey depletion through rodenticide programmes is rapidly and directly fatal; colonial burrowing rodent species (primary prey) are the primary targets of warehouse rodent control	HIGH — highest secondary poisoning risk of all mammal SCC assessed; species follows rodent tunnels directly into treated zones in substrate storage, potting areas and enclosed processing plant spaces; SGAR accumulation through sequential prey consumption is well-documented; any acute rodenticide programme associated with the processing plant receiving and product storage areas poses a direct mortality risk	HIGH
Aardvark <i>Orycteropus afer</i> Regional: NT	HIGH — confirmed present by camera trap in adjacent areas; soil preparation for nursery bed establishment, compaction by construction vehicles building processing plant foundations (receiving area, dryer buildings, cold storage and dry storage warehouse footings, quality control laboratory, staff facilities, parking hardstanding), installation of stormwater management drainage channels and security fencing perimeter destroys	HIGH — insecticides applied to nursery growing substrate, mother block orchards and soil around processing plant buildings eliminate ant and termite colonies; hardstanding for loading bays, parking, internal access roads and processing plant floors sterilises foraging soil across the footprint; confirmed burrow presence in adjacent areas means individual animals are at	HIGH — systematic insecticide treatment of nursery growing media eliminates soil-hosted ant and termite colonies; pre-emergent herbicides used around processing plant perimeter and stormwater channels reduce plant-hosted ant activity; no dietary alternative exists; Taylor & Skinner (2003) estimated densities of ~8 aardvark per 10 km² in the Karoo, making	HIGH

	burrow systems and renders soil physically unavailable for burrowing across the complete 19.2 ha footprint	acute risk of direct injury from construction machinery during soil preparation	local losses within the 19.2 ha footprint individually significant	
Southern African Hedgehog <i>Atelerix frontalis</i> Regional: NT	MODERATE — some tolerance of disturbed environments; drip/micro irrigation lines in nursery and irrigation runoff around processing plant wash-water settlement tanks create moist soil microhabitat supporting earthworms; nursery margins with mulch and leaf litter from potting operations provide partial foraging substrate adjacent to cleared areas; confirmed records in study area 2013–2024 (Smith & da Silva, 2025)	MODERATE — insecticides in nursery propagation areas and processing plant pest management programmes reduce invertebrate prey (beetles, worms, crickets, millipedes); drip irrigation wet zones partially compensate through supporting worm populations; organic hull and shell waste in receiving and sorting areas initially increases arthropod density but is managed as waste and pest-controlled	HIGH — direct insecticide poisoning in nursery and horticultural operations is the primary documented cause of hedgehog population declines across South Africa; agrochemical storage facility compliance management reduces acute spill risk but not chronic pesticide drift onto adjacent natural terrain; insecticide application around processing plant stormwater channels and external areas represents specific residual risk	MODERATE–HIGH
Damara Horseshoe Bat <i>Rhinolophus damarensis</i> Regional: VU	LOW — roost sites in rocky caves and mine shafts well removed from the nursery and processing plant footprint; direct habitat transformation does not affect roost sites; however, electrical infrastructure servicing greenhouse tunnels, drying equipment, cold storage compressors, processing plant	MODERATE — insecticides applied to mother block orchards and nursery growing areas suppress aerial insect biomass across the irrigated footprint; processing plant security floodlighting and drying facility lighting initially concentrates flying insects around the facility	MODERATE — organochlorine and systemic insecticides used in nursery propagation reduce flying insect prey across the broader landscape; pyrethroid insecticides used in processing plant staff facilities and canteen pose low but non-negligible exposure risk through insect ingestion;	MODERATE

	lighting and security lighting creates expanding artificial light pollution across flight corridors from roost sites to foraging areas	but insecticide use in these areas reduces insect populations over time; drip/micro irrigation wet zones support chironomid midges and other insect prey in margins	horseshoe bats are among the most insecticide-sensitive bat families globally; agrochemical storage facility spill risk represents the most acute point-source exposure pathway	
Brown Hyaena <i>Parahyaena brunnea</i> Regional: NT	LOW — home range up to 1 000 km ² ; the 19.2 ha nursery and processing plant footprint is ecologically negligible relative to total territory; will avoid operational processing areas and staff facility zones but can persist across the broader farm landscape; security fencing with controlled access gate will physically exclude this species from the site perimeter during operations	LOW — primary scavenger with broad diet; hull and shell organic waste from processing operations, catering waste from staff canteen, and packaging waste from the processing plant all represent scavenging attractants that may draw Brown Hyaena into proximity with operational areas, creating human–wildlife conflict risk; waste must be secured in closed containers in the solid waste storage area	LOW — not a primary target of nursery or processing plant rodenticide programmes; secondary poisoning through scavenging rodenticide-killed carcasses near substrate storage and product warehouses exists but is proportionally low relative to body mass; effluent from wash water settlement tanks may attract scavengers to the site boundary; site waste management compliance directly affects this risk level	LOW

5.4 Class Reptilia

The impact of the proposed development on the single reptile Species of Conservation Concern is assessed in Table 15. Three impact pathways are evaluated: (1) habitat loss and infrastructure footprint; (2) food source and foraging; and (3) chemical use.

Psammobates tentorius verroxii (Northern Tent Tortoise, NT at subspecies level; NT at species level) is assessed as **HIGH** overall significance.

The processing plant component introduces impact pathways not associated with the nursery alone. The de-hulling and washing line operations generate organic acid-rich wash water managed via settlement tanks; any surface leakage or overflow during high-volume harvest operations contacts adjacent natural terrain and alters soil chemistry unfavourably for Aizoaceae food plants. The drying tunnel operations (50–93°C air temperatures) generate heat plumes affecting microhabitat temperature profiles adjacent to the processing building, potentially rendering marginal habitat unsuitable for tortoise thermoregulation. The stormwater management system (attenuation and drainage channels) requires earthworks extending beyond the direct building footprint, further compressing the transition zone between the facility boundary and natural shrubland.

A pre-construction tortoise walk-through survey and translocation is a mandatory minimum requirement before any soil-disturbing activity including fence removal, access road construction, service trenching and foundation excavation. A reptile-safe herbicide protocol for all perimeter and external areas is required to prevent food plant elimination beyond the physical footprint. A minimum 50 m undisturbed shrubland buffer between the facility outer security fence and any further land clearing must be maintained as a connectivity corridor for displaced individuals, consistent with the species' slow colonisation rates (sexual maturity at 5–8 years, clutch size 1–3 eggs, incubation 150–200 days).

Table 15. Impact of Nursery and Pistachio processing plant development on reptile Species of Conservation Concern.

(Impact Rating Key: **HIGH** — Significant, mitigation and permit conditions required). **NT**, Near Threatened.

Species / Status	Habitat Loss & Infrastructure Footprint	Food Source / Foraging	Chemical Use (Herbicide / Pesticide)	Overall Significance
Tent Tortoise <i>Psammobates tentorius</i> Regional Status: NT	HIGH — the entire 19.2 ha footprint comprises near-natural Nama Karoo succulent shrubland on quartz gravel substrate; Any construction destroys the open quartz gravel shrubland substrate on which <i>P. t. verroxii</i> depends for thermoregulation, movement and shelter; security fencing and controlled access gate create a permanent barrier preventing recolonisation from adjacent natural terrain	HIGH — entirely dependent on Karoo succulent plants for both food and all water intake; individuals unable to locate food plants on or adjacent to the transformed footprint face starvation and dehydration simultaneously	MODERATE to HIGH — herbicides applied in nursery beds and hardening-off areas to control weed competition eliminate succulent food plants within the direct footprint; fungicides applied to mother block orchards and nursery propagation areas accumulate in succulent plant tissues consumed by tortoises; wash water from de-hulling and washing line operations contains organic acids directed to settlement tanks but with potential diffuse leakage into adjacent shrubland; fertiliser runoff from nursery irrigation alters soil pH and chemistry of adjacent natural terrain in ways unfavourable to Aizoaceae food plant establishment	HIGH

6 CONCLUSION

The proposed nursery and pistachio processing plant will result in the near-complete transformation of 19.2 ha of near-natural Northern Upper Karoo shrubland, driven primarily by the infrastructure and operational elements described in sections 2 to 6 of the enquiry form: full-footprint vegetation clearing for the nursery and processing components, permanent electrical and lighting infrastructure, concentrated product storage requiring rodent control, security fencing, and seasonal peak truck traffic. These elements underlie the **HIGH** overall significance ratings assigned to Ludwig's Bustard, Kori Bustard, Black-footed Cat, African Striped Weasel, Aardvark and the Tent Tortoise, and the **MODERATE-HIGH** rating for the Southern African Hedgehog. Verreaux's Eagle and Brown Hyaena are rated **LOW**, reflecting the absence of on-site rocky/hyrax habitat and the latter's very large home range respectively, while the Lanner Falcon and Damara Horseshoe Bat fall in the **LOW-MODERATE** to **MODERATE** range. None of the identified impacts are considered sufficient to preclude the development, but several require binding mitigation as conditions of Environmental Authorisation.

7 RECOMMENDATIONS

Recommendations made are based on the typical construction and operation of a nursery and processing plant and all specifications do not necessarily apply to this specific development or the construction and layout thereof. The following actions, where applicable, are recommended to avoid or minimise any harm or deaths to species of conservational concern;

- **Electrical infrastructure:** all power lines, transformers and connections serving the nursery and processing plant must use bird-safe design standards, given Ludwig's Bustard's extreme vulnerability to power-line collision.
- **Rodenticide protocol:** prohibit second-generation anticoagulant rodenticides (SGARs) across the site; the concentrated product storage volumes ($\pm 1,500$ – $3,000$ tonnes/annum) will attract rodents, creating a secondary-poisoning pathway for the Black-footed Cat and African Striped Weasel. Only first-generation or non-anticoagulant alternatives should be permitted.
- **Pre-construction faunal surveys:** complete an Aardvark burrow survey (full footprint plus a 200 m buffer) and a tortoise walk-through and translocation before any vegetation clearing, road construction, or foundation work begins.

- **Construction timing:** sequence vegetation clearing and other high-disturbance construction activities outside the August–December bustard breeding season where practicable.
- **Lighting design:** shield and downlight all security and processing-area lighting to limit spillover into flight corridors used by the Damara Horseshoe Bat and to avoid disorientating ground-nesting birds.
- **Fencing:** incorporate small-mammal and tortoise gaps into the security fencing line, or set the fence back from the natural veld boundary, so it does not act as a hard barrier to movement and recolonisation.
- **Effluent and stormwater management:** settlement tanks and drainage channels must be engineered to prevent diffuse runoff into adjoining veld, protecting tortoise food plants (Aizoaceae) from chemical and pH alteration.
- **Buffer zone:** maintain a minimum 50 m undisturbed shrubland buffer between the security perimeter and any further land clearing, to serve as a connectivity corridor for displaced individuals.

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APPENDIX 1

Table A1. Bird species as listed by SABAP2 for pentad 2940_2250 Uitdraai (Erf No. 33), the Global and Regional Red Data Book Assessment of each species, as well as species observed during the field survey. (Source; GBIF, iNaturalist, SABAP2, SANBI). **EN**, Endangered; **VU**, Vulnerable; **NT**, Near Threatened; **LC**, Least Concern.

Order / Family	Genus & Species	Common Name	Red Data Book Assessment		Observed
			Global	Regional	
Accipitriformes					
Accipitridae	<i>Aquila verreauxii</i>	Verreaux's Eagle	LC	VU	Mr. D Muller 1
	<i>Buteo buteo</i>	Common Buzzard	LC	LC	
	<i>Elanus caeruleus</i>	Black-winged Kite	LC	LC	
	<i>Haliaeetus vocifer</i>	African Fish Eagle	LC	LC	
	<i>Melierax canorus</i>	Pale Chanting Goshawk	LC	LC	
	<i>Milvus aegyptius</i>	Yellow-billed Kite	LC	LC	
Anseriformes					
Anatidae	<i>Alopochen aegyptiaca</i>	Egyptian Goose	LC	LC	
	<i>Anas undulata</i>	Yellow-billed Duck	LC	LC	
	<i>Dendrocygna viduata</i>	White-faced Whistling Duck	LC	LC	
	<i>Plectropterus gambensis</i>	Spur-winged Goose	LC	LC	
	<i>Tadorna cana</i>	South African Shelduck	LC	LC	
Bucerotiformes					
Upupidae	<i>Upupa africana</i>	African Hoopoe	LC	LC	1
Caprimulgiformes					

Apodidae	<i>Apus affinis</i>	Little Swift	LC	LC	
	<i>Apus caffer</i>	White-rumped Swift	LC	LC	
	<i>Cypsiurus parvus</i>	African Palm Swift	LC	LC	
Charadriiformes					
Charadriidae	<i>Charadrius tricollaris</i>	Three-banded Plover	LC	LC	
	<i>Vanellus armatus</i>	Blacksmith Lapwing	LC	LC	
	<i>Vanellus coronatus</i>	Crowned Lapwing	LC	LC	
Glareolidae	<i>Rhinoptilus africanus</i>	Double-banded Courser	LC	LC	
Pteroclididae	<i>Pterocles namaqua</i>	Namaqua Sandgrouse	LC	LC	
Recurvirostridae	<i>Himantopus himantopus</i>	Black-winged Stilt	LC	LC	
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	LC	LC	
Ciconiiformes					
Ciconiidae	<i>Ciconia abdimii</i>	Abdim's Stork	LC	LC	
Coliiformes					
Coliidae	<i>Colius colius</i>	White-backed Mousebird	LC	LC	
	<i>Urocolius indicus</i>	Red-faced Mousebird	LC	LC	
Columbiformes					
Columbidae	<i>Oena capensis</i>	Namaqua Dove	LC	LC	1
	<i>Spilopelia senegalensis</i>	Laughing Dove	LC	LC	1
	<i>Streptopelia capicola</i>	Ring-necked Dove	LC	LC	
	<i>Streptopelia semitorquata</i>	Red-eyed Dove	LC	LC	
Coraciiformes					
Cerylidae	<i>Ceryle rudis</i>	Pied Kingfisher	LC	LC	
	<i>Megaceryle maxima</i>	Giant Kingfisher	LC	LC	
Dacelonidae	<i>Halcyon albiventris</i>	Brown-hooded Kingfisher	LC	LC	
Meropidae	<i>Merops apiaster</i>	European Bee-eater	LC	LC	
	<i>Merops bullockoides</i>	White-fronted Bee-eater	LC	LC	
	<i>Merops hirundineus</i>	Swallow-tailed Bee-eater	LC	LC	

Cuculiformes					
Centropodidae	<i>Centropus burchellii</i>	Burchell's Coucal	LC	LC	
Cuculidae	<i>Chrysococcyx caprius</i>	Diederik Cuckoo	LC	LC	
Falconiformes					
Falconidae	<i>Falco biarmicus</i>	Lanner Falcon	LC	NT	1
	<i>Falco chicquera</i>	Red-necked Falcon	LC	LC	
	<i>Falco rupicolus</i>	Rock Kestrel	LC	LC	
Galliformes					
Numididae	<i>Numida meleagris</i>	Helmeted Guinea fowl	LC	LC	
Gruiformes					
Turnicidae	<i>Turnix sylvaticus</i>	Common Buttonquail	LC	LC	
Otidiformes					
Otididae	<i>Afrotis afraoides</i>	Northern Black Korhaan	LC	LC	1
	<i>Ardeotis kori</i>	Kori Bustard	NT	NT	Camera trap
	<i>Eupodotis vigorsii</i>	Karoo Korhaan	LC	LC	
	<i>Neotis ludwigii</i>	Ludwig's Bustard	EN	EN	
Passeriformes					
Acrocephalidae	<i>Acrocephalus baeticatus</i>	African Reed Warbler	LC	LC	
	<i>Acrocephalus gracilirostris</i>	Lesser Swamp Warbler	LC	LC	
	<i>Acrocephalus palustris</i>	Marsh Warbler	LC	LC	
Alaudidae	<i>Calendulauda africanoides</i>	Fawn-coloured Lark	LC	LC	
	<i>Calendulauda sabota</i>	Sabota Lark	LC	LC	
	<i>Certhilauda subcoronata</i>	Karoo Long-billed Lark	LC	LC	
	<i>Chersomanes albofasciata</i>	Spike-heeled Lark	LC	LC	1
Cisticolidae	<i>Cisticola aridulus</i>	Desert Cisticola	LC	LC	1
	<i>Cisticola juncidis</i>	Zitting Cisticola	LC	LC	
	<i>Cisticola tinniens</i>	Levaillant's Cisticola	LC	LC	
	<i>Malcorus pectoralis</i>	Rufous-eared Warbler	LC	LC	1

	<i>Prinia flavicans</i>	Black-chested Prinia	LC	LC	
Corvidae	<i>Corvus albus</i>	Pied Crow	LC	LC	1
Emberizidae	<i>Emberiza impetuari</i>	Lark-like Bunting	LC	LC	
Estrildidae	<i>Brunhilda erythronotos</i>	Black-faced Waxbill	LC	LC	
	<i>Estrilda astrild</i>	Common Waxbill	LC	LC	
	<i>Lagonosticta senegala</i>	Red-billed Firefinch	LC	LC	
Fringillidae	<i>Crithagra albogularis</i>	White-throated Canary	LC	LC	
	<i>Crithagra atrogularis</i>	Black-throated Canary	LC	LC	
	<i>Crithagra flaviventris</i>	Yellow Canary	LC	LC	1
Hirundinidae	<i>Cecropis cucullata</i>	Greater Striped Swallow	LC	LC	1
	<i>Delichon urbicum</i>	Common House Martin	LC	LC	
	<i>Hirundo albigularis</i>	White-throated Swallow	LC	LC	
	<i>Hirundo rustica</i>	Barn Swallow	LC	LC	
	<i>Ptyonoprogne fuligula</i>	Rock Martin	LC	LC	1
	<i>Riparia paludicola</i>	Brown-throated Martin	LC	LC	
	<i>Riparia riparia</i>	Sand Martin	LC	LC	
Laniidae	<i>Lanius collaris</i>	Southern Fiscal	LC	LC	1
Macrosphenidae	<i>Phragmacia substriata</i>	Namaqua Warbler	LC	LC	
	<i>Sylvietta rufescens</i>	Long-billed Crombec	LC	LC	
Malaconotidae	<i>Nilaus afer</i>	Brubru	LC	LC	
Motacillidae	<i>Anthus cinnamomeus</i>	African Pipit	LC	LC	
	<i>Motacilla capensis</i>	Cape Wagtail	LC	LC	
Muscicapidae	<i>Batis pririt</i>	Pririt Batis	LC	LC	
	<i>Cercotrichas coryphoeus</i>	Karoo Scrub Robin	LC	LC	1
	<i>Cercotrichas paena</i>	Kalahari Scrub Robin	LC	LC	
	<i>Cossypha caffra</i>	Cape Robin-Chat	LC	LC	
	<i>Melaenornis infuscatus</i>	Chat Flycatcher	LC	LC	
	<i>Melaenornis silens</i>	Fiscal Flycatcher	LC	LC	

	<i>Monticola brevipes</i>	Short-toed Rock Thrush	LC	LC	
	<i>Muscicapa striata</i>	Spotted Flycatcher	LC	LC	
	<i>Myrmecocichla formicivora</i>	Ant-eating Chat	LC	LC	1
	<i>Oenanthe familiaris</i>	Familiar Chat	LC	LC	
Nectariniidae	<i>Cinnyris fuscus</i>	Dusky Sunbird	LC	LC	
Paridae	<i>Melaniparus cinerascens</i>	Ashy Tit	LC	LC	
		Southern Grey-headed			
Passeridae	<i>Passer diffusus</i>	Sparrow	LC	LC	
	<i>Passer domesticus</i>	House Sparrow	LC	LC	
	<i>Passer melanurus</i>	Cape Sparrow	LC	LC	1
Ploceidae	<i>Euplectes orix</i>	Southern Red Bishop	LC	LC	1
	<i>Philetairus socius</i>	Sociable Weaver	LC	LC	1
	<i>Plocepasser mahali</i>	White-browed Sparrow-Weaver	LC	LC	1
	<i>Ploceus capensis</i>	Cape Weaver	LC	LC	
	<i>Ploceus velatus</i>	Southern Masked Weaver	LC	LC	1
	<i>Quelea quelea</i>	Red-billed Quelea	LC	LC	1
	<i>Sporopipes squamifrons</i>	Scaly-feathered Weaver	LC	LC	1
Pycnonotidae	<i>Pycnonotus nigricans</i>	African Red-eyed Bulbul	LC	LC	
Sturnidae	<i>Creatophora cinerea</i>	Wattled Starling	LC	LC	
	<i>Lamprotornis nitens</i>	Cape Starling	LC	LC	
	<i>Sturnus vulgaris</i>	Common Starling	LC	LC	1
Sylviidae	<i>Curruca subcoerulea</i>	Chestnut-vented Warbler	LC	LC	1
Turdidae	<i>Turdus smithi</i>	Karoo Thrush	LC	LC	
Viduidae	<i>Vidua macroura</i>	Pin-tailed Whydah	LC	LC	
Zosteropidae	<i>Zosterops pallidus</i>	Orange River White-eye	LC	LC	
Pelecaniformes					
Ardeidae	<i>Ardea cinerea</i>	Grey Heron	LC	LC	
	<i>Ardea goliath</i>	Goliath Heron	LC	LC	

	<i>Ardea melanocephala</i>	Black-headed Heron	LC	LC	
	<i>Butorides striata</i>	Striated Heron	LC	LC	
	<i>Egretta garzetta</i>	Little Egret	LC	LC	
Scopidae	<i>Scopus umbretta</i>	Hamerkop	LC	LC	
Threskiornithidae	<i>Bostrychia hagedash</i>	Hadada Ibis	LC	LC	
	<i>Threskiornis aethiopicus</i>	African Sacred Ibis	LC	LC	
Piciformes					
Indicatoridae	<i>Indicator minor</i>	Lesser Honeyguide	LC	LC	
Lybiidae	<i>Trachyphonus vaillantii</i>	Crested Barbet	LC	LC	
	<i>Tricholaema leucomelas</i>	Acacia Pied Barbet	LC	LC	
Picidae	<i>Campethera abingoni</i>	Golden-tailed Woodpecker	LC	LC	
	<i>Dendropicos fuscescens</i>	Cardinal Woodpecker	LC	LC	
Strigiformes					
Strigidae	<i>Glaucidium perlatum</i>	Pearl-spotted Owlet	LC	LC	
Tytonidae	<i>Tyto alba</i>	Western Barn Owl	LC	LC	
Suliformes					
Anhingidae	<i>Anhinga rufa</i>	African Darter	LC	LC	
Phalacrocoracidae	<i>Microcarbo africanus</i>	Reed Cormorant	LC	LC	
	<i>Phalacrocorax lucidus</i>	White-breasted Cormorant	LC	LC	

APPENDIX 2

Table A 2. Mammal species as listed by iNaturalist, GBIF, the Global and Regional Red Data Book Assessment of each species, as well as species observed during the field survey at the farm Uitdraai (Erf No. 33, Portion 15). **VU**, Vulnerable; **NT**, Near Threatened; **LC**, Least Concern.

Order/Family	Genus & Species	Common Name	Red Data Book Assessment		Observed
			Global	Regional	
Carnivora					
Canidae	<i>Lupulella mesomelas</i>	Black-backed Jackal	LC	LC	Road kill
	<i>Otocyon megalotis</i>	Bat-eared Fox	LC	LC	
	<i>Vulpes chama</i>	Cape Fox	LC	LC	
Felidae	<i>Caracal caracal</i>	Caracal	LC	LC	
	<i>Felis lybica cafra</i>	Southern African Wildcat	LC	LC	
	<i>Felis nigripes</i>	Black-footed Cat	VU	VU	
Herpestidae	<i>Atilax paludinosus</i>	Water/Marsh Mongoose	LC	LC	1
	<i>Cynictis penicillata</i>	Yellow mongoose	LC	LC	
	<i>Herpestes pulverulentus</i>	Cape Grey Mongoose	LC	LC	
	<i>Herpestes sanguineus</i>	Slender Mongoose	LC	LC	1
	<i>Suricata suricatta</i>	Suricate/Meerkat	LC	LC	
Hyaenidae	<i>Parahyaena brunnea</i>	Brown Hyaena	NT	NT	Road kill
	<i>Proteles cristatus</i>	Aardwolf	LC	LC	
Mustelidae	<i>Ictonyx striatus</i>	Striped polecat/Zorilla	LC	LC	Road kill
	<i>Mellivora capensis</i>	Honey Badger	LC	LC	
		<i>Poecilogale albinucha</i>	African Striped Weasel	LC	NT
Viverridae	<i>Genetta genetta</i>	Southern Small-spotted Genet	LC	LC	Road kill

Cetartiodactyla					
Bovidae	<i>Alcelaphus buselaphus</i>				
	<i>caama</i>	Red Hartebeest	LC	LC	
	<i>Antidorcas marsupialis</i>	Springbok	LC	LC	
	<i>Connochaetes taurinus</i>	Blue Wildebeest	LC	LC	
	<i>Connochaetes gnou</i>	Black Wildebeest	LC	LC	
	<i>Kobus ellipsiprymnus</i>	Common Waterbuck	LC	LC	
	<i>Oreotragus oreotragus</i>	Klipspringer	LC	LC	
	<i>Oryx gazella</i>	Gemsbok	LC	LC	
	<i>Raphicerus campestris</i>	Steenbok	LC	LC	Camera trap
	<i>Sylvicapra grimmia</i>	Common duiker	LC	LC	1
	<i>Tragelaphus oryx</i>	Eland	LC	LC	
	<i>Tragelaphus strepsiceros</i>	Greater Kudu	LC	LC	Dung
Giraffidae	<i>Giraffa camelopardalis</i>	Southern Giraffe	VU	LC	
Chiroptera					
Molossidae	<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	LC	LC	
Nycteridae	<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	LC	LC	
Rhinolophidae	<i>Rhinolophus clivosus</i>	Geoffroy's Horseshoe Bat	LC	LC	
	<i>Rhinolophus damarensis</i>	Damara Horseshoe Bat	LC	VU	
Vespertilionidae	<i>Cnephaeus hottentotus</i>	Long-tailed Serotine Bat	LC	LC	
	<i>Laephotis capensis</i>	Cape Roof Bat	LC	LC	
Eulipotyphla					
Erinaceidae	<i>Atelerix frontalis</i>	Southern African Hedgehog	LC	NT	
Soricidae	<i>Suncus varilla</i>	Lesser Dwarf Shrew	LC	LC	
Hyracoidea					
Procaviidae	<i>Procavia capensis</i>	Rock Hyrax	LC	LC	

Lagomorpha					
Leporidae	<i>Lepus capensis</i>	Cape Hare	LC	LC	
	<i>Pronolagus rupestris</i>	Smith's Red Rock Rabbit	LC	LC	
Macroscelidea					
Macroscelididae	<i>Macroscelides proboscideus</i>	Karoo Round-eared Sengi	LC	LC	
	<i>Macroscelides rupestris</i>	Western Rock Sengi	LC	LC	
Primates					
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	LC	LC	Road obs.
	<i>Papio ursinus</i>	Chacma Baboon	LC	LC	
Rodentia					
Sciuridae	<i>Xerus inauris</i>	Cape ground squirrel	LC	LC	1
Bathyergidae	<i>Cryptomys hottentostus</i>	Common Mole-rat	LC	LC	
Hystriidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	LC	
Muridae	<i>Aethomys chrysophilus</i>	Red Veld Rat	LC	LC	
	<i>Desmodillus auricularis</i>	Cape Short-eared Gerbil	LC	LC	
	<i>Gerbilliscus brantsii</i>	Brants's Gerbil	LC	LC	
	<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	LC	LC	
	<i>Mastomys coucha</i>	Southern Multimammate Mouse	LC	LC	
	<i>Micaelamys namaquensis</i>	Namaqua Rock Rat	LC	LC	
	<i>Mus minutoides</i>	Pygmy Mouse	LC	LC	
	<i>Otomys unisulcatus</i>	Karoo Bush Rat	LC	LC	
	<i>Parotomys brantsii</i>	Brants' Whistling Rat	LC	LC	
	<i>Rhabdomys bechuanae</i>	West-Central Four-striped Grass Rat	LC	LC	
Nesomyidae	<i>Malacothrix typica</i>	Large-eared Mouse	LC	LC	
Pedetidae	<i>Pedetes capensis</i>	Springhare	LC	LC	
Tubulidentata					
Orycteropodidae	<i>Orycteropus afer</i>	Camera trap	LC	NT	

APPENDIX 3

Table A 3. Reptile species (Class Reptilia) as listed by iNaturalist, GBIF, the Global and Regional Red Data Book Assessment of each species, as well as species observed during the field survey at Uitdraai (Erf No. 33). **NT**, Near Threatened; **LC**, Least Concern.

Order/Family	Genus & Species	Common Name	Red Data Book Assessment		Observed
			Global	Regional	
Order Squamata					
Agamidae	<i>Agama aculeata</i>	Ground Agama	LC	LC	Road kill
	<i>Agama atra</i>	Southern Rock Agama	LC	LC	
Amphisbaenidae	<i>Monopeltis infuscata</i>	Dusky Worm Lizard	LC	LC	
	<i>Zygaspis quadrifrons</i>	Kalahari Dwarf Worm Lizard	LC	LC	
Colubridae	<i>Dasypeltis scabra</i>	Common Egg Eater	LC	LC	
	<i>Telescopus beetzii</i>	Karoo Tiger Snake	LC	LC	
Cordylidae	<i>Karusasaurus polyzonus</i>	Karoo Girdled Lizard	LC	LC	
Elapidae	<i>Naja nivea</i>	Cape cobra	LC	LC	
	<i>Elapsoidea sundevallii</i>	Sundevall's Garter Snake	LC	LC	
	<i>Naja nigricincta</i>	Western Barred Spitting Cobra	LC	LC	
Gekkonidae	<i>Chondrodactylus bibronii</i>	Bibron's Thick-toed Gecko	LC	LC	
	<i>Lygodactylus capensis</i>	Common Dwarf Gecko	LC	LC	
	<i>Ptenopus garrulus</i>	Common Barking Gecko	LC	LC	
Lacertidae	<i>Meroles suborbitalis</i>	Spotted Desert Lizard	LC	LC	
	<i>Heliobolus lugubris</i>	Bushveld Lizard	LC	LC	
	<i>Nucras intertexta</i>	Spotted Sandveld Lizard	LC	LC	1

	<i>Nucras tessellata</i>	Western Sandveld Lizard	LC	LC	
	<i>Pedioplanis lineoocellata</i>	Spotted Sand Lizard	LC	LC	
	<i>Pedioplanis namaquensis</i>	Namaqua Sand Lizard	LC	LC	
Lamprophiidae	<i>Boaedon capensis</i>	Cape House Snake	LC	LC	
	<i>Pseudaspis cana</i>	Mole Snake	LC	LC	
Leptotyphlopidae	<i>Leptotyphlops scutifrons</i>	Peter's Thread Snake	LC	LC	
Prosymnidae	<i>Prosymna sundevallii</i>	Sundevall's Shovel-snout	LC	LC	
Psammophiidae	<i>Psammophis leightoni</i>	Cape Whip Snake	LC	LC	
	<i>Psammophis notostictus</i>	Karoo Sand Snake	LC	LC	
	<i>Psammophis trinasalis</i>	Fork-marked Sand Snake	LC	LC	
Scincidae	<i>Acontias lineatus</i>	Striped Legless Skink	LC	LC	
	<i>Acontias occidentalis</i>	Western Legless Skink	LC	LC	
	<i>Trachylepis capensis</i>	Cape skink	LC	LC	
	<i>Trachylepis spilogaster</i>	Kalahari Tree Skink	LC	LC	
	<i>Trachylepis sulcata</i>	Western Rock Skink	LC	LC	
	<i>Trachylepis variegata</i>	Variegated Skink	LC	LC	
Typhlopidae	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	LC	LC	
Varanidae	<i>Varanus albigularis</i>	Rock Monitor	LC	LC	
	<i>Varanus niloticus</i>	Water Monitor	LC	LC	
Viperidae	<i>Bitis arietans</i>	Puff adder	LC	LC	Road kill
	<i>Bitis caudalis</i>	Horned Adder	LC	LC	
Order Testudines					
Testudinidae	<i>Stigmochelys pardalis</i>	Leopard Tortoise	LC	LC	
	<i>Psammobates tentorius</i>	Tent Tortoise	NT	NT	
Pelomedusidae	<i>Pelomedusa galeata</i>	South African Helmeted Terrapin	LC	LC	

APPENDIX 4

Table A 4. Frog species (Class Amphibia, Order Anura) as listed by iNaturalist, GBIF, the Global and Regional Red Data Book Assessment of each species, as well as species observed during the field survey at Uitdraai (Erf No. 33). **LC**, Least Concern.

Family	Genus & Species	Common Name	Red Data Book Assessment		Observed
			Global	Regional	
Brevicipitidae	<i>Breviceps a. adspersus</i>	Common Rain Frog	LC	LC	
Bufonidae	<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad	LC	LC	
	<i>Sclerophrys capensis</i>	Raucous/Ranger's Toad	LC	LC	
	<i>Sclerophrys gutturalis</i>	Guttural Toad	LC	LC	
	<i>Sclerophrys poweri</i>	Western Olive Toad	LC	LC	
	<i>Vandijkophrynus gariensis</i>	Karoo Toad	LC	LC	
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	LC	LC	
Pipidae	<i>Xenopus leavis</i>	Common Platanna	LC	LC	
Pyxicephalidae	<i>Amietia delalandii</i>	Common River Frog	LC	LC	
	<i>Amietia poyntoni</i>	Poynton's River Frog	LC	LC	
	<i>Cacosternum boettgeri</i>	Boettger's Caco	LC	LC	
	<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC	LC	
	<i>Tomopterna adiasola</i>	Tremolo Sand Frog	LC	LC	
	<i>Tomopterna tandyi</i>	Tandy's Sand frog	LC	LC	

BASIC ASSESSMENT

Appendix E: Public Participation

As this is the Draft Basic Assessment Report, proof of the distribution of notification emails, the newspaper advertisement and the placement of the site notice board will only be available for inclusion in the Final Basic Assessment Report (FBAR).

Advertisement was placed in the Noordwes-Karoo Nuusblad.

Notice Board was erected at the site.

In terms of those notified, the following people/entities were notified:

Siyathemba Municipality

Attention: Municipal Manager: Mr. Thomas van Staden

Ward Councillor Ward 3 -

Attention: Mr. W. Pieterse

Pixley Ka Seme District Municipality

Attention: Municipal Manager: Mr. Isak Visser

Department of Water and Sanitation (Upington)

Attention: Alexia Hlengani

Department of Agriculture- email

Attention: Me. Thembisile Mabuza

Northern Cape Department of Roads and Public Works

Contact person: Crystal Robertson (Communication Officer)

Northern Cape Department of Roads and Public Works

Mr. K. Nogwili

South African National Roads Agency (SANRAL)

Ms. N. Abrahams

Department of Agriculture, Environmental Affairs, Rural Development and Land Reform

Case Officer: Ms Madisa

Gail Letimela

Dineo Moleko

Mr. Bryan Fisher

The Office of the Regional Land Claims Commissioner Land Restitution Support: Northern Cape

Chief Director: Dr. Mangalane Du Toit

SAHRIS

Ms. N. Higgitt

Ms. R.A Timothy

Civil aviation:

Environmental section

Defence

Lt. Col. Zondi

BASIC ASSESSMENT

Neighbours

Driaan Potgieter
Egbert van Rensburg
Franz Terblanche
Pieter Paul
Ton Theron

Draft BAR

Appendix F: Impact Assessment

Draft BAR

Appendix F: Impact Assessment

The impact assessment was undertaken in accordance with the methodology contained in the Basic Assessment Report and is informed by the findings and recommendations of the specialist studies conducted for the proposed development. The assessment considers the potential environmental and socio-economic impacts associated with the Planning, Design and Development Phase, Construction Phase and Operational Phase of the proposed activity.

Each identified impact was assessed for Alternative 1, Alternative 2 (preferred alternative) and the No-Go Alternative, where applicable. The assessment considered the extent and duration of the impact, probability of occurrence, reversibility, potential for irreplaceable loss of resources, cumulative impacts and overall significance both before and after mitigation.

The specialist investigations identified biodiversity, fauna habitat, and heritage resources as the primary environmental considerations relevant to the proposed development. Alternative 2 was identified as the preferred alternative as it avoids the CBA and is a site that has been impacted. It is therefore associated with lower overall ecological impacts when compared to Alternative 1. The No-Go Alternative would avoid the direct impacts associated with the proposed development but would also result in the loss of the anticipated socio-economic and agricultural benefits associated with the project.

Mitigation measures included in this assessment are summarised in the tables below and are further detailed in the Environmental Management Programme (EMPr) in Appendix G. The significance ratings presented after mitigation assume that all recommended mitigation and management measures are effectively implemented throughout the life cycle of the project.

Significance colour legend:

High	Medium-High	Medium	Medium-Low	Low	Very Low
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PLANNING, DESIGN AND DEVELOPMENT PHASE			
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Failure to obtain and comply with all applicable statutory approvals and associated conditions could lead to delays in project implementation, increased financial costs and potential legal consequences arising from regulatory non-compliance.		N/A
Extent and duration of impact:	Project-specific; potentially medium to long term where approvals are delayed, refused or compliance failures require corrective action.	Project-specific; potentially medium to long term where approvals are delayed, refused or compliance failures require corrective action.	N/A
Consequence of impact or risk:	Failure to secure the required environmental, biodiversity, access and other statutory approvals could delay commencement, result in unlawful activities, enforcement action, additional permitting costs or redesign.		N/A
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Low	N/A

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Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Project delays; additional specialist or permitting requirements; redesign; increased costs; enforcement action; reputational impacts.		N/A
Cumulative impact prior to mitigation:	Medium-High	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• No site establishment or construction may commence until Environmental Authorisation and all other applicable statutory approvals have been obtained. • Compile and maintain a statutory approvals/permit register identifying all approvals, conditions, responsible persons and validity periods. • Obtain the necessary permit(s) prior to removing, transplanting or otherwise disturbing protected plant species. • Comply with all conditions imposed by the Northern Cape Department of Roads and Public Works in respect of access from the R357. • Ensure the final layout and development footprint correspond with the footprint authorised under the EA. • Incorporate all EA, specialist and EMP requirements into tender and construction documentation. • Appoint an ECO prior to commencement of construction to monitor compliance. • No deviation or expansion outside the authorised footprint may occur without first determining whether further statutory approval is required.		N/A
Residual impacts:	Minor residual administrative risk associated with conditions, permit renewals or unforeseen approval requirements.		N/A
Cumulative impact post mitigation:	Medium	Low	N/A
Significance rating of impact	Medium-High (-)	Low (-)	N/A

Appendix F: Impact Assessment

after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)			
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CONSTRUCTION PHASE			
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Loss of indigenous vegetation & protected plant species due to vegetation clearing and site preparation.		No impact; indigenous vegetation remains intact.
Extent and duration of impact:	Site-specific to local; permanent for vegetation within the development footprint.	Site-specific to local; permanent for vegetation within the development footprint.	N/A
Consequence of impact or risk:	Permanent loss of near-natural shrubland of comparatively higher conservation importance, including numerous protected plants and <i>Boscia albitrunca</i> . Loss would reduce vegetation integrity and ecological functioning within a more sensitive landscape.	Permanent transformation of predominantly near-natural shrubland. Protected <i>Aizoon plinthoides</i> , <i>Aloe claviflora</i> and cf. <i>Nerine</i> sp. may be affected, although they occur in substantially lower numbers and the preferred site has lower ecological sensitivity.	Existing vegetation and protected plants remain undisturbed.
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	High	Medium	N/A
Degree to which the impact can be reversed:	Very Low	Very Low	N/A
Indirect impacts:	Habitat fragmentation; loss of plant habitat and ecological connectivity; reduction in fauna habitat; increased edge effects; increased susceptibility to alien plant establishment.	Reduction in vegetation cover and fauna habitat; fragmentation; edge effects; potential alien invasion of disturbed areas.	N/A
Cumulative impact prior to mitigation:	High	Medium-High	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very High (-)	High (-)	N/A
Degree to which the impact can be avoided:	Low	Medium	Fully Avoidable

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Degree to which the impact can be managed:	Medium-Low	Medium-High	N/A
Degree to which the impact can be mitigated:	Low	Medium	N/A
Proposed mitigation: <i>Refer to EMP for full list of mitigation</i>	• Restrict vegetation clearing strictly to the authorised development footprint. • Clearly demarcate the construction footprint before clearing; all vegetation outside this footprint must be treated as a no-go area. • No unnecessary clearing, disturbance or establishment of laydown areas outside the permanent footprint. • Undertake a pre-construction walk-through to identify protected plant species within areas to be cleared. • Obtain the required provincial permits before removing, damaging or translocating protected plant species. • Where feasible and appropriate, rescue/translocate protected plants prior to clearing. • Retain indigenous vegetation around the facility and within undeveloped portions wherever practicable. • Prohibit indiscriminate clearing by construction personnel. • Rehabilitate all temporary construction disturbance using locally indigenous vegetation. • Implement alien invasive plant control following disturbance.		
Residual impacts:	High	Medium	N/A
Cumulative impact post mitigation:	High	Medium	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	Medium (-)	N/A

Potential impact and risk:	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Spread of alien invasive plants: Spread and establishment of alien invasive plant species following vegetation clearing, soil disturbance and movement of construction vehicles and materials.		
Extent and duration of impact:	Site-specific to local; medium to long term if invasive plants establish and spread	Site-specific to local; medium to long term if invasive plants establish and spread	Existing baseline alien invasion may continue, but no construction-related

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	into adjoining vegetation.	into adjoining vegetation.	pathway would be created.
Consequence of impact or risk:	Disturbance of relatively intact vegetation could facilitate establishment and spread of alien plants into surrounding natural habitat, reducing ecological integrity and increasing future control requirements.	Clearing and soil disturbance may facilitate proliferation and spread of existing alien species, particularly from the disturbed Gwarrie unit and along roads, stockpiles and disturbed areas	No additional construction-related invasion risk.
Probability of occurrence:	Probable	Probable	Low/existing baseline
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Low	Very Low
Degree to which the impact can be reversed:	Medium	High	High
Indirect impacts:	Competition with indigenous species; modification of soil moisture and soil properties; erosion; degradation of fauna habitat; spread into adjacent natural veld.	Competition with indigenous vegetation; delayed rehabilitation; erosion and gradual spread into adjoining natural veld.	Existing alien species may continue to spread if unmanaged.
Cumulative impact prior to mitigation:	Medium	Medium-Low	Very Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium-Low (-)	Very Low/Neutral
Degree to which the impact can be avoided:	Medium	Medium	High
Degree to which the impact can be managed:	High	High	High
Degree to which the impact can be mitigated:	High	High	High
Proposed mitigation: <i>Refer to EMP for full list of mitigation</i>	• Implement an Alien Invasive Plant Control Programme before, during and following construction. • Remove/control listed alien invasive plants within the construction footprint before major earthworks where practicable. • Prevent alien plants from reaching seed-producing stage. • Undertake follow-up inspections and control throughout construction.		

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	- Inspect disturbed areas, stockpiles, road verges and rehabilitation areas regularly. - Ensure imported soil, fill and construction material is free of alien plant propagules as far as practicable. - Clean earthmoving equipment where it has operated in heavily infested areas before moving to uninfested areas. - Rehabilitate disturbed areas promptly to reduce opportunities for alien establishment. - Use locally indigenous species for rehabilitation. - Continue control during the operational phase.		
Residual impacts:	Low risk of reinvasion from neighbouring land or disturbed areas.	Low risk of reinvasion, particularly from existing plants and disturbed road/operational areas.	Existing baseline occurrence may remain.
Cumulative impact post mitigation:	Low	Low	Very Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Medium-Low (-)	Very Low / Neutral

Potential impact and risk:	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Loss of fauna habitat and disturbance of fauna resulting from vegetation clearing, machinery movement and human activity		
Extent and duration of impact:	Site-specific with local ecological connectivity effects; permanent where habitat is cleared.	Site-specific with local ecological connectivity effects; permanent where habitat is cleared.	No project-related habitat loss.
Consequence of impact or risk:	Clearing would permanently remove comparatively intact, structurally valuable habitat, reduce available foraging/shelter areas and increase fragmentation within surrounding natural veld.	Clearing would permanently remove approximately 19.2 ha of fauna habitat. The preferred site nevertheless occurs within a broader landscape containing similar surrounding habitat and does not contain unique faunal habitat or identified critical breeding areas.	Existing fauna habitat and ecological connectivity remain unchanged.

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Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	High	Medium-High	N/A
Degree to which the impact can be reversed:	Very Low	Very Low	N/A
Indirect impacts:	Reduced foraging and shelter resources; fragmentation; displacement into surrounding habitat; reduced connectivity; edge effects and increased pressure on adjacent habitats.	Displacement into adjoining veld; reduced local foraging and shelter; reduced permeability; edge effects and cumulative loss of open Nama Karoo habitat.	N/A
Cumulative impact prior to mitigation:	High	High	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very High (-)	High (-)	N/A
Degree to which the impact can be avoided:	Low	Low	Fully avoided
Degree to which the impact can be managed:	Medium-Low	Medium	Not applicable
Degree to which the impact can be mitigated:	Low	Medium	Not applicable
Proposed mitigation: Refer to EMP for full list of mitigation	• Keep the development within the approved footprint and prohibit further clearing. • Maintain an undisturbed shrubland corridor/buffer around the facility where practicable, including the specialist-recommended connectivity area. • Avoid unnecessary perimeter clearing and retain natural vegetation outside operational areas. • Use wildlife-friendly fencing designs where compatible with security. • Locate temporary laydown areas inside the permanent footprint. • Rehabilitate temporary disturbance and prevent secondary access tracks.		No mitigation required.
Residual impacts:	Permanent loss and fragmentation of high-value habitat would remain.	Permanent habitat loss within the footprint and some reduction in landscape permeability.	None.
Cumulative impact post mitigation:	Medium-High	Medium	None
Significance rating of impact after mitigation	High (-)	Medium-High (-)	Very Low / Neutral

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(e.g. Low, Medium, Medium-High, High, or Very-High)			
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Disturbance, displacement and mortality of fauna Construction noise, lighting, personnel, vehicles, excavations and machinery may disturb, displace, injure or kill fauna.		No construction-related impact, as the development would not proceed.
Extent and duration of impact:	Site-specific to local; short term during construction, with possible permanent effects where animals are killed or excluded.	Site-specific to local; short term during construction, with possible permanent effects where animals are killed or excluded.	N/A
Consequence of impact or risk:	This site supports more intact habitat and structurally important vegetation. Clearing and intensive construction would displace resident animals and create a high risk to slow-moving species, burrowing mammals, nesting birds and reptiles, including tortoises.	The fauna specialist identified potentially significant effects on open-habitat birds, small and medium mammals and Tent Tortoise. Soil disturbance, traffic and fencing create particular risks for slow-moving and burrowing species. Nearby natural veld provides some displacement habitat, but does not eliminate mortality or disturbance risk.	N/A
Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-High	Medium	N/A
Degree to which the impact can be reversed:	Medium-Low	Medium	N/A
Indirect impacts:	Abandonment of breeding or foraging areas; increased road mortality; conflict with workers; movement into less suitable habitat; predation or starvation following displacement.	Temporary abandonment of habitat; road kills; entrapment in excavations; increased human-wildlife conflict; reduced breeding success.	N/A
Cumulative impact prior to mitigation:	High	Medium-High	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-	High (-)	High (-)	N/A

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High, High, or Very-High)			
Degree to which the impact can be avoided:	Low	Medium	N/A
Degree to which the impact can be managed:	Medium	High	N/A
Degree to which the impact can be mitigated:	Medium	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Mandatory pre-construction tortoise and fauna walk-through before any soil disturbance. • Relocate fauna only by appropriately trained personnel and under permits where required. • Inspect open excavations each morning and before backfilling; install escape ramps. • Restrict speed to 20–30 km/h on site. • Prohibit night driving except where essential. • No hunting, poisoning, trapping or keeping of fauna. • Keep lighting to the minimum required and shield lights. • Avoid unnecessary clearing during peak bird breeding periods where practicable. • Appoint an ECO to monitor compliance.		N/A
Residual impacts:	Some displacement and risk of incidental mortality would remain.	Low-level disturbance and occasional displacement may continue during construction.	N/A
Cumulative impact post mitigation:	Medium	Medium-Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	N/A

Potential impact and risk:	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Impacts on drainage lines due to vegetation removal, earthworks and increased sedimentation risk.		No impact. Natural drainage of site will remain the same.
Extent and duration of impact:	Site Specific and Short Term	Site Specific and Short Term	N/A
Consequence of impact or risk:	Disturbance of drainage features, increased sedimentation.	Disturbance of drainage features, increased sedimentation.	N/A
Probability of occurrence:	Probable	Likely	N/A
Degree to which the impact	High	Medium	N/A

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may cause irreplaceable loss of resources:			
Degree to which the impact can be reversed:	High	Medium	N/A
Indirect impacts:	Reduced ecological functioning and downstream habitat degradation.	Reduced ecological functioning and downstream habitat degradation.	N/A
Cumulative impact prior to mitigation:	Low	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low	Medium-High	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: <i>Refer to EMP for full list of mitigation</i>	• Maintain the drainage lines and keep 32m buffer. • Prohibit cultivation and stockpiling within sensitive areas. • Implement erosion and sediment control measures. • Maintain natural vegetation within buffer areas. • Keep fuels, chemicals and cement in contained areas. • Provide portable sanitation and service it regularly. • Inspect and maintain controls, particularly after rainfall.		N/A
Residual impacts:	Minor residual disturbance may remain despite the implementation of buffers and management measures.	Increased residual disturbance may remain despite the implementation of buffers and management measures.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Medium-Low (-)	N/A

Potential impact and risk:	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Soil erosion and soil degradation associated with vegetation clearing, soil disturbance and earthworks.		No impact, as soil will not be disturbed.

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Extent and duration of impact:	Site Specific and Short to Medium Term.	Site Specific and Short to Medium Term.	N/A
Consequence of impact or risk:	Loss of topsoil and reduction in soil stability.	Loss of topsoil and reduction in soil stability.	N/A
Probability of occurrence:	Probable	Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium-Low	N/A
Degree to which the impact can be reversed:	Low	Low	N/A
Indirect impacts:	Increased sediment runoff to adjacent natural areas.	Increased sediment runoff to adjacent natural areas.	N/A
Cumulative impact prior to mitigation:	Low	Low	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	Medium	Medium	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Confine earthworks to approved areas. • Strip, store and reuse topsoil. • Stabilise exposed surfaces and stockpiles. • Provide temporary stormwater controls and erosion protection. • Maintain natural drainage patterns as far as possible. • Repair erosion promptly. • Rehabilitate all temporary works areas.		N/A
Residual impacts:	Localised soil disturbance may persist until disturbed areas are fully stabilised.	Localised soil disturbance may persist until disturbed areas are fully stabilised.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Soil contamination from fuels and hazardous substances Leaks or spills of fuel, oils, cement, chemicals		No construction-related impact, as the development would

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	and hazardous substances may contaminate soil.		not proceed.
Extent and duration of impact:	Site-specific; short to medium term, potentially long term if contamination is not remediated.	Site-specific; short to medium term, potentially long term if contamination is not remediated.	N/A
Consequence of impact or risk:	Contamination could impair soil functioning and affect intact surrounding vegetation and fauna habitat.	Construction introduces fuels, lubricants, cement and chemicals into a previously undeveloped site. Localised contamination could affect soil, protected plants outside the footprint and fauna, but is readily preventable and remediable.	N/A
Probability of occurrence:	Possible	Possible	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium-Low	None
Degree to which the impact can be reversed:	Medium	High	N/A
Indirect impacts:	Plant mortality; toxicity to fauna; mobilisation by runoff; reduced rehabilitation success.	Plant stress; fauna exposure; contaminated runoff; impaired rehabilitation.	N/A
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Use bunded storage and designated refuelling areas. • Maintain equipment and use drip trays. • Keep an approved spill-response procedure and spill kits on site. • Train workers and report all incidents to the ECO. • Remove and lawfully dispose of contaminated material.		

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	Prevent cement washout onto bare ground.		
Residual impacts:	Low risk of small accidental spills.	Very limited risk of minor local contamination.	N/A
Cumulative impact post mitigation:	Low	Very Low-Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Dust emissions: Clearing, excavation, stockpiling and vehicle movement may generate nuisance dust.		No construction-related impact, as the development would not proceed.
Extent and duration of impact:	Site-specific to local; short term and intermittent during construction.	Site-specific to local; short term and intermittent during construction.	N/A
Consequence of impact or risk:	Dust may settle on adjacent intact vegetation, reduce photosynthetic performance, disturb fauna and affect road users on the R357. The consequence is moderately greater at Alternative 1 due to its higher ecological sensitivity.	Dust may affect workers, adjacent vegetation and R357 users. No close residential receptors are identified, but the arid environment and exposed soils make dust generation likely.	
Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	N/A
Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Reduced plant vigour; nuisance and visibility impacts; deposition on neighbouring habitat.	Temporary nuisance; reduced visibility; dust deposition on plants and habitat.	N/A
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact	High	High	N/A

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can be mitigated:			
Proposed mitigation: Refer to EMP for full list of mitigation	• Water unpaved roads and active work areas when required. • Limit speeds and vehicle movements. • Cover loads and stabilise stockpiles. • Avoid major earthworks during strong winds. • Maintain machinery and roads. • Respond promptly to complaints.		N/A
Residual impacts:	Short-lived dust during dry or windy conditions.	Minor intermittent dust.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Noise disturbance Construction machinery, vehicles, drilling and general activity will increase ambient noise.		No construction-related impact, as the development would not proceed.
Extent and duration of impact:	Site-specific to local; short term and intermittent during construction.	Site-specific to local; short term and intermittent during construction.	N/A
Consequence of impact or risk:	Noise may displace fauna from high-value habitat and interfere with foraging or breeding behaviour, particularly open-habitat birds and sensitive mammals.	The fauna report identifies disturbance as a material pathway for bustards and other fauna. Construction noise will temporarily reduce habitat use around the preferred site, although surrounding natural areas remain available.	N/A
Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-Low	Medium-Low	N/A
Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Temporary habitat avoidance; reduced breeding success; stress and altered movement patterns.	Temporary displacement; interruption of feeding or breeding; increased stress.	N/A
Cumulative impact prior to mitigation:	Medium-High	Medium	N/A

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Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Restrict noisy work to daylight hours. • Maintain equipment and silencers. • Avoid unnecessary hooting and idling. • Use acoustic shielding where practical. • Keep workers and equipment inside demarcated areas. • Minimise night lighting and night work.		N/A
Residual impacts:	Temporary noise-related displacement close to active works.	Short-term fauna avoidance near active construction.	N/A
Cumulative impact post mitigation:	Medium-Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Waste generation Construction will generate general, recyclable, hazardous and building waste.		No construction-related impact, as the development would not proceed.
Extent and duration of impact:	Site-specific; short term, with off-site consequences if waste is unlawfully disposed of.	Site-specific; short term, with off-site consequences if waste is unlawfully disposed of.	N/A
Consequence of impact or risk:	Poorly managed waste could pollute high-sensitivity vegetation, attract scavengers, injure fauna and cause visual degradation.	Uncontrolled waste may contaminate soil, attract rodents and scavenging birds, injure fauna and spread beyond the footprint.	N/A
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-Low	Low	N/A
Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Fauna entanglement or ingestion; pest attraction; litter	Pest attraction; fauna injury; litter in adjacent veld;	N/A

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	dispersal; soil contamination.	contamination.	
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Provide adequate labelled and covered waste containers. • Separate recyclables and hazardous waste. • Store hazardous waste in bunded areas. • Use authorised transporters and disposal facilities. • Maintain waste manifests. • Prohibit littering and undertake routine clean-ups.		N/A
Residual impacts:	Small volumes of unavoidable construction waste requiring lawful disposal.	Minor unavoidable waste generation.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

Potential impact and risk:	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Heritage chance finds resulting from ground disturbance during site preparation and cultivation establishment.		No impact, as no ground disturbance will take place.
Extent and duration of impact:	Site Specific and Long Term	Site Specific and Long Term	N/A
Consequence of impact or risk:	Low potential disturbance or destruction of previously unidentified heritage resources.	Low potential disturbance or destruction of previously unidentified heritage resources.	N/A
Probability of occurrence:	Low Likelihood	Low Likelihood	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	N/A
Degree to which the impact	Low	Low	N/A

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can be reversed:			
Indirect impacts:	Loss of scientific and cultural information.	Loss of scientific and cultural information.	N/A
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium	Medium	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Apply the Chance Find Protocol throughout earthworks. • Halt work, protect the find and notify the ECO and heritage authority. • Use a qualified archaeologist or palaeontologist where required. • Obtain permits before rescue or removal. • Brief construction personnel on recognising possible finds.		N/A
Residual impacts:	Low residual impact is anticipated following implementation of the Chance Finds Procedure.	Low residual impact is anticipated following implementation of the Chance Finds Procedure.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very Low (-)	Very Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Temporary traffic impacts and road safety Construction vehicles and delivery trucks may increase traffic, turning movements, road deterioration and collision risk on the R357 and site access.		No construction-related impact, as the development would not proceed.
Extent and duration of impact:	Local; short term and intermittent during construction.	Local; short term and intermittent during construction.	N/A
Consequence of impact or risk:	Heavy vehicles entering and leaving near a provincial road may affect road users and increase heavy-collision risk, particularly where	The preferred site is adjacent to the R357. Construction traffic will temporarily increase heavy-vehicle movements and turning activity	N/A

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	dust, slow-moving vehicles or inadequate signage reduce visibility.	but can be controlled through access design and traffic management.	
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	N/A
Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Dust, noise, delays, road damage and wildlife road mortality.	Noise, dust, delays and increased risk of fauna road kills.	N/A
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Use an approved access and traffic management plan. • Install warning signage and maintain clear sight lines. • Enforce safe speeds and delivery procedures. • Keep the public road free of mud, stones and debris. • Avoid roadside parking and queuing. • Record and investigate traffic incidents.		N/A
Residual impacts:	Minor temporary delays and intermittent heavy-vehicle presence.	Low-level temporary traffic disturbance.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Temporary employment and local economic benefits (positive) Creation of temporary construction employment, procurement opportunities and		The development would not proceed and no construction employment or

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	local expenditure.		procurement benefits would arise.
Extent and duration of impact:	Local to municipal; short term during construction.	Local to municipal; short term during construction.	Local to municipal; long term opportunity cost.
Consequence of impact or risk:	Construction may provide employment and income in a municipality with high unemployment and support local contractors and suppliers. The socio-economic benefit is similar for both sites, although Alternative 1 has a substantially higher environmental cost.	The project is expected to create substantial temporary construction opportunities and stimulate local procurement. This is beneficial in Siyathemba Municipality, where unemployment is a key socio-economic concern.	The municipality would forgo temporary employment, income, skills development and local procurement associated with construction.
Probability of occurrence:	Probable	High Probability	High Probability
Degree to which the impact may cause irreplaceable loss of resources:	None	None	Low
Degree to which the impact can be reversed:	Not applicable / benefit ends after construction	Not applicable / benefit ends after construction	Medium, as similar opportunities may arise from other projects
Indirect impacts:	Skills development; increased household income; secondary spending in local businesses.	Skills transfer, increased household income, support for local suppliers and multiplier effects.	Foregone household income and local business expenditure.
Cumulative impact prior to mitigation:	Medium positive	Medium-High positive	Medium-Low negative
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (+)	Medium-High (+)	Medium-Low (-)
Degree to which the impact can be avoided:	Not applicable	Not applicable	Not applicable
Degree to which the impact can be managed:	High	High	Not applicable
Degree to which the impact can be mitigated:	Can be enhanced	Can be enhanced	Not applicable
Proposed mitigation: Refer to EMP for full list of mitigation	Enhancement measures: • Set reasonable local labour and procurement targets. • Advertise opportunities locally and apply fair recruitment. • Prioritise local SMMEs where capacity and pricing are suitable. • Provide accredited or documented training where possible.		No project-specific enhancement is possible under the No-Go Alternative.

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	Prevent labour-related conflict through a grievance mechanism and worker code of conduct.		
Residual impacts:	Temporary skills, income and experience may continue to benefit workers after construction.	Skills, work experience and some local business development may persist.	Lost construction-phase socio-economic opportunity.
Cumulative impact post mitigation:	Medium positive	Medium-High positive	Medium-Low negative
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (+)	Medium-High (+)	Medium-Low (-)

OPERATIONAL PHASE			
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Spread and establishment of alien invasive plants in operational areas and adjoining natural veld through ongoing vehicle movement, landscaping, disturbed soils and stormwater infrastructure.		No project-related operational spread would occur; however, alien plants already present may continue to spread if the land is not actively managed.
Extent and duration of impact:	Site-specific to local; long term for the duration of operation.	Site-specific to local; long term.	Site-specific to local; long term.
Consequence of impact or risk:	This area contains comparatively intact and ecologically sensitive shrubland. Persistent operational disturbance could facilitate the spread of <i>Neltuma glandulosa</i> , <i>Salsola kali</i> and other weeds into adjoining natural vegetation, reducing habitat integrity and increasing long-term control requirements.	The current grazing land would remain unchanged. Existing alien plants may persist or expand depending on landowner management, but the development would not create new operational disturbance pathways.	The current grazing land would remain unchanged. Existing alien plants may persist or expand depending on landowner management, but the development would not create new operational disturbance pathways.
Probability of occurrence:	High Probability	Probable	Probable
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Low	Low
Degree to which the impact	Medium	Medium	Medium

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can be reversed:			
Indirect impacts:	Competition with indigenous vegetation; altered soil moisture, erosion and fire patterns; reduced habitat quality for fauna; spread along roads and drainage infrastructure.	Gradual deterioration of veld condition and spread into surrounding natural vegetation if unmanaged.	Gradual deterioration of veld condition and spread into surrounding natural vegetation if unmanaged.
Cumulative impact prior to mitigation:	Medium-High	Medium-Low	Medium-Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium-Low (-)	Medium-Low (-)
Degree to which the impact can be avoided:	Medium	High	High
Degree to which the impact can be managed:	High	High	High
Degree to which the impact can be mitigated:	High	High	High
Proposed mitigation: Refer to EMP for full list of mitigation	- Implement and maintain an operational Alien Invasive Plant Control Plan. - Inspect operational areas, road verges, stormwater infrastructure and site boundaries at least bi-annually and after significant rainfall. - Remove listed alien plants before seed set and undertake follow-up control. - Use indigenous species for landscaping and prevent introduction of invasive ornamentals. Maintain records of infestations and treatment.		Continue routine veld management and control listed alien invasive plants in accordance with applicable legal requirements.
Residual impacts:	A continuing risk of reinvasion from surrounding land and vehicle movement will remain, requiring ongoing control.	Potential low-level persistence or reinvasion of alien plants.	Potential low-level persistence or reinvasion of alien plants.
Cumulative impact post mitigation:	Medium-Low	Low	Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Low (-)	Low (-)

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Permanent occupation and operation of the facility would maintain the loss of approximately 19.2 ha of near-natural		No development-related habitat loss or fragmentation would

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	shrubland and reduce local habitat permeability.		occur.
Extent and duration of impact:	Site-specific with local connectivity effects; permanent.	Site-specific with local connectivity effects; permanent.	N/A
Consequence of impact or risk:	Alternative 1 contains intact, higher-sensitivity shrubland and Shepherd's Trees that provide important structural habitat. Buildings, hardstand areas, internal roads, fencing and regular activity would permanently reduce foraging, shelter and movement opportunities and intensify edge effects.	The preferred site provides suitable habitat for bustards, Lanner Falcon prey species, Black-footed Cat, African Striped Weasel, Aardvark, Southern African Hedgehog and Tent Tortoise. The site is less botanically sensitive than Alternative 1 and similar habitat remains around it, but the developed footprint would remain unavailable to most fauna.	N/A
Probability of occurrence:	Definite	Definite	N/A
Degree to which the impact may cause irreplaceable loss of resources:	High	Medium-High	N/A
Degree to which the impact can be reversed:	Very Low	Very Low	N/A
Indirect impacts:	Reduced prey and food availability; isolation of less-mobile fauna; reduced recolonisation; greater pressure on adjoining habitat; increased edge-related mortality.	Displacement into adjoining veld; reduction in foraging and shelter resources; fencing-related barrier effects; cumulative loss of open Nama Karoo habitat.	N/A
Cumulative impact prior to mitigation:	High	High	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very High (-)	High (-)	N/A
Degree to which the impact can be avoided:	Very Low	Very Low	N/A
Degree to which the impact can be managed:	Medium-Low	Medium	N/A
Degree to which the impact can be mitigated:	Low	Medium	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	Keep all operations, parking, storage and maintenance inside the authorised footprint.		N/A

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	- Protect surrounding natural veld as no-go habitat and prevent secondary clearing. - Maintain a vegetated connectivity strip or perimeter buffer where practicable. - Use wildlife-sensitive fencing details where compatible with security. - Rehabilitate redundant disturbed areas and prevent informal access tracks.		
Residual impacts:	Permanent loss and fragmentation of higher-value habitat would remain despite management.	Permanent habitat loss within the footprint and some reduction in local connectivity.	N/A
Cumulative impact post mitigation:	Medium-High	Medium	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	Medium-High (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Routine human presence, trucks, machinery, security activity, noise and lighting would disturb and displace fauna from the developed footprint and immediate surroundings.		No project-related operational disturbance or displacement would occur.
Extent and duration of impact:	Site-specific to local; long term and intermittent throughout operation.	Site-specific to local; long term and intermittent throughout operation.	
Consequence of impact or risk:	Continuing disturbance could reduce use of adjoining habitat by open-country birds and sensitive mammals, interfere with breeding and foraging, and reinforce the barrier created by habitat transformation.	Fauna using the preferred site and adjoining shrubland may avoid active areas, particularly during peak harvest and vehicle movements. Similar surrounding habitat provides alternative refuge, making the consequence lower than at Alternative 1.	Fauna would continue to use the site under the existing grazing regime and baseline road-related disturbance from the R357.
Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-High	Medium	N/A
Degree to which the impact can be reversed:	Medium-High	Medium-High	N/A
Indirect impacts:	Altered movement and activity patterns; reduced breeding success; increased	Temporary interruption of feeding or breeding; altered movement;	N/A

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	competition in adjacent habitat; greater exposure to roads, predators and human conflict.	displacement into adjoining veld; increased stress and exposure to roads.	
Cumulative impact prior to mitigation:	High	Medium-High	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (-)	Medium-High (-)	N/A
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Restrict staff and vehicles to designated areas and roads. • Prohibit hunting, trapping, collecting, feeding and harassment of fauna. • Apply low speed limits and staff awareness training. • Minimise night work, unnecessary noise and lighting. • Keep domestic animals out of the site. • Record and respond to fauna incidents.		N/A
Residual impacts:	Some fauna avoidance of the active facility and immediate boundary will persist.	Low-level avoidance of active operational areas will remain.	N/A
Cumulative impact post mitigation:	Medium	Medium-Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium-Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Fauna may be killed or injured by operational vehicles, machinery, fencing, pest-control practices or entrapment in infrastructure.		No project-related operational vehicle or activity mortality would occur.
Extent and duration of impact:	Site-specific to local; long term and intermittent.	Site-specific to local; long term and intermittent.	N/A
Consequence of impact or risk:	This area supports higher-value habitat and potentially greater fauna use. Regular truck and staff traffic,	Peak seasonal vehicle movements and ongoing pest management may cause occasional mortality. The fauna	Existing mortality risk associated with the R357, grazing activities and normal farm access would remain unchanged.

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	particularly during harvest, could increase road kills, while poorly designed pest control or open structures could cause poisoning or entrapment of mammals, reptiles and birds.	report highlights particular secondary-poisoning risks for Black-footed Cat, African Striped Weasel and other predators if rodenticides are poorly managed. Surrounding habitat remains available, but mortality of SCC could still be significant.	
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-High	Medium	N/A
Degree to which the impact can be reversed:	Medium-Low	Medium-Low	N/A
Indirect impacts:	Secondary poisoning of predators and scavengers; local population reduction; disruption of food webs; increased human-wildlife conflict.	Secondary poisoning; reduced local fauna abundance; disruption of predator-prey relationships; scavenger attraction to carcasses.	N/A
Cumulative impact prior to mitigation:	Medium-High	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Apply a 20-30 km/h operational speed limit and driver awareness programme. • Install fauna warning signs and record all collisions or injuries. • Inspect vehicles and work areas before start-up. • Fit escape structures or covers to open drains, tanks and sumps. • Implement integrated pest management; prioritise exclusion, hygiene and trapping and avoid SGAR rodenticides where feasible.		N/A

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	Prohibit hunting or intentional killing and arrange safe relocation when required.		
Residual impacts:	Occasional collision or incidental mortality risk will remain, particularly during peak traffic periods.	A low risk of isolated mortality incidents remains.	N/A
Cumulative impact post mitigation:	Medium-Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Low (-)	N/A
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Processing machinery, dryers, ventilation, loading, trucks, alarms and maintenance activities would increase ambient noise levels.		No processing-related operational noise would occur.
Extent and duration of impact:	Site-specific to local; long term, seasonal and intermittent, with peaks during harvest.	Site-specific to local; long term, seasonal and intermittent, with peaks during harvest.	N/A
Consequence of impact or risk:	Noise at Alternative 1 would occur within and next to higher-sensitivity intact habitat, potentially causing persistent avoidance and disturbance of birds and mammals and reducing the functional value of adjoining habitat.	Noise may temporarily displace fauna from the preferred site boundary, particularly during peak processing and loading. The absence of nearby residential receptors and availability of surrounding habitat reduce the consequence.	Existing noise from the R357, grazing and routine farm activities would continue.
Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-Low	Low	N/A
Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Habitat avoidance; interference with communication, feeding or breeding; stress to fauna; nuisance to road users or distant receptors.	Temporary fauna avoidance; interference with feeding or breeding; limited nuisance beyond the site.	N/A
Cumulative impact prior to mitigation:	Medium-High	Medium	N/A
Significance rating of impact	Medium-High (-)	Medium (-)	N/A

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prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)			
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Maintain equipment, silencers and vibration control. • Enclose or screen fixed noisy equipment where feasible. • Restrict non-essential noisy activities and deliveries to daytime. • Avoid idling and unnecessary hooting. • Monitor and investigate complaints or unusual noise.		N/A
Residual impacts:	Intermittent operational noise and fauna avoidance close to the facility will remain.	Low-level intermittent noise near operational areas.	N/A
Cumulative impact post mitigation:	Medium-Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Night lighting for security, processing, yards and vehicle movements may disturb nocturnal fauna and alter the local dark environment.		No development-related artificial lighting would be introduced.
Extent and duration of impact:	Site-specific to local; long term and recurring at night.	Site-specific to local; long term and recurring at night.	N/A
Consequence of impact or risk:	Alternative 1 is embedded in comparatively intact dark natural habitat. Unshielded lighting could attract and kill insects, alter predator-prey interactions, disorient birds and bats and cause avoidance by nocturnal mammals across a wider edge zone.	Lighting could attract insects, affect nocturnal mammals and disorient birds, but careful design can substantially contain spill within the preferred operational footprint.	N/A

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Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium-Low	N/A
Degree to which the impact can be reversed:	Medium-High	Medium-High	N/A
Indirect impacts:	Reduced insect availability in surrounding veld; altered movement and feeding; increased predation; cumulative loss of dark habitat.	Local changes in insect abundance and predator-prey interactions; fauna avoidance of illuminated edges.	N/A
Cumulative impact prior to mitigation:	Medium-High	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Use only essential lighting. • Install fully shielded downward-facing luminaires. • Use warm-colour low-intensity lamps, timers and motion sensors. • Direct perimeter lighting inward and prevent spill onto adjoining veld. • Switch off non-essential lights outside operating periods.		N/A
Residual impacts:	Some localised night-time illumination and insect attraction will remain.	Minor localised light spill and insect attraction.	N/A
Cumulative impact post mitigation:	Medium-Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Operational traffic, product and by-product handling, loading and dry windy conditions may generate dust.		No facility-related operational dust would be generated.
Extent and duration of impact:	Site-specific to local; long term, intermittent and	Site-specific to local; long term, intermittent and	N/A

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	seasonally elevated.	seasonally elevated.	
Consequence of impact or risk:	Dust may settle on adjoining high-sensitivity vegetation, reduce plant vigour, affect fauna habitat and visibility on the R357, and create occupational or nuisance impacts. Consequences are greater where natural habitat is more sensitive.	Dust may affect adjacent shrubland, workers and R357 visibility. The arid setting makes dust likely, but the impact can be effectively managed through surface treatment and housekeeping.	N/A
Probability of occurrence:	High Probability	High Probability	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-Low	Low	N/A
Degree to which the impact can be reversed:	High	High	N/A
Indirect impacts:	Reduced photosynthesis and plant condition; nuisance and visibility effects; contamination of stormwater; respiratory exposure; deterioration of adjoining habitat.	Dust deposition on plants, reduce photosynthesis; reduced visibility; nuisance and occupational exposure; sediment in stormwater.	N/A
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Low	Low	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Stabilise or pave high-use roads and yards. • Use water or approved dust suppression as necessary. • Enforce low speeds and cover dusty materials and waste. • Maintain good housekeeping and clean loading areas. • Avoid dusty activities during strong winds and address complaints.		N/A
Residual impacts:	Intermittent dust during dry windy	Minor intermittent dust during extreme	N/A

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	conditions and peak vehicle movement.	dry or windy conditions.	
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Roofs, roads and hardstand surfaces would increase runoff and may cause erosion or sediment movement if stormwater infrastructure is inadequate.		No new roofs or hardstand areas would alter runoff.
Extent and duration of impact:	Site-specific to local; long term, with episodic impacts during rainfall events.	Site-specific to local; long term, episodic during rainfall.	Site-specific; long term.
Consequence of impact or risk:	Poorly controlled runoff could erode or degrade adjoining shrubland, create gullies and alter natural infiltration and drainage patterns. Although no watercourse occurs in the footprint, off-site erosion could spread beyond the facility boundary.	The preferred site has no identified aquatic features, but uncontrolled runoff could erode disturbed margins and affect adjoining shrubland. Appropriate attenuation, energy dissipation and maintenance can substantially reduce the impact.	Natural infiltration and runoff processes would continue, subject to existing grazing and road drainage conditions.
Probability of occurrence:	Probable	Probable	Improbable / baseline only
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium-Low	Low
Degree to which the impact can be reversed:	Medium	Medium	Medium-High
Indirect impacts:	Sedimentation and vegetation loss; dust generation from eroded surfaces; damage to infrastructure; transport of contaminants into surrounding soils.	Local erosion and sediment deposition; infrastructure damage; transport of pollutants and dust-generating fines.	Existing erosion processes may continue where veld is degraded or runoff is concentrated by the R357.
Cumulative impact prior to mitigation:	Medium-High	Medium	Low baseline
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	Neutral / Very Low (-)
Degree to which the impact	Low	Low	Fully avoided

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can be avoided:			
Degree to which the impact can be managed:	High	High	High
Degree to which the impact can be mitigated:	High	High	High
Proposed mitigation: Refer to EMP for full list of mitigation	• Maintain separate clean and dirty stormwater systems. • Use attenuation, energy dissipation and stable vegetated outlets. • Stabilise channels and discharge points. • Inspect and maintain drains, culverts and settlement structures, especially after storms. • Repair erosion promptly and retain vegetation on site margins.		Continue sound veld management and repair any existing erosion.
Residual impacts:	Altered runoff patterns and a low risk of localised erosion at outlets will remain.	Minor localised erosion risk at discharge points.	Existing baseline erosion risk remains.
Cumulative impact post mitigation:	Medium-Low	Low	Low baseline
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-Low (-)	Low (-)	Neutral / Very Low (-)

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Leaks, spills or poor storage of oils, cleaning agents, refrigerants, pesticides and maintenance chemicals may contaminate soil.		No facility-related storage or handling of operational fuels and chemicals would occur.
Extent and duration of impact:	Site-specific, potentially local; long term with acute incidents possible throughout operation.	Site-specific, potentially local; long term with acute incidents possible.	N/A
Consequence of impact or risk:	Contamination could sterilise soil, damage higher-sensitivity vegetation and expose fauna to toxic substances. Persistent hydrocarbons or chemicals may be difficult to remove from arid soils and could migrate in runoff.	Spills could damage soil and adjacent vegetation and contaminate runoff. The impact is readily manageable if hazardous materials are kept on impermeable, bunded surfaces and incidents are rapidly contained.	N/A
Probability of occurrence:	Probable	Probable	N/A

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Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium-Low	N/A
Degree to which the impact can be reversed:	Medium-Low	Medium-Low	N/A
Indirect impacts:	Vegetation dieback; fauna poisoning; contaminated stormwater; hazardous waste generation; fire risk and worker exposure.	Vegetation damage; fauna exposure; contaminated stormwater; hazardous waste and fire risk.	N/A
Cumulative impact prior to mitigation:	Medium-High	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Use roofed, secure and bunded chemical storage. • Maintain equipment only on impermeable contained surfaces. • Keep spill kits, SDSs and trained responders available. • Inspect equipment and storage routinely. • Excavate and lawfully dispose of contaminated soil; record and report material incidents.		N/A
Residual impacts:	A low risk of isolated spills and minor residual contamination remains.	Low risk of isolated spills or small residual contamination.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Very Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Contaminated stormwater, wash water, sewage, chemicals, or waste may pollute soil and groundwater and potentially migrate to off-site surface-water receptors.		No processing effluent, facility sewage or contaminated operational runoff would be generated.

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Extent and duration of impact:	Site-specific to regional receiving environment; long term, with episodic incidents.	Site-specific to regional receiving environment; long term, with episodic incidents.	N/A
Consequence of impact or risk:	No watercourse occurs within the footprint, but uncontrolled effluent or spills could infiltrate soils or be transported off site. At Alternative 1, pollution would also degrade more sensitive terrestrial habitat before reaching any downstream receptor.	The preferred footprint contains no wetlands but is near a drainage line. The processing plant includes washing and effluent infrastructure, and failures could contaminate groundwater or off-site runoff. Proper containment and recycling can reduce the risk to low levels.	N/A
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-High	Medium	N/A
Degree to which the impact can be reversed:	Medium-Low	Medium-Low	N/A
Indirect impacts:	Soil contamination; vegetation and fauna exposure; odour and pest attraction; downstream water-quality deterioration; regulatory non-compliance.	Soil and groundwater contamination; fauna exposure; odour and pests; downstream water-quality effects and legal non-compliance.	N/A
Cumulative impact prior to mitigation:	Medium-High	Medium-High	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium-High (-)	Medium-High (-)	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Maintain separate clean and contaminated stormwater systems. • Collect and contain process wash water in impermeable settlement/recycling systems. • Maintain lawful sewage management and prevent any untreated discharge. • Store chemicals and waste in bunded or impermeable areas.		N/A

Appendix F: Impact Assessment

	- Inspect tanks, pipelines and effluent systems; retain disposal and maintenance records. - Implement spill and overflow response procedures.		
Residual impacts:	A low residual risk of accidental leaks, overflow or off-site migration remains.	Low residual risk of isolated leakage or overflow.	N/A
Cumulative impact post mitigation:	Medium-Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Operational solid waste generation affecting the receiving environment.		No project-related impact.
Extent and duration of impact:	Site-specific to local; long-term throughout operation.	Site-specific to local; long-term throughout operation.	No development-related impact.
Consequence of impact or risk:	Higher consequence due to greater ecological sensitivity.	Lower consequence as preferred site avoids higher sensitivity vegetation and habitat.	Existing baseline conditions remain.
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-Low	Low	N/A
Degree to which the impact can be reversed:	Medium	Medium	N/A
Indirect impacts:	May include the attraction of pests and scavengers, leading to the secondary spread of waste and degradation of surrounding habitats and environmental quality. Could also be ingested by wildlife, resulting in injury, illness or mortality, and disrupting natural ecological processes.	May include the attraction of pests and scavengers, leading to the secondary spread of waste and degradation of surrounding habitats and environmental quality. Could also be ingested by wildlife, resulting in injury, illness or mortality, and disrupting natural ecological processes.	N/A
Cumulative impact prior to mitigation:	Medium	Medium-Low	N/A
Significance rating of impact prior to mitigation	Medium (-)	Medium (-)	N/A

Appendix F: Impact Assessment

(e.g. Low, Medium, Medium-High, High, or Very-High)			
Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Implement EMP, • Good housekeeping, • Monitoring & maintenance, • Staff training and adaptive management.		N/A
Residual impacts:	Low residual impact after mitigation.	Very low residual impact after mitigation.	N/A
Cumulative impact post mitigation:	Medium-Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Very Low (-)	N/A

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Operational visual impact affecting the receiving environment.		No project-related visual impact.
Extent and duration of impact:	Site Specific to local and long term throughout operation.	Site Specific to local and long term throughout operation.	N/A
Consequence of impact or risk:	The visual character and scenic quality of the surrounding landscape may be adversely affected, reducing the area's aesthetic value and sense of place.	The visual character and scenic quality of the site have already been affected, thus the risk of the consequence is lower.	N/A
Probability of occurrence:	Likely	Likely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium	Medium-Low	N/A
Degree to which the impact can be reversed:	Medium	Medium	N/A
Indirect impacts:	Loss of sense of place for surrounding area.	Secondary effects on surrounding environment and land use.	N/A
Cumulative impact prior to mitigation:	Medium	Medium-Low	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A

Appendix F: Impact Assessment

Degree to which the impact can be avoided:	Medium	Medium	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	Low	Medium	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Implement EMP. • Maintain a clean site and good housekeeping • Implement monitoring, staff training and adaptive management.		N/A
Residual impacts:	Low residual impact after mitigation.	Very low residual impact after mitigation.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
Nature of impact:	Increased traffic and road safety affecting the receiving environment.		No project-related impact.
Extent and duration of impact:	Site Specific to local and long term throughout operation.	Site Specific to local and long term throughout operation.	N/A
Consequence of impact or risk:	Medium risk since the site enters the R357 and there are no calming lanes.	Medium risk since the site enters the R357 and there are no calming lanes.	N/A
Probability of occurrence:	Probable	Probable	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	N/A
Degree to which the impact can be reversed:	Medium	Medium	N/A
Indirect impacts:	Increased traffic on the R357 may elevate the risk of wildlife-vehicle collisions and contribute to cumulative road safety impacts for other road users.	Increased traffic on the R357 may elevate the risk of wildlife-vehicle collisions and contribute to cumulative road safety impacts for other road users.	N/A
Cumulative impact prior to mitigation:	Medium	Medium	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Medium	Medium	N/A

Appendix F: Impact Assessment

Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A
Proposed mitigation: Refer to EMP for full list of mitigation	• Ensure that the site access is designed and maintained to provide adequate sight distance in both directions along the R357. • Upgrade the access intersection, where required, in accordance with the requirements of the relevant roads authority. • Install appropriate road warning signage (e.g. turning vehicles/heavy vehicles) where approved by the roads authority. • Restrict heavy vehicle movements to daylight hours, where practicable, to improve visibility and road safety. • Implement a site Traffic Management Plan for operational vehicle movements, including speed limits and designated entry and exit procedures. • Ensure all trucks are roadworthy, comply with legal load limits, and that loads are securely covered where necessary. • Maintain the access road in good condition to prevent loose material or mud from being deposited onto the R357. • Require all drivers to comply with posted speed limits and road traffic regulations. • Monitor traffic volumes and road safety incidents and implement additional mitigation if operational traffic increases beyond anticipated levels.		N/A
Residual impacts:	Minor increase in traffic volumes and collision risk on the R357, but with appropriate access design and traffic management, the impact should remain low.	Minor increase in traffic volumes and collision risk on the R357, but with appropriate access design and traffic management, the impact should remain low.	N/A
Cumulative impact post mitigation:	Low	Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (-)	Low (-)	N/A
	Alternative 1:	Alternative 2 (preferred site)	No-Go Option

Appendix F: Impact Assessment

Nature of impact:	Contribution to local and regional agricultural development.		No contribution to local and regional agricultural development
Extent and duration of impact:	Region and Long Term	Region and Long Term	N/A
Consequence of impact or risk:	Strengthened agricultural sector and food production capacity	Strengthened agricultural sector and food production capacity	No additional contribution to agricultural sector and food production capacity
Probability of occurrence:	High Probability	High Probability	Definite
Degree to which the impact may cause irreplaceable loss of resources:	N/A	N/A	Low
Degree to which the impact can be reversed:	N/A	N/A	Medium
Indirect impacts:	Support for broader regional economic growth.	Support for broader regional economic growth.	No additional support for broader regional economic growth.
Cumulative impact prior to mitigation:	Low	Low	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Low (+)	Low (+)	Low (-)
Degree to which the impact can be avoided:	Low – the applicant does not want to avoid a positive impact	Low – the applicant does not want to avoid a positive impact	High
Degree to which the impact can be managed:	High	High	Low
Degree to which the impact can be mitigated:	High	High	Low
Proposed mitigation: Refer to EMP for full list of mitigation	• Maintain sustainable agricultural agro-production. • Support local economic participation. • Implement environmentally responsible farming practices.		N/A
Residual impacts:	Positive contribution to the local and regional agricultural economy remains.	Positive contribution to the local and regional agricultural economy remains.	No additional contribution to the local and regional agricultural economy remains.
Cumulative impact post mitigation:	Medium-High (+)	Medium-High (+)	Low (-)
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (+)	High (+)	Medium-High (-)

	Alternative 1:	Alternative 2 (preferred site)	No-Go Option
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Appendix F: Impact Assessment

Nature of impact:	Cumulative ecological impacts affecting the receiving environment.		No project-related impact.
Extent and duration of impact:	Site Specific to local and long term throughout operation.	Site Specific to local and long term throughout operation.	N/A
Consequence of impact or risk:	The development, together with existing and foreseeable land-use changes, may contribute to the cumulative loss and fragmentation of higher-value natural habitat, resulting in a greater decline in local ecological integrity and biodiversity.	The development, together with existing and foreseeable land-use changes, may contribute to cumulative habitat loss and fragmentation; however, as the site is located within a less sensitive and more disturbed area, the contribution to cumulative ecological impacts would be comparatively lower.	N/A
Probability of occurrence:	Probable	Unlikely	N/A
Degree to which the impact may cause irreplaceable loss of resources:	Medium-High	Medium	N/A
Degree to which the impact can be reversed:	Medium-Low	Medium	N/A
Indirect impacts:	The development may contribute to further habitat fragmentation, reduced ecological connectivity and increased edge effects, resulting in the displacement of fauna and facilitating the spread of invasive alien plant species.	The development may contribute to minor habitat fragmentation and edge effects; however, these indirect impacts are expected to be limited due to the site's lower ecological sensitivity and the implementation of mitigation measures.	N/A
Cumulative impact prior to mitigation:	Medium	Medium-Low	N/A
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Medium (-)	N/A
Degree to which the impact can be avoided:	Medium-High	High	N/A
Degree to which the impact can be managed:	High	High	N/A
Degree to which the impact can be mitigated:	High	High	N/A

Appendix F: Impact Assessment

Proposed mitigation: Refer to EMP for full list of mitigation	• Limit all operational activities to the approved development footprint and prevent any unnecessary disturbance of adjacent natural vegetation. • Implement an Alien Invasive Species Management Plan, with routine monitoring and control of invasive plants. • Rehabilitate all disturbed areas not required for ongoing operations using indigenous species where appropriate. • Maintain effective stormwater management to prevent erosion and off-site sedimentation. • Minimise unnecessary lighting and noise to reduce disturbance to surrounding fauna. • Ensure effective waste management to prevent pollution and attraction of wildlife. • Monitor the effectiveness of mitigation measures through routine environmental inspections and implement corrective actions where required. • Promote environmental awareness amongst operational staff through regular training and induction. • Avoid future expansion into adjacent natural habitat unless supported by the required environmental authorisations and specialist assessments.	N/A	
Residual impacts:	Despite mitigation, a residual cumulative impact on ecological integrity is expected due to the permanent loss of more sensitive natural habitat and the incremental contribution to habitat fragmentation within the surrounding landscape.	A minor residual cumulative impact on ecological integrity may remain; however, the contribution to cumulative habitat loss and fragmentation is expected to be low due to the site's lower ecological sensitivity and the implementation of mitigation measures.	N/A
Cumulative impact post mitigation:	Medium	Medium-Low	N/A
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Medium (-)	Low (-)	N/A

DECOMMISSIONING AND CLOSURE PHASE

Should the activity be authorized, it is highly unlikely that the proposed development will be decommissioned in the next 30 years. Therefore, a decommissioning Phase for the impact assessment is not included.

In the unlikely case of decommissioning, a closure plan is submitted and approved by the relevant authority/ties before closure commences. The relevant State Departments, applicable at the time of decommissioning, and the relevant environmental legislation should be consulted before decommissioning.

Appendix G: Environmental Management Programme (EMPr)

Draft BAR



APPENDIX G

ENVIRONMENTAL MANAGEMENT PLAN

For the

Application for Environmental Authorisation for the
Pistachio Processing Plant on Portion 18 (Ptn of Ptn 15)
of the Farm Uitdraai No. 33, Prieska

Prepared for

PRIESKA PISTACHIO COMPANY (PTY) LTD



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BACKGROUND

Digital Soils Africa (Pty) LTD (DSA) was tasked by Prieska Pistachio Company (Pty) Ltd to conduct environmental investigations and complete the Environmental Authorisation Application for the authorisation of clearing 19.8Ha of vegetation on Portion 18 (Ptn of Ptn 15) of the Farm Uitdraai No. 33, Prieska in the Northern Cape to establish a pistachio nut processing plant.

In terms of the National Environmental Management Act 107 of 1998 ("NEMA"), environmental authorisation must be obtained before any person can conduct activities that cause damage to the environment.

DSA was appointed by Prieska Pistachio Company (Pty) Ltd (also referred to as the Applicant) as the independent environmental assessment practitioner (EAP) to undertake the Environmental Authorisation Application for the commencement of a listed activity in terms of the Environmental Impact Assessment Regulations 2014, as amended in 2017.

The Applicant would like to develop 19.8 Ha to establish a pistachio nut processing plant.

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Environmental Assessment Practitioner (EAP): Natalia Sharp

Postal address: 45 Church Street, Walmer, 6070

Cell Phone: 082 414 0472

Email: natalie@dsafrica.co.za

EAP qualifications: B.Sc (Botany and Zoology) (UFS); B.Sc. (Hons) Limnology (UFS); Masters in Environmental Management: Evaluation of Phytoplankton as an indicator in a biomonitoring program, with special reference to the Modder River.

EAP Registrations/Associations: SACNASP (123443) & Reg. EAP (2020/230)

Natalie Sharp is the project manager and senior Environmental Assessment Practitioner leading this project and is registered as an Environmental Assessment Practitioner (EAP) with the Certification Board for Environmental Assessment Practitioners of South Africa (EAPSA) (Registration Number: 2020/230) and as a Professional Natural Scientist (Pri.Sci.Nat) with the South African Council for Natural Scientific Professions (SACNASP) (Registration Number: 123443) (see Appendix A for detailed CV and qualifications). Natalie Sharp has worked in the environmental industry for over seventeen years.

PURPOSE OF THE DOCUMENT

This document serves as a programme to manage the environmental impacts during the pre-construction, construction, and operational phases of the proposed development. This document will provide mitigation measures to prevent, reduce, avoid, or rehabilitate and mitigation measures must be implemented during all the phases of the development. The objective will be to limit the negative impacts and increase positive impacts.

The Environmental Management Plan (EMP) will also:

- Provide applicable legislative framework;
- Provide management objectives, and actions to achieve such objectives;
- List roles and responsibilities;
- Provide record-keeping methods, auditing or review, and report writing;

SITE LOCALITY

The site is situated southeast of Prieska in the Northern Cape ($29^{\circ} 41' 41.35''S$; $22^{\circ} 52' 47.49''E$ most centre point of the site), within the Siyathemba Municipal area. The site can be reached by travelling along the R357 for about 12.4km. The site is accessible via private roads directly from the R357.



FIGURE 1: SITE LOCATION IS REPRESENTED AS THE RED POLYGON.

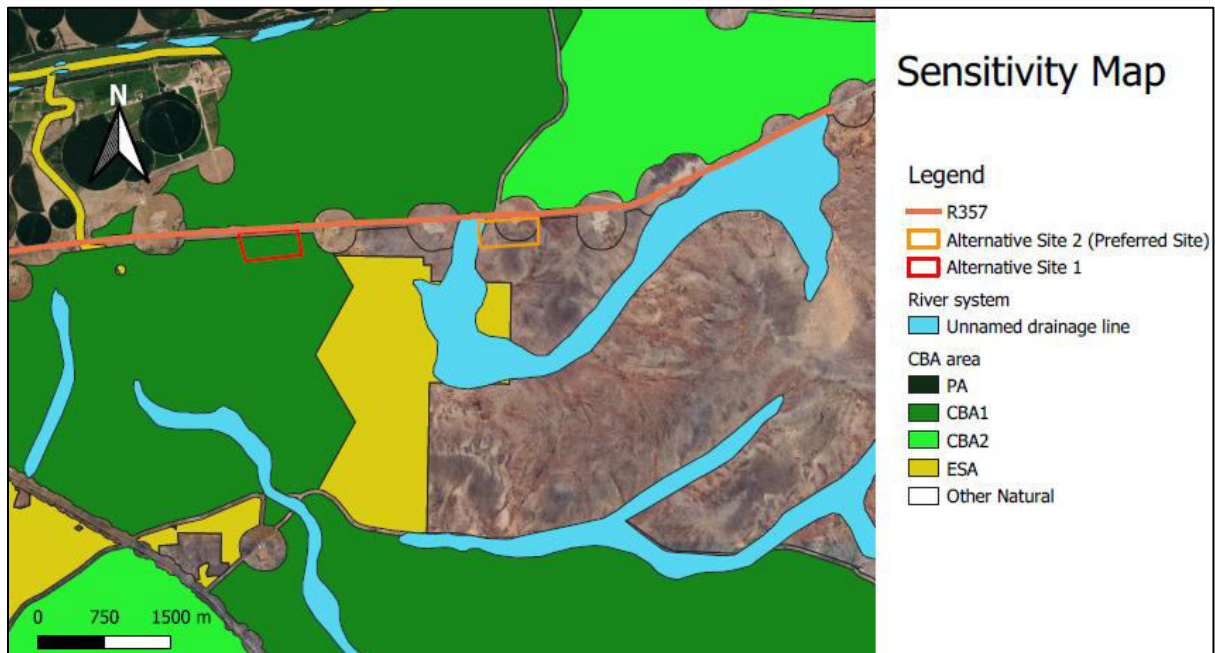


FIGURE 2: ALTERNATIVE SITE 2 (PREFERRED SITE) DOES NOT FALL WITHIN CBA ACCORDING TO THE BGIS OF THE NORTHERN CAPE BIODIVERSITY CONSERVATION PLAN. THE UNAMED DRAINAGE LINE IS INFORMATION OBTAINED FROM NATIONAL WETLAND DATA FROM SANBI. NO WETLAND WAS IDENTIFIED ON SITE.

DESCRIPTION OF THE PROPOSED LISTED ACTIVITIES

TABLE 1: EIA LISTED ACTIVITIES

Listings	Describe the portion of the proposed project to which the applicable listed activity relates.	Coordinates of listed activities (centre point coordinates of the listed activity location)
GNR 327 Activity 27:	The clearance of an area of 1Ha or more, but less than 20Ha of indigenous vegetation.	29°41'41.15"S 22°52'47.82"E
GNR 327 Activity 8:	The development and related operation of agri-industrial facilities outside industrial complexes where the development footprint covers an areas of 2000m ² or more.	29°41'45.95"S 22°51'08.10"E

The proposed activities will include the clearing of 19.8Ha of vegetation to establish a pistachio processing plant.

LEGISLATIVE REVIEW

ENVIRONMENTAL ASSESSMENTS UNDERTAKEN FOR THE DEVELOPMENT

In terms of the National Environmental Management Act 107 of 1998 (“NEMA”), environmental authorization must be obtained before any person can conduct activities that cause damage to the environment. Environmental legislation intends to regulate the interaction of human life with the natural environment. The purpose of environmental legislation is to protect and preserve the environment for current and future generations. The following Acts and Regulations apply to the proposed project:

LEGISLATION

1. Section 24 of the **Constitution of the Republic of South Africa Act (No 108 of 1996)** states that everyone has the right:

(ii) to an environment that is not harmful to their health or well-being;

(iii) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development.

2. The **National Environmental Management Act (Act No 107 of 1998)**. NEMA is based on the concept of sustainable development and the objective is to provide for cooperative environmental governance, by providing the legal framework for environmental planning and development.

NEMA has basic principles that state:

- That all the principles throughout the Republic apply to the actions of all organs of state that may significantly affect the environment;

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
 - Development must be socially, environmentally and economically sustainable.
 - Sustainable development requires consideration of all relevant factors.
 - Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.
 - There should be equal access to environmental resources, benefits and services to meet basic human needs and the Government should promote public participation when making decisions about the environment;
 - Decisions must be taken openly and transparently and there must be access to information;
 - Communities must be given environmental education;
 - Workers have the right to refuse to do work that is harmful to their health or the environment;
 - The role of youth and women in environmental management must be recognized;
 - The person or company who pollutes the environment must pay to clean it up;
 - The environment is held in trust by the state for the benefit of all South Africans; and
 - The utmost caution should be taken when permission for new developments is granted.
3. The **Environmental Impact Assessment Regulations: 324, 325, 326 & 327 of 7 April 2017**. The purpose of these Regulations is to regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing, and consideration of, and decision on, applications for environmental authorizations for the commencements of listed activities, subjected to environmental impact assessment, to avoid or mitigate detrimental impacts on the environment, and to optimize positive environmental impacts, and for matters pertaining thereto.

Duty of Care

Chapter 7 of the NEMA prescribed a general 'duty of care' and the requirement to remediate environmental damage. Section 28(1) of NEMA states:

Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or insofar as such harm to the environment is authorized by law or cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment.

The Duty of Care can, inter alia, be enforced through directives issued by the competent authority.

In terms of 2014 NEMA EIA Regulations, as amended, the activities listed in Table 1 is triggered by this proposed development, thereby requiring an EA from the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARDLR).

4. The **National Water Act (No. 36 of 1998)**. The major objectives of the National Water Act are to:

- Aid in providing basic human needs;
- Meet the growing demand for water sustainably;
- Ensure equal access to water and use of water resources
- Protect the quality of water of natural resources;
- Foster social and economic development; and
- Conserve aquatic and related ecosystems.

Desktop studie indicated that there might be a wetland in the northwestern corner of the property (Figure 2). Upon site investigation it was found that the site does not host any wetland or water features.

The Department of Water and Sanitation will be consulted however it is not expected that any water use license application would be required.

5. The **National Environmental Management: Biodiversity Act**:

The act provides the framework for: i) the management and conservation of biological diversity within the Republic and the components of such biological diversity; ii) the use of indigenous biological resources in a sustainable manner; and iii) the fair and equitable sharing among stakeholders of benefits arising from bioprospecting involving indigenous biological resources.

The act also provides for co-operative governance in biodiversity management and by establishing a South African National Biodiversity Institute, the objectives of the Act can be achieved.

Three Regulations are applicable: 1) Threatened and Endangered Ecosystems, 2) ToPs (2008) (Threatened or Protected species), and 3) AIS (Alien and Invasive Species).

6. The **National Environmental Management: Protected Areas Act**:

The Protected Areas Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. It provides for the establishment of a national register of all national, provincial and local protected areas and the management of those areas. The Act also provides for the governance and functions of South African National Parks and matters in connection therewith.

7. The National Forests Act No. 84 of 1998 (NFA) & List of Protected Tree Species under the National Forest Act, 1998 (Act No. 84 of 1998).

The purposes of this Act are to promote the sustainable management and development of forests for the benefit of all. The Act also provides special measures for the protection of certain forests and trees and promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.

According to the Act, a natural forest is defined as a group of indigenous trees whose crowns are largely contiguous or which have been declared by the Minister to be a natural forest under section 7(2). No person may cut, disturb, damage or destroy any indigenous tree in a natural forest; or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any tree, or any forest product derived from a tree within a natural forest.

The principals of the Act indicate that:

- a) Natural forests must not be destroyed save in exceptional circumstances where, in the opinion of the Minister, proposed new land use is preferable in terms of its economic, social or environmental benefits;
- b) A minimum area of each woodland type should be conserved; and
- c) Forests must be developed and managed so as to-
 - (i) conserve biological diversity, ecosystems and habitats;
 - (ii) sustain the potential yield of their economic, social and environmental benefits;
 - (iii) promote the fair distribution of their economic, social, health and environmental benefits;
 - (iv) promote their health and vitality;
 - (v) conserve natural resources, especially soil and water;
 - (vi) conserve heritage resources and promote aesthetic, cultural and spiritual values; and

- (vii) advance persons or categories of persons disadvantaged by unfair discrimination. Page 15 of 82 (4) The Minister must determine the minimum area of each woodland type to be conserved in terms of subsection (3)(b) based on scientific advice.

Below is the list of protected species identified on site that may require a permit to be removed.

Species	Family	Growth Form	Protection Status / Notes	Location on Site
<i>Aizoon plinthoides</i>	Aizoaceae	Dwarf shrub	Listed as a specially protected species under the Northern Cape Nature Conservation Ordinance (Schedule 2).	Shrubland Vegetation Unit
<i>Aloe claviflora</i>	Asphodelaceae	Succulent	Protected succulent under the Northern Cape Nature Conservation Ordinance (Schedule 2). The report specifically notes that it was found on the southern boundary of the study site.	Shrubland Vegetation Unit (southern boundary)
<i>cf. Nerine</i> sp.	Amaryllidaceae	Bulb	Protected because of the family to which it belongs. Identification to species level was not possible due to the absence of flowers. Several individuals were recorded.	Shrubland Vegetation Unit

8. Conservation of Agricultural Resources Act (Act 43 of 1983):

The objectives of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) are to provide for the conservation of the natural agricultural resources of South Africa by the:

- Maintenance of the production potential of land;
- Combating and prevention of erosion and weakening or destruction of the water sources; and
- Protection of the vegetation and the combating of weeds and invader plants.

The CARA states that no land user shall utilise the vegetation of wetlands (a watercourse or pans) in a manner that will cause its deterioration or damage. This includes cultivation, overgrazing, diverting water run-off and other developments that damage the water resource.

The CARA includes regulations on alien invasive plants. According to the amended regulations (GN R280 of March 2001), declared weeds and invader plants are divided into three categories:

- Category 1 may not be grown and must be eradicated and controlled,
- Category 2 may only be grown in an area demarcated for commercial cultivation purposes and for which a permit has been issued, and must be controlled, and

- Category 3 plants may no longer be planted and existing plants may remain as long as their spread is prevented, except within the flood line of watercourses and wetlands.

It is the legal duty of the land user or landowner to control invasive alien plants occurring on the land under their control. Should alien plant species occur within the study area; this will be managed in line with the EMPr.

9. Bio-regional Plans:

In terms of the provincial and local protected areas, the area under application is situated within an area that has been identified as other natural areas according to the BGIS of the Northern Cape Biodiversity Conservation Plan and does fall within a critically biodiversity area 1&2. The Siyathemba Municipality Spatial Development Framework (SDF) identified areas within the Municipality

The purpose of the SDF is:

- To guide spatial planning, land development, and land use management in the local municipal area. More specifically, to geographically detail land use.
- To give strategic direction in terms of investment in the local Municipal area to the private sector and community investors concerning the levels, locations, types, and forms of investment that need to be made and that will be supported by the Local Municipality.
- The SDF identified impacts associated with mixed farming (crops and livestock) as:
 - The destruction of biodiversity;
 - Indigenous flora being substituted with exotic species;
 - The loss of herbaceous annuals;
 - Exposure of bare soil and subsequent erosion;
 - Areas are homogenized and ecosystem functioning on cultivated land is essentially simplified to the production of bio-mass;
 - Depletion and degradation of soils may lead to unproductive soils.

The Siyathemba Local Municipality Spatial Development Framework (SDF) designates the proposed site as "Agriculture 1" and used for grazing. As the proposed pistachio processing facility is directly linked to the agricultural value chain by supporting the processing of locally produced pistachios, the development is considered compatible with and supportive of the intended agricultural land use. The proposal therefore aligns with and gives effect to the objectives of the Siyathemba Local Municipality Spatial Development Framework.

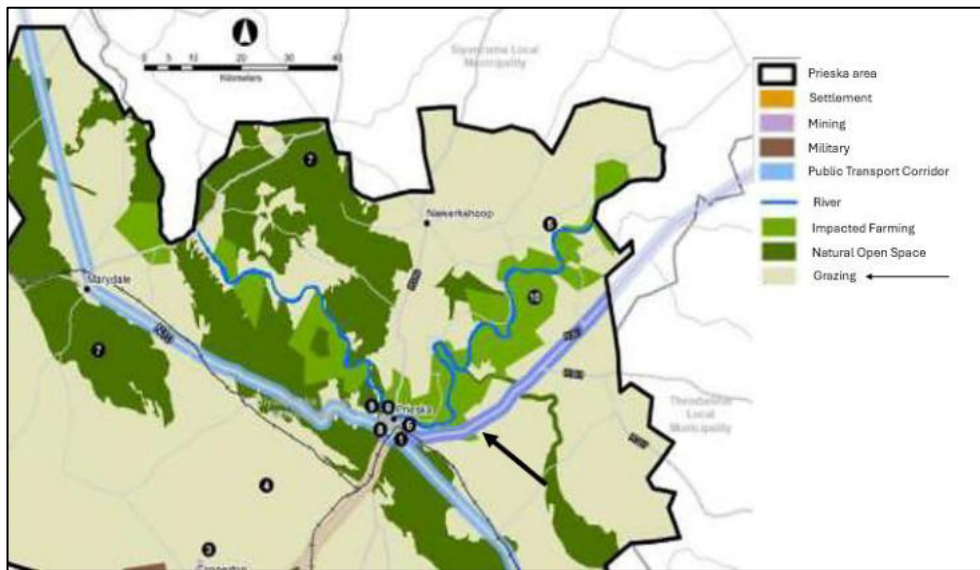


FIGURE 3: SIYATHEMBA SPATIAL FRAMEWORK (IDP 2025/26). THE SITE IS ALLOCATED BY THE BLACK ARROW WHICH IS CONSIDERED GRAZING CLASSIFICATION.

The vegetation survey that will be conducted will verify the sensitivity of the site from a botanical and ecological point of view.

10. Northern Cape Nature Conservation (Act 09 of 2009):

The objective of the Act is to provide for the sustainable utilisation of wild animals, aquatic biota, and plants, to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, to provide for offences and penalties for contravention of the Act, to provide for the appointment of nature conservators to implement the provisions of the Act, to provide for the issuing of permits and other authorisations, and to provide for matters connected therewith.

This Act aims at improving sustainability in terms of balancing natural resource usage and protection or conservation thereof. It includes six schedules, as follows:

- (viii) Schedule 1 - Specially Protected species;
- (ix) Schedule 2 - Protected species;
- (x) Schedule 3 - Common indigenous species;
- (xi) Schedule 4 - Damage causing animal species;
- (xii) Schedule 5 - Pet species; and
- (xiii) Schedule 6 - Invasive Species.

With regards to protected flora, the Northern Cape Nature Conservation Act includes a list of protected flora.

It will be recommended that relevant permits be obtained and that a detailed plant search and rescue operation be conducted before the clearance of vegetation, as part of the EMPr.

11. The Provincial Spatial Development Framework for the Northern Cape (Office of the Premier of the Northern Cape, 2012):

On 22 August 2012, the Northern Cape Provincial Spatial Development Framework (PSDF) was approved in accordance with the Northern Cape Planning and Development Act, 1998. However, the Spatial and Land Use Management Act (SPLUMA) was approved in 2013 and now requires the review of the Northern Cape PSFD 2012, which commences in 2018.

The PSDF needs to address spatial inefficiencies and inequalities, identify areas of opportunity and ensure proactive management of natural resources and ecosystems in the Province. The PSDF will focus on transforming spatial development whilst SPLUMA provides the tool for that transformation.

The approval of the PSDF in terms of the Northern Cape Planning and Development Act 7 of 1998 means that the PSDF has statutory status as the common spatial vision and strategy around which to align the future development and management of the province.

In terms of Land Use Management, there are 6 (six) Spatial Planning Categories, which are, 1) Category A (Nature Conservation Area); 2) Category B (Natural Buffer Areas) 3) Category C (Agricultural Areas); 4) Category D (Urban Related Areas); Category E (Industrial Areas); Category F (Surface Infrastructure Areas).

The SPCs are not a blueprint for land-use classification, or a zoning scheme, however, the SPCs provide a framework to guide decision-making regarding land use at all levels of planning, and they have been articulated in a spirit of creating and fostering an organised process that enables people to work together to achieve sustainable development in a coherent manner. The designation of SPCs does not change existing zoning or land-use regulations or legislation. SPCs merely help to clarify and facilitate coherent decision-making that can lead to better zoning, laws and regulations. The SPCs, furthermore, provide a framework in terms of which land-use decisions can be standardised throughout the province.

The land-use classification has further adopted a bioregional planning approach which provides for three broad land-use categories, i.e. a core conservation area (SPC A), a conservation focussed buffer area (SPC B), and a transition area (SPC C-F).

In terms of this application, the proposed development will fall within the Land Use Management Category C, since the Applicant would like to clear vegetation to establish pistachio processing plant.

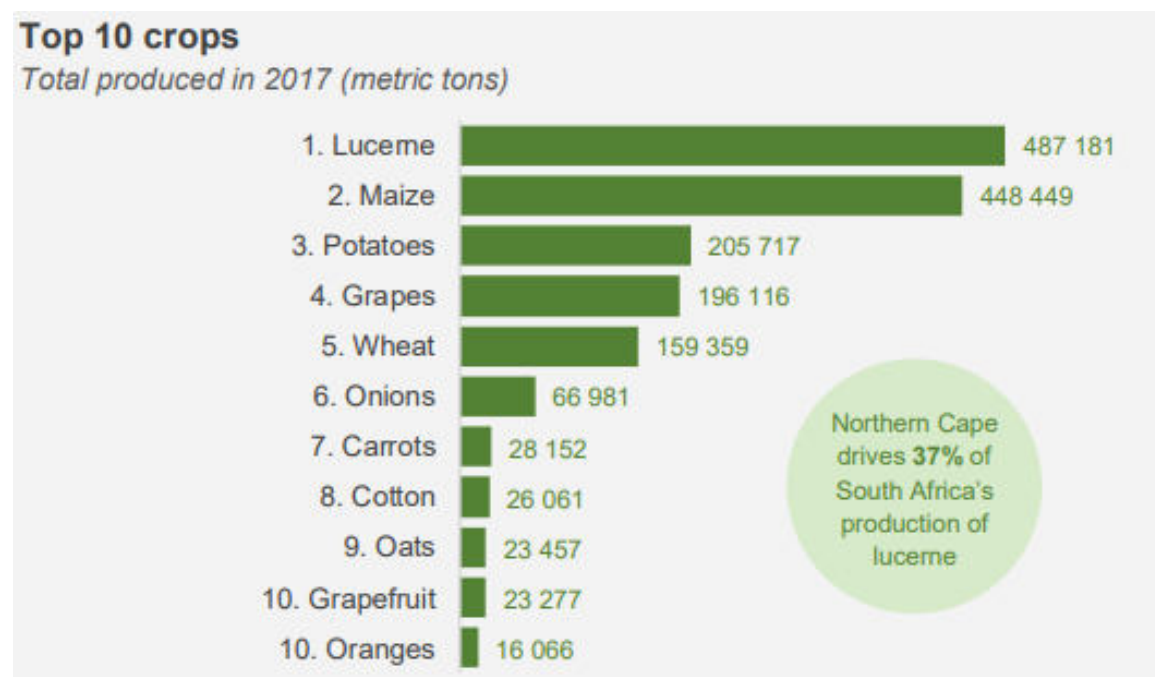


FIGURE 4: TOP 10 CROPS PRODUCED IN NORTHERN CAPE (SOURCE STATS SA, 2020).

The Northern Cape produces about 37% of South Africa lucerne (STATS SA, 2020) and about 9% of South Africa's total maize production (Department of Agriculture, Forestry and Fisheries, 2017), therefore the proposed production is in line with the achievement of the agricultural sector in the Northern Cape.

In terms of the Agricultural Areas in Spatial Planning, the key strategies and intervention are:

- Give effect to the ideas of the sustainable Development Goals pertaining to the promotion of sustainable agriculture and rural development.
- Development of an Agricultural Master Plan for the Province to identify and protect the most fertile land for cultivation and food security purposes.
- Consider the rezoning of low-potential agricultural land as a mechanism to promote sustainable economic development by unlocking the latent capital vested in non-agricultural uses through the Sustainable Development Initiative (SDI) approach.

- Encourage bona fide game farms to combine their landholdings to create an extensive Spatial Planning Buffer Area (SPC B), that would support biodiversity conservation in a meaningful manner. Such areas should be managed as Special Management Areas.
- Encourage local processing of farm products and the provision of local farm services to enhance the total economy, increase the viability of agricultural production and reduce rural poverty.

12. The National Heritage Resources Act (No 25 of 1999):

The basic objectives of the National Heritage Resources Act are to set norms and maintain essential national standards and general principles for the governing and management of heritage resources in the Republic and to protect heritage resources of national significance.

The South African Heritage Resources Agency (SAHRA) has been established to coordinate and promote the management of heritage resources at the national level.

The proposed site is situated on agricultural land currently used for grazing, however, a heritage assessment was completed and will be submitted to SAHRA.

13. Occupational Health and Safety Act (No 85 of 1993):

The act provides for the health and safety of persons at work and the health and safety of persons in connection with the use of machinery, the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work. The EMPs should provide measures to ensure that the objectives of the Act are met on this site.

14. Alien and Invasive Species Regulations, 1 August 2014

Regulations regarding alien and invasive species.

15. National Road Traffic Act, 1996 (Act 93 of 1996):

Regulations relating to the transport of goods and substances by road.

PROJECT DESCRIPTION

The proposed development entails the establishment of a pistachio processing facility on approximately 19.8 ha on Portion 18 (Portion of Portion 15) of Farm Uitdraai No. 33, within the Siyathemba Local Municipality, Northern Cape.

The facility will receive pistachio nuts harvested from local and regional orchards for cleaning, de-hulling, washing, drying, sorting, grading, shelling (where required), packaging and storage before distribution to local and export markets. The development will provide essential agricultural support infrastructure to strengthen the regional pistachio value chain and promote value-added processing within the Northern Cape.

The proposed facility will comprise receiving and processing areas, drying and grading equipment, packaging facilities, storage warehouses, quality control laboratories, administrative offices, staff amenities, internal access roads, parking areas, stormwater management infrastructure, waste and effluent management systems, electrical infrastructure, security fencing and fire protection infrastructure.

During project planning, two potential development sites were assessed from a terrestrial biodiversity perspective. The current preferred site was selected as the environmentally preferable alternative, as it presents a substantially lower ecological sensitivity than the original site while remaining suitable for the proposed development. The specialist investigations indicate that, with the implementation of appropriate mitigation measures, the identified environmental impacts can be effectively managed.

This is a permanent change from natural grazing to nut plant processing infrastructure. Should the activity be authorized, it is highly unlikely that the proposed development will be decommissioned. However, should the proposed pistachio processing facility cease operations due to commercial or operational reasons, the most likely outcome is that the facility would be sold, leased or repurposed for another agricultural or agro-industrial use.

Given the investment in buildings, services and processing infrastructure, complete demolition of the facility is considered unlikely. Should demolition become necessary, all processing equipment, buildings, hard surfaces and associated infrastructure would be dismantled and removed to approved waste disposal or recycling facilities. Any contaminated areas would be remediated where required, unnecessary infrastructure removed, and disturbed areas rehabilitated to a stable condition to minimise erosion and allow natural vegetation to re-establish where practical.

Ownership

The proposed site is owned by Uitdraai Boerdery (Pty) Ltd.

Zoning

The site is zoned Agriculture and the proposed development is not an application for a change of land used, as Agriculture 1 allows for the establishment of the processing plant. Therefore, *no* application in terms of the Subdivision of Agricultural Land Act (SALA) Act 70 of 1970 for sub-division and rezoning, is necessary.

METHOD STATEMENT & ACTIVITY SPECIFIC MANAGEMENT PLAN

The Method Statements set out the materials, labour, and method that the contractor proposes using to carry out an activity, identified by the Environmental Officer and/or Project Manager/Plant Manager. The Method Statements contain sufficient detail such that the Environmental Officer and Project/Plant Manager can assess whether the Contractor's proposal is following the requirements of the Environmental Management Plan. The contractor must sign each Method Statement along with the Environmental Officer and Project/Plant Manager to formalize the approved Method Statement. Method Statements and/or Management Plans must be submitted by the Contractor to the Project/Plant Manager and Environmental Officer for approval before the commencement of the activity.

The Method Statements for this project, as a minimum, must include:

- Soil Management and Erosion;
- Stormwater control/drainage;
- Flora & Fauna Management;
- Fires
- Waste
- Traffic

Method Statements must address the following aspects:

- What – a brief description of the work to be undertaken;
- How – a detailed description of the process of work, methods, and materials;
- Where – a description of the location of the work (if applicable); and
- When – the sequencing of actions with commencement and completion date estimates.

An Environmental Control Officer should be appointed, such responsibilities and duties could be transferred to the Project/Plant Manager and/or Applicant once operational and must monitor the

implementation of the Method Statements and activity-specific management plans during the operation phase of the project.

PLANNING, DESIGN PHASE MANAGEMENT & PRE-CONSTRUCTION PHASE

During the planning and design phase, all statutory approvals, permits and authorisations required for the proposed agricultural development shall be obtained and their conditions incorporated into the final project design prior to the commencement of any clearing or construction.

The preferred layout (Alternative 2) shall be retained to avoid the high-sensitivity CBA area.

The Environmental Management Programme (EMPr) shall be communicated to all contractors and personnel prior to construction, and environmental awareness training shall be undertaken to ensure that all activities proceed in accordance with the approved environmental authorisation and associated management requirements.

No development shall occur outside the approved footprints without further environmental assessment.

Furthermore, a Heritage Chance Find Procedure shall be incorporated into the EMPr to address the unlikely discovery of archaeological material, fossil resources or human remains during future ground-disturbing activities.

CONSTRUCTION PHASE MANAGEMENT

Should the activity be authorized, the overall goal for the construction phase is to manage the activities associated with the construction of the site in such a way that:

- The receiving environment is protected from degradation and harm;
- There is timeous detection of, and responses to, environmental change due to monitoring;
- The activity complies with all relevant legislation, permits, and authorizations.

The Applicant is responsible for the ongoing management of the site. All measures and conditions described by the botanist, zoologist, and heritage specialist, in this EMP, the Environmental Authorisation, and any other relevant documents/legislation, should be strictly adhered to during the construction and operational phase.

Project activities in the Construction phase may include:

- Plant and animal search and rescue;
- Cut, destroy and/or transplant protected tree species – considering that no removal may take place without appropriate permits from the Department of Forestry;
- Alien vegetation control measurements;
- Environmental awareness training;
- Erosion control mechanisms and soil management; and
- Waste management.

OPERATION PHASE MANAGEMENT

The overall goal for the operational phase is to manage the activities associated with the operation and maintenance of the pistachio processing facility in such a way that:

- The development continues to provide positive socio-economic benefits through employment creation and support of the regional pistachio industry;
- Processing activities are undertaken in a manner that prevents pollution and minimises environmental impacts;
- Stormwater management systems are maintained to prevent erosion, flooding, and the contamination of surrounding land;
- Solid waste, pistachio by-products, wash water, and other operational waste streams are managed in accordance with applicable waste management requirements;
- Hazardous substances, including oils, lubricants and cleaning chemicals, are stored, handled and disposed of in a manner that prevents soil and water contamination;
- Alien invasive vegetation is monitored and controlled to prevent its spread and reduce fire risk;
- Fire prevention and emergency response measures are maintained and implemented to minimise fire risks associated with the operation of the facility;
- The activity complies with all relevant environmental legislation, permits, licences, and authorisations.

The Applicant shall be responsible for the ongoing environmental management of the facility throughout its operational life. All measures and conditions contained in this Environmental Management Programme (EMPr), the Environmental Authorisation, and any other applicable permits, licences and relevant legislation shall be implemented and adhered to for the duration of the operational phase.

ORGANIZATIONAL REQUIREMENTS

The Applicant should be familiar with the requirements of the EMP and should execute all maintenance activities in an environmentally responsible manner.

This overview offers a perspective of the proposed organization of the EMP and the recommended responsibilities of key members of the project team. The ultimate responsibility and public accountability for the EMP and general environmental management reside with the Applicant.

The workers will be responsible for implementing the instructions from the plant manager (or Applicant), and it is recommended that the plant manager appoints a responsible worker to report back on a daily/weekly/monthly basis, ensuring compliance with the conditions of the EMP. If needed, to provide a basic level of environmental training to the responsible worker/s.

If needed, an independent and external Environmental Control Officer (ECO) can be appointed by the Applicant to assist and advise on the implementation of the EMP and to conduct environmental audits no less than once every five (5) years unless otherwise instructed by the DAEARDLR.

ROLES AND RESPONSIBILITIES

AUTHORITIES

The issuing of the necessary permits/licences/certificates and authorizations is the responsibility of the authorities, in this case, the Department of Agriculture, Environmental Affairs (*for environmental authorisation approval and protected species removal*), Rural Development and Land Reform (DAEARDLR). The authorities will also ensure that the Applicant complies with the conditions of the Environmental Authorisation and other permits/licenses/approvals.

Authorities are entitled to perform site inspections to ensure compliance with the conditions and of non-compliance, the authorities may provide instructions to ensure an action plan with corrective measures is carried out or to cease with the project, especially in the case of long-term non-compliance.

APPLICANT

The Applicant, in this case, Prieska Pistachio Company (Pty) Ltd, has the responsibility for environmental management during the pre-construction, construction and operational phase until the property is sold

or an application for closure is made. Thereafter it will be the responsibility of the landowner or new tenants.

The EMP becomes legally binding to the Applicant and everyone acting on behalf of the Applicant during the construction and operation activities. The activities are regarded as permanent therefore there is no provision made for decommissioning activities.

In summary, the Applicant is responsible for:

- Reviewing the environmental monitoring programme in the EMP or as recommended by the Environmental Control Officer (ECO) if one is appointed;
- Ensuring that the required environmental audits are undertaken on a timely basis and that the results of the audits are communicated to all personnel that are responsible;
- Implementing an environmental monitoring programme approved by the authorities and providing such results to the authorities;
- Conducting regular site inspections and monitoring to ensure compliance with the EMP;
- Advising on actions to be taken in the event of incidents or public complaints;
- Keeping a complaint register on-site/on the farm.

SITE OR PLANT MANAGER

The Site/Plant Manager shall be responsible for ensuring that the operational activities of the pistachio processing facility are undertaken in accordance with the requirements of the Environmental Authorisation, this Environmental Management Programme (EMPr), and all applicable environmental legislation. The Plant Manager's responsibilities shall include, but not be limited to, the following:

- Ensuring compliance with all conditions of the Environmental Authorisation, EMPr, permits and licences.
- Implementing and maintaining the environmental management measures prescribed in the EMPr.
- Ensuring that all employees and contractors receive appropriate environmental awareness training.
- Monitoring operational activities to prevent pollution of soil, surface water and groundwater.
- Ensuring that stormwater management infrastructure is inspected and maintained.
- Overseeing the appropriate storage, handling and disposal of general waste, recyclable materials, hazardous substances and wash water.
- Ensuring that spills of fuels, oils, chemicals or other hazardous substances are promptly contained, cleaned up and reported where required.

- Implementing alien invasive plant control measures and maintaining the site in a safe and environmentally acceptable condition.
- Ensuring that fire prevention equipment is maintained and that emergency response procedures are implemented.
- Investigating environmental incidents, implementing corrective actions, and maintaining records of incidents and remedial measures.
- Liaising with the Environmental Control Officer (where appointed), environmental specialists, regulatory authorities and service providers on environmental matters.
- Maintaining all environmental records, monitoring reports, waste disposal records and permits as required by legislation.

The Applicant can appoint a Site/Plant Manager to also be responsible for the environmental management during the operational phase and must report to the Applicant regularly.

RESPONSIBLE CONTRACTORS

It is the responsibility of Contractors to ensure that there is compliance with the environmental specifications contained in the Environmental Impact Assessment (EIA), the Environmental Management Programme (EMP), and the Environmental Authorisation (EA). This implies that Contractors must familiarise themselves with the documentation and understand the restrictions and conditions. If any infringements are noted, the ECO (if one is appointed) or/and the Applicant must be notified before further action is taken.

Contractors will also be responsible for the workforce on-site and could report to the Plant Manager or Applicant.

SUB-CONTRACTORS

Sub-contractors must operate under the supervision of the Contractors and are liable for issues associated with their actions.

ENVIRONMENTAL CONTROL OFFICER

An Environmental Control Officer (ECO) can be appointed by the Applicant to advise and assist where necessary and to monitor the implementation of the EMP, as an external function. The ECO must have previous experience in environmental management and compliance monitoring.

The ECO should conduct an independent evaluation of compliance with the EMP, but is not responsible for enforcing the conditions of the EMP.

Specific responsibilities include:

- Undertake environmental site audits as determined by the responsible authority;
- Recommend environmentally appropriate solutions to environmental problems;
- Recommend additional environmental management measures, if applicable;
- To assist in environmental training for the staff;
- Help raise awareness for environmental sensitive issues and help foster an appropriate environmental attitude towards the environment;
- Respond to non-compliance and provide corrective actions and procedures;
- Assist the Applicant if liaising with authorities is required.

MITIGATION MEASURES & MONITORING

The following maintenance and mitigation measures are recommended for implementation by the Applicant for the construction phase and the duration of the operational phase.

Below is the table representing the summary of the significant impact ratings, after mitigation, which is discussed in Appendix F.

	Alternative 1:	Alternative 2 (preferred site)	No-Go
PLANNING, DESIGN AND DEVELOPMENT PHASE			
Failure to obtain and comply with all applicable statutory approvals and associated conditions could lead to delays in project implementation, increased financial costs and potential legal consequences	Medium-High (-)	Low (-)	N/A

arising from regulatory non-compliance.			
CONSTRUCTION PHASE			
Loss of indigenous vegetation & protected plant species due to vegetation clearing and site preparation.	High (-)	Medium (-)	N/A
Spread of alien invasive plants Spread and establishment of alien invasive plant species following vegetation clearing, soil disturbance and movement of construction vehicles and materials.	Medium-Low (-)	Medium-Low (-)	Very Low / Neutral
Loss of fauna habitat and disturbance of fauna resulting from vegetation clearing, machinery movement and human activity	High (-)	Medium-High (-)	Very Low / Neutral
Disturbance, displacement and mortality of fauna Construction noise, lighting, personnel, vehicles, excavations and machinery may disturb, displace, injure or kill fauna.	Medium-High (-)	Medium (-)	N/A
Impacts on drainage lines due to vegetation removal, earthworks and increased sedimentation risk	Low (-)	Medium-Low (-)	N/A
Soil erosion and soil degradation associated with vegetation clearing, soil disturbance and earthworks.	Low (-)	Low (-)	N/A
Soil contamination from fuels and hazardous substances Leaks or spills of fuel, oils,	Low (-)	Low (-)	N/A

cement, chemicals and hazardous substances may contaminate soil.			
Dust emissions Clearing, excavation, stockpiling and vehicle movement may generate nuisance dust.	Low (-)	Low (-)	N/A
Noise disturbance Construction machinery, vehicles, drilling and general activity will increase ambient noise	Medium-Low (-)	Low (-)	N/A
Waste generation Construction will generate general, recyclable, hazardous and building waste.	Low (-)	Low (-)	N/A
Heritage chance finds resulting from ground disturbance during site preparation and cultivation establishment.	Very Low (-)	Very Low (-)	N/A
Temporary traffic impacts and road safety Construction vehicles and delivery trucks may increase traffic, turning movements, road deterioration and collision risk on the R357 and site access.	Low (-)	Low (-)	N/A
Temporary employment and local economic benefits (positive) Creation of temporary construction employment, procurement opportunities and local expenditure.	Medium (+)	Medium-High (+)	Medium-Low (-)
OPERATIONAL PHASE			

Spread and establishment of alien invasive plants in operational areas and adjoining natural veld through ongoing vehicle movement, landscaping, disturbed soils and stormwater infrastructure.	Medium-Low (-)	Low (-)	Low (-)
Permanent occupation and operation of the facility would maintain the loss of approximately 19.2 ha of near-natural shrubland and reduce local habitat permeability.	High (-)	Medium-High (-)	N/A
Routine human presence, trucks, machinery, security activity, noise and lighting would disturb and displace fauna from the developed footprint and immediate surroundings.	Medium-High (-)	Medium-Low (-)	N/A
Fauna may be killed or injured by operational vehicles, machinery, fencing, pest-control practices or entrapment in infrastructure.	Medium-Low (-)	Low (-)	N/A
Processing machinery, dryers, ventilation, loading, trucks, alarms and maintenance activities would increase ambient noise levels.	Medium-Low (-)	Low (-)	N/A
Night lighting for security, processing, yards and vehicle movements may disturb nocturnal fauna and alter the local dark environment.	Medium-Low (-)	Low (-)	N/A
Operational traffic, product and by-product handling, loading and dry windy conditions may generate dust.	Low (-)	Low (-)	N/A
Roofs, roads and hardstand surfaces would increase runoff	Medium-Low (-)	Low (-)	Neutral / Very Low (-)

and may cause erosion or sediment movement if stormwater infrastructure is inadequate.			
Leaks, spills or poor storage of oils, cleaning agents, refrigerants, pesticides and maintenance chemicals may contaminate soil.	Low (-)	Very Low (-)	N/A
Contaminated stormwater, wash water, sewage, chemicals, or waste may pollute soil and groundwater and potentially migrate to off-site surface-water receptors.	Low (-)	Low (-)	N/A
Operational solid waste generation affecting the receiving environment.	Low (-)	Very Low (-)	N/A
Operational visual impact affecting the receiving environment.	Low (-)	Low (-)	N/A
Increased traffic and road safety affecting the receiving environment.	Low (-)	Low (-)	N/A
Contribution to local and regional agricultural development.	High (+)	High (+)	Medium-High (-)
Cumulative ecological impacts affecting the receiving environment.	Medium (-)	Low (-)	N/A
DECOMMISSIONING AND CLOSURE PHASE			
Not assessed at this stage.			

GENERAL ADMINISTRATIVE RESPONSIBILITIES FOR PRE-CONSTRUCTION

Pre-Construction Actions				
Item	Actions/Management Measures	Responsible Person & Time Frame	Monitoring Methods	Indicators
Authorisation	Ensure that the required authorisation and permits have been obtained before the start of construction.	The Applicant must ensure all documentation is correct and in place before construction commence. The Applicant must ensure all conditions of the EA are adhere to before construction commence.	- Keep record of correspondence and proof of submission. - Keep record of authorisation.	Authorisation and contracts on file.
Environmental Compliance	- Appoint a suitably qualified Environmental Control Officer (ECO) or suitably qualified Plant Manager to oversee construction activities. - Include the EMPr in all tender documents to ensure that sufficient resources are allocated	The Applicant and Engineering & Building contractors, before the call for tenders.	Applicant to check tender documents, permits, and contracts.	Incorporated in tender documents.

	to environmental management by the Contractor. - Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental rehabilitation. - Permits from the relevant authorities must be obtained for the destruction or removal of plant species protected in terms of the National Forests Act, NEMBA ToPs Regulations, or the Nature & Environmental Conservation Ordinance. - Permits for the removal and translocation of plant SCCs must be obtained from the appropriate authorities.			
Employment	- Set targets for the use of local labour based on the needs of the proponent and the availability of existing skills and people who are willing to undergo training. - Ensure that Contractors from outside the local area that tenders for work meet the required targets for how many locals are given employment.	The Applicant, before the call for tenders.	- Applicant to check tender documents and contracts. - Keep record of how targets were determined. - Keep record of staff by origin.	- Incorporated in tender documents. - Percentage of local staff. - Percentage of Previously Disadvantaged Individual (PDI) staff.

	- Consider implementing labour-intensive rather than capital-intensive work methods wherever possible. - Consider purchasing resources from local sources wherever possible.		Keep record of training provided.	- Number of incidents. - Time activities stopped. - Number of recurring incidents.
Waste Develop a waste management plan	- Expected type and amount of waste; - Measures to reduce waste; - Type and expected volume of recyclable waste; - Recycling facilities that will collect / receive waste; - Type of storage for different waste types; - Waste contractors that will collect waste.	The Applicant, ECO, representative Site Manager and building contractors to develop the waste management plan during the Design Phase.	Review of design documents.	Adequate provision for waste disposal.

GENERAL ADMINISTRATIVE RESPONSIBILITIES FOR CONSTRUCTION

Construction Phase Actions				
Item	Actions/Management Measures	Responsible Person & Time Frame	Monitoring Methods	Indicators

Site area	• Demarcate an area at the site to allow for construction vehicles, equipment, material and waste storage areas. • Provide water facilities and ablution facilities (portable chemical toilets) at the site for personnel. • Demarcate construction site boundaries upon the area. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO or Site Manager and ensure that plant, labour and materials remain within site boundaries. Use hessian cloth or shade cloth (at least 2m high) to erect around the site to mitigate dust. • Designate the area beyond the boundary of the site as “No go” areas for all personnel on site. No vehicles, machinery, materials or people shall be permitted in the “No go” area at any time without the express permission of the ECO or Site Manager.	• ECO or Site Manager must ensure that the method statement for Construction Activities is completed at least two weeks prior to the start of construction activities. • A small site camp can be established and used in an area accepted by Applicant and the ECO (before construction). • The ECO or responsible Site Manager to oversee no additional areas are cleared for establishing a site camp. • Site inspections should be conducted	• Visual inspections. • Method statement. • Completing monitoring report.	• Accepted method statement. • Site boundaries demarcated. • Signage in place. • Monitoring Reports on file to be used for environmental auditing as per EA.
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		by the Contractor and the responsible Site Manager (daily), and the ECO (monthly if appointed) to detect signs of degradation or non-compliance at the site.		
Safety and Security	- Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.) are established prior to commencing construction. Submit these emergency procedures to the Applicant and the ECO or Site Manager for approval. - Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.	- The Applicant, Contractor, ECO and Project Engineer or the responsible Site Manager are responsible throughout the construction phase. - It must be ensured that the health and safety of staff/labours are prioritised and protocols are in place, which is the responsibility of the Applicant,	- Visual inspection and approval by Applicant, Contractors, and ECO/SM. - Completing monitoring report.	- Number of safety/emergency incidents. - Monitoring Reports on file to be used for environmental auditing as per EA.

	• Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk. • Advise the ECO or Site Manager of any emergencies on site, together with a record of action taken. • Secure the site, particularly to restrict unauthorised access to fuels and any other hazardous substances. • Store all construction material and equipment in locked containers within the existing site. Employ 24-hour security for the site. • Liaise with the local fire-fighting Department with regard to emergency procedures	Contractors and ECO and SM throughout the construction phase.		
Soil Management: • Prevent erosion. • Prevent soil pollution and degradation.	• No additional land should be cleared. • In general, adequate structures must be put in place (temporary or permanent where necessary in extreme cases) to deal with increased/accelerated run-off and sediment volumes. The use of silt fencing and potentially sandbags or hessian 'sausage' nets can be used to	• The demarcating of the site and identification of topsoil stockpile area must be identified before construction start and is the responsibility of the	• Visual inspections. • Maintain register of pollution events and response. • Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning.	• Incidence of Erosion. • Incidence of incorrect storage and harvesting of topsoil. • Number of pollution incidents.

	prevent erosion in susceptible construction areas. • All erosion and impact areas that will not be covered with buildings/roads/concrete slabs are to be adequately sloped and re-vegetated to prevent the onset of erosion within the site. • The spoil material during construction can be reused as backfill or erosion mitigation works. • Monitor disturbed areas, footpaths, vehicle tracks, and access roads for erosion regularly during construction. Implement remedial action immediately once erosion is detected. • If signs of erosion appear along the spillways or the receiving environment below the site, the Applicant should repair/rehabilitate these areas as soon as possible. • Cleared areas should be exposed to the minimum amount of time possible.	Applicant, Contractor, and ECO/SM. • Prior to clearing vegetation, the Contractor must ensure topsoil is stored as prescribed above for the duration of the construction phase, and the ECO/SM must inspect the activities on a monthly basis. • Site inspections should be conducted by the Contractor (daily), ECO (monthly) and Project Engineer (weekly) or the responsible Site Manager to detect signs of erosion. • It must be ensured that the erosion	• Completing monitoring report.	• Time activities stopped. • Number of recurring incidents • Availability and completeness of register and records. • Monitoring Reports on file to be used for environmental auditing as per EA.
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	• Revegetate the cleared areas as soon as possible to limit the period which the soil will remain without vegetation cover that will not be covered by buildings or road or the builder's yard. • Once profiled, the site will be flat and erosion is not foreseen to be a problem, however, should erosion become problematic: ○ Any erosion rills or gullies that develop will be filled in with subsoil and compacted. The upper layer is to be scarified to bind with topsoil, top-dressed with soil, fertilized, and seeded. ○ Such areas will be provided with a mulch/manure layer (which can also include the growth medium) of at least 5 cm thick. ○ In the worst-case scenario, geofabric or Soil Saver (natural organic sheet material with seeds) will be placed onto the affected area after the spreading of topsoil and seeding was affected. A soil conservation officer or expert will be appointed to oversee the process.	minimization measures installed, are effective. • The Contractor, ECO, Project Engineer or the responsible site manager must inspect the site to ensure stormwater management systems are effective and no erosion results. • Visual inspection must be conducted by the Contractor, ECO Project Engineer or the responsible site manager to detect any source of soil pollution regularly. • The Applicant is ultimately responsible for the development of the site without		
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	• Effective measures should be implemented to manage stormwater run-off, as per the civil report. • Roads/tracks should be well maintained. • All <i>in situ</i> soils (20-50cm topsoil) will be removed and conserved from areas earmarked for construction of buildings, roads, etc. and must be used for rehabilitation on areas not earmarked for construction but still impacted. Stored topsoil can also be used for landscaping. • Stockpile topsoil separately from subsoil and replace in the same order as removed (from bottom to top: rock/fill, subsoil, topsoil & leaf litter). • Any spoil material (which can include excess topsoil or subsoil) must be carted to a registered landfill site. • Stored topsoil, that will be used, should be stored along perimeters, where it will not be further disturbed until it is	resulting in sediment loss and/or erosion.		
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	used, and it will be piled to a maximum height of 1m. • Topsoil stored for periods longer than 3 months must be upgraded with fertilizer, and lightly covered with some of the available grass cuttings removed from development areas. • Topsoil must be removed ahead of construction and reinstated as soon as possible to limit the deterioration of the soil and prevent it from becoming sterile. • Topsoil that will be reintroduced to areas, keyed-in slightly with lower horizons by ripping it lightly along the contour and fertilized as follow: ○ Manure must be lightly scarified and seeded with the prescribed seed mix of indigenous grass species. ○ Vegetation removed from the area should be used as mulch. ○ Upgrading of soils and re-vegetation of disturbed areas will be done concurrently with development.			
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	• Vehicles will not drive over rehabilitated areas to prevent the dieback of established vegetation. • Oil and lubricants will be stored inside the workshop container at the site during the construction phase. • Used oils and lubricants will be stored within a bunded area. It will be disposed of at a registered recycling facility regularly. • All filters or oil/lubricant contaminated material will be stored in a separate receptacle within the bund wall and disposed of at a registered recycling facility regularly. • All vehicles will be leak-free. Ensure that all vehicles and equipment are well maintained and serviced. • Conduct regular checks for fuel, oil and hydrocarbon leaks on vehicles and machinery. • All generators, compressors and fuel supply used on-site should be placed			
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	on a drip-trays to prevent spills and leaks directly onto the soil. • Construction materials may not be stored for extended periods and must be removed from the study area once the construction phase has been concluded. • Construction buildings should preferably be prefabricated or constructed of reusable/recyclable materials. • No storage of vehicles or equipment will be allowed outside of the designated laydown areas. • Hydrocarbons shall not be drained into the soil nor shall used filters and hydrocarbon-contaminated parts be buried in the soil but will be removed to an approved waste site or recycling facility. • Making use of bio-remediation facilitated by a specialist company will negate large spills whilst smaller spills could be treated with fertilizer to break			
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	it down or be scooped up by a front-end loader to a hazardous waste site. • Peatsorb or sawdust will be used to contain larger spills and some of this material must be on-site as a contingency measure. • Spills will be prevented by properly maintaining vehicles and restricting servicing of vehicles to an offsite workshop. • Only in the case of an emergency will vehicle maintenance and servicing will be done onsite. Emergency repairs will be done over drip pans. • In case of emergencies used oils and lubricants will be siphoned in receptacles with proper lids and disposed of at a registered recycling facility immediately. A receptacle will be provided for used filters and oil-contaminated vehicle parts which will be respectively disposed of at a registered waste facility and scrap yard immediately.			
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	- The chemical toilets (one per 10 people) will be maintained according to Municipal bylaws or specifications issued by a local Health Inspector. - Provide easily accessible temporary toilets and litter bins at the construction site. - The diesel tank of the generator (if needed) will be leak-free and the generator and fuel receptacle will be placed inside a steel tray that will be provided for 110% capacity of the volume stored. - All construction material/machinery/vehicles/debris must be removed before topsoil is re-introduced to the proposed garden or lawn area.			
Land Use and Land Capabilities: Ensure the site is developed as	- The development will be restricted to the approved area. - The development will be done according to the layout plan. - No fires would be allowed on the property to safeguard the land use of	Site inspections should be conducted by the Contractor (daily), ECO (monthly) and Project Engineer (weekly) or the	- Visual inspections. - Completing monitoring report.	- Number of incidents and response. - Monitoring Reports on file to be used for environmental auditing as per EA.

per the site layout plan.	the property as well as those of abutting properties.	responsible site manager to ensure the development is restricted to the approved area.		
Ecologically Sensitive and Flora Management: - To minimize damage to indigenous flora and fauna utilizing the surrounding areas. - To control and prevent alien vegetation growth.	- The development would be restricted to the demarcated area as provided by the site plan and no vegetation outside the demarcated boundaries will be removed. - Indigenous plant species should be used in rehabilitation efforts (if there are any areas) and within the landscaping of the gardens of the shopping centre. - Permits for the removal and translocation of plant SCCs must be obtained from the appropriate authorities. As per the Specialist recommendations that is achievable: - Obtain the required permits before removing or disturbing the protected	- The Applicant, the Contractor, or ECO or representative Site Manager must check for alien invasive vegetation and remove thereof as the development progress. - The Contractor is responsible for the behaviour of his staff with specific reference to environmental management until the construction is completed.	- Visual inspection. - Appointment of vegetation specialist. - Search and Rescue Report. - Check evidence of alien vegetation. - Alien Control Report.	- Reports on file. - Permits on file. - Size of area cleared relative to the development footprint. - Size of area disturbed outside of construction site boundary. - Construction footprint and road reserve clear of alien vegetation.

	plant species recorded on the site, namely: • <i>Aizoon plinthoides</i>; • <i>Aloe claviflora</i>; and • <i>cf. Nerine</i> sp. • Conduct a pre-construction search for protected plants within the approved development footprint so that all affected individuals can be identified for the permit application. • Rescue and relocate affected protected plants where required by the issuing authority and where relocation is considered feasible. • Clearly demarcate the approved 19.8 ha development footprint and prevent vegetation clearing outside this area. • Limit temporary construction areas, material storage, vehicle movement and contractor activities to the approved footprint. • Retain natural vegetation outside the approved development footprint and	• The Applicant is responsible for establishing the conservation trust.		
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	prevent unnecessary disturbance to the surrounding natural vegetation bordering the site. - Control the alien invasive plant species identified in the report, particularly Category 1b species that must be controlled and the Category 3 <i>Neltuma glandulosa</i>. - Prevent the spread of alien invasive plants into surrounding natural areas during construction and operation. - Rehabilitate temporary disturbance areas that are not required for permanent infrastructure. Alien Vegetation Control: - An Alien Invasive Species (AIS) management plan for the site must be implemented for the construction and operational phase of the development. - The plan must identify areas for action (if any) and prescribe the necessary removal methods			
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	and frequencies to be applied. This plan must be also prescribing a monitoring plan and be updated as/when new data is collated; • The AIS management plan must ensure that all listed AIS are systematically brought under control, and that AIS are managed throughout the project lifespan. • Any AIS material removed during the clearing of the development footprints must be removed from the site and destroyed or moved to a registered landfill site so that reestablishment on site is avoided. • Regular surveillance and follow-up clearing of AIS must take place. • All category 1a, 1b & 2 listed plants must be eradicated from the site.			
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	• The disturbed areas that are not built-up must be rehabilitated and kept free of alien invasive vegetation. • Special attention must be given to: ○ <i>Alternanthera pungens</i> - Remove manually before seed set or apply an appropriate registered herbicide where necessary. Monitor disturbed areas regularly and prevent re-establishment. ○ <i>Argemone ochroleuca</i> - Remove manually or chemically before flowering and seed production. Dispose of plant material appropriately and monitor for regrowth. ○ <i>Boerhavia cordobensis</i> - Remove by hand or apply an appropriate registered herbicide before seed production. Monitor disturbed areas and eradicate new infestations promptly.			
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	○ <i>Neltuma glandulosa</i> (formerly <i>Prosopis glandulosa</i>) - Cut mature trees and immediately treat stumps with a registered herbicide to prevent resprouting. Remove seedlings and monitor the site regularly for regrowth. ○ <i>Salsola kalii</i> - Remove manually or chemically before flowering and seed set. Maintain good site housekeeping and rehabilitate disturbed areas to reduce reinfestation.			
Faunal Management • To minimize damage to indigenous fauna utilizing the surrounding areas.	As per the Specialist recommendations: • Install bird-safe electrical infrastructure, including power lines, transformers and electrical connections, to reduce the risk of collisions by bird species of conservation concern, particularly Ludwig's Bustard. • Prohibit the use of second-generation anticoagulant rodenticides (SGARs) on site to prevent secondary poisoning of	• A list of animals that are relocated must be kept by the Applicant, the Contractor, and ECO/SM. • The Applicant, the Contractor, or ECO or representative Site Manager (SM) must check for snaring devices, traces of	Visual inspection	• Number of animals harmed/ incidents. • Monitoring records.

	species such as the Black-footed Cat and African Striped Weasel. Where rodent control is required, only first-generation or non-anticoagulant alternatives should be used. • Undertake pre-construction faunal surveys, including: ○ An Aardvark burrow survey covering the entire development footprint and a 200 m buffer; and ○ A tortoise walk-through survey, with rescue and translocation of individuals before vegetation clearing or earthworks commence. • Where practicable, major vegetation clearing should be undertaken outside the peak bustard breeding season (August to December). • Use wildlife-friendly lighting design, ensuring that all security and operational lighting is shielded and directed downward to minimise light spill into surrounding natural habitat and flight corridors used by bats and to	poison, and removal thereof weekly. • The ECO/SM is responsible to identify/allocate appropriate areas in the surrounding area to be used for the relocation of species where possible, before the removal of such an animal. • The Contractor is responsible for the behaviour of their staff with specific reference to environmental management for the duration of construction. • The Contractor, ECO, or representative Site Manager must report		
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	reduce disturbance to ground-nesting birds. • Design perimeter fencing to maintain faunal movement, by incorporating small-mammal and tortoise gaps or by setting the fence back from the natural veld boundary to avoid creating a barrier to movement and recolonisation. • Design and maintain settlement tanks and stormwater drainage systems to prevent contaminated runoff from entering adjacent natural veld and affecting faunal habitat and food resources. • Maintain a minimum 50 m undisturbed shrubland buffer between the site perimeter and abutting land to retain habitat connectivity for displaced fauna. General mitigation includes: • The clearing and disturbance activities must be conducted in a progressive	all animal mortalities to the Applicant on the same day as mortality has been identified. Such mortalities should be recorded. • If any carcasses are collected for monitoring purposes, a permit is needed in terms of the Provincial Nature and Conservation Ordinance. The Applicant is responsible for obtaining such a permit.		
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	linear manner, from one side of the area to the other and over several days, to provide an easy escape route for all small mammals and herpetofauna. • All construction and maintenance motor vehicle operators must undergo an environmental induction that includes instruction on the need to comply with speed limits, and to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion are limited. A signed register of attendance must be kept for proof. • Vehicles will not display fuel, oil or lubricant leaks and will be maintained to an acceptable standard. • Any fuel spills will be cleaned up immediately and contaminated soil or used spill-absorbing material will be removed to an approved waste facility. • Handling of hydrocarbons will be done in accordance with all applicable			
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	legislation to prevent pollution incidents. • The movement of vehicles will be restricted to the authorized development area and farm roads. • Attention must be given to reptiles and slow-moving animals (tortoises) that might occur in the study area. • Before the topsoil and vegetation are removed in a certain phase someone must walk through the site to ensure that there are no animals that could be harmed by the excavator. • Reptiles that occur in the proposed study area should be chased away and tortoises should be appropriately captured and relocated to abutting areas. • No animals entering or settling in the study area will be trapped or killed and this requirement will be included in the environmental awareness programme, which has to be discussed with workers			
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	on an annual basis and presented by the applicant or any competent ECO/FM. • No hunting or snaring would be allowed outside or inside the study area and the applicant should implement a severe penalty system for people transgressing this requirement. • The applicant will implement a proper supervision mechanism to ensure that poaching is not taking place. • No person may carry out a restricted activity in terms of the List of Threatened or Protected Species (TOPS) regulations i.e. killing, catching, hunting by any method or device including searching, injuring with intent to hunt, catch or kill any such specimen involving a TOPS specimen without a TOPS permit. The applicant will take full responsibility for any animals that are proven to be killed by a member of the construction staff. The applicant will implement an environmental awareness programme and ensure all			
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	employees are coherent in the above regard. • Veldt fires will not be allowed. The applicant will take full responsibility for any financial losses which prove to be the result of negligence in this regard. • Informal cooking fires by farm personnel will not be allowed on-site. • No burning of waste will be allowed at the site. • Proper housekeeping with an emphasis on waste management should be applied. Plastic and wire could be lethal to cattle and other animals and should therefore be controlled. Household waste disposal will be through depositing waste in strategically positioned containers fitted with scavenger proof lids. • Some bird species might build a nest of grass and twigs on the ground or construct a nest between grass tufts. Some of these nests may contain chicks or eggs, therefore care must be taken to			
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	carefully relocate the nests to areas outside the study area before vegetation clearing commences or if possible, relocate chicks or eggs to bird sanctuaries. • Some animals take shelter and live in burrows. Burrowing animals can detect prey items using seismic cues and therefore these animals would be able to use the vibrations of vehicles and excavators to realize their potential vulnerability. Care must be taken not to injure these burrowing animals when the excavator is used in the proposed study area. • An expert who holds a Competency Certificate to handle dangerous and venomous reptiles should be contracted to remove any animals that may cause harm to employees at the study site. A declaration/ testimonial must be provided to prove prior experience in this regard. Appropriate permits are required to move animals.			
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	The Applicant should remove any of the staff caught interfering with wildlife from the site immediately.			
Stormwater control - Prevent silt transport into abutting areas. - Allow for drainage as per the civil engineer report.	- Vegetation clearing must take place as per the site development plan and all runoff must be contained as per the civil engineer design and recommendations. - To mitigate pollution discharge from this proposed development, the following must be put in place: - Prevent harmful chemicals from entering the stormwater system by implementing rules at the Site to not dispose of harmful chemicals into the stormwater system. - Inform the responsible person(s) accordingly, if it is noted that the stormwater control systems are failing.	- Site inspections should be conducted by the Contractor (daily), ECO (monthly) and Project Engineer (weekly) or the responsible Site Manager to detect signs of stormwater structure failure. - The Contractor, ECO and Project Engineer or the responsible Site Manager must inspect the site to ensure stormwater management systems are effective. - Visual inspection must be conducted by the Contractor, ECO	- Visual inspection of stormwater structures and downstream respective areas. - Review layout plans.	- Incidence of stormwater contamination. - Visible leaks/ water wastage. - Visible surface erosion. - Compliance with storm water management plan.

		and Project Engineer or the responsible site manager to detect any source of degradation regularly.		
Prevent sedimentation in receiving environment outside of the study area.	- The release of stormwater must be allowed to drain as per the civil report. - It will be the responsibility of the Applicant, the Contractor, or ECO or representative Site Manager to ensure that the management of the site is sufficient to not cause any degradation to the receiving environment. - The receiving area must be monitored regularly for detection of any erosion, sedimentation along the downstream area, and/or degradation. - Temporarily storage of oils, fuels, and hazardous substances/liquids, and the bitumen tanker during the construction phase must be positioned on a concrete floor with a spill trap. No spills on bare soil will be allowed.	- The Contractor, ECO, or representative Site Manager must log and record the monitoring. - The DAEARDLR and the DWS are responsible for compliance monitoring. - The Contractor, Project Engineer, ECO or representative Site Manager must visually inspect runoff basins, stormwater control structures, weekly/monthly to ensure that they are	- Visually inspect runoff basins, stormwater control structures. - Visually inspect areas of working (Site, portable toilets, active construction areas and access road). - Monthly water consumption records. - Completing monitoring report.	- Number of pollution incidents. - Number of incidents of staff not using portable toilets. - No evidence of water wasted. - Consistent water usage. - Monitoring Reports on file to be used for environmental auditing as per EA.

	○ The storage area must be adequately bunded to contain any spillage from containers (at least 110% of the volume of the substance stored therein. Such storage must be kept clean by ‘mopping’ up any spillage of any hazardous substances immediately. ○ Prevent rainwater from accumulating in the bund by either providing a roof over the bund or removing any rainwater to ensure the capacity of the bund is maintained. ● No fuels/ oils must be allowed to discharge directly into stormwater pipes or drains. ● Emergency spill kits must be available to clean up and remove spills. ● All vehicles and machinery operating onsite must be regularly inspected for oil, fuel, and any other fluid leaks before entering the construction area. ● All vehicles and machinery must be regularly serviced and well-maintained	in an acceptable condition. ● Other potential sources of surface water pollution must be inspected regularly (e.g. materials storage areas, vehicles, and construction equipment on a daily or weekly basis). ● Visual inspection must be conducted by the Contractor (daily), ECO (monthly) and Project Engineer (weekly) or representative Site Manager to detect any source of surface water pollution. ● The Applicant is responsible to contact the relative		
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	before being allowed onto the construction site. • Emergency repairs of vehicles or machinery will be done over drip pans. • Major maintenance of vehicles will be done at the offsite workshop to a leak-free condition. • Hydrocarbons shall not be drained into the soils nor shall used filters and hydrocarbon-contaminated parts be buried at the site, but will be removed to an approved waste site or recycling facility. • Making use of bio-remediation facilitated by a specialist company will negate larger spills whilst smaller spills could be treated with fertilizer to break it down or be scooped up by a front-end loader to a hazardous waste site. • Peatsorb or sawdust will be used to contain larger spills and some of this material must be on-site as a contingency measure.	authority if a large spill occurs and report the incident immediately.		
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	• In case of emergencies used oils and lubricants will be siphoned in receptacles with proper lids and disposed of at a registered recycling facility immediately. • For emergency cases, a receptacle will be provided for used filters and oil-contaminated vehicle parts which will be respectively disposed of at a registered waste facility and scrap yard immediately. • In general, any cement mixing should take place over a bin-lined (impermeable) surface or in the load bin of the vehicle to prevent the mixing of cement with the ground. • All concrete spills must be cleaned up and disposed of at a registered waste disposal site. • Cement/concrete can also be trucked in ready-mix vehicles. • Generators possibly required during construction must be placed on trays, which contain a suitable absorbent			
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	material to soak up any leaks or spills. Once construction has been completed, all contaminated absorbent material must be removed from the site and disposed of at a registered waste disposal site. • Suitable temporary chemical sanitation facilities are to be provided at least 1 per every 10 people. It must be checked regularly for maintenance purposes and cleaned often to prevent spills. • Waste will be contained in receptacles stationed at appropriate areas within the construction site and be removed from the study area regularly. No household or industrial waste will be burnt or buried on the site. The waste manifest must be obtained from the local municipality when waste is disposed of at licensed waste disposal sites to prove legal disposal. • The spoil material during construction can be reused as backfill or erosion mitigation works, while excess spoil			
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	must be disposed of off-site at the nearest registered Municipal Dumping Site. • An area on the proposed site must be earmarked for the storage of spoil material on-site. • The designated area must be easily accessible for dumping trucks to collect the spoil material, which must be carted to a registered landfill site. • Non-recyclables will be disposed of at a registered landfill site. • General waste must be kept in bins within the construction site and should be collected and disposed of every week or it should be disposed of in a skip and transported to the nearest registered landfill site. • Spent canisters for paints and solvents are the responsibility of the respective contractor and are disposed of at a suitable landfill site or recycled. • In case of large, critical spills the Departments of Water and Sanitation			
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	and DAEARDLR will be informed immediately for assistance and advice and a competent company conversant with bio-remediation will be appointed as soon as possible to address the possible impacts of a such spill. All costs would be for the account of the applicant.			
Noise Management Prevent excessive noise generation within the site and surrounding area.	- All equipment and activities comply with noise regulations. - All vehicles will be fitted with standard exhaust systems and will be serviced regularly. - Silencer units in vehicles and equipment are to be maintained in good working order. - Unnecessary hooting, shouting, flapping of tailgates, and excessive use of exhaust brakes will be discouraged. - Unnecessary idling of vehicles will be discouraged during the construction phase. - Travelling speed on site will be reduced to 20 km/h.	- The Contractor (daily), ECO, or representative Site Manager must monitor and manage the noise generated during the construction phase. - The Applicant, representative site manager, or ECO/SM must log and record complaints received from abutting residents.	- Monitor noise along closest boundary of the site relative to the active construction area on times during activities. - Completing monitoring report.	- Number of registered complaints. - Monitoring Reports on file to be used for environmental auditing as per EA.

	• Moving parts of vehicles will be regularly lubricated, replaced, and serviced. • Construction work that involves using grinders and hammers on steel or any other steel-on-steel activity will not be performed early morning or early evening. • Normal working hours will apply for weekdays (8am to 5pm) – No work on public holidays or, Saturdays or Sundays, unless agreed to by the neighbouring community or association representing the community. • Workforces and contractors will be managed correctly in terms of noise generation and be sensitized to dignified human behaviour. • All Health and Safety guidelines must be complied with. • Workers working in areas where the 8-hour ambient noise levels exceed 85dB must have the appropriate Personal Protective Equipment (PPE).	• The Applicant and Contractor must make every effort to immediately resolve the issue (within one week), once a complaint is received. • The DAEARDLR are responsible for compliance monitoring. • The Contractor must contract a qualified company/person to conduct a noise survey/s if DAEARDLR requires such measurements and the outcome of the noise survey must be presented to the DAEARDLR.		
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Air Quality Management Prevent excessive dust generation and emissions within the site and surrounding area.	- Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. - Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface (with “dirty water”) and putting up signs to enforce speed limits to enforce reduced speeds. - Dust suppression measures must be implemented on access road and working areas during dry and windy periods. Water used for this purpose must be in quantities that do not result in the generation of run-off. - Hessian cloth (at least 2m high) must be placed along property boundary to minimize dust. Specific attention to be given to the western and northern boundaries. - Exposed areas should only be irrigated once or twice a day during periods of strong winds (>30km/hour). Over-irrigation should be carefully	- The Contractor (daily), ECO (monthly), or representative Site Manager must monitor and manage the dust generation during the construction phase. - The ECO and representative Site Manager must log and record complaints received from abutting residents. - The representative Site Manager must communicate with the Applicant and Contractor immediately once a complaint is received and attempt to	- Visual inspections and assessment of dust plumes. - Visual assessment of dust control measures. - Completing monitoring report. - Keep a register of complaints received and response. - If needed contract a dust measuring company to formally monitor dust counts.	- Complaints Receive and Response Report on file. - Visibility of dust coming off construction site. - Dust mitigation measures in place. - Number of days that dust plumes are visible. - Number of registered complaints. - Size of disturbed areas. - Monitoring Reports on file to be used for environmental auditing as per EA.
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	monitored, so as not to cause sheet wash on exposed areas. • Construction activities shall not impose dust counts of more than 80 mg/m²/per day at any residence or more than 40 mg/m²/per day during normal operations. • Vehicles are to be maintained properly and fitted with standard exhaust systems and will not be left idling unnecessarily. • Vehicle trips must be restricted to what is essential. • No burring of waste will be allowed on the property. • Cooking fires will not be allowed. • Cigarette butts might not be disposed of in the veldt, but must be put out and disposed of in the waste bins provided at the site. • Bio-degradable waste will be contained in receptacles with proper lids and be removed from the study area regularly. No odours will be tolerated on the site.	resolve the issue within a week after the complaint. • The DAEARDLR are responsible for compliance monitoring. • The Contractor must contract a qualified company/person to conduct dust survey/s if DAEARDLR requires, such measurements and the outcome of the dust sampling must be presented to the DAEARDLR. • Visual inspection must be conducted by the Contractor, Project Engineer, ECO or representative Site Manager to detect		
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	• No chemicals that could generate odours will be stored or disposed of on-site. • No non-environmentally friendly suppressants may be used as this could result in the pollution of soil or water sources. • Dust counts must be done whenever the DAEARDLR requires such measurements and the outcome of the dust sampling presented to the DAEARDLR. • The terms of reference for the dust counts must be determined in conjunction with the officials from the DAEARDLR. • Speed of vehicles will be restricted to 20km/h, especially when travelling along the western and northern boundaries. • All site workers need to wear the appropriate safety gear.	any source of dust pollution regularly.		
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	- Transported material that can be blown off as dust must be covered to limit dust generation. - No construction works should be executed between 5pm and 8am the next day, on Saturdays, Sundays or Public Holidays unless agreed to by the neighbouring community or association representing the community.			
Fire Management - Prevent the loss of life (humans, fauna, or flora) within the site and surrounding area. - No site fires are to be caused by construction activities and workers.	- All measures to prevent fires must be included in the development and related project activities. - A fire emergency plan must be developed and known to all workers on site. - Veldt fires will be prevented by not allowing fires and restricting smoking only to designated areas at the site. The Applicant will take full responsibility for any financial losses which prove to be the result of negligence in this regard. - No cooking fires will be allowed during the construction of infrastructure or	- The Applicant must appoint a fire officer before commencement with construction. - The fire officer must inspect and ensure that firefighting equipment onsite is functional and in working condition monthly. - The Applicant is responsible for supplying firefighting	- Review detailed layout plans. - Completing monitoring report, which should also include: - Inspect attendance register for training sessions. - Inspect fire extinguishers and certificates.	- Compliance with measures. - Number of fire incidents. - Certified extinguishers in appropriate locations. - Monitoring Reports on file to be used for environmental auditing as per EA.

Approved emergency response procedures, where relevant.	buildings. Workers must bring ready-made food to site. • No burning of waste will be allowed at the site. • Fire-fighting equipment will be available on-site and all workers will be conversant with the related protocol. • Employees should be trained in fire safety and there should be fire marshals. • Local fire station numbers should be known or easily accessible to all staff. • The prescribed fire safety precautions in terms of the Occupational Health and Safety Act must be adhered to during the construction and operational phase. • The following signs must be installed at any sites where there is a potentially high risk of flames/explosion: ○ No smoking, no open flame, no cellphones. ○ Signs must be placed in conspicuous places and management must	equipment before construction commences.		
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	manage staff to adhere to the safety principles. • Clearly mark fire points and fire assembly areas. • Fire drills should be conducted at least before construction commence. • Formulate and bring to the notice of all workers and clients fire safety policies and rules. • Establish and clearly mark the fire exits and escape routes. • The documented protocol must be followed to inform the responsible person(s) and landowner/adjacent landowner (s) accordingly. • All trained workforce must be commanded to beat fire with appropriate available appliances. • Use a water cart and available hoses and fire extinguishers to contain the fire. • Use the loader to create a firebreak ahead or around the fire. • No fires will be allowed onsite.			
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	• The Contractor shall comply with all safety requirements enforced; these include emergency evacuation procedures, fire preventative measures, etc. • The Contractor shall supply firefighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities, etc. • The Contractor is to provide designated safe smoking areas. • The Contractor or ECO/SM must ensure that fuel, lubricants, transmission, and hydraulic fluids shall only be stored in the designated areas that comply with the OHS Act. • The Contractor or ECO/SM must ensure that there is compliance with the National Veld and Forest Fire Act (No. 101 of 1998).			
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	• The Contractor or ECO/SM must ensure proper emergency response procedures are in place for dealing with fires. • The Contractor, ECO or representative Site Manager must ensure that the burning of waste is not permitted. • The Contractor, ECO or representative Site Manager must ensure suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment. • The Contractor, ECO or representative Site Manager must ensure that all fire control mechanisms (firefighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. • All staff on site will be made aware of general fire prevention and control methods, and the name of the			
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	responsible person to alert to the presence of a fire. - The Contractor, ECO and fire officer must ensure that: “No-smoking” signs are placed in areas used for the storage of oil and fuel. - Basic fire fighting equipment shall be readily available on site. - Employees shall be made aware of the procedures in the event of a fire.			
Visual Impact Management - To ensure that appropriate management strategies are adhered to minimize the visual impact. - To receive no complaints regarding	- The approved Site Development Plan must be constructed. - Outside lighting at the site camp must be designed and limited to minimize impacts on fauna. All outside lighting must be directed away from sensitive areas. Fluorescent and mercury vapour lighting must be avoided, and sodium vapour (green/red) lights must be used wherever possible. - The building contractors should avoid placing stockpiles and other services in	- The Contractor (daily), ECO (monthly), or representative Site Manager must monitor and manage the personnel onsite and maintain ongoing housekeeping to keep the construction site tidy. - The ECO and representative Site	- Visual inspections. - Completing monitoring report.	- Number of complaints - Monitoring Reports on file to be used for environmental auditing as per EA.

impacts on visual quality.	areas likely to pose obstructive visual impact. - No vegetation clearing will take place outside the proposed study area during the construction phase. If vegetation outside the study area is disturbed it must be rehabilitated. - Clearing of vegetation will be restricted to the minimum required for optimal construction at any given time. - The proposed study area and immediate surroundings must be kept clean and free of litter continuously. A weekly cleanup of the entire site must be done. - No dumping of waste in unauthorized areas around the site must be permitted. - Dust plumes on haul roads will be reduced by reducing vehicle speed and ensuring a quality wearing course is maintained (if needed). - Topsoil stockpile/s stripped from the site must be stored and used in the	Manager must keep a complaint register and log any complaints received. - The representative Site Manager must communicate with the Applicant and Contractor immediately once a complaint is received and attempt to resolve the issue within a week after the complaint. - The DAEARDLR are responsible for compliance monitoring. - The Contractor must implement management actions.		
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	landscaping and shall be vegetated immediately after establishment. • Spoil debris will not be dumped haphazardly in the veldt but handled as discussed under 'Waste'. • Time switches must be used for outdoor lighting. • Security and internal lighting shall be effectively designed so as not to spill outward onto surrounding properties. • Use specifically designed lighting equipment (full cut-off lighting fixtures) that minimizes the upward spread of light near to and above the horizontal. • Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any observer is not more than 70°. • Utilize control systems to reduce light levels during inactive periods or at predetermined times while maintaining sufficient lighting for safety & security.			
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Waste Management To ensure that appropriate waste management strategies are adhered to at all times.	- Implementation of a waste management plan, this plan must also prescribe a monitoring plan and be updated as/when new data is collated. Waste management must be a priority and all waste must be collected, stored and disposed of adequately. It is recommended that all waste be removed from site on a weekly basis (as a minimum) to prevent rodents and pests entering the site. - Refuse bins will be emptied and secured. A pest control plan must be put in place and implemented; it is imperative that poisons not be used. - Temporary storage of domestic waste shall be in covered waste skips. - Maximum domestic waste storage period will be 7 days. - Staff would be trained to distinguish between various types of waste (building rubble, domestic and industrial).	<u>Solid Waste Management:</u> - The Contractor, ECO or representative Site Manager must ensure waste bins with lids should be provided at regular intervals throughout the site including any sub-contractor site. - The Contractor, ECO or representative Site Manager must ensure that the bins shall be emptied regularly and the accumulated waste disposed of at an appropriately permitted disposal site. - The Contractor, ECO or representative Site Manager must ensure	Visual inspection of waste materials, the handling and storage areas.	- Number of incidents of non-compliance with safety procedures concerning waste materials. - Number of incidents of batching outside works footprint. - Contamination of water and soil. - Number of spills of waste materials. - Cost of cleaning up spills. - Evidence of contamination and leaks. - Visible litter / waste on site.
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	• Rubble will be neatly stored in demarcated areas away from the road, where access from the public can be controlled and restricted where required, but with easy access for removal trucks. • Rubble and other construction waste products should be re-used if possible, where not possible, it must be disposed of at the nearest registered waste disposal facility. • General rubble will be disposed of regularly at the local waste facility and others, such as metals will be sold to a recycling company. • Waste will not be burnt or buried on site. • An area will be demarcated for industrial waste. Tire casings will be disposed of as soon as possible at the nearest registered waste facility or sold at a recycling facility. Dysfunctional equipment shall be sold to a recycling company or disposed of at a hazardous waste site, depending on the nature of the materials involved. All vehicle	that the burning or burying of any waste is not permitted. • The Contractor, ECO or representative Site Manager must ensure that the site is to be checked for litter daily. All litter should be collected regularly and deposited in the waste bins. • The Contractor, ECO or representative Site Manager must ensure that non-reusable building material is to be treated as waste and disposed of at an appropriately permitted disposal site. • The Contractor, ECO or representative Site		
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	batteries shall be recycled to a facility like e.g. Midas or be removed to a hazardous waste facility. Staff will be informed of the hazards and the correct manner to deal with waste stored at the site. • The odd tyre casings and dysfunctional equipment that could be generated will be disposed of immediately at the nearest registered waste facility. • Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off-site as soon as possible. • Any waste produced will be removed from the development area continuously to the nearest waste facility with specific emphasis on household waste, plastics, unusable scrap metal, and tire casings, if any. The activity should not contribute to any surrounding windblown litter. • A skip with a proper cover will be positioned in allocated areas. Large	Manager must ensure that cement aggregates should be collected and disposed of at an appropriately permitted disposal site. • The Contractor, ECO or representative Site Manager must ensure that used cement bags and containers which held hazardous materials or substances are to be collected into a dedicated hazardous waste container/containment area and disposed of appropriately. <u>Effluent Management:</u>		
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	refuse bins fitted with a proper lid will be positioned at the various workstations in the development area, and be emptied regularly in the skip. • Cement bags must be kept in a sealed container. • Waste may not be removed from the site by staff or members of the public. • Construction vehicles may not leak any fuel, oil, or lubricants and will be maintained to an acceptable standard. • Any fuel spills will be cleaned up immediately and the soil from spill areas to be removed to a registered waste disposal site. • The salvage yard will be neat and all usable material will be placed in rows and separated into applicable categories. • Unusable scrap metal or dysfunctional machinery will be positioned on one side and removed every month to a recycling facility.	• Appropriate measures to prevent runoff from escaping from the mixing/batching area should be taken. • The Contractor (daily), ECO or representative Site Manager must ensure that cement should never be mixed directly on the ground surface and must be mixed on an appropriately lined surface. • The Contractor (daily), ECO or representative Site Manager must ensure that wastewater from batching operations or ready mix trucks		
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	• No day-to-day repairs or servicing of vehicles or equipment will take place on-site. • No washing of vehicles will take place on the property. • None of these wastes will be buried/drained into the soil. • The chemical toilets will be maintained according to Municipal specifications and as discussed under the heading “Water”. If it produces foul odours, it shall be remedied according to available guidelines. Where necessary components of it will be regularly disinfected. If there is any doubt about the impact of the system on surface or groundwater, a water analysis shall be performed. • Proper care will be taken that the surroundings are not used for ablutions and the necessary penalty system will be imposed for such offences. • Waste receptacles will be clearly marked to increase visibility and to distinguish it from hazardous waste	shall be discharged into a lined pond provided for this purpose. The pond is to be de-sludged regularly, and the cement residue is removed from the site and disposed of at an appropriately permitted disposal facility. • The Contractor (daily), ECO or representative Site Manager must ensure that no water contaminated with cement or bitumen shall be allowed to enter the environment. • The Contractor (daily), ECO or		
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	receptacles. During normal operations, the waste bins will suffice. - Domestic waste generated ancillary to the development process will be deposited in containers with scavenger-proof lids placed at the site. It will be regularly removed from the site to the nearest waste site and not dumped in the veld nor burnt or buried on site. Containers will be clearly marked to ensure that they are used for the right purpose. Management will provide clear management guidelines and this aspect will be included in the environmental awareness programme. - Any foul smells will be treated with the necessary disinfectants or lime can be introduced to the bottom of the receptacle. - Spoil material can be reused as backfill or erosion mitigation works, while excess spoil must be disposed of off-site at the nearest registered Municipal Dumping Site. Non-recyclables will be disposed of at a registered landfill site.	representative Site Manager must ensure that pollution of ground and surface water should be avoided. - The Contractor (daily), ECO or representative Site Manager must ensure that ablution facilities should be available to all workers. - The Contractor (daily), ECO or representative Site Manager must ensure that where chemical toilets are used at least one toilet per 10 individuals should be available. - The Contractor (daily), ECO or		
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	• An area on the proposed site must be earmarked for the storage of spoil material on-site. • The designated area must be easily accessible for dumping trucks to collect the spoil material, which must be carted to a registered landfill site. • Facilities must be cleaned up and will be maintained and kept neat continuously. • Effluent from the construction site will be dealt with as described under the heading "Surface Water". • Spent canisters for paints and solvents are the responsibility of the respective contractor and are disposed of at a suitable landfill site or recycled. • Waste manifests are to be obtained as proof of legal disposal.	representative Site Manager must ensure that portable/chemical toilets should be emptied at regular intervals by suitably qualified contractors, according to appropriate health and safety standards. • The Contractor (daily), ECO or representative Site Manager must ensure that no human waste should be dumped at the site. • The Contractor (daily), ECO or representative Site Manager must ensure that toilets shall be secured to prevent		
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		them from blowing over during periods of high winds. - The Contractor (daily), ECO or representative Site Manager must ensure that toilet paper should be provided at each toilet. <u>Fuels and Oils Management:</u> - The Contractor, ECO or representative Site Manager must ensure that in the case of fuel or oil storage, the storage tanks shall be bunded and the bund is to be fitted with a drainage control valve which is to remain closed except when		
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		the bund is being emptied. Accumulated rainwater is to be released from the bund after rain events. The Contractor, ECO or representative Site Manager must ensure that in such events that the combined capacity of storage tanks may not exceed 30m³. • The Contractor (daily), ECO or representative Site Manager must ensure that spills are to be avoided as far as is practically possible. Where spills occur compromised		
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		soil/vegetation should be treated as hazardous waste and disposed of accordingly. • The Contractor (daily), ECO or representative Site Manager must ensure that equipment for dealing with hazardous waste spills should be kept on-site and accessible at all times. • The Contractor (daily), ECO or representative Site Manager must ensure that construction vehicles and heavy plants standing for extended periods (e.g. overnight)		
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		should have drip trays placed beneath them. - The Contractor (daily), ECO or representative Site Manager must ensure that fire prevention measures should be taken in the vicinity of vehicles and stored oil and fuels. <u>Hazardous materials management:</u> - The Contractor or ECO/SM must ensure that information on all hazardous materials should be kept on-site and available to all. This should include safety information such as how to handle these		
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		materials or treat injuries as a result of these materials. • The Contractor (daily), ECO or representative Site Manager must ensure that hazardous materials should be stored in a contained, stable and safe environment with relevant labels placed on storage containers and lids firmly applied to prevent spillage. • The Contractor (daily), ECO or representative Site Manager must ensure that the storage facility is to comply with relevant safety		
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		and hazardous material regulations. The Contractor or ECO must ensure that staff training is to be provided for all those handling and working with hazardous materials.		
Traffic Management - The ensure that appropriate management strategies are adhered to minimize the impact on traffic. - Ensure that construction vehicles have access to	- All vehicles will be properly maintained in accordance with the Northern Cape Roads Act, 14 of 1998. - All drivers will display the necessary road etiquette and dispose of applicable driver's licenses. - No unnecessary hooting would be permitted. - During dry windy periods, wet suppression of unpaved areas should be applied by using a water cart. - Provide hard-surface areas for vehicles and regularly inspect the areas for oil leaks and clean these areas and ensure leaks of vehicles are repaired.	- The Contractor, ECO, or representative Site Manager must monitor and ensure that the correct signage is displayed, at the correct place, and is clearly visible monthly. - The Contractor must ensure that all vehicles operating on the construction site are properly maintained and	- Visual inspection of vehicles and machinery, for: - Leaks. - Overloading. - Keep record of vehicles entering the site and time they enter. - Keep record of incidents and complaints. - Completing monitoring report.	- Number of incidents on non-compliance. - Number of leaks and spills. - Cost of cleaning up spills. - Number of complaints. - Number of vehicles traveling to the site each day. - Condition of vehicles. - Monitoring Reports on file to be used for

dedicated sites and routes. - To ensure the safety of the community through proper access control, abiding by road traffic ordinances, and by implementing proper signage and traffic control measures. - To ensure that there is no transporting of overload material and no speeding.	- Vehicles entering any other public road, will come to a complete stop before entering the road and any transgressions in this regard will be heavily penalized. All contractors will sign a letter of agreement to this effect. - All vehicles visiting the site shall be roadworthy and will be included in the agreement with contractors. - The access roads to the site must be maintained and kept in good working condition. - Overloading will not be permitted. Speeding will be prohibited and drivers will be penalized should it be proved that this requirement is contravened. - Driving speed on the site will be reduced to 20km/h for safety reasons and to reduce dust generation. - Hauling of heavy vehicles will only mostly commence at 08:00 and ceases at 17:00. No construction vehicle may park along R357 unless it is an emergency.	served and road-worthy daily. - The Contractor, ECO, or representative Site Manager must monitor and manage. - The ECO and representative Site Manager must keep a complaint register and log any complaints received. - The representative Site Manager must communicate with the Applicant and Contractor immediately once a complaint is received and attempt to resolve the issue within a week after the complaint.		environmental auditing as per EA.
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	- Large construction vehicles must not be permitted to utilize public roads during peak hours (06:30-8:30 am and 16:00-18:00). - The Developer must appoint a traffic marshal/s or flagman for situations where construction traffic may impede normal traffic flows along the public roads. - A breathalyzer can be used to ensure that no member of the workforce is permitted to work on the construction site or drive a vehicle under the influence of alcohol. This also includes the use of narcotic substances. - The appropriate signage (W107 & W108 –1,2m size) will be erected on both sides of all the site entrances during the construction phase. - If poor visibility or slow access of vehicles onto R357 could result in any accidents, a flagman will be used at the access during the construction phase.	- The DAEARDLR are responsible for compliance monitoring. - The Contractor must implement management actions.		
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Socio-Economic • Ensure that where possible, local people are employed. • To ensure the safety of the community through proper access control, and proper signage and traffic control measures.	• Those mitigation measures are described under previous headings. • Staff members of the applicant will not be allowed to access any other section of the landowners or abutting properties. • No wandering of any construction workers in any area outside the study area. • Gates providing access to the construction site will be kept closed during non-operational periods. • Stakeholders must continue with engagements with the surrounding communities through the appointment of a representative site manager. The representative site manager could also assist in raising any concerns/complaints noted by the affected community to the developer. • Local people should be employed where possible. • Any construction personnel found to be trespassing must be subjected to a	• The Contractor or representative Site Manager must monitor and ensure that the site is fenced with correct warning signage that is displayed and clearly visible before construction and must inspect the site regularly to re-erect fence or signage that might have been removed. • The Applicant must ensure that a representative Site Manager is employed and that access to the representative Site Manager is easily accessible for community members	• The representative site manager must keep a complaint register and log any complaints received and report to the Contractor and Applicant. • Check training attendance register. • Observe whether activities are executed in line with EMP requirements. • Completing monitoring report.	• Keep Complaints register on site. • Complaints followed up and dealt with. • Keep record of how targets were determined. • Keep record of training provided. • Proportion of workers that completed environmental training. • Compliance of workers with EMP. • Keep record of staff by origin. • Monitoring Reports on file to be used for environmental auditing as per EA.
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	disciplinary hearing. Any employee that is caught trespassing onto neighbouring properties and committing criminal offences, should be immediately dismissed. • Construction workers and vehicles must take heed of normal road safety regulations; thus, all personnel must obey and respect the road rules. A courteous and respectful driving manner should be enforced and rewarded to prevent harm to any individual. • A designated speed limit within the development must be set by the developer to limit speed. • The site must be completely fenced off during construction with warning signs posted along the fence. Access to the site must be controlled with a locked gate and a security guard could be appointed.	before construction commences. • The representative site manager must keep a complaint register and log any complaints received and report to the Contractor and Applicant. • The Applicant and Contractor to ensure priority/preference is given to local people for employment. • The Applicant and Contractor is responsible for maintaining a Complaints Register throughout the construction phase. • The Applicant and Contractor to ensure		
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	• All the project employees should be subject to a health awareness educational programme. • Changes in crime patterns will need to be monitored in consultation with the local police and community policing forums. <i>The Use of Security Personnel during the Construction Phase</i> • Particular criteria need to be developed for the recruitment of security personnel during the construction phase. • When hiring security personnel, the client must make a reasonable effort to inquire whether the personnel have not been part of past abuses. • As far as possible, security personnel should be recruited from the surrounding communities. This should allow them to distinguish between the local population and outsiders.	priority/preference is given to local people for employment. • ECO and Constructor are responsible to provide Environmental Awareness Training with personal before construction starts, or before additional activities are undertaken or when new staff work on site.		
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	- Security personnel need to be properly trained in the use of force and, most importantly, appropriate conduct towards nearby and affected communities and residents. - A code of conduct must be developed for the security personnel. - All the nearby affected communities and wards need to be informed about the roles and responsibilities of the security personnel.			
Heritage, Archaeological and Palaeontological Management To ensure that any archaeological and historical material of interest that might be found	- Any subsurface evidence of archaeological sites or remains, e.g. stone tool artifacts, bone or ostrich eggshell fragments, charcoal and ash heaps, or remnants of stone-made structures or unmarked graves found during the construction phase of the development, must be reported to SAHRA APM Unit (Tel. 021 462 5402). - A Chance Find Protocol shall be implemented throughout all construction activities.	- Should it be required, the Applicant is responsible for acquiring any permits. - The Contractor, Applicant or representative Plant Manager must report any new findings if anything is unearthed during construction immediately.	- Visual inspections - Completing monitoring report.	- Time to rehabilitation. - Size of disturbed areas. - Monitoring Reports on file to be used for environmental auditing as per EA.

is reported to SAHRA. • To ensure that if any human remains are found, are reported to the local police, and SAHRA. • To ensure that contractors and personnel on site are aware of the responsibilities (preservation and appropriate management of new findings) and chain of command should any	• Should any previously unidentified archaeological structures, graves, stone-walled features or historical remains be encountered, the area shall immediately be designated as a temporary no-go area pending inspection by a qualified archaeologist. • Small in situ artefacts or material shall remain in place and be protected from damage until assessed by a specialist. • If unmarked human burials or human remains are uncovered, all work in the affected area shall cease immediately, and the South African Police Service, SAHRA Burial Grounds and Graves Unit, and a qualified archaeologist shall be notified. • Should any significant archaeological resources be identified, a Phase 2 rescue excavation may be required, subject to permits issued by SAHRA. • Sufficient time shall be allowed for the recording, recovery, or protection of heritage material where required.	• The Contractor, Applicant or representative Plant Manager must ensure the operators of earthmoving equipment are informed of the process to be followed should new findings be unearthed during construction before construction. • The Applicant and Contractor must ensure that construction around the new findings site ceases and sufficient time is provided for removal/collections of such material, should it be unearthed.		
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archaeological and historical material of interest of human remains be found onsite.	• All operators of earthmoving equipment shall receive induction regarding the Chance Find Protocol and their obligation to report any heritage discoveries immediately. • Any archaeological, palaeontological or burial find shall be immediately secured and clearly demarcated to prevent further disturbance until assessed by an appropriate specialist. • If fossil material is uncovered during excavation, work shall cease in the immediate area. The ECO shall photograph the find, record its GPS coordinates (where possible), ensure it remains undisturbed, and notify a qualified palaeontologist and SAHRA for further guidance. Portable fossil material shall not be cleaned or damaged prior to specialist assessment.	• The Contractor, Applicant or representative Plant Manager must be present when a new area is cleared.		
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GENERAL ADMINISTRATIVE RESPONSIBILITIES FOR OPERATIONAL PHASE

Operational Phase Actions:				
Item	Actions/Management Measures	Responsible Person & Time Frame	Monitoring Methods	Indicators
Ownership and Responsibility	The responsibility of the sites are the applicant (Prieska Pistachio Company (Pty) Ltd).	The Applicant is responsible	The applicant is responsible for environmental compliance.	Documents submitted and approved by DAEARDLR.
Safety and Security	- Ensure that emergency procedures (in relation to fire, spills, accidents to employees, use of hazardous substances, etc.) are regularly conveyed and made known to process plant workers. - Keep data of the emergency procedures practicality, including responsible personnel, contact details of emergency services, etc. updated. Make any new changed available to all the relevant personnel. - Maintain the emergency and safety signage on site and demarcate any areas which may pose a safety risk if it fades.	- The Applicant/Site Owner, Contractor, SM and Project Engineer or the responsible site manager are responsible throughout the operational phase. - It must be ensured that the health and safety of staff/labours are prioritised, updated, and protocols are in place, which is the responsibility of the Applicant, Contractors and SM	Continued monitoring.	- Number of safety/emergency incidents. - Monitoring Reports on file to be used for environmental auditing as per EA, if required.

	- Advise the ECO of any emergencies on site, together with a record of action taken. - Secure the site, particularly to restrict unauthorised access to fuels and any other hazardous substances. - Liaise with the local fire-fighting department with regards to emergency procedures updates. Since there is a planned filling station, this potential impact is a possibility. The developer and petrol station manager must adhere to the stringent health and safety standards. - Once operational, the processing plant can employ/contract a reputable security company/ies to deter or reduce possible vagrant and criminal activities.	throughout the construction phase.		
Soil Management: - Maintain no erosion status; - Maintain systems to prevent soil	- The owner will maintain the grass areas and gardens around the buildings and take responsibility for the property. - Monitor rehabilitated areas after heavy rains during the operational phase. Implement remedial action immediately if erosion is detected.	- Site inspections should be conducted by the Applicant/Site Owner (after heavy rain events), or the responsible Site Manager to detect signs of erosion. - The Applicant/Site Owner, or the responsible Site Manager	- Visual inspections. - Maintain register of pollution events and response. - Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning.	- Incidence of Erosion. - Number of pollution incidents. - Time activities stopped.

pollution and degradation.	• If signs of erosion appear along the spillways or the receiving environment below the site, the Applicant should repair/rehabilitate these areas as soon as possible. • Maintain and manage stormwater run-off. • Internal roads/tracks should be well maintained by the property owner. • All generators and/or compressors used on-site should be placed on a drip-trays to prevent spills and leaks directly onto the soil. • In the event of spills: ○ Making use of bio-remediation facilitated by a specialist company will negate large spills whilst smaller spills could be treated with fertilizer to break it down or be scooped up by a front-end loader to a hazardous waste site. ○ Peatsorb or sawdust will be used to contain larger spills and some of this material must be on-site as a contingency measure. ○ Spills will be prevented by properly maintaining generators.	must inspect the site annually to ensure stormwater management systems are effective and no erosion results. • Visual inspection must be conducted by the Applicant/Site Owner, or the responsible Site Manager to detect any source of soil pollution annually. • The Applicant/Site Owner is ultimately responsible for the any actions at the site that may result in sediment loss and/or erosion.	• Continued monitoring.	• Number of recurring incidents. • Availability and completeness of register and records. • Monitoring Reports on file to be used for environmental auditing if required.
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	The sewage infrastructure must be maintained.			
Ecologically Sensitive and Flora Management: - To minimize damage to indigenous flora and fauna utilizing the surrounding areas. - To control and prevent alien vegetation growth.	- The fire management plan must be revised annually to ensure relevance and effectiveness. - No open fires would be allowed on the surrounding areas. - Indigenous plant species should be encouraged to established in gardens. - The Alien Invasive Species (AIS) management plan must continue into the operational phase and ensure that all listed AIS are continuously remove from the site. - Regular surveillance and follow-up clearing of AIS must take place. - All category 1a, 1b & 2 listed plants must be eradicated from the site. - Maintain the objectives of the conservation trust.	The Applicant/Site Owner, or representative Site Manager must continue to log and record the monitoring.	- Visual inspection. - Check evidence of alien vegetation. - Alien Control Report.	- Reports on file. - Site is clear of alien vegetation.
Water Quality	Regular maintenance of stormwater and sewage system – this will be the responsibility of the Applicant/Site Owner.	The Applicant/Site Owner, or representative Site Manager must continue to log and record the monitoring.	Visual inspection of stormwater structures and downstream respective areas.	Incidence of stormwater contamination.

Prevent pollution and Stormwater control - Prevent silt transport into abutting areas. - Allow for natural drainage as per the civil engineer design.	- Stormwater management should not endanger off-site environment. - Any litter blocking the stormwater system must be removed. - The refuse will be collected and disposed of at the registered waste disposal site as per the normal practice for business and residential premises. - Waste must be handled as discussed under the heading 'Waste'. - In case of large, critical spills the Departments of Water and Sanitation and DAEARDLR will be informed immediately for assistance and advice and a competent company conversant with bio-remediation will be appointed as soon as possible to address the possible impacts of a such spill. All costs would be for the account of the applicant. - Inform the responsible person(s) accordingly, if it is noted that the stormwater control systems are failing.	- The DAEARDLR and the DWS are responsible for compliance monitoring. - The Applicant/Site Owner, or representative Site Manager must visually inspect runoff basins, stormwater control structures, annually to ensure that they are in an acceptable condition. - Regular visual inspection must be conducted by the Applicant/Site Owner or representative site manager to detect any source of surface water pollution. - The Applicant/Site Owner is responsible to contact the relative authority if a large spill occurs and report the incident immediately.	Review stormwater system plans.	- Visible leaks/ water wastage. - Visible surface erosion. - Compliance with storm water management plan.
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Noise Management Prevent excessive noise generation within the site and surrounding area during operating hours.	- All equipment (that would be required for ongoing maintenance on buildings) and activities comply with noise regulations. - Travelling speed on site will be limited to 40 km/h. - Workforces will be managed correctly in terms of noise generation and be sensitized to dignified human behaviour. - All Health and Safety guidelines must be complied with.	- The Applicant/Site Owner or representative site manager must monitor and manage the noise generated during the operational phase from those employed at the centre. The Applicant cannot take responsibility for the public. - The Applicant/Site Owner, or representative site manager must log and record complaints received from abutting residents. - The Applicant/Site Owner must make every effort to immediately resolve the issue (within one week), once a complaint is received. - The DAEARDLR are responsible for compliance monitoring.	Continued monitoring.	- Number of registered complaints. - Monitoring Reports on file to be used for environmental auditing as per EA, if required.
Air Quality Management	Areas around the buildings will be well maintained and roads will be paved to ensure no sources of dust.	The Applicant/Site Owner and representative site manager must log and record	Continued monitoring.	Complaints Receive and Response

Maintain good air quality conditions	- No burning of waste will be allowed on the properties. - Open cooking fires will not be allowed. - Cigarette butts might not be disposed of in the veldt, but must be put out and disposed of in the waste bins provided at the Sites. - Waste must be handled as discussed under the heading 'Waste'. - No chemicals that could generate odours will be stored or disposed of on-site.	complaints received from abutting residents. - The representative site manager must communicate with the Applicant/Site Owner immediately once a complaint is received and attempt to resolve the issue within a week after the complaint. - The DAEARDLR are responsible for compliance monitoring.	Keep a register of complaints received and response.	Report on file. - Number of registered complaints. - Monitoring Reports on file to be used for environmental auditing as per EA.
Fire Management - Prevent the loss of life (humans, fauna, or flora) within the site and surrounding area. - No site fires are to be caused by	- The fire emergency plan must be relevant and updated and known to all workers on the site. - No open cooking fires will be allowed. - Proper amenities in the kitchen area must be used. - No burning of waste will be allowed at the site. - Fire-fighting equipment will be in working condition, regularly checked and maintained and available on-site and all	- The Applicant/Site Owner must appoint a fire officer. - The fire officer must inspect and ensure that firefighting equipment onsite is functional and in working condition quarterly. - The Applicant/Site Owner is responsible for supplying and maintaining firefighting equipment for the duration of the operation.	- Continued monitoring, including: - Inspect attendance register for training sessions. - Inspect fire extinguishers and certificates.	- Compliance with measures. - Number of fire incidents. - Certified extinguishers in appropriate locations.

operational activities and workers. Approved emergency response procedures are relevant and updated.	students/workers will be conversant with the related protocol. - New employees should be trained in fire safety and there should be fire marshals. This should be included in their induction when newly arrived. - Local fire station numbers should be known or easily accessible to all staff and updated if the number changes. - The prescribed fire safety precautions in terms of the Occupational Health and Safety Act must be adhered to during the operational phase. - Clearly mark fire points and fire assembly areas must be maintained. - Fire drills should be conducted at least once a year and testing and servicing of fire-fighting equipment and appliances must be conducted regularly. - Conduct a fire audit once a year, to ensure fire-fighting equipment is still functional and the emergency response plan is still appropriate.			Monitoring Reports on file to be used for environmental auditing as per EA, if required.
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	• Formulate and bring to the notice of all workers and clients fire safety policies and rules. • Access to a fire hydrant system must not be obstructed at the site. • Maintain the clearly mark the fire exits and escape routes. • Ensure that the designs are still relevant and provide fire exits from all the working areas. • The exists shall open outwards and shall remain open during working hours. • Assess the potential hazard of fire and the sensitivity of the environment. • The documented protocol must be followed to inform the responsible person(s) and landowner/adjacent landowner (s) accordingly. • All trained workforce must be commanded to beat fire with appropriate available appliances. • Use fire hydrant and fire extinguishers to contain the fire. • Open uncontrolled fires will be forbidden at the site.			
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	• The Applicant/Site Owner shall comply with all safety requirements enforced; these include emergency evacuation procedures, fire preventative measures, etc. • The Applicant/Site Owner must ensure that there is compliance with the National Veld and Forest Fire Act (No. 101 of 1998). • The Applicant/Site Owner must ensure proper emergency response procedures are in place for dealing with fires. • The Applicant/Site Owner or representative site manager must ensure that the burning of waste is not permitted. • The Applicant/Site Owner or representative site manager must ensure suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment. • The Applicant/Site Owner or representative site manager must ensure that all fire control mechanisms (firefighting equipment) will be routinely inspected by a			
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	qualified investigator for efficacy thereof and be approved by local fire services. All new staff will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.			
Visual Impact Management - Ensure the sites are well maintained to minimize the visual impact. - To receive no complaints regarding impacts on visual quality.	- Outside lighting must be maintained and directed away from sensitive areas. Fluorescent and mercury vapour lighting must be avoided, and sodium vapour (green/red) lights must be used wherever possible. - Alien vegetation will be removed continuously at the sites. - Maintain buildings and gardens of the site. - The site and immediate surroundings must be kept clean and free of litter continuously. Regular cleanup of the entire site must be done. - No dumping of waste in unauthorized areas around the sites must be permitted. - Time switches must be used for outdoor lighting.	- The Applicant/Site Owner or representative Site Manager must monitor and manage the personnel onsite and maintain ongoing housekeeping to keep the site tidy. - The Applicant/Site Owner and representative Site Manager must keep a complaint register and log any complaints received. - The representative Site Manager must communicate with the Applicant/Site Owner and Contractor immediately once a complaint is received and attempt to resolve the	- Visual inspections. - Continued monitoring.	- Number of complaints - Monitoring Reports on file to be used for environmental auditing as per EA.

	• Security and internal lighting shall not spill outward onto surrounding properties. • Use specifically designed lighting equipment (full cut-off lighting fixtures) that minimizes the upward spread of light near to and above the horizontal. • Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any observer is not more than 70°. • Low-wattage luminaries should be used and be directed only onto the path/s. • Utilize control systems to reduce light levels during inactive periods or at predetermined times while maintaining sufficient lighting for safety & security. • Energy-efficient models must be considered and applied wherein the consumption of electricity will be reduced. These include, but are not limited to: ○ Energy-saving bulbs; such as LED technology for artificial lighting, rather than standard light fittings to reduce power consumption and increase the life span of the bulbs.	issue within a week after the complaint. • The DAEARDLR are responsible for compliance monitoring. • The Contractor must implement management actions.		
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	- o Maintaining the solar panels to supply power to lights to reduce the electrical load on the national grid. • Use of generators if solar is insufficient and power outages are experienced.			
Waste Management To ensure that appropriate waste management strategies are adhered to at all times.	• General rubble will be disposed of regularly at the local waste facility. • Waste will not be burnt or buried on the sites. • Dysfunctional equipment shall be sold to a recycling company or disposed of at a hazardous waste site, depending on the nature of the materials involved. • Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off-site as soon as possible. • Any waste produced will be removed from the development area continuously to the nearest waste facility with specific emphasis on household waste, plastics, unusable scrap metal, and tire casings, if any. The activity should not contribute to any surrounding windblown litter.	<u>Solid Waste Management:</u> • The Applicant/Site Owner or representative site manager must ensure waste bins with lids should be provided at regular intervals throughout the site and that the bins are emptied regularly and the accumulated waste disposed of at an appropriately permitted disposal site. • The Applicant/Site Owner or representative site manager must ensure that the burning or burying of any waste is not permitted. • The Applicant/Site Owner or representative site manager must ensure that the site is to	• Visual inspection of waste materials, the handling and storage areas.	• Number of incidents of non-compliance with safety procedures concerning waste materials. • Contamination of water and soil. • Number of spills of waste materials. • Cost of cleaning up spills.

	• A skip with a proper cover will be positioned in allocated areas. Large refuse bins fitted with a proper lid will be positioned at the various workstations in the development area, and be emptied regularly in the skip. • The sewage system will be well maintained. If there is any doubt about the impact of the system on surface or groundwater, a water analysis shall be performed and maintenance carried out by a qualified professional company. • Proper care will be taken that the surroundings are not used for ablutions and the necessary penalty system will be imposed for such offences. • Waste receptacles will be clearly marked to increase visibility. • Domestic waste generated will be deposited in containers with scavenger-proof lids placed at the sites. It will be regularly removed from the property as per the normal Municipal refuse removal agreement.	be checked for litter daily. All litter should be collected regularly and deposited in the waste bins. <u>Effluent Management:</u> • The Applicant/Site Owner, ECO or representative Site Manager must ensure that pollution of ground and surface water should be avoided. • The Applicant/Site Owner or representative Site Manager must ensure that well-maintained ablution facilities should be available to all workers.		• Evidence of contamination and leaks. • Visible litter / waste on site.
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	- Waste will not be dumped in the abutting veld nor burnt or buried on abutting open properties. - Any foul smells will be treated with the necessary disinfectants or lime can be introduced to the bottom of the receptacle. - Facilities must be cleaned up and will be maintained and kept neat continuously. - Effluent from the sites will be dealt with as described under the heading "Surface Water". - Waste manifests are to be obtained as proof of legal disposal. - Greywater will be harvested from all parking areas and will go into underground tanks for garden irrigation.			
Traffic Management Ensure that site vehicles have access to dedicated sites and routes.	- No unnecessary hooting would be permitted. - Driving speed on the sites will be limited to 40km/h for safety reasons. - A breathalyzer can be used to ensure that no member of the workforce is permitted to work on the site or drive a vehicle under the influence of alcohol. This also includes the use of narcotic substances.	- The Applicant/Site Owner or representative Site Manager must maintain the correct signage at the sites. - The representative Site Manager must keep a complaint register and log any complaints received.	- Visual inspection of vehicles and machinery, for: - Leaks. - Keep record of incidents and complaints. - Completing monitoring report.	- Number of incidents on non-compliance. - Number of leaks and spills. - Number of complaints.

To ensure the safety of the community through proper access control, abiding by road traffic ordinances, and by maintaining proper signage and traffic control measures.	- The appropriate signage (W107 & W108 – 1,2m size) will be maintained. - The required parking provision can be accommodated on site and will be indicated on the Site Development Plan to be submitted to the Local Municipality. - In the unforeseen event of congestion and as a result verge parking occurs, the local traffic authorities can be contacted, the issue reported and the local authority to resolve it. - In addition, <i>if approved by the local authority</i>, small beacons/fencing can be erected along the verges preventing parking.	- The representative Site Manager must communicate with the Applicant/Site Owner immediately once a complaint is received and attempt to resolve the issue within a week after the complaint. - The DAEARDLR are responsible for compliance monitoring.		- Condition of roads. - Monitoring Reports on file to be used for environmental auditing as per EA, if required.
Socio-Economic - Ensure that where possible, local people are employed. - To ensure the safety of the community	- Those mitigation measures are described under previous headings. - Staff members will not be allowed to access any other section of the landowners or abutting properties. - Stakeholders must continue with engagements with the surrounding communities through the appointment of a representative site manager. The	- The representative Site Manager must keep a complaint register and log any complaints received and report to the Applicant. - The Applicant/Site Owner and the representative Site Manager are responsible for maintaining a Complaints	- The representative site manager must keep a complaint register and log any complaints received and report to the Applicant/Site Owner. - Observe whether activities are executed in line with EMP requirements.	- Keep Complaints register on site. - Complaints followed up and dealt with.

through proper access control, and proper signage and traffic control measures.	representative site manager could also assist in raising any concerns/complaints noted by the affected community to the developer. - Local people should be employed when new positions becomes available and where possible. - Any personnel found to be trespassing must be subjected to a disciplinary hearing. Any employee that is caught trespassing onto neighbouring properties and committing criminal offences, should be immediately dismissed. - Changes in crime patterns will need to be monitored in consultation with the local police and community policing forums.	Register throughout the operations. The Applicant/Site Owner to ensure priory/preference is given to local people for new employment.	Continued monitoring.	- Keep record of how targets were determined. - Keep record of training provided. - Keep record of staff by origin. - Monitoring Reports on file to be used for environmental auditing as per EA, if required.
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DECOMMISSIONING PHASE

Should the proposed pistachio processing facility cease operations due to commercial or operational reasons, the most likely outcome is that the facility would be sold, leased or repurposed for another agricultural or agro-industrial use.

Therefore a decommissioning Phase for the EMP is not included in this management plan, since an EMP is a living document and would need to be amended and adopted as the years' progress. This is normally the function of an Environmental Audit, which should take place once every 5 years, at least.

Also, it is most likely that environmental laws and local municipal laws would be amended and requirements might change over the years. Due to the uncertainty of the laws few years from now, it is proposed that if the result is the removal of the crops and termination of the pivot areas, then a closure plan be submitted and approved by the relevant authority/ties before closure commence. Therefore at this stage, the decommissioning phase will not be discussed.

MONITORING, REPORTING & AUDITING

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. Monitoring during construction must be on-going for the duration of this phase. The ECO must ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process will be to monitor the implementation of the specified environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- Ensure adequate and appropriate interventions to address non-compliance;
- Ensure adequate and appropriate interventions to address environmental degradation;
- Provide a mechanism for the lodging and resolution of public complaints;
- Ensure appropriate and adequate record keeping related to environmental compliance;
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and,
- Aid in communication and feedback to authorities and stakeholders.

All documentation e.g., audit/monitoring/compliance reports and notifications, required to be submitted to the DAEARDLR in terms of the Environmental Authorisation.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

NON-COMPLIANCE REPORTS

All supervisory staff including, the ECO must be provided with the means to be able to submit non-conformance reports to the representative Plant Manager or Applicant. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty-eight) hours.

The non-conformance report will be updated on the completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Plant Manager and ECO or as per DAEARDLR instruction.

INCIDENT REPORTS

According to Section 30 of National Environmental Management Act (NEMA), an “Incident” is defined as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

- a) the nature of the incident;
- b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
- c) initial measures taken to minimise impacts;
- d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
- e) measures taken and to be taken to avoid a recurrence of such incident.

Example of Incident Register:

Date	Incident - <i>describe what incident and possible explanation and possible reasons, including photo record. Assign a reference no. for incident.</i>	Action Taken – <i>provide details and proof of action e.g. documents, photos, etc.</i>	Signature

Example of Accident Register:

Date	Names of persons involved	Accident - <i>describe what accident, injuries, and possible explanation and possible reasons, including photo record. Assign a reference no. for accident.</i>	Action Taken – <i>provide details and proof of action e.g. documents.</i>	Signature

Example of Complaint Register:

Date	Names of persons involved	Accident - <i>describe what complaint was received and reasons, including photo record if possible.</i>	Action Taken – <i>provide details and proof of action taken to resolve the complaint e.g. documents.</i>	Signature

MONITORING REPORTS

A monitoring report will be compiled by the ECO as dictated by the conditions of the EA and must be submitted to the DAEARDLR for their records on request. This report should include the current status of environmental parameters during the construction phase, details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out, or any other aspect as per the EIA Regulations (2014, as amended).

Continued monitoring may continue on an annual basis during the operational phase, or as instructed by the DAEARDLR.

AUDIT REPORTS

The Applicant must ensure that project compliance with the conditions of the EA is audited by an independent auditor (e.g. qualified EAP appointed as an ECO), and that the audit reports are submitted to the DAEARDLR at intervals as dictated by the conditions of the EA. The audit report will be as prescribed by the EA. Such audits must be undertaken during the construction phase of the proposed development. The effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation should be audited. The results must form part of the project monitoring and audit reports.

FINAL AUDIT REPORT

A final environmental audit report must be compiled by an independent external auditor (qualified EAP) and be submitted to DAEARDLR upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

ENVIRONMENTAL TRAINING

The goal of an environmental training or environmental awareness plan is to prescribe how the Applicant intends to inform all of his employees of all the possible environmental risks resulting from their particular line/function of work within the structures of the organization. This plan will also prescribe how the identified risks will be dealt with to avoid pollution and environmental degradation.

All personnel associated with the project must understand the purpose and benefits of the EMP.

The appropriate training must occur as part of an induction program and should include:

ENVIRONMENTAL MANAGEMENT INTRODUCTION TO ALL PERSONNEL:

General environmental information session/s to ensure that employees at each relevant function and level receive environmental information and are aware of the environmental management objectives.

It is also the responsibility of the Applicant or the ECO (if one is appointed) or the Plant Manager to conduct basic training with less literate employees describing the listed environmental impacts and the mitigation measures to be followed more practically. The Applicant may choose to employ an independent consultant (ECO) to conduct such training. Such training is best done in the employee's home language, onsite as it is more useful and visual. As a minimum the Basic Environmental Awareness Plan must address the following:

- The need for training
- General discussion on what is the environment
- Why must the environment be protected
- Types of environmental impacts
- Mitigation measures and Basic Rules to comply with
- Fines and Penalties
- Questions and Answers

JOB-SPECIFIC TRAINING

Employees whose function of work can cause significant environmental impacts must be trained, educated, and afforded the experience to ensure that their tasks are performed to the best of their ability to minimize environmental degradation on the site, with specific reference to the receiving environment.

The spinoff of Environmental training will produce a group of people being equipped and enriched with the knowledge to implement the main principles that were taught to them, outside of the workplace as well. It will enable them to put into practice their knowledge at home or other workplaces, should they one day leave the site.

The Applicant/ECO is responsible to provide training annually (or more regularly if the need should arise) to employees on:

- The importance of compliance with the objectives of the EMP and procedures to achieve the objectives of the EMP.
- Identifying the significant environmental impacts: actual or potential impacts and how employees' activities might influence the impacts.
- Benefits for improved personal performance with regards to environmental awareness.
- Their roles and responsibilities in achieving compliance with the objectives of the EMP and procedures to achieve the objectives of the EMP, including emergency preparedness and response requirements.
- The potential consequences of departure from specified operating procedures.

In terms of job-specific training, the Applicant, Plant Manager, or ECO, and Contractor must identify relevant personnel and training courses for employees performing tasks, which can cause significant environmental impacts. They must become competent based on appropriate education, training, and/or experience.

Comprehension training must include:

- Emergency preparedness and response, including an incident report.
- Soil stability and erosion control.
- Drainage management.
- Water conservation and water quality protection.
- Fire evacuations and risk control.
- Poaching.
- Faunal incidences – prevention of disturbance to fauna, reporting any faunal mortalities.
- Alien vegetation identification and control.
- Waste management.
- Ability to recognize archaeological and palaeontological artefacts.
- Incentives and rewards for good environmental practice.

This list is not intended to be exclusive or exhaustive.

After training needs have been identified, it is the responsibility of the Applicant and ECO to ensure that employees attend the relevant identified training and attendance must be documented. The Applicant must decide on the appropriate time to conduct environmental training.

As an incentive to motivate employees, progress in compliance with the training programme can be recorded and evaluated to nominate and elect the best candidate who has improved personal performance with regard to environmental awareness. Such an employee may be rewarded at the discretion of the Applicant. This can be done through the following method:

- By Management through task observation;
- During internal and external audits, when the effectiveness of the EMP is evaluated;
- Own initiatives that are taken by employees to improve the environment.

The Environmental Awareness Plan must apply to the specific task and the level of understanding of the employee. Open communication between the employees and the Plant Manager, or ECO, the Contractor, and Applicant must be established and in the event of an environmental emergency, the Applicant, Plant Manager, and ECO must have process steps in place to ensure that the situation is contained and the correct procedure is followed to ensure that pollution and degradation do not occur.

Mitigation measures listed in this document must be used as a guideline to conduct such training and to establish the rules for operation. After such training, each employee may receive a certificate for completing the training. The Applicant, Plant Manager, or ECO may also have a checklist available onsite to ensure that employees are constantly aware of the mitigation measures.

DESCRIPTIONS OF SOLUTIONS TO RISKS

The following risks have been identified:

- Soil management and stability and erosion after heavy rains.
- Unauthorized clearing of natural vegetation.
- Alien vegetation infestation.
- Waste management.
- Dust control.
- Safety and security management.

The following procedures must be brought to the attention of all staff and suitable material/equipment provided to deal with them.

SOIL STABILITY AND EROSION DURING HEAVY RAINS

- Assess the site and downstream area of drainage and inform the responsible person (s) accordingly.
- Assess the potential hazard and inform the responsible person(s) accordingly.
- Ensure that the soil structure is functional and does not result in being washed away after heavy rains; inform the responsible person (s) accordingly.

- Ensure that erosion rills are not left to deteriorate but removed/filled in and seeded as soon as possible.

UNAUTHORIZED CLEARING OF NATURAL VEGETATION

- Stop the operator of heavy equipment immediately carrying on with such activity and request him to vacate the site.
- Determine if any plants can be saved and place them in the soil and water.
- Assess the potential hazard and inform the responsible person(s) accordingly.

ALIEN VEGETATION INFESTATION

- Assess the level/scope of degradation caused by infestation and inform the responsible person(s) accordingly.
- Identify the alien plants establishing and the best method to remove such plants.
- Ensure that procedures are handled as prescribed in the EMP.
- Ensure that the areas cleared from alien vegetation be re-established with plant species natural to this area.

WASTE MANAGEMENT

- Minimize environmental impacts associated with waste.
- Apply waste management principles of preventing, minimize, recycle, or re-use, with disposal as the last option.
- No littering on the site.
- Maintain a clean and tidy site.

DUST CONTROL

- Ensure that appropriate dust suppression measures or temporary stabilizing mechanisms are used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, etc.), particularly during prolonged periods of dry weather.
- Identify when dust suppression has to be undertaken.
- Ensure that speed limits are strictly adhered to.

PESTICIDE CONTROL

- Assess protective clothing and equipment before handling or applying pesticides to ensure there is no tears/lack/faulty clothing or equipment.
- Ensure exposure time is reduced to what is necessary, to reduce the risk of poisoning.
- Ensure correct pesticides are used and instructions according to the labels are followed.

- Ensure an emergency kit is available at the site and contact details of health professionals are known to workers.
- If animals are found dead at the site, try to establish if it is due to pesticide poisoning.
- Inform abutting neighbours of the time and date of pesticide application and monitor crops.

SAFETY & SECURITY MANAGEMENT

- Ensure that construction workers and farmworkers are managed and informed of the consequences if trespassing occurs.
- Ensure suitable management of the labour force to prevent security-related issues.
- All requirements according to the OHS Act be followed and implemented.

ENVIRONMENTAL AWARENESS TRAINING

The following environmental training and training on dealing with emergencies and remediation measures for such emergencies:

ENVIRONMENTAL TRAINING

1. The Applicant, Plant Manager or ECO will have one-on-one information sessions with employees working in specific sections of the site.
2. Once a semester all employees should participate in a walkthrough of the specific site area and be requested to highlight unattended environmental impacts to increase their assessment ability and focus on potential impacts in the entire area.
3. Unattended impacts identified will be discussed and employees will be requested to provide solutions to such impacts. These solutions will be discussed and corrected if not in line with general environmental policies.
4. Employees should attend a 6 monthly or annual meeting to discuss any environmental aspect of concern and mechanisms to avoid such scenarios.
5. Employees will attend one course/seminar/presentation on environmental awareness.

TRAINING ON DEALING WITH EMERGENCIES AND REMEDIATION MEASURES FOR SUCH EMERGENCIES

- An emergency protocol will be established and documented and will deal specifically with the line of authority and responsibility and contact details of dedicated persons, including that of the landowner/abutting landowner.
- Potential emergencies will be determined and documented for each section of the site and will be discussed with individuals/groups. Emergencies identified at the site are erosion after heavy precipitation, unauthorized clearing of land, degradation of soil, pesticide poisoning, and alien vegetation infestation.

- Remediation measures, provisional and/or permanent, which are aligned with the conditions of the EMP will be documented for identified emergencies and will be discussed with employees. Each employee will be provided with a short manual on how to deal with identified emergencies.
- The Applicant or Plant Manager will provide an information session on dealing with emergencies and remediation of such emergencies once every two or five years by a recognized environmental practitioner (ECO).
- Employees will be informed on suitable material/equipment available to deal with emergencies and the functions of this material/equipment.

APPENDIX 1: POSSIBLE DECLARATION OF CONTRACTOR

I, _____, declare that:

- I/we have read and understood the content of the Environmental Management Plan and the relevant associated documents from specialists for the construction of infrastructure Portion 18 (Ptn of Ptn 15) of the Farm Uitdraai No. 33, Prieska in the Siyathemba Municipal, of which Prieska Pistachio Company (Pty) Ltd is the Applicant.
- I/we declare that I/we understand the responsibilities in terms of my/our role and responsibilities towards good environmental management practice.
- I/we declare that I/we understand the responsibilities in terms of my/our role and responsibilities towards good health and safety practice.
- I/we declare that I/we understand my/our role in terms of enforcing and implementing the requirements of the mitigation measures set out in the Environmental Management Plan.
- I/we declare that I/we understand my/our role in terms of honouring and enforcing the requirements set out in the Environmental Management Plan.
- I/we will comply with all applicable legislation.
- I/we have the expertise to perform the work as contracted.
- I/we will ensure that information containing my/our contract work is made available to the Applicant and ECO for their information with a reasonable opportunity to act on the situation.
- I/we will provide the competent authority with access to all information at my/our disposal regarding the contract work, whether such information is favorable to the Applicant or not.

Signature of the contractor

Name of company

Date

Witness signature

Appendix H: Details of EAP and expertise

EAP CV

CURRICULUM VITAE

NATALIA SHARP

Personal Details

Date of birth: 12 August 1979

Nationality: South African

Identity number: 790812 000 7080

Gender: Female

Languages: English / Afrikaans

Qualifications:

BSc (2000) UFS – Zoology and Botany

BSc Honors (2001) UFS - Limnology

Masters in Environmental Management (2003) UFS - Evaluation of Phytoplankton as an indicator in a biomonitoring program, with special reference to the Modder River.

Experience (Twenty years' experience in environmental law and environmental management)

During the 2 years associated with the Centre for Environmental Management intense training was provided for equipping Natalia Sharp with adequate knowledge in terms of biomonitoring water systems and scientific report writing for research done by her through the Centre. Various scientific contributions were made during these few years which included formal reports to Bloem Water and seminars providing management principles for polluted water bodies, thus providing her with additional regulatory and environmental skills.

During the 5 years associated with the DME, now changed to the Department of Mineral Resources (DMR), vast knowledge was gained in terms mine environmental management, the

BASIC ASSESSMENT

development, rehabilitation and closure of mining and prospecting areas. Environmental Management Programmes, Environmental Performance Assessment Reports, and Closure Reports were scrutinized continually. Therefore, adequate expertise was gained to assist the applicants with relevant environmental and mining advice and providing her with adequate knowledge to evaluate environmental impacts relating to mining.

During the 11 years associated with SES (Stellenryck Environmental Solutions), Natalia Sharp has obtained immense understanding in completing environmental impact assessments, not only associated with mining projects, but also for a wide variety of different developing projects such as Light Industrial developments, Road upgrade projects, bush clearing for agricultural developments, and applications for exemptions, and so forth. She has excellent experience in writing environmental reports, which ranges from Scoping Reports, Environmental Management Plans, Environmental Awareness Plans, Mining Work Programs, Closure Plans, Risk Assessments, Performance Evaluations on projects, and Plan of Study reports. She has also been involved in performing biomonitoring on river systems associated with some of the projects, completing it by obtaining all the data and writing the Biomonitoring Report for the relevant Department. This is mainly attributed to her Limnology background and she is competently able to add value to this field in her current position.

During the past 3 years of association with Digital Soils Africa (DSA) as an independent environmental consulting firm that are also soil specialists focussing on all soil solutions in the agricultural and environmental fields, Natalie Sharp has gained more exposure to projects involved with the Department of Agriculture and the Department of Water and Sanitation. This included applications for the cultivation of virgin soil and obtaining knowledge of the administrative processes in applying for these permits, assisting farmers with identifying suitable soils for cultivation and applying to the DWS for water use rights for irrigation.

BASIC ASSESSMENT

Natalie Sharp has also gained experience in GIS mapping with the free software QGIS because of working at DSA.

In terms of management skills, DSA appointed Natalie Sharp as the lead project manager on all environmental-related projects: she managed the environmental authorisation projects and specialist team associated with such applications, including Section 24G applications, applications for protected plant species with the Department of Forestry, Water Use License Applications, Cultivation for virgin soil applications, SAHRIS applications, Civil Aviation approvals and correspondence with the Department of Defence.

As the lead project manager, she has gained experience in proposals and cost analysis for projects and has established a network of professional connections in the Eastern Cape region and Northern Cape region.

Centre for Environmental Management University of the Free State: Lab Assistant [2001 – 2003]

Previous Employment

Mine Environmental Management [2003-2005] at the Department of Mineral Resources: Environmental Officer

Mine Environmental Management [2005-2008] at the Department of Mineral Resources: Senior Environmental Officer

Stellenryck Environmental Solutions: Senior Environmental Practitioner [2008-2019]

Current Employment

Digital Soils Africa Pty Ltd: Senior Environmental Practitioner [2020-currently]

Professional affiliation/registration

Pri.Sci.Nat (Reg no. 123443)

Reg. EAP (EAPASA)

Member of IAIAAsa (7237)

References

Darren Bouwer 083 703 3002

Johan van Tol 083 387 6243

Maartje Weyers 082 375 3662

BASIC ASSESSMENT

Projects Completed (Summary)

Project Manager for Projects (DMRE):	Number Completed
Amendments to Environmental Management Plans (EMP)	2
Environmental Management Plans (EMP) with impact assessment included in the document - completed prior to 8 December 2014	73
Scoping Reports completed prior to 8 December 2014	5
Closure Reports & Risk Assessments for quarries	27
Performance Assessment Reports/Environmental Audits	42
Public Participation	80
Environmental Applications to DMRE post 8 December 2014	15
Scoping Reports completed post 8 December 2014	5
EIA's completed post 8 December 2014	3
BAR's + EMP completed post 8 December 2014	9
Biomonitoring and Reporting	1
Environmental Awareness Program and Basic Training	5
Conversion Applications for Mining Rights	3
Project Manager for Projects (DEDEAT)	
Basic Assessment Reports completed	15
Scoping and EIA completed	6
Public Participation	25
Section 24G Application and documents	5
Compost Farm registration	1
Part 1 and/or Part 2 Amendment Reports	2
Project Manager for Projects (DWS)	
eWULA applications and associated documentations	6

BASIC ASSESSMENT

Rehabilitation Plans and Environmental Management Plans	8
Project Manager for Projects (DARDLR)	
Applications for cultivation of virgin soils	5
Project Manager for Projects (SAHRA)	
SAHRIS applications	9

**Environmental Assessment
Practitioners Association
of South Africa**



Registration No. 2020/230

Herewith certifies that

NATALIA SHARP

is registered as an

Environmental Assessment Practitioner

**Registered in accordance with the prescribed criteria of Regulation 15. (1)
of the Section 24H Registration Authority Regulations
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the
National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).**

Effective: 01 April 2026

Expires: 31 March 2027

Chairperson

Registrar





herewith certifies that

Natalia Sharp

Registration Number: 123443

is a registered scientist

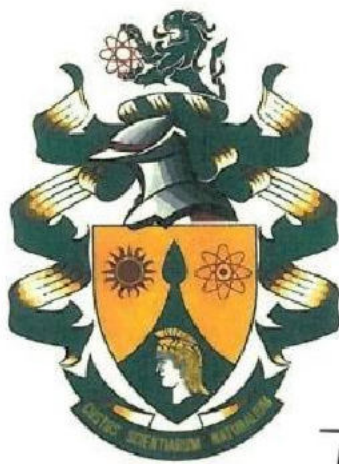
in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)

in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)

Effective **13 November 2019**

Expires **31 March 2027**



A stylized, handwritten signature in black ink, likely belonging to the President of the Council.

President of Council

A stylized, handwritten signature in black ink, likely belonging to the Chief Executive Officer.

Chief Executive Officer





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IAIAsa Confirmation of Membership: 2026/2027 Natalie Sharp | Membership no: 7237

TO WHOM IT MAY CONCERN

Natalie Sharp, Digital Soils Africa (IAIAsa membership Number 7237) is a paid-up Full Member in good standing of the South African Affiliate of the International Association for Impact Assessment and has been a member of IAIAsa since Wednesday, March 1, 2023.

Membership has been continuous from Wednesday, March 1, 2023 to date.

This membership is valid from 01 March 2026 to 28 February 2027.

IAIAsa is a voluntary association and is not a statutory body regulating the profession. Its members are expected to abide by the association code of ethics which is available on our website.

Any Individual conducting activities governed by the National Environmental Management Act 1998 (Act 107 of 1998) (NEMA) is required to be registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

Any practicing natural scientist is required to be registered in terms of the Natural Scientific Professions Act, 2003 (Act No. 27 of 2003) (Sections 18 (1) and 20(2)(a) with the South African Council for Natural Scientific Professions (SACNASP) in the relevant field of practice for the specialist work conducted.

IAIAsa is an Affiliate of IAIA which is an international body through a memorandum of understanding. IAIA is not responsible or liable for the actions or activities of the Affiliates. Membership of one does not imply membership of the other.

Any enquiries regarding this membership may be directed to the Secretariat at the above contact details.

Yours sincerely

Zama Mkhize-Pila
President 2025/2026

IAIAsa Membership Certificate

President: Z. Mkhize, Past President: C. Niemandt, President Elect: T. Mutshatshi, Secretary: B. Mthembu, Treasurer: M. Vawda, Members: H. Antonopoulos, T. Hokinyane, O. Mafika, J. Minnaar, D. Wieners. Branch Chairs: M. Botha, N. Jamal, L. Mashego, H. Stander, T. Shakwane.

Full Name	Natalie Sharp
E-mail	natalie@dsafrica.co.za
Company Name:	Digital Soils Africa
Member Type:	Full
IAIAsa Membership Number:	7237
IAIAsa Member Since	Wednesday, March 1, 2023

Appendix I: Specialist's declaration of interest

Appendix I1: Dr Lloyd – Palaeontology & Heritage

Draft BAR



agriculture, environmental affairs,
rural development and land reform

Department:
agriculture, environmental affairs,
rural development and land reform .
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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

File Reference Number:
NEAS Reference Number:
Date Received:

(For official use only)

1. Project title:

Nursery and pistachio processing plant on Portion 18 (Ptn of Ptn 15) of the farm Uitdraai No. 33, Prieska, Siyathemba Local Municipality, Northern Cape province.

2. Details of the specialist:

Project Specialist:
Trading name (if any):
Business reg. no./ID. no.:
Contact person:
Physical address:
Postal address:
Postal code:
Telephone:
E-mail:
Qualifications:

Dr. L. Rossouw
Paleo Field Services
6711225124086
L. Rossouw
Piet du Ploey Str. 12, Langenhovenpark, Bloemfontein, 9301
" " "
9330
0842505992
lloyd@paleots.co.za
Phd
ASAPA & PSSA

Cell: 0842505992
Fax:

3. Details of the consultant

Project consultant/firm:
Business reg. no./ID. no.:
Contact person:
Postal address:
Postal code:
Telephone:
E-mail:

Digital Soils Africa (Pty) Ltd
2012/111217/07
Natalie Sharp
45 Church Street, Walmer
6070
082 414 0472
natalie@dsafrica.co.za

Cell: 082 414 0472
Fax:

Gesertifiseer 'n ware afskrif van die oorspronklike / Certified a true copy of the original

Datum: 28/07/2026 Date

Ex Officio ~~KOMMISARIS VAN EDE~~
Ex Officio COMMISSIONER OF OATHS
BRAAM VAN WYK
PRINSIPAAL / PRINCIPAL

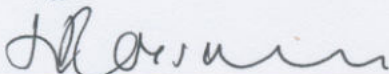
Grey Kollege Sekondêr
Jack Meiringstraat
Parkwest
Bloemfontein

Grey College Secondary
Jack Meiring Street
Parkwest
Bloemfontein

4. Declaration by the specialist appointed in terms of the Environmental Impact Assessment Regulations, 2014 as amended.

I, Lloyd Rossonw, 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:

Paleo Field Services

Name of company (if applicable):

20/07/2026

Date:

Signature of the Commissioner of Oaths:

Date:

Designation:

Official stamp (below):

Gesertifiseer 'n ware afskrif van die oorspronklike / Certified a true copy of the original

Datum

28/07/2026

Date

Ex Officio KOMMISSARIS VAN EDE
Ex Officio COMMISSIONER OF OATHS
BRAAM VAN WYK
PRINSIPAAL / PRINCIPAL

Grey Kollege Sekondêr
Jack Meiringstraat
Parkwest
Bloemfontein

Grey College Secondary
Jack Meiring Street
Parkwest
Bloemfontein

L ROSSOUW - BIOSKETCH

Name: Lloyd Rossouw

Nationality: South African

ID # 6711225124086

Home Address: 12 Piet du Plooy Street, Langenhovenpark, Bloemfontein, 9330, South Africa.

Academic Education & Qualifications

Degrees

Ph.D Palaeoenvironmental Science, Dept. of Plant Science, 2009. University of the Free State.

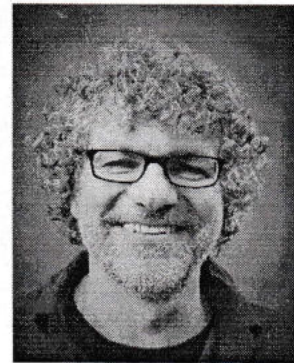
M.Sc. Quaternary Vertebrate Palaeontology (cum laude), 2001. Bernard Price Institute for Palaeontology, University of the Witwatersrand.

B.A. (Hons.) Archaeology, 1991. University of Stellenbosch.

Formal Courses

Theory and Practice of Stable Light Isotope Spectrometry, Stable Light Isotope Facility, University of Cape Town, RSA (2003)

Gross Human Anatomy, Duke University Medical School, Durham, North Carolina, United States of America (1999).



Employment History

Director, Paleo Field Services (2024 -).

HOD & Curator of Collections, Florisbad Quaternary Research Station, National Museum, Bloemfontein (2019 – 2024).

HOD, Department of Archaeology, National Museum, Bloemfontein (2010 – 2019).

Museum Scientist, Florisbad Quaternary Research Station, National Museum, Bloemfontein (1999 – 2009).

Field Investigator, Palaeo-Anthropological Research Group, Department of Anatomical Sciences, University of the Witwatersrand (1998).

Collections Manager, Florisbad Quaternary Research Station, National Museum, Bloemfontein (1994-1997).

Professional Affiliation

Member and registered heritage practitioner, Association of Southern African Professional Archaeologists (ASAPA Reg. no. 122), 2002 – Present.

Member, Palaeontological Society of Southern Africa (PSSA), 2002 - Present

Research Fellow, Dept. of Plant Sciences, University of the Free State, Bloemfontein (2018 – Present).

Fieldwork Experience

Lloyd Rossouw previously led the Archaeology and Florisbad Quaternary Research Departments at the National Museum in Bloemfontein and has more than 30 years of fieldwork experience in South African archaeology and Quaternary palaeontology (Appendix 1). He earned a BA degree in Archaeology, completed an Honours programme in Stone Age Archaeology at the University of Stellenbosch, and received training in osteology and Quaternary palaeontology for his MSc at the Bernard Price Institute of Palaeontology (Wits). He also undertook instruction in human anatomy at Duke University in Durham, North Carolina, USA. For his PhD at the University of the Free State, he developed a palaeobotanical method that uses plant silica remains to reconstruct past environmental conditions. His fieldwork includes participation in various excavations and surveys, such as historical built environments and farmsteads (including Keerweder, Zomerlust, Boekenhoutskloof, Bien Donne, Sterhuis, Fredericksberg, Aurora), rock art surveys (Ceres, Vanrhynsdorp, Clanwilliam, Piketberg), industrial projects (coastal section for Moss gas Pipeline Project, Molenaars River crossing for Du Toitskloof Pass Tunnel Project), Stone Age sites (Hoedjiespunt, Klasies River Mouth, Erfkroon, Damvlei, Thyspunt, Sunnyside, Baden Baden, Florisbad, Cornelia), and palaeontological localities (Langebaanweg, Zwartklip, Besaansklip, Boesmansfontein, Spitskop, Congo Valley, Braamhoek, Gladysvale, Taung). He has surveyed and mapped multiple open sites in the central interior region, including the northern Karoo, lower Orange, Vaal, Modder, Vet and Sand River basins as well as the central Makgadikgadi basin.

Ten most recent Heritage Impact Assessments 2026

- 2926AA Bloemfontein_Palaeontological and Heritage Impact assessment for the proposed Mangaung Metropolitan Municipality Northern Bulk Distribution Pipeline, Bloemfontein, Free State Province.
- 2827AA Ventersburg_Heritage Impact Statement & Site Management Plan: Mashiane family graveyard — Virginia Solar Park, Lejweleputswa DM, Free State Province.
- 2824DA Barkley West_Palaeontological and Heritage Impact assessment for a proposed new cemetery and crematorium development on Portion 350 of farm Vooruitzicht 81, near Kimberley, Sol Plaatje LM, Northern Cape Province.
- 2728AD Frankfort_Palaeontological and Heritage Impact assessment for a proposed new cattle feedlot development and compost facility on adjoining farms Van Oordt 664 and Van Oordt A 935 near Frankfort, Mafube LM, Free State Province.
- 2824BB Warrenton_PIA & HIA Warrenton WWTW & Bulk Water Reticulation NC.
- 2726DD Riebeeckstad_Desktop PIA - 7ha Residential Development, Constantia Str Thabong, FS.
- 2926 AA Bloemfontein_Palaeontological and Heritage Impact assessment for the proposed 17 km section N8 Ring Road (Phase 1) near Bloemfontein, FS Province.
- 2922DB Prieska Oos_PIA & AIA Bloukrans Goue Akker & Monterey Agricultural Development.
- 3026CB Goedemoed_HIA Brandfontein 36 Feedlot Expansion.
- 2819CD Oupvlakte_PIA & AIA Sending WWTW & Irrigation Area.

Peer-reviewed Publications

- Monteagudo, F.C., Richard, M. Rossouw, L. and Toffolo M. B. 2025. Archaeological survey of the Modder River dongas, Free State, South Africa. Southern African Field Archaeology. DOI: <https://doi.org/10.36615/safa.20.3540.2025>

2. Toffolo, M.B., Tribolo, C., Horwitz, L.K., **Rossouw, L.**, Bousman, C.B., Richard, M., Boaretto, E. and Miller, C.E. 2023. Palaeoenvironments and chronology of the Damvlei Later Stone Age site, Free State, South Africa. *South African Archaeological Bulletin* 78 (219).
3. Richard, M., Kaplan-Ashiri, I., Alonso, M., Pons-Branchu, E., Dapoigny, A., **Rossouw, L.** and Toffolo, M.B. 2023. New ESR dates from Lovedale, Free State, South Africa: implications for the study of tooth diagenesis. *South African Archaeological Bulletin* 78 (219).
4. Will Archer, Darya Presnyakova, Vera Aldeias, Debra Colarossi, Louisa Hutten, Tobias Lauer, Guillaume Porraz, **Lloyd Rossouw**, Matthew Shaw. 2023. Late Acheulean occupations at Montagu Cave and the pattern of Middle Pleistocene behavioral change in Western Cape, southern Africa, *Journal of Human Evolution* 184, <https://doi.org/10.1016/j.jhevol.2023.103435>.
5. Bousman, B., Codron, D., Gowlett, J., Herries, A.I.R., **Rossouw, L.**, Toffolo, M. 2023. *Cornelia-Uitzoek, Free State, South Africa*. In Beyin, A. Wright, D., Wilkins, J., Bouzouggar, A. Olszewski, D. (Eds.) *Handbook of Pleistocene Archaeology of Africa: Hominin Behavior, Geography, and Chronology*. Springer.
6. Bousman, B., Brink, J.S., **Rossouw, L.**, Bateman, M., Morris, S., Meier, H., Cohen, B., Trower, G., Herries, A.I.R., Palmison, M., Ringstaff, C., Thornton-Barnett, S. 2023. *Erfkroon, Western Free State, South Africa*. In Beyin, A. Wright, D., Wilkins, J., Bouzouggar, A. Olszewski, D. (Eds.) *Handbook of Pleistocene Archaeology of Africa: Hominin Behavior, Geography, and Chronology*. Springer.
7. James S. Brink*, John A.J. Gowlett, Andy I.R. Herries, John Hancox, Jacopo Moggi-Cecchi, Daryl Codron, **Lloyd Rossouw**, Gary Trower, Olivia M.L. Stone, C. Britt Bousman, Rainer Grün, and Antoine Souron 2022. *Cornelia-Uitzoek: Paleoeology, Archeology and Geochronology* In: S.C. Reynolds and R. Bobe (eds). *African Paleoeology and Human Evolution*. Cambridge University Press.
8. Liora Kolska Horwitz, Margaret D. Avery, Marion K. Bamford, Francesco Berna, James S. Brink*, Michaela Ecker, Yolanda Fernandez-Jalvo, Paul Goldberg, Sharon Holt, Julia Lee-Thorp, Ari Matmon, Robyn Pickering, Naomi Porat, **Lloyd Rossouw**, Louis Scott, and Michael Chazan 2022. Wonderwerk Cave, Northern Cape Province: An Early–Middle Pleistocene Paleoenvironmental Sequence for the Interior of South Africa. In: S.C. Reynolds and R. Bobe (eds). *African Paleoeology and Human Evolution*. Cambridge University Press.
9. Kristen Wroth, Chantal Tribolo, C. Britt Bousman, Liora Kolska Horwitz, **Lloyd Rossouw**, Christopher E. Miller, Michael B. Toffolo 2022. Human occupation of the semi-arid grasslands in the interior of South Africa during Marine Isotope Stage 4: New archaeological and paleoecological evidence from Lovedale, Free State. *Quaternary Science Reviews*, 283 <https://doi.org/10.1016/j.quascirev.2022.107455>
10. **Rossouw, L.** 2022. Morphological variation in the distal phalanges of the springbok, *Antidorcas marsupialis* (Zimmermann 1780) (Mammalia: Bovidae). *South African Journal of Science*, 118(3/4) <https://doi.org/10.17159/sajs.2022/10452> Grine, F., Gonzalvo, E., Rossouw, L., Holt, S., Black, W. & Braga J. 2021. Variation in Middle Stone Age mandibular molar enamel-dentine junction topography at Klasies River Main Site assessed by diffeomorphic surface matching. *Journal of Human Evolution* 161. Michaela Ecker, James S. Brink, **Lloyd Rossouw**, Michael Chazan, Liora K. Horwitz and Julia A. Lee-Thorp 2018. The palaeoecological context of the Oldowan–Acheulean in southern Africa. *Nature - Ecology & Evolution*. <https://doi.org/10.1038/s41559-018-0560-0>
12. Lucinda R. Backwell, Christine Steininger, Johann Neveling, Fernando Abdala, Lucy Pereira, Elver Mayer, **Lloyd Rossouw**, Paloma de la Pena, James Brink. 2017. Holocene large mammal mass death assemblage from South Africa. *Quaternary International* <https://doi.org/10.1016/j.quaint.2017.11.055>
13. **Rossouw, L.** 2016 An Early Pleistocene phytolith record from Wonderwerk Cave, South Africa. *African Archaeological Review*. DOI 10.1007/s10437-016-9227.
14. Scott, L., **Rossouw, L.**, Cordova, C. and Risberg, J. 2016 Palaeoenvironmental Context of Coprolites and Plant Microfossils from Unit II, Azokh 1, In Y. Fernandez-Jalvo et al. (eds.) *Azokh Cave and the Transcaucasian Corridor*. Vertebrate Paleobiology and Paleoanthropology Series. Springer.
15. Van Aardt, A.C, Bousman, C.B. Brink, J.S. Brook, G.A., Z. Jacobs, Z. du Preez, P.L. **Rossouw, L.** and L. Scott, L. 2015. First chronological, palaeoenvironmental, and archaeological data from the Baden-Baden fossil spring complex in the western Free State, South Africa *Palaeoecology of Africa* 37.
16. Lucinda R. Backwell, Terence S. McCarthy, Lyn Wadley, Zoë Henderson, Christine M. Steininger, Bonita deKlerk, Magali Barré, Michel Lamothe, Brian M. Chase, Stephan Woodborne, George J. Susino, Marion K. Bamford, Christine Sievers, James S. Brink, **Lloyd Rossouw**, Luca Pollarolo, Gary Trower, Louis Scott and Francesco d'Errico. 2014. Multiproxy record of late Quaternary climate change and Middle Stone Age human occupation at Wonderkrater, South Africa. *Quaternary Science Reviews* 99: 42 – 59.
17. Chazan, M. Avery, D.M., Bamford, M.K., Berna, F., Brink, J., Fernandez-Jalvo, Y., Goldberg, P., Holt, S., Matmon, A., Porat, N., Ron, H., **Rossouw, L.**, Scott, L. and Horwitz, L. 2012. The Oldowan horizon in Wonderwerk Cave (South Africa): archaeological, geological, paleontological and palaeoclimatic evidence. *Journal of Human Evolution* 63(6):859-66.
18. Brink, J.S. Herries, A.I.R., Moggi-Cecchi, J., Gowlett, J.A.J., Bousman, C.B., Hancox, J.P., Grün, R., Eisenmann, V., Adams, J.W. and **Rossouw, L.** 2012. First hominine remains from a ~1.0 million year old bone bed at Cornelia-Uitzoek, Free State Province, South Africa. *Journal of Human Evolution* 63: 527-535.
19. Henry, A.M., Unger, P.S. Passey, B.H., Sponheimer, M., **Rossouw, L.**, Bamford M., Sandberg, P., de Ruiter D.J. and Berger, L.R. 2012. The diet of *Australopithecus sediba*. *Nature*. DOI: 10.1038/nature11185.
20. **Rossouw, L.** and Scott, L. 2011. Phytoliths and Pollen, the Microscopic Plant Remains in Pliocene Volcanic Sediments Around Laetoli, Tanzania In: T. Harrison (ed.), *Paleontology and Geology of Laetoli: Human Evolution in Context. Volume 1: Geology, Geochronology, Paleoeology and Paleoenvironment*, Vertebrate Paleobiology and Paleoanthropology. Springer. New York.
21. Fernandez-Jalvo Y. Scott, L., Carrion, J.S., Gil-Romera, G. Brink, J.S. Neumann, F. & **Rossouw, L.** 2010. Pollen taphonomy of hyaena coprolites: an experimental approach. *Zona Arqueologica Numero 13, Alcala de Henares. Museo Arqueologico Regional* pp. 148 – 157.
22. **Rossouw, L.**, Stynder, D.D. and Haarhof, P. 2009. Evidence for opal phytolith preservation in the Langebaanweg 'E' Quarry Varswater Formation and its potential for palaeohabitat reconstruction. *South African Journal of Science* 105: 223 – 227.

23. Herries, A.I., Brink, J.S., Bousman, B., Eisenmann, V., Gowlett, J.A.J., Grun, R., Hancox, J., Moggi-Cecchi, J. & Rossouw, L. 2009. A palaeomagnetic age of about 990,000 years for the Cornelia-Uitzoek fossil vertebrate, hominin and Acheulian site, South Africa. *American Journal of Physical Anthropology* 138: s148–s149. (Published Abstract).
24. Codron, D., Brink, J.S., Rossouw, L., Claus, M., Codron, J., Lee-Thorp, J. and Sponheimer, M. 2008. Functional differentiation of African grazing ruminants: an example of specialized adaptations to very small changes in diet. *Biological Journal of the Linnean Society*, 2008, 94, 755–764.
25. Codron, D., Brink, J.S., Rossouw, L. and Clauss, M. 2008. The evolution of ecological specialization in southern African ungulates: competition- or physical environmental turnover? *Oikos* 117(3): 344 – 353.
26. Brink, J.S., Grun, R., Rossouw, L. and Codron, D. 2007. Mid-Quaternary large mammal succession and extinction in southern Africa. *Quaternary International* 167 – 168 (3-486) (Published Abstract)
27. Rossouw, L. 2006. Florisian mammal fossils from erosional gullies along the Modder River at Mitasrust farm, central Free State, South Africa. *Navorsing van die Nasionale Museum* 22(6): 145-162.
28. Henderson, Z.L., Scott, L., Rossouw, L. & Jacobs, Z. 2006. The dating, palaeoenvironments and archaeology of the Sunnyside 1 site, Clarens, South Africa. In: T. Rocek (ed.). *Intergrading the diversity of 21st century anthropology: the life and intellectual legacies of Susan Kent*. Archaeological Papers of the American Anthropological Association Vol. 16 No. 1, pp. 139-149.
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30. Scott, L. & Rossouw, L. 2005. Reassessment of botanical evidence for palaeoenvironments at Florisbad, South Africa. *South African Archaeological Bulletin* 60 (182): 96 – 102.
31. Grab, S., Scott, L., Rossouw, L. & Meyer S. 2005. Holocene palaeoenvironments inferred from a sedimentary sequence in the Tsoaing River Basin, western Lesotho. *Catena* 61: 49 – 62.
32. Brink, J.S. & Rossouw, L. 2000. New trial excavations at the Cornelia-Uitzoek type locality. *Navorsing van die Nasionale Museum Bloemfontein* 16 (6): 141 – 156.
33. Rossouw, L. 1996. The extraction of opal phytoliths from the fossilised teeth of two bovid species from Florisbad. *Navorsing van die Nasionale Museum Bloemfontein* 12(8): 165 - 175.
34. Prins, F. & Rossouw, L. 1992. Magico-religious interactions, dreams and ritual transformations: towards a better understanding of trance experience among the Khoi. *Southern African Field Archaeology* 1(1): 33 - 39.

Popular Articles

- Rossouw, L. 2022. The versatility of grasses: from major food sources to handy indicators of past environmental change. *Culna* 77
- Rossouw, L. 2022. Southern land beneath the sea. *Culna* 77
- Rossouw, L. 2020. Before Darwin: Lamarck's evolutionary concept of Acquired Characteristics. *Culna* 74
- Rossouw, L. 2007. Direct evidence of grass in the diet of Later Stone Age people. *Culna* 62.
- Rossouw, L. 2001. The extinct Giant Long-Horned Buffalo of Africa (*Pelorovis antiquus*). *Culna* 56

Technical Reports & Field Notes

- Rossouw, L. 2019. Identification of post-cranial elements in the White Rhinoceros, *Ceratotherium simum*. *Confidential Report prepared for the Directorate for Priority Crime Investigation, 60 Park Road, Tourism Centre, Willows, Bloemfontein*.
- Rossouw, L. 2000. New Late Pleistocene/Holocene fossil vertebrate localities and Stone Age surface sites along the Riet River around Koffiefontein, Free State. *Unpublished Report for the Palaeo-Anthropological Research Group, University of the Witwatersrand*
- Rossouw, L. (2004a). *Laetoli, Tanzania: Participation in palaeoanthropological fieldwork on the Eyasi Plateau, southern Serengeti* [Unpublished expedition fieldnotes]. FQRS-NM Bfn.
- Rossouw, L. 2000. Preliminary species list of Late Pleistocene / Holocene fossil vertebrate remains from erosional gullies along the Modder River NE of Sannaspos, Free State. Unpublished Report, Palaeo-Anthropological Research Group, University of the Witwatersrand.
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Die Universiteit van Stellenbosch

Hiermee word verklaar dat nademaal

LLOYD ROSSOUW

ten opsigte van die Honneurs-Baccalaureus-graadkursus
 in die Lettere en Wysbegeerte met

ARCHEOLOGIE

as studierigting, voldoen het aan al die vereistes soos
 neergelê in Wet Nr. 37 van 1959 en die Statuut en
 Regulasies van die Universiteit, die graad

Honneurs-Baccalaureus in die Lettere en
 Wysbegeerte (Hons.-B.A.)

10 DESEMBER 1991

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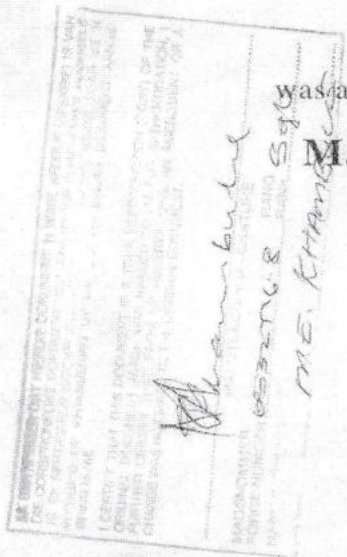
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Lloyd Rossouw

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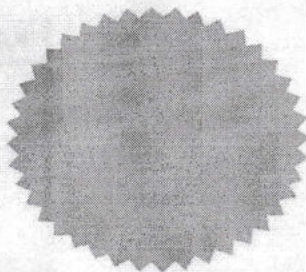
(with distinction)



Dean, Faculty of Science

Acting Vice-Chancellor and Principal

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THE APPLICATION OF FOSSIL GRASS-PHYTOLITH ANALYSIS IN THE
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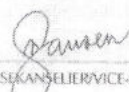
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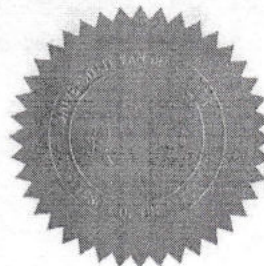
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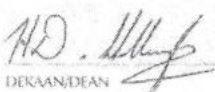
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THE ASSOCIATION OF SOUTHERN AFRICAN PROFESSIONAL ARCHAEOLOGISTS

CERTIFICATE OF MEMBERSHIP

HEREBY CONFIRMS THAT

LLOYD ROSSOUW

Is a Professional Member (No 0122) of
the Association of Southern African Professional
Archaeologists and is in good standing
with the organisation

Valid April 2025
March 2026



WOUTER FOURIE
CHAIRPERSON

SHAHZAADEE KHAN
TREASURER

APPENDIX 1: Synopsis of fieldwork experience

1989

Eastern Cape (Tsitsikamma Coast, Kouga LM), research excavations into the Middle Stone Age cave deposits at Klasies River Main Site, on the Indian Ocean cliff line ~25 km east of Humansdorp — a globally significant MSA sequence preserving some of the earliest anatomically modern human (*Homo sapiens*) remains, MSA I-II / Howiesons Poort assemblages, and rich shellfish, marine mammal and terrestrial faunal records spanning MIS 5–3 (Rossouw, 1989a).

Northern Cape (Kenhardt district, Khâi-Ma / Kai !Garib LM margin), research survey of Later Stone Age open-air occupation sites at Bitterputs, on the southern Bushmanland plain — characteristic Wilton-related microlithic assemblages, ostrich eggshell scatters and ephemeral hearth features associated with Holocene pan margins and ephemeral water sources (Rossouw, 1989b).

Southern / Western Cape (Mossel Bay – Cape Winelands corridor), Phase 1 archaeological impact study of coastal shell middens along the ~30 km Vlees Bay Mossas Pipeline footprint, on Holocene aeolianite and beach-rock substrates — middens typical of the southern Cape "Strandloper" Late Holocene LSA tradition, with mixed *Choromytilus*/*Patella* shellfish, lithic scatters and occasional ceramics (Rossouw, 1989c); and historical archaeology contracts at Sterhuis Veebos, Grabouw (Theewaterskloof LM), First National Bank, Stellenbosch, and 17 Van Ryneveld Street, Stellenbosch — VOC-period (late 17th – 18th century) Cape Dutch built-environment investigations (Rossouw, 1989d–f).

1990

Western Cape (Garden Route, Cederberg / Olifants River basin, Cape Winelands), coastal palaeoenvironmental research (vibra-coring of Holocene wetland sediments around Knysna lagoon and adjacent estuarine pans) targeting pollen, diatom and phytolith proxies of post-LGM sea-level and vegetation change; and rock art recording and rehabilitation expeditions at Kagga Kamma in the Ceres Karoo (~30 km NE of Ceres) and at Gifberg / Wiedouw west of Vanrhynsdorp, on Table Mountain Group sandstone shelters preserving fine-line San hunter-gatherer paintings (eland, therianthropes, geometric motifs) of likely mid- to Late Holocene age (Rossouw, 1990a–c); continuation of the First National Bank, Stellenbosch, historical archaeology contract; historical archaeology contract at Bien Donné Farmstead (est. 1762), Franschhoek (Cape Dutch werf complex on a French Huguenot land grant); and historical archaeology contract at Simondium (Rossouw, 1990d–f).

1991

Western Cape (Cederberg, Cape Winelands, Swartland), rock art recording and rehabilitation expeditions at Traveller's Rest, Clanwilliam (Olifants River valley, Table Mountain Group sandstone shelters with San fine-line paintings and finger-dot motifs) and at Banghoek, Piketberg (Rossouw, 1991a–b); historical archaeology contracts at Fredericksberg Farmstead (est. 1690 — among the earliest Huguenot-period werf complexes in the Drakenstein), Franschhoek; Boekenhoutskloof Farmstead (est. 1776), Franschhoek; and Bien Donné [Phase 2], Simondium (Rossouw, 1991c–e).

1992

Western Cape (Cape Winelands), historical archaeology contracts at Keerweder, Franschhoek; Zomerlust, Paarl (early Cape Dutch townhouse / outbuilding complex); Bien Donné [Phase 3], Simondium; and the Markötter Sports Ground Grave, Stellenbosch — historical burial investigation and exhumation under HWC / NHRA Section 36 protocols (Rossouw, 1992a–d).

1994

Free State (Mangaung Metro), research excavation of the Middle Stone Age living floor at Florisbad spring site (~45 km NW of Bloemfontein) on the Florisbad Pan margin — type locality of the Florisian Land Mammal Age and source of the ~260 ka archaic *Homo helmei* / early modern human cranium, with *in situ* preparation of fossil remains and the recording, plotting and cataloguing of associated MSA stone tools (points, scrapers, blades) and Florisian fossil mammals (Rossouw, 1994).

1995

Free State (Mangaung Metro, Xhariep DM), research excavations and recording at Boesmansfontein, Philippolis (Late Pleistocene carnivore lairs eroding from calcretised pan margins, with brown hyena / spotted hyena bone accumulations of taphonomic significance for MSA fauna interpretation) and continuation of the Florisbad MSA living-floor programme (Rossouw, 1995a, c).

Free State / Eastern margin (Phumelela LM), recording of vertebrate fossils eroding from Middle Pleistocene fossil-bearing strata at the Cornelia-Uitsoek type locality — a Cornelian Land Mammal Age type site on the upper Wilge River system associated with Acheulean (Earlier Stone Age) artefacts and an extinct large mammal fauna including *Megalotragus*, *Antidorcas bondi*, *Equus capensis* and *Pelorovis* (Rossouw, 1995b).

North West / Northern Cape margin (Lekwa-Teemane LM), excavation of early Holocene hyena lairs from diamond-bearing Vaal River gravels at Kareepan, Bloemhof, with associated Wilton-type LSA microlithics and a brown-hyena-accumulated faunal assemblage (Rossouw, 1995d).

Western Cape (Eden DM, Saldanha Bay LM), research survey and excavation of Late Pleistocene fossil localities in the Congo Valley foothills of the Swartberg Mountains, Oudtshoorn — karstic cave systems with MSA-associated faunas comparable to Boomplaas (Rossouw, 1995e); and Council for Geoscience-contract excavation, plotting, *in situ* preparation, analysis and cataloguing of vertebrate fossil remains from a species-rich terminal Pleistocene carnivore lair at Besaansklip, on the rocky promontory south of Saldanha Bay (Rossouw, 1995g).

Eastern Cape (Kouga LM), research survey of early Last Glacial archaeological localities and fossil vertebrate remains from eroded carnivore lairs at Oyster Bay, Cape St Francis, on Holocene Schelm Hoek Formation coastal dune barriers, with MSA / early LSA surface scatters and palaeo-shoreline shell middens (Rossouw, 1995f).

1996

Free State (Lejweleputswa, Mangaung Metro – Modder / Sand River system), PURE-affiliated research expeditions surveying and recording vertebrate fossil exposures and Stone Age archaeological surface sites exposed by extensive erosional gully systems on the Sand River and Doring River in the Virginia district — Florisian fossil mammals together with MSA / LSA lithic scatters eroding from Quaternary alluvial terraces (Rossouw, 1996a–b); and mapping, plotting and recovery of terminal Pleistocene fossil vertebrate remains and lithic artefacts from Modder River overbank sediments at Mitasrust, Sannaspos and Damvlei east of Bloemfontein, on the same Florisian / post-Florisian alluvial sequences that frame the Florisbad regional palaeoenvironmental record (Rossouw, 1996c–e).

1997

North West Province (Greater Taung LM), palaeontological and archaeological research survey at Taung and Equus Cave, on the Ghaap Plateau dolomite escarpment ~60 km north of Vryburg — Taung is the discovery site of the *Australopithecus africanus* "Taung Child" (Plio-Pleistocene tufa / breccia infill), while Equus Cave preserves a Late Pleistocene — Holocene faunal and LSA archaeological sequence (Rossouw, 1997a).

Free State (Lejweleputswa – Modder / Sand River system), continued PURE-affiliated survey and recording of vertebrate fossil exposures and Stone Age surface sites along the Sand River and Doring River erosional gully systems, Virginia district; and mapping and excavation of discrete localities at Erfkroon on the Modder River (~60 km SW of Florisbad) yielding MSA and LSA artefacts together with Florisian fossil vertebrates — a key open-air locality complementing the Florisbad type sequence (Rossouw, 1997b–d).

1998

Free State (Lejweleputswa, Phumelela LM), archaeological excavations into the fossil-bearing deposits of the Cornelia-Uitsoek type locality — Acheulean ESA artefacts in primary association with the Cornelian large-mammal fauna; and continued PURE-affiliated survey along the Sand River and Doring River erosional gully systems, Virginia district (Rossouw, 1998a–c).

Botswana (Central, North-East, Kgalegadi and Bobirwa Districts), regional reconnaissance expeditions mapping and recording Late Pleistocene fossil vertebrate remains and Stone Age archaeological localities along the Boteti River (~250 km between Maun and Tsoe, north-eastern Makgadikgadi) — palaeo-lake Makgadikgadi shorelines with associated MSA / LSA scatters; the northern Makgadikgadi pans at Makgwe Pan; the central Makgadikgadi at Ntwetwe Pan and Sowa Pan / Orapa (kimberlite-hosted palaeo-drainage and lacustrine sequences); the Tuli Block sandstone belt along the Motloutsi River (between Mmadinare and Pontdrif) and the Shashe River, with rock-art shelters and Iron Age occurrences; the southern Kalahari along the Molopo River (Metlojane to Tshabong); and a ~1,200 km eastern Kalahari traverse from Tshabong through Mabuasehube to Maun, on Kalahari Group aeolian sands mantling Karoo and basement substrates — recording surface MSA points and LSA microlithic scatters on pan margins and linear dune crests (Rossouw, 1998d–k).

1999

Free State (Thabo Mofutsanyana, Lejweleputswa, Xhariep DM), mapping and recording of Late Pleistocene fossil vertebrate remains and Stone Age archaeological localities along the Brakspruit and Venterspruit tributaries of the north-eastern Free State; mapping and recording of Late Pleistocene / Holocene fossil vertebrates and Stone Age surface sites along the Riet River in the Koffiefontein district — a region with well-documented Wilton LSA, Type R Iron Age stone-walled settlements and historic Griqua / Korana presence; and a high-resolution theodolite stratigraphic survey of the fossil-bearing Plio/Pleistocene river gravels exposed by the Virginia Railway Cutting on the northern bank of the Sand River, providing a reference section for ESA / MSA gravel-terrace archaeology of the central interior (Rossouw, 1999a, b, f).

Gauteng / North West margin (Sterkfontein Valley UNESCO World Heritage Site / Cradle of Humankind), research excavation, plotting and analysis of Late Pleistocene fossil vertebrate remains from the decalcified deposits outside Gladysvale Cave (Member 1–3 fossil-bearing sediments yielding *Australopithecus africanus*, *Paranthropus robustus* dental remains and a rich Plio-Pleistocene mammal fauna); and sorting and analysis of Australopithec-bearing breccia at Kromdraai (type locality of *Paranthropus robustus*) for fossil vertebrate identification (Rossouw, 1999c–d).

Mpumalanga / Free State margin (Dipaleseng / Lekwa LM), palaeontological survey of extensive erosional gullies along the Klip River near Platrand, Standerton — Karoo Supergroup (Beaufort Group) substrates with potential for *Lystrorhynchus*-zone vertebrate exposures (Rossouw, 1999e).
 Northern Cape (Frances Baard, Pixley ka Seme DM — Vaal-Orange confluence), archaeological and palaeontological survey of Stone Age localities and material along ~50 km of river banks and terraces between Warrenton and Douglas — classic Vaal River gravel terrace sequences with Earlier Stone Age (Victoria West / handaxe assemblages), MSA and LSA components, and diamond-bearing palaeo-drainage exposures (Rossouw, 1999g).

2000

Free State (Phumelela LM), extended archaeological and palaeontological research excavations into the fossil-bearing deposits of the Cornelia-Uitsoek type locality, refining the Acheulean ESA / Cornelian fauna stratigraphic association at the type site (Rossouw, 2000).

2001

Northern Cape (Siyanquma LM), Phase 1 archaeological survey for impact assessment at Margaux, Griekwastad — region with Griqua / 19th-century mission history overlying earlier LSA and Korana / Tswana presence (Rossouw, 2001).

2002

Free State (Mangaung Metro — Modder River basin), research monitoring of Quaternary overbank sediments for vertebrate fossil exposures and Stone Age archaeological surface sites along ~80 km of the Modder River between Sannaspos and Waterval east of Bloemfontein — extension of the regional Florisian / post-Florisian alluvial archive (Rossouw, 2002).

2003

Free State (Thabo Mofutsanyana DM), research survey and phytolith sampling of the grassy terraces on the north-western Korannaberg plateau at Merimetsi — sampling for C3/C4 grass discrimination and Holocene palaeoenvironmental reconstruction (Rossouw, 2003a).
 Northern Cape (Pixley ka Seme DM), Phase 1 archaeological impact assessment at the Skietbaan Railway Siding, Douglas, on Vaal River gravel terraces with potential ESA / MSA components (Rossouw, 2003b).

2004

Tanzania (Ngorongoro Conservation Area), participation in palaeoanthropological research fieldwork at Laetoli, on the Eyasi Plateau of the southern Serengeti — type locality of the ~3.66 Ma *Australopithecus afarensis* hominin trackways and Pliocene Laetoli Beds tuffs (Rossouw, 2004a).
 Free State (Thabo Mofutsanyana DM), dating, palaeoenvironmental sampling and archaeological excavation at the Sunnyside 1 MSA/LSA locality, Clarens (Clarens Formation cave shelter on the sandstone escarpment of the Maluti foothills, with a stratified MSA → LSA sequence and OSL chronology; subsequently published as Henderson, Scott, Rossouw & Jacobs, 2005); phytolith sampling at the Heelbo Holocene fossil vertebrate locality near Senekal; and Phase 1 archaeological impact assessment at Eensgevonden Driekuil (Rossouw, 2004b–d).

2005

Free State (Lejweleputswa, Mangaung Metro, Xhariep, Phumelela LM), palaeontological and archaeological research survey of pans in the Wesselsbron district — Quaternary pan-margin fossil and lithic exposures; phytolith sampling at the Erfkroon fossil exposures and archaeological horizons on the Modder River (MSA / LSA sequence in alluvial fines); archaeological excavation of vertebrate fossils and Early Stone Age (Acheulean) artefacts at the Middle Pleistocene Cornelia-Uitsoek type locality; Phase 1 archaeological impact assessment of a 10 km section of road P42/2 at Bethulie; Phase 1 archaeological impact assessment of an informal graveyard at Bergendal, Bloemfontein; and Phase 1 archaeological impact assessment of a section of road R702/R26 at Wepener (Rossouw, 2005a, c, d, e, f, h).
 Northern Cape (John Taolo Gaetsewe DM), phytolith research sampling at Excavations 1 and 6, Wonderwerk Cave, on the eastern Kuruman Hills dolomite escarpment — one of southern Africa's longest stratified cave sequences (Oldowan / Acheulean ESA through MSA, LSA and Iron Age, with associated palaeoenvironmental proxies) (Rossouw, 2005b).

North West Province (Maquassi Hills LM), Phase 1 archaeological impact assessment at Kareeboom, Wolmaransstad, on Highveld interior with potential LSA, Late Iron Age stone-walled settlement and historic farmstead components (Rossouw, 2005g).

2006

Free State (Phumelela, Lejweleputswa, Mofhaka LM), continued research investigation of the fossil-bearing deposits of the Cornelia-Uitsoek type locality (ESA / Cornelian fauna) and the Erfkroon fossil and archaeological locality on the Modder River (~60 km SW of Florisbad), refining the open-air MSA / Florisian alluvial archive; and Phase 1 archaeological impact assessment of the Lace Diamond Mine, Kroonstad (Rossouw, 2006a, b, f).
 North West Province (Ramotshere Moiloa, JB Marks LM), Phase 1 archaeological impact assessments at Broekmansfontein, Groot Marico and Drogpan, Ventersdorp, in regions with characteristic Late Iron Age Tswana stone-walled settlement landscapes and Anglo-Boer War features (Rossouw, 2006c–d).

Free State / KwaZulu-Natal border (Maluti-a-Phofung — uThukela DM), archaeological survey along the inter-provincial route between Metsimatho Dam and Rugged Glen Nature Reserve, across the Drakensberg foothills — terrain rich in San rock-art shelters in Clarens Formation sandstone overhangs and Late Iron Age / historic Basotho settlement features (Rossouw, 2006e).

2007

Limpopo (Waterberg DM), research excavation and phytolith sampling at the Late Pleistocene Wonderkrater spring locality, Naboomspruit, for palaeoenvironmental reconstruction — a reference sequence for MIS 3 — Holocene vegetation and climate, with associated MSA / LSA archaeology (Rossouw, 2007a).
 Free State (Lejweleputswa), continued mapping of the fossil-bearing Plio/Pleistocene river gravels exposed by the Virginia Railway Cutting on the northern bank of the Sand River — reference exposure for ESA / MSA gravel-terrace stratigraphy of the central interior (Rossouw, 2007b).

Free State (Mangaung Metro, Thaba Patshwa), Phase 1 archaeological impact assessments of the Somerton Graveyard, Bloemfontein, and at Thaba Patshwa (Rossouw, 2007e, i).
 Northern Cape (Siyanquma, Renosterberg, Karoo Hoogland LMs; Frances Baard DM margin), Phase 1 archaeological impact assessments of a section along the Orange River in the Hay District (riverine LSA, colonial trekboer features); of the Petrusville town lands; an archaeological survey of the ~135 km road between Williston and Sutherland (Karoo dolerite landscapes with ESA / MSA quarry sites and Bushmanland LSA occurrences); and an archaeological and palaeontological survey of Farm Kromellenboog near Christiana (Rossouw, 2007c, d, g, h).

Eastern Cape (Chris Hani DM), Phase 1 archaeological impact assessment of the Steynsburg town lands, on the western Karoo margin — region with Karoo Supergroup palaeontology, LSA / colonial frontier archaeology (Rossouw, 2007f).
 North West Province (JB Marks LM), Phase 1 archaeological impact assessment at Zwartplaats, Ventersdorp (Rossouw, 2007j).

2008

Western Cape (West Coast DM, Saldanha Bay LM), palaeontological research excavations into the Mio-Pliocene Varswater Formation phosphate sands at Langebaanweg West Coast Fossil Park — Africa's premier ~5 Ma terminal Miocene / early Pliocene vertebrate locality, with sabre-toothed cats, short-necked giraffes, three-toed horses and one of the richest fossil bird assemblages globally (Rossouw, 2008a).
 Free State (Lejweleputswa — Modder River basin), continued mapping of Stone Age artefacts (MSA points, LSA microliths) and Florisian fossil vertebrates at Erfkroon, refining the open-air alluvial reference sequence (Rossouw, 2008b).

2009

Northern Cape / North West margin (John Taolo Gaetsewe DM), research survey and sampling of modern hyena dens at Tswalu Game Reserve in the Korannaberg foothills, for taphonomic comparative reference — providing actualistic baselines for interpreting Late Pleistocene carnivore-accumulated bone assemblages (Rossouw, 2009a).
 Northern Cape (Namakwa DM), archaeological research survey of Pleistocene coastal dunes at Cliff Point, in collaboration with the University of Cape Town Department of Archaeology — targeting MSA / LSA coastal adaptations along the cool Benguela-influenced west coast (Rossouw, 2009b).

2010

Gauteng / North West border (Cradle of Humankind UNESCO World Heritage Site), phytolith research sampling of the Pliocene fossil-bearing deposits at the Malapa hominid site for palaeoenvironmental reconstruction — type locality (~1.98 Ma) of *Australopithecus sediba*, with phytolith data informing the local Plio-Pleistocene vegetation context (Rossouw, 2010a).

Free State (Thabo Mofutsanyana, Xhariep, Mangaung Metro), archaeological research survey of a portion of the Sterkfontein Dam Nature Reserve near Harrismit (Clarens Formation sandstone shelters with potential San rock art and LSA occupation); monitoring of Quaternary overbank sediments for vertebrate fossil exposures and Stone Age archaeological surface sites along the Riet River between Koffiefontein and Kalkfontein Dam (~70 km river reach on the Free State / Northern Cape border, with documented LSA, Type R settlements and Griqua / Korana presence); and survey of historical British military sites of the Anglo-Boer War (1899–1902) and its aftermath in Bloemfontein North — blockhouses, redoubts, concentration camp peripherals and Imperial cemetery features (Rossouw, 2010b–d).

Northern Cape (Umsobomvu LM), research mapping of Stone Age quarry / knapping sites in the Noupoort district, located along Karoo dolerite – sedimentary bedrock contact zones on the Stormberg / Karoo Supergroup margin — primary lithic raw-material extraction loci typical of central interior ESA / MSA quarry behaviour (Rossouw, 2010e).

Western Cape (Central Karoo DM), Phase 1 palaeontological survey of a proposed new subsurface water pipeline route at Beaufort West, on Permian Adelaide Subgroup substrates — strata noted for *Pristerognathus–Tropidostoma* Assemblage Zone therapsid fossils (Rossouw, 2010f).

2011

Free State (Lejweleputswa, Phumelela LM), continuation of the Florisbad Quaternary Research Department fieldwork programme — Erfkroon / Modder River mapping and excavation (MSA / LSA + Florisian fauna), ongoing field monitoring of the Cornelia-Uitzoek type locality (ESA Acheulean + Cornelian fauna), and modern reference sampling of central-interior game reserves and hyena den environments for taphonomic and phytolith comparative work (NM Bfn *Kwartverslae*, 2011); and Phase 1 HIA at Aqua Boerdery, Boshof, on Quaternary alluvium of the upper Modder catchment with potential for surface LSA scatters.

Eastern Cape (Tsitsikamma Coast – Kouga LM; Chris Hani & Amathole DM; OR Tambo DM), Phase 1 PIA / HIA surveys for the St Francis 66 kV Transmission Line (RedCap), traversing coastal MSA / LSA shell midden landscapes; BESC Borrow Pits across the Chris Hani and Amathole Districts, in Karoo Supergroup and Beaufort Group terrain with frontier-war historical features; isiXwiba Tsomo Pipeline and Qumanco Borrow Pit, crossing Late Iron Age / historic Xhosa settlement landscapes; AIA of the Xashimba Abattoir, Queenstown; and the BESC Oliver Tambo Borrow Pits x54 PIA on Mskaba / Natal Group sandstone and Karoo dolerite substrates.

North West Province (Ditsobotla LM), Phase 1 HIA for the Elizabeth 357 Township, Lichtenburg — region with Late Iron Age Tswana stone-walling and Anglo-Boer War heritage.

Northern Cape (Pixley ka Seme DM), Phase 1 AIA for the Moofontein Uranium prospecting footprint, on Karoo Supergroup substrates of the Bushmanland plain (Rossouw, 2011a–j).

2012

Free State (Lejweleputswa, Mangaung Metro, Thabo Mofutsanyana DM – Modder, Vet and Sand River basins), continued Erfkroon and Cornelia-Uitzoek research field seasons (MSA / ESA + Quaternary fauna), with phytolith and palaeoenvironmental sampling expeditions across the three river basins (NM Bfn *Kwartverslae*, 2012); Phase 1 HIAs for the TERRA Thabong Stormwater (Welkom), TERRA Botshabelo Solar, EKO Grootspuit Solar, EKO Portion 4 Bronkhorstfontein Solar, and the TERRA N5 Section 1 Kestell–Harrismith road corridor — the last skirting Clarens Formation sandstone country with documented San rock-art shelters.

Northern Cape (John Taolo Gaetsewe, Frances Baard, Pixley ka Seme DM), Phase 1 AIA / HIAs for the TERRA Hotazel R31 Borrow Pits x3 (Kalahari plain, surface LSA scatters); TERRA Heuningvlei Pipeline; TERRA Borrow Pits x6 Hotazel; TERRA Riverton Pipeline; MDA Strydenburg Pipeline (Quaternary calcrete and aeolian sand on Ghaap Plateau dolomite, with potential ESA / MSA on calcrete pavements); and CCS Cluster 6 Borrow Pit.

Eastern Cape (Sarah Baartman, Buffalo City, Amathole DM), Phase 1 PIA for the TERRA Little Mooi River Weir; CES KOS to Alexandria Bulk Water; CES Port Alfred Bulk Water Abstraction (coastal Holocene middens and Khoekhoe / Strandloper traces); CSS Harbour View, East London; isiXwiba Ripplemead; and isiXwiba Killarney Dam.

Free State / Mining Belt (Matjhabeng LM), EKO Vogelsrand Quarry & Crusher HIA, in Witwatersrand Supergroup gold-mining landscape with associated 20th-century industrial heritage (Rossouw, 2012a–r).

2013

Free State (Mangaung Metro, Xhariep, Lejweleputswa, Thabo Mofutsanyana DM), continued Florisbad / Erfkroon / Cornelia research field seasons with phytolith sampling at selected Holocene fossil exposures (NM Bfn *Kwartverslae*, 2013); Phase 1 HIAs / PIA for the SRK Trompsburg N1 Section 14 (Karoo Supergroup substrates with potential therapsid fauna); EKO Sydenham 445 Borrow Pit; TERRA N5 Tom Schutte Bridge; SS Winburg Cemetery; SS Theunissen Cemetery (two parcels); NSVT Roodewal; NSVT Rouxville Bulk Water Pipeline; EKO Tafelkop Quarry; PHETHOGO Homestead Township (two parcels); MDA Verkyerskop AIA, Phumelela LM (Anglo-Boer War battlefield landscape); EKO Rouxville–Aliwal Borrow Pit; and the CSIR Dealesville Mainstream Solar x12 PV palaeontological assessment.

Eastern Cape (Amathole, Sarah Baartman, OR Tambo DM), EKO Koonap Quarry HIA; CCS Willowvale–Dwesa Borrow Pits PIA (Wild Coast, Late Iron Age / historic Xhosa landscape); MDA Phase 1 HIA Farm Bosduifkloof 522; CCS Phase 1 PIA Farm 559, East London; ZITHATHILE Phase 1 HIA Zithathele Quarry; SAVANNAH Blackwood and Boundary Solar desktop PIA; and the PPC Disco Chicks PIA, Kirkwood (Sundays River Formation Cretaceous fossil substrates).

Northern Cape (John Taolo Gaetsewe, Pixley ka Seme DM), TERRA Bankara Borrow Pit, Kuruman HIA (Ghaap Plateau dolomite, with documented LSA and Korana / Tswana heritage); TERRA Hotazel–Tsineng Graves Letter of Recommendation (NHRA Section 36 graves protocol); TERRA Dithakong Road HIA — passing close to the historically significant Battle of Dithakong (1823) landscape; SS Morago Pipeline PIA; MDA Blaauwskop HIA; and the DIACOR Prieska HIA across the Remainder & Portions 1–4 of Farm 23, Kliphuis 29 and Engelde Wildeboom 22 (commenced September 2013) on Orange River terrace and Kalahari plain.

National coastal logistics corridor, CSIR Transnet Marine Infrastructure DEIAR — Chapter 12 Heritage Assessment, covering port and rail-linked facilities along the South African coastline with associated shipwreck, harbour, lighthouse and coastal midden heritage (Rossouw, 2013a–z).

2014

Free State (Mafube, Phumelela, Tswelopele, Setsoto, Mantsopa, Mafube LMs, Mangaung Metro), continued Florisbad / Erfkroon / Cornelia research field seasons and central-interior reference sampling (NM Bfn *Kwartverslae*, 2014); the NSVT Free State Township Development series at Frankfort, Tweeling, Cornelia and Villiers — central interior with Late Iron Age Tswana stone-walled settlements and Anglo-Boer War landscape; PHETHOGO Township Development HIAs at Vrede, Memel, Bultfontein Phahameng, Warden and Paul Roux; MDA Wesselsheim, Bethlehem HIA; MDA Lennertsville Cemetery AIA (NHRA Section 36); TERRA Harrismith N5–R712 AIA; NSVT Koffiefontein SWS PIA; TRAKONE Petrus Hennenman AIA; and the ENVIRO Nalisview Cemetery combined HIA on Farm Nalisview 2835 near Bloemfontein — the last recording three historical structures (dated ~1913–1940), a series of large circular stone mounds (likely Late Iron Age / early historic Sotho-Tswana kraal features), and one modern building.

Northern Cape (Pixley ka Seme, Frances Baard DM), MDA Hopetown Extraction Point HIA (Vaal River gravel terraces, ESA / MSA); TERRA Prieska Fairview Residential AIA; and RALPH MABULO AIA on a portion of Barkly West Commonage 687 — within the historic Griqua / Korana diamond-fields landscape.

North West Province (Matlosana LM), EKO Van Niekerks Rust Sand Mine; EKO Spytfontein Quarry; DERA Goedvoorzicht AIA; DERA Rhenosterspruit 326 AIA; and the ENVIRO Mahikeng Curro School HIA — region with Late Iron Age Tswana stone-walled towns (e.g. Kaditshwene complex) and Anglo-Boer War heritage.

Eastern Cape (Amathole, Joe Gqabi, Chris Hani DM), CCS Masimini–Madonisi Borrow Pits x4 PIA; ARCHEOMAPS Phase 1 PIA Calypso Heights, East London; EKO Indwe Quarry AIA; EKO Camden Shooting Range AIA; CCS KeiGate East London Phase 1 PIA; and EKO Sterkspruit WWTW & Lines HIA — frontier-war and 19th-century mission-station heritage.

Renewable-energy / hydroelectric series and Lesotho cross-border work, ENVIRO Rooikat Hydroelectric PIA and three iterations of the ENVIRO Meerkat Hydroelectric PIA; and the ENVIRO Maseru Truckstop combined PIA & HIA (Lesotho lowlands, Karoo Supergroup substrates with regional Sotho heritage) (Rossouw, 2014a–af).

2015

Free State (Mangaung Metro, Lejweleputswa DM), continued Florisbad and Erfkroon research field seasons (MSA / LSA + Florisian fauna) with ongoing phytolith reference sampling (NM Bfn *Kwartverslae*, 2015); the Rusfontein Dam WTW combined HIA; and the Q435 MvW Phase 1 PIA on Plaas Onderverdeling 5, Avenham Nr. 2187.

Northern Cape (John Taolo Gaetsewe, Namakwa DM), EKO Hotazel Witloop & Vlermuislaagte Power Lines HIA — two new power-line sections south of Hotazel between Hotazel and Kathu on aeolian sand and calcrete substrates of the Kalahari plain, with potential for surface LSA Wilton microlithic scatters; and the 291888 Aggeneys ENDEMIC Black Mountain – Aggeneys 56 Big Syncline HIA, a 25 ha pristine exploration drilling footprint ~3 km NW of Aggeneys on Bushmanland Group gneisses of the Namaqua–Natal Metamorphic Complex, Khâi-Ma LM — area associated with Bushmanland LSA hunter-gatherer occupation and Nama / !Khomani heritage (Rossouw, 2015a–d).

2016

Free State, Northern Cape & Eastern Cape interior, final NM Bfn Florisbad / Erfkroon / Cornelia field seasons during the transitional year prior to full-time consultancy (NM Bfn *Kwartverslae*, 2016); and a Phase 1 HIA / PIA portfolio on infrastructure, agricultural and mining footprints — including continuing assignments for EKO, TERRA, NSVT, MDA, ENVIRO and Greenbox client portfolios across the three provinces, sampling a representative range of Karoo Supergroup, Witwatersrand Supergroup, Vaal River gravel and Kalahari Group substrates and their associated ESA / MSA / LSA, Iron Age and historic heritage signatures (Rossouw, 2016a–n).

2017

Free State (Xhariep DM), closing field season of the NM Bfn quarterly research programme (final entries in *Evaluering Kwartverslae Personeel*, 2017); and the Q527 PGS Tetra4 Cluster 1 PIA, Gariep, on Karoo Supergroup substrates of the Adelaide Subgroup — relevant to the *Tropidostoma–Cistecephalus* Assemblage Zone therapsid record.

Northern Cape (John Taolo Gaetsewe DM), EKO Hotazel Witloop & Vlermuislaagte Powerlines (re-issue), Kalahari plain.

Free State and Northern Cape interior, continuing portfolio of HIAs and PIA across the central interior, sampling Karoo and Kalahari heritage substrates (Rossouw, 2017a–n).

2018

Free State, Northern Cape and Eastern Cape interior, Phase 1 HIA / PIA portfolio across the central and eastern Karoo — on Adelaide and Tarkastad Subgroup substrates with associated Karoo therapsid palaeontology, ESA / MSA quarry sites near dolerite contacts, and surface LSA Wilton scatters — with project register and invoicing schedule consolidated in the running quotation workbook (Rossouw, 2018a–n).

2019

Northern Cape (John Taolo Gaetsewe, Frances Baard, ZF Mgcawu DM), field-based PIAs for the PGS Kolomela A1a & Kalkfontein Powerlines (Kumba Iron Ore's Kolomela operations, on Ghaap Plateau dolomite and Banded Iron Formation substrates — bedrock of the Transvaal Supergroup with associated ESA quarry potential); the Q868 GBOX Dithakong Borrow Pits x5 (BP 8–12) HIA — near the documented Battle of Dithakong (1823) historical landscape; the Q872 ECOCON Olifantshoek Township Development HIA; and the Q883 EMG Reivilo HIA.

Gauteng / West Rand (Mogale City LM), Q870 GBOX 500 ha Development Area HIA, Krugersdorp, on Witwatersrand Supergroup substrates within the broader Cradle of Humankind / Sterkfontein Valley sensitivity envelope.

Mpumalanga (Emakhazeni LM, Nkangala DM), Q871 GBOX Farm Vlakfontein HIA, Dullstroom, on Karoo Supergroup substrates of the eastern Highveld escarpment — region with documented Late Iron Age Bokoni stone-walled agricultural terrace landscapes (Rossouw, 2019a–f).

2020

Free State, Northern Cape and Mpumalanga, Phase 1 HIA / PIA surveys for infrastructure, solar and township developments during the COVID-19-constrained field season — including assessment of Karoo Supergroup palaeontological sensitivity, surface LSA and Late Iron Age stone-walled features and historic farm-complex heritage, with desktop and site-visit components carried out under prevailing pandemic protocols (Rossouw, 2020a–n).

2021

Free State (Xhariep, Lejweleputswa, Thabo Mofutsanyana DM), GBOX Bethulie Solar PIA; the 2825 DB Dealesville EMG Good Hope Solar PV HIA; the 2829 AC Harrismith EMATRIX Intabazwe Pipeline HIA; the 2829 AC Harrismith & 2828 BD Korfskop EMATRIX Tshame Pipeline HIA; and the 2829 AC Harrismith EMATRIX Bergsig Residential Development HIA — last three in Clarens / Elliot Formation sandstone country with potential San rock-art shelters and Anglo-Boer War heritage.

Northern Cape (Pixley ka Seme DM), 2923 DB Rooddam DSA Phase 1 HIA for the Naauwtes Fontein Pivots, Hopetown, on Quaternary calcretes mantling Karoo Supergroup substrates of the Orange River basin, near the Vaal-Orange ESA / MSA gravel-terrace archive.

Western Cape (Central Karoo DM, Beaufort West LM), Palaeontological Impact Statement for the Ishwati Emoyeni WEP Amendment — addition of 33 turbines to the previously authorised 80-turbine Ishwati Emoyeni Wind Energy Facility near Murraysburg, on Permian Adelaide Subgroup substrates with documented *Pristerognathus* – *Trapidozoma* Assemblage Zone therapsid fossils (SAHRA Case No. 130611TS10) (Rossouw, 2021a–g).

2022

Northern Cape (Pixley ka Seme, Frances Baard DM), GBOX Phase 1 HIA Bottomland Solar Facility & associated electricity, water and road network for the Prieska Energy Hub (BIF / haematite / crocidolite / chert bedrock of the Asbestos Hills Subgroup, capped by Tertiary calcretes and Quaternary aeolian and alluvial cover — substrates with elevated ESA / MSA raw-material potential); GBOX Phase 1 HIA 170 MW Townlands Solar 1 Development, Prieska (400 ha solar footprint + substation + 760 m access road + 6.6 km x ~50 m 132 kV powerline corridor, on aeolian sand, polymict gravels and localised BIF-capping limestones); ENVIRONAMICS Phase 1 PIA Droogfontein PV Footprints D4 + Alt (615 ha) and D5 + Alt (1,000 ha) near Kimberley (Vaal River gravel terrace catchment, ESA / MSA potential); and the EXM Phase 1 PIA Macarthy-Zama Mining Right Application on Macarthy Farm (~775 ha).

Mpumalanga (Nkomazi LM, Ehlanzeni DM), ENVIRONAMICS Phase 1 PIA Gas-to-Power Project, Komatipoort — comprising the Marathon Substation expansion, Komatipoort Substation B, a 100 km x 400 kV Gumeni-Marathon line, three 115 km x 400 kV Marathon-Komatipoort B lines, and a 5 km x 275 kV Komatipoort B-Komatipoort line on Lebombo / Karoo basalt substrates — within the regional Late Iron Age and historic Tsonga / Swazi settlement landscape.

Western Cape (Saldanha Bay LM, Central Karoo DM), GBERG Phase 1 PIA for the residential development on Erf 325 & 1475, Jakobsbaai, on Cape Supergroup substrates of the West Coast — area with documented coastal MSA and Holocene shell midden heritage; and the 3223BC Kunna EMG Phase 1 HIA for an agricultural development (two orchards + two irrigation pivots), Farm Harmonie 140/RE, Murraysburg, on Adelaide Subgroup substrates.

Free State (Matjhabeng LM, Lejweleputswa DM), ERM Phase 1 PIA Grootspuit II 300 MW PV Solar Facility on parts of Welverdrup 67, Langverwacht 281 and Schotland Noord 178, Odendaalsrus — Witwatersrand Supergroup mining belt landscape.

Northern Cape / Western Cape (Kai IGarib – Matzikama LMs), AECOM Phase 1 PIA for the 2 x 765 kV Powerlines between Juno and Aries Substations (~350 km, Kenhardt to Vredendal), traversing Bushmanland and Knersvlakte plains — long linear corridor crossing diverse LSA / Bushmanland hunter-gatherer and Khoekhoe pastoralist heritage.

North West Province (Moses Kotane LM, Bojanala Platinum DM), AG Phase 1 HIA for the Mogwase 7.5 km Outflow — within the broader Pilanesberg / BaKgatla-ba-Kgafela cultural landscape.

Eastern Cape (Kouga LM, Sarah Baartman DM), Exigent Phase 1 HIA Oyster Village Project, Farm Goed Geloof 745, St Francis Bay (re-issue), on Holocene Schelm Hoek Formation coastal dune barriers with potential MSA / LSA shell midden heritage (Rossouw, 2022a–k).

2023

Free State (Mangaung, Lejweleputswa, Fezile Dabi, Thabo Mofutsanyana DM), Phase 1 PIA, HIA & Heritage Compliance Statement field surveys for residential, agro-industrial, infrastructure and waste developments — sampling Karoo Supergroup, Vaal / Modder / Wilge alluvial and Clarens Formation substrates with their associated palaeontological, LSA / Iron Age and Anglo-Boer War heritage — comprising the PIA & HIA New 38 ha Residential & Commercial Development, R64 Bainsvlei, Bloemfontein; HIA Bulk Sewer Line Connection to the Municipal Network, Thaba Nchu Cluster Schools (within the historic BaRolong / Methodist mission landscape); HIA Martindale Incinerator, Bloemfontein; HIA Kestell WWTW; HCS Wolwehoek Compost, Sasolburg; HCS Blokhuis Composting, Harrismith; HCS Reitz Milling Plant; HIA Qibing Filling Station, Wepener; HCS Usherwood Chicken Houses, Bloemfontein; HIA Township Establishment on Plot 5 Midway Small Holdings, Bloemfontein; HIA Phambili Estoire-type residential subdivisions; and two assessments at HIA Resort Development, Farm Beginsel, Fouriesburg (~15 ha) (initial and expanded scopes) — in Clarens Formation sandstone country with documented San rock-art shelters.

Northern Cape (Frances Baard, ZF Mgcawu, John Taolo Gaetsewe DM), combined PIA / HIA & HCS field investigations for the HCS Phase 1 HIA Owendale Township Development (manganese fields landscape); HCS 4.5 ha Hotel Development, Hotazel; and the HIA Jannic Boerdery Landbou Ontwikkeling (~52 ha), Kimberley (Vaal River gravel terrace context).

North West Province (Dr Ruth Segomotsi Mompati, Bojanala Platinum DM), Phase 1 HIA & PIA field surveys for the HIA Bloemhof Shopping Center (~7 ha); HIA Schweizer Reneke Reservoir; and the HIA Mogwase 7.5 km Outflow (the latter spanning the December 2022 – February 2023 field season, within the BaKgatla cultural landscape).

Limpopo (Mopani DM), Phase 1 HIA field investigation for the Residential & Cemetery Development (~25 ha residential + 100-grave cemetery), Tzaneen — within the broader Tsonga / Northern Sotho settlement landscape.

KwaZulu-Natal (Newcastle LM, Amajuba DM), Heritage Compliance Statement for the HIA New Fair International Poultry Abattoir, Newcastle — within Anglo-Boer War, Anglo-Zulu War and colliery industrial heritage.

Eastern Cape (Buffalo City Metro, Sarah Baartman & Dr Beyers Naudé DM), Phase 1 HIA field investigations comprising the HIA Rem 813 East London Mixed-Use Development (~35 ha); HIA 66 kV Overhead Power Line Options x2, Queenstown; HIA Filling Station N2 Papiesfontein, near Gqeberha; HIA New Filling Station, Graaff-Reinet (within 18th–19th-century frontier town heritage); and the HIA Oyster Village Project, Portion 247 Erf 745, Farm Goed Geloof 745, St Francis Bay (~28 ha) on Holocene Schelm Hoek Formation coastal dune barriers with potential MSA / LSA shell midden heritage.

Western Cape (Central Karoo DM), Phase 1 HIA fieldwork on Permian Adelaide Subgroup (Teekloof and Balfour Formation) substrates — *Cistecephalus* / *Dicynodon* Assemblage Zone therapsid sensitivity — comprising the HIA Mordant Solar PV Facility (~3,500 ha) near Three Sisters; the HIA Murraysburg Wind Turbine Tower Manufacturing Facility (~13 ha); and the HIA Wilge WWTW & Associated Sewer Pump Stations – Letter of Exemption.

2024

Free State (Mangaung, Lejweleputswa, Fezile Dabi, Thabo Mofutsanyana DM), Phase 1 PIA / HIA and Heritage Compliance Statement field surveys for township, agro-industrial, infrastructure and renewable-energy developments — sampling Karoo Supergroup palaeontological substrates, Vals / Modder / Wilge alluvial archives and Clarens Formation sandstone country — comprising the HIA & PIA Mabele Emoyeni Wind Energy Project (~30,900 ha between Ventersburg, Kroonstad, Steynrus and Senekal); HIA Bellevue 51 Truckstop, Winburg (Anglo-Boer War battlefield context); HIA Morago Borrow Pit; HIA Welgegund Borrow Pit, Excelsior; HIA Ficksburg WWTW; the two large Enviromatrix borrow-pit / quarry packages — HIA 9x Quarries Central and Eastern Free State (Package 1: A1, A2, A3, A5, A7, A8, A9, A10, A13) and HIA 9x Quarries Central and Southern Free State (Package 2: B1, B2, B3, B4, B5, B8, B9, B10, B13); PIA Frankfort Township Establishment, Mafube LM; HIA Frankfort Township Development, Farm Aberdeen 530; HIA Selosha 3/900 Township Development (~290 ha) within the BaRolong cultural landscape; HIA Reddersburg Township Establishment; HIA Truckstop Development, Klein Smaldeel, Parys; HIA Memel Township Establishment; HCS Qwa Qwa Petrol Station; HIA Villiers Township Establishment; HIA Trompsburg Township Development Expansion (~43 ha); HCS Lefika Crusher Expansion, Bethlehem; HIA Kroonstad Holiday Resort (~18 ha); PIA Grootvlei Hatchery Expansion, Kroonstad (left bank Vals River alluvium, with potential surface LSA scatters and reworked Quaternary fauna); PIA & HIA Old Mill Drift Agri-Estate, Portion 1 Beginsel 346, Fouriesburg (Clarens Formation sandstone shelters); and the PIA Fuel Depot Expansion, Kroonstad – Letter of Exemption.

Northern Cape (Frances Baard, ZF Mgcawu & John Taolo Gaetsewe DM), Phase 1 PIA & HIA field surveys for the HIA Platfontein Real Estate Development (~50 ha), Kimberley — area with documented !Xun and Khwe community heritage; HIA New Truckstop Development, RE Erf 1 & 10 Postmasburg (manganese mining and historic Griqua context); and the HIA Phambili Township Development, Letsemeng LM, Jacobsdal.

Western Cape (Hessequa LM), Phase 1 HIA & Heritage Compliance Statement for the HIA Eco-Estate, Portion 22 Farm Zwart Jongers Fontein 489, Jongensfontein — coastal landscape with MSA / LSA shell midden potential.

North West Province (Greater Taung & Dr Ruth Segomotsi Mompati DM), Palaeontological Impact Statement for the Prospecting Application on Farm Kareefontein 340, Bloemhof (Vaal River gravel terrace setting); and combined HIA field survey for the pipeline through the Harts River, Schweizer Reneke — within the BaThaping cultural and 19th-century colonial frontier landscape.

Limpopo (Sekhukhune DM), Phase 1 HIA field investigation for the HIA Burgersfort Township Development — within BaPedi heritage landscape.
 Eastern Cape (Inxuba Yethemba LM, Chris Hani DM), Phase 1 PIA & HIA field assessments on the western Karoo margin for the PIA & HIA Kwanonzame Township Development (~188 ha), Middelburg (palaeontologically insignificant igneous rock intruding Adelaide Subgroup sandstone and mudstone) and the PIA & HIA Midros Township Development, Middelburg — within 19th-century frontier-war and colonial settlement heritage.

2025

Free State (Mangaung, Lejweleputswa, Fezile Dabi, Thabo Mofutsanyana DM), combined Phase 1 palaeontological and archaeological field surveys and impact assessments for residential, agro-industrial, infrastructure and renewable-energy developments — across Karoo Supergroup palaeontological sensitivity, alluvial and Clarens Formation substrates — including the HIA Proposed Industrial Development, Farm Ribblesdale 1506 near Bloemfontein; PIA & HIA Plots 9 & 12 Lilyvale, Bloemfontein (MDA); HIA Expansion of existing Cattle Feedlot, Farm Witfontein 398 near Parys; HIA Proposed Feed Mill, Farm Goedeheop 1188 near Vrededorp (within the Vrededorp Dome UNESCO World Heritage Site environs); HIA Proposed cemetery, Farm Kameeldoon 35, Hoopstad; HIA Proposed cemetery, Farm Wesselsrust 451, Bultfontein; PIA & HIA Diesel Depot & Truck Stop, Bothaville; PIA & HIA Bluegum Bush Filling Station, Phuthaditjhaba; PIA & HIA Ladybrand WWTW (Clarens Formation sandstone country with documented San rock-art shelters); Desktop HIA & PIA Manyatseng Bulk Outfall Sewer Upgrade, Ladybrand (Mantsopa LM); PIA & HIA Welbedacht WWTW (Welbedacht DM); PIA & HIA New Cemetery Development, Philippolis; PIA & HIA 2x Cemetery Expansions, Fouriesburg; PIA & HIA TS Development, Portion 5 Helena 213, Slabberts; PIA & HIA TS Development Atbara 1752, Bethlehem; PIA & HIA Bethlehem WWTW; PIA & HIA Farm 3/1880 Randfontein Solar PV, Harrismith; and the PIA & HIA Inversion Flight Academy, Portion 12 Poortje 389, Heidelberg.

Northern Cape (Frances Baard, Sol Plaatje, Pixley ka Seme, Kareeberg, John Taolo Gaetsewe, ZF Mgcawu & Namakwa DM), extensive Phase 1 PIA / HIA field investigations along the Vaal-Orange River corridor and Karoo interior — sampling Ghaap Plateau dolomite, Vaal / Orange gravel terraces and Kalahari plain heritage substrates — comprising the HIA Bulk Water Supply Pipeline between Riverton and Kimberley (Sol Plaatje LM); HIA MBSC Section 1 Bulk Water Pipeline Riverton-Midstation; HIA New Truckstop Facility at Modder River; HIA Proposed Sewer Pipeline & WWTW, Postmasburg; HIA Koelkop Reservoir Water Pipeline, Carnarvon (Kareeberg LM); the 2723AD Kuruman HIA Batharos RDP Internal Roads (~4.5 km gravel road & 250 m Kuruman River culvert-bridge), Batharos Ba Ga Motlware — including a small cemetery north of the river and four graves east of Section E-F (NHRA Section 36 graves protocol); PIA & HIA Prieska Mall Development (14.5 ha); 2821DD Groblershoop Heritage Impact Statement, Orange River Solar PV Facility internal roads, batching plant & crusher sites (ZF Mgcawu DM, on Orange River terrace ESA / MSA substrates); PIA & HIA Kathu Waste Handling Facility (~95 ha, John Taolo Gaetsewe — close to the Kathu Pan ESA / MSA archaeological landscape); PIA & HIA Screening, BVI DKM Solar Facility, Klip Kraal 451, Upington (~1,250 ha); Groblershoop ORSF Substation PIA & HIA; HIA Four new borrow-pit sites along the N14 Section 3 between Kakamas and the Orange River Bridge; and the PIA & HIA Pella, Melkbosrand & Sending WWTW (Khâi-Ma LM — Bushmanland LSA and Nama heritage).

Western Cape (Prince Albert LM, Central Karoo DM), Phase 1 PIA field investigation for the Bulk Water Storage Facility (~3 ha, ~50,000 m³ / ~15 m deep excavation), Prince Albert, on Karoo Supergroup substrates (Beaufort Group therspsid sensitivity).

North West Province (JB Marks LM, Dr Kenneth Kaunda DM), combined PIA & HIA fieldwork for the Jouberton and Alabama Phase 2 Outfall Sewer Upgrade, Klerksdorp; and the PIA & HIA Makwasi Road Upgrade (D1954 / D158 / D565 / D156, ~40 km linear footprint) — across Witwatersrand Supergroup gold-mining and Late Iron Age Tswana stone-walled settlement landscape.

Limpopo (Capricorn DM), Phase 1 HIA field survey for the Proposed Moringa Tree cultivation area at Ga-Raditshaba — within Northern Sotho heritage landscape.

Gauteng / West Rand (Rand West City LM), Phase 1 HIA & PIA field survey of the Cooke 4 Ezulwini mine footprint (~1,600 ha), Westonaria, on Witwatersrand Supergroup substrates within the Cradle of Humankind / West Rand mining heritage envelope.

Mpumalanga (Gert Sibande DM), Phase 1 HIA & PIA fieldwork for the Lekwa Solar PV Facility (~258 ha, three sections on one land portion), Standerton; and combined PIA & HIA assessments for the Tutuka Solar PV Powerline (~1,500 ha) and Majuba Solar PV Powerline (~2,000 ha) grid-connection corridors — across Karoo Supergroup substrates with Anglo-Boer War battlefield heritage and historic farmstead complexes.

2026

Free State (Lejweleputswa, Mangaung, Fezile Dabi, Thabo Mofutsanyana DM), combined Phase 1 palaeontological and archaeological field surveys for residential, infrastructure and agro-industrial developments — across Karoo Supergroup, Vals / Modder / Wilge alluvial and Vrededorp Dome environs — including the 2726DD Riebeeckstad Desktop PIA — 7 ha Residential Development, Constantia Str Thabong; 2926AA Bloemfontein PIA Chicken Broiler De Hoop 230, Bloemfontein; 2926DD Welbedacht PIA Pre-treatment Sedimentation Tanks, Welbedacht WTW; 2727CA Kroonstad PIA Maokeng 880 m Smaldeel Road Upgrade; 2926AA Bloemfontein HIA Mangaung Metropolitan Northern Bulk Distribution Pipeline; 2926AB Maselsspoort PIA Bloemspruit Plots; 2926AA Bloemfontein HIA Ribblesdale Industrial Development; 2728AB Vanheenskoop HIA Wilgedraai 1159 Cattle Feedlot, Frankfort (Mafube LM); 2828CB Clarens HIA Old Mill Agri-Estate, Farm Beginsel 346, Fouriesburg (Clarens Formation sandstone country, San rock-art sensitivity); 2628CC Deneyville PIA & HIA Brakpan 700 & Vaaldam Settlement 1777 Feedlot s24G Rectification (Vaal Dam catchment, with potential reworked Vaal River gravel ESA / MSA archaeology); MDA PIA & HIA Residential Development, Farm Zuurfontein 2022, Bloemfontein; MDA PIA & HIA Philippolis WWTW (within the historic Griqua capital landscape); LEFATSE PIA & HIA Expansion of Chicken Houses, Farm Hamelfontein 169RE, Trompsburg; EMATRIX 21.2 km N8 Ring Road around Bloemfontein; NSVT Heritage Compliance Statement — Farm Georgina 2150 Cemetery Subdivision; NSVT PIA & HIA Filling Station, Farm Isaaks Hoop A 590, Petrusburg; PIA & HIA Constantia St Electrification, Welkom; and the 3026CB Goedemoed PIA Brandfontein 36 Feedlot Expansion on the southern Free State / Eastern Cape margin.

Mantsopa & Setsoto LM, eastern Free State, palaeontological / archaeological survey, recording and impact assessment for the 2927AB Ladybrand PIA Manyatseng Bulk Outfall Sewer — Karoo Supergroup substrates within Clarens Formation sandstone country with documented San rock-art shelters and Late Iron Age / Sotho heritage.

Lejweleputswa DM (Mashiane Family Graveyard, Virginia Solar Park development footprint), NHRA-aligned heritage impact assessment and heritage management plan for an *in situ* family burial ground within the development footprint (graveyard heritage under NHRA Section 36 and the Removal of Graves and Dead Bodies Ordinance), with associated buffer recommendations and chance-find protocols.

Northern Cape (Kareeberg, Pixley ka Seme, Frances Baard, Siyathemba, Dawid Kruiper, Khâi-Ma & Tsantsabane LMs), extensive Phase 1 PIA / HIA field investigations along the lower Orange River corridor and Karoo interior — sampling Ghaap Plateau dolomite, Vaal-Orange gravel terraces, Kalahari plain and Bushmanland heritage substrates — comprising the 2824BB Warrenton PIA Warrenton WWTW & Bulk Water Reticulation; 2824BA Majeng PIA & HIA Majeng Village Electrification (Kalahari Group aeolian sands mantling pedogenic calcretes, with surface LSA scatter potential); 2824DD Beaconsfield HIA Bulk Water Pipeline MBSC6 Section 3A Midstation-Galeshewe, Kimberley (within the historic Kimberley diamond-fields landscape); 2823AC Postmasburg HIA Proposed Sewer Pipeline & WWTW Facility; 2723AD Kuruman HIA Batharos RDP Internal Road Upgrade — Revised Alignment (including a structured Public Participation Process and site visit on 17 March 2026 following a SAHRA cease-works order related to unmarked graves; an ESA unifacial flake was recorded ~90 m west of the impact corridor, consistent with the wider Kathu Pan ESA landscape); Archaeological Monitoring Report — one-week construction monitoring near grave sites, Batharos Road (Project 391); 3022CC Carnarvon HIA New Sewer Pipeline WWTW to Carnarvon (Kareeberg LM); 2922DB Prieska Oos PIA Tweefontein 373 & Kalkfontein 374 Pivots; 2922DB Prieska Oos PIA & AIA Uitdraai Nursery & Pistachio Processing Plant; 2922DB Prieska Oos PIA & AIA Erf 1 & Erf 971 Pecan Orchard & Pivot Development; 2922DB Prieska Oos HIA Bloukrans, Goue Akker & Monterey (Muis Hoek 34) s24G Rectification of centre-pivot cultivation on the left bank of the Orange River (with potential reworked Orange River terrace ESA / MSA archaeology); 2922DD Redlands HIA Doringberg PV, Prieska; 2821CA Kanoneiland PIA Olyvenhouts Drift Raisins s24G Rectification; 2620DD Askham HIA Cemetery Expansion (Dawid Kruiper LM — !Khomani San heritage); 2821AD Upington East HIA Cemetery Expansion near Louisvale Road, Upington (Dawid Kruiper LM); NSVT PIA & HIA Cemetery 316 ha Footprint, Farm Vooruitzicht 81 KBY; ENDEMIC HIA & PIA Epang Uranium Projects PRA_1, PRA_2 & PRA_3, Springbok (Namaqua-Natal Metamorphic Complex; Nama heritage landscape); EMG Airfield Development (RPAS Airline) between Copperton & Vanwyksvlei; and the EMG Prince Albert Raw Water Supply Project (Adelaide Subgroup therspsid sensitivity).

Khâi-Ma & Ikheis LMs, lower Orange River frontier (NC), combined PIA / HIA fieldwork on Namaqua-Natal Metamorphic Complex substrates (Bushmanland Group gneisses and granites) mantled by Quaternary aeolian sands and bedrock-derived gravelly topsoils — with potential for surface Bushmanland LSA / Wilton microlithic scatters and Khoekhoen / Nama pastoralist heritage — for the 2919AA Pella PIA & AIA Pella WWTW & Irrigation Area (within the historic Roman Catholic mission landscape of Pella); 2819CD Oupvlakte PIA & AIA Sending WWTW & Irrigation Area (near Onseepkans); and 2819CD Oupvlakte PIA & AIA Melkbosrand WWTW & Irrigation Area, with systematic pedestrian survey along low-lying sandy plains and incised drainage lines.

North West Province (Bojanala Platinum & Dr Kenneth Kaunda DM), Phase 1 PIA & HIA fieldwork for poultry, mining and infrastructure developments — within the broader BaKgatla / BaTswana Late Iron Age stone-walled settlement landscape and Witwatersrand Supergroup mining heritage — comprising the EMG HIA & PIA Tisella Poultry Farm Development, Rhenosterfontein 86; LT PIA & HIA Brits Chicken Houses; and the 2626DC Klerksdorp HIA Jouberton and Alabama Phase 2 Outfall Sewer Upgrade, Klerksdorp.

Limpopo / Gauteng border (Bela-Bela & Lesedi LMs), Phase 1 PIA & HIA field investigations — within Bushveld Igneous Complex / Karoo Supergroup substrates with associated Late Iron Age Tswana and Anglo-Boer War heritage — comprising the 2528AB Pienaarsrivier PIA Coldmix Plant, Farm Springbokvlakte 41 JR.



LLOYD ROSSOUW

Director — Paleo Field Services

Senior Heritage, Archaeological & Palaeontological Impact Specialist

South Africa • ASAPA Reg. No. 122 (since 2002) • Ph.D. (UFS) • *M.Sc. cum laude (Wits)*

Field-based heritage specialist with **35+ years of on-site fieldwork** and **300+ specialist reports** delivered nationwide across every province of South Africa.

35+	300+	9 / 9
Years of fieldwork	Specialist reports	Provinces surveyed

Field Experience by Sector

Sector	Field Experience & Typical Footprints
Renewable Energy	Solar PV, wind, battery storage & grid across Free State, Northern Cape, North West & Western Cape — field surveys on large footprints. (primary growth sector)
Linear Infrastructure	On-foot corridor walkdowns for powerlines, bulk water & sewer pipelines, road upgrades across multi-jurisdictional routes.
Mining & Industrial	Prospecting/mining right areas, waste facilities & industrial expansions in geologically & archaeologically complex terrain.
Agro-Industrial	Feedlots, irrigation pivots, orchards & agri-processing sites in mixed-sensitivity rural landscapes.
Township & Residential	Township establishment, mixed-use & urban infill footprints integrated with planning approvals.
Graves & Community	Field identification of family graveyards & cemeteries; exhumation/relocation planning.

Core Services

- Heritage Impact Assessments (HIA) — NHRA s.38(3)
- Palaeontological Impact Assessments (PIA) — desktop & field
- Archaeological Impact Assessments (AIA) — Phase 1 & mitigation
- Chance Find Protocols — construction-phase compliance
- Cultural Landscape & Heritage Management Plans
- Section 24G rectification & SAHRA / PHRA liaison

Career Highlights

Years	Role	Institution
2024 – Present	Director	Paleo Field Services
2019 – 2024	HOD & Curator of Collections	Florisbad Quaternary Research Station, National Museum
2010 – 2019	Head of Department: Archaeology	National Museum, Bloemfontein
1999 – 2009	Museum Scientist	Florisbad Quaternary Research Station

Qualifications & Professional Standing

Qualifications

- Ph.D.** Palaeoenvironmental Science — Univ. of the Free State
- M.Sc.** Quaternary Vertebrate Palaeontology (*cum laude*) — Univ. of the Witwatersrand
- B.A. (Hons.)** Archaeology — Univ. of Stellenbosch

Professional Standing

- ASAPA Registered Heritage Practitioner** (No. 122) — continuous since 2002
- Member, **PSSA**, continuous since 2002
- Research Fellow**, University of the Free State
- Peer-reviewed author** — Nature Ecology & Evolution, Quaternary Science Reviews, J. Human Evolution, S. Afr. J. Science

Die Universiteit van Stellenbosch

Hiermee word verklaar dat nademaal

LLOYD ROSSOUW

ten opsigte van die Honneurs-Baccalaureus-graadkursus
in die Lettere en Wysbegeerte met

ARCHEOLOGIE

as studierigting, voldoen het aan al die vereistes soos
neergelê in Wet Nr. 37 van 1959 en die Statuut en
Regulasies van die Universiteit, die graad

**Honneurs-Baccalaureus in die Lettere en
Wysbegeerte (Hons.-B.A.)**

10 DESEMBER 1991

aan HOM verleen is.

IK SERTIFISEER DAT HIERDIE KOPIE VAN DIE OORSPRONKELIKE DOKUMENT 'N WARE AFKOPIE VAN DIE OORSPRONKELIKE DOKUMENT IS. IK SERTIFISEER VERDER DAT DIT 'N WARE AFKOPIE VAN DIE OORSPRONKELIKE DOKUMENT IS. IK SERTIFISEER VERDER DAT DIT 'N WARE AFKOPIE VAN DIE OORSPRONKELIKE DOKUMENT IS.

I CERTIFY THAT THIS DOCUMENT IS A TRUE COPY OF THE ORIGINAL DOCUMENT WHICH I HAVE HEREIN AUTHENTICATED. I FURTHER CERTIFY THAT THIS IS A TRUE COPY OF THE ORIGINAL DOCUMENT.

Handtekening: *M. E. Kambule*

MAGSOMMER: 2530768 RANG: Sgts

NAAM: M. E. KAMBULE

Stellenbosch

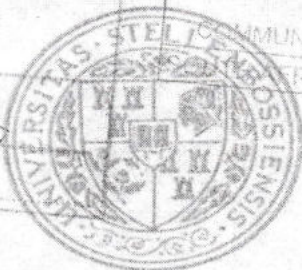
10 DESEMBER 1991

SUID-AFRIKAANSE POLISIEDIENS
GEMEENSKAP DIENSSENTRUM

14-01-2023

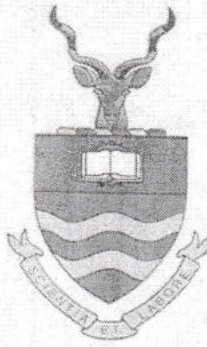
BAINSVLEI
COMMUNITY SERVICE CENTRE

AFRIKAANSE POLISIEDIENS



G. J. J. J.
REKTOR

Antzinger
REGISTRATEUR



UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

SUID-AFRIKAANSE POLISIEDIENS
GEMEENSKAP DIENS
14-01-2003
BAINSVLEI
COMMUNITY SERVICE CENTRE
SOUTH AFRICAN POLICE SERVICE

At a congregation of the University
held on 24 April 2001

Lloyd Rossouw

was admitted to the Degree of
Master of Science

(with distinction)

THE UNIVERSITY OF THE WITWATERSRAND CERTIFIES THAT THE DOCUMENT IS A TRUE COPY OF THE ORIGINAL DOCUMENT WHICH WAS FURNISHED TO THE UNIVERSITY FOR AUTHENTICATION. IT FURTHER CERTIFIES THAT THE DOCUMENT IS A TRUE COPY OF THE ORIGINAL DOCUMENT. IT CHANGE WAS IN THE DOCUMENT. IT IS A TRUE COPY OF THE ORIGINAL DOCUMENT.

[Signature]

MAGISTRAR
FORCE NUMBER 003276-8
RANK Sglt
NAME MR. KHANDE

[Signature]

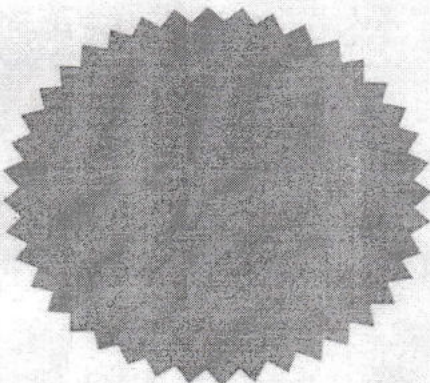
Dean, Faculty of Science

[Signature]

Acting Vice-Chancellor and Principal

[Signature]

Registrar



SUID-AFRIKAANSE POLISIEDIENS
GEMEENSKAP DIENSSENTRUM
14-01-2023
BAINSVLEI
COMMUNITY SERVICE CENTRE
SOUTH AFRICAN POLICE SERVICE

UNIVERSITEIT
VAN DIE
VRYSTAAT



UNIVERSITY
OF THE
FREE STATE

HIERMEE WORD VERKLAAR DAT NADAT AAN DIE
STATUTE EN REGULASIES VAN DIE UNIVERSITEIT
VOLDOEN IS, ONDER MEER DEUR DIE VOOR-
LEGGING VAN 'N PROEFSKRIF GETITEL

IT IS HEREBY CERTIFIED THAT, IN ACCORDANCE
WITH THE STATUTES AND REGULATIONS OF
THE UNIVERSITY, AND PURSUANT TO THE
SUBMISSION OF A THESIS ENTITLED

THE APPLICATION OF FOSSIL GRASS-PHYTOLITH ANALYSIS IN THE
RECONSTRUCTION OF LATE CAINOZOIC ENVIRONMENTS IN THE
SOUTH AFRICAN CENTRAL INTERIOR

DIE GRAAD THE DEGREE

Philosophiae Doctor

in Plantwetenskappe
in Plant Sciences

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

LLOYD ROSSOUW

AS BEWYS DAARVAN PLAAS ONS ONS ONDER-
SKIEFTE HANDTEKENINGE EN DIE SEËL VAN
DIE UNIVERSITEIT HIERONDER.

AS WITNESS OUR RESPECTIVE SIGNATURES
AND THE SEAL OF THE UNIVERSITY
BELOW.

Jansen
VISEKANSELIER/VICE-CHANCELLOR

[Signature]
DIREKTEUR/DIRECTOR



H.D. [Signature]
DEKAAN/DEAN

BLOEMFONTEIN
2009-09-16
2001106992

<<archaeologists

THE ASSOCIATION OF SOUTHERN AFRICAN PROFESSIONAL ARCHAEOLOGISTS

CERTIFICATE OF MEMBERSHIP

HEREBY CONFIRMS THAT

LLOYD ROSSOUW

Is a Professional Member (No 0122) of
the Association of Southern African Professional
Archaeologists and is in good standing
with the organisation



Valid April 2025
March 2026

WOUTER FOURIE
CHAIRPERSON

SHAHZAADEE KHAN
TREASURER

BASIC ASSESSMENT

Appendix I2: Dr Butler & Dr Netherlands – Terrestrial Fauna

Draft BAR



agriculture, environmental affairs,
rural development and land reform

Department:
agriculture, environmental affairs,
rural development and land reform .
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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

File Reference Number:
NEAS Reference Number:
Date Received:

(For official use only)

1. Project title:

Nursery and pistachio processing plant on Portion 18 (Ptn of Ptn 15) of the farm Uitdraai No. 33, Prieska, Siyathemba Local Municipality, Northern Cape province.

2. Details of the specialist:

Project Specialist:

Trading name (if any):

Business reg. no./ID. no.:

Contact person:

Physical address:

Postal address:

Postal code:

Telephone:

E-mail:

Qualifications:

Professional affiliation (s)
(if any)

Dr HJB Butler

BioBase Environmental Pty LTD

2024/104397/07

H Butler

14 Eddie de Beer, Dan Pienaar, Bloemfontein

14 Eddie de Beer, Dan Pienaar, Bloemfontein

9301

Cell: 0827718101

Fax:

Hennie.butler@gmail.com

PhD (Zoology)

Southern African Wildlife Management Association (SAWMA)

3. Details of the consultant

Project consultant/firm:

Business reg. no./ID. no.:

Contact person:

Postal address:

Postal code:

Telephone:

E-mail:

Digital Soils Africa (Pty) Ltd

2012/111217/07

Natalie Sharp

45 Church Street, Walmer

6070

Cell: 082 414 0472

Fax:

082 414 0472

natalie@dsafrica.co.za

4. Declaration by the specialist appointed in terms of the Environmental Impact Assessment Regulations, 2014 as amended.

I, HJB Butler, 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:

BioBase Environmental Pty LTD

Name of company (if applicable):

26 /05/2026

Date:

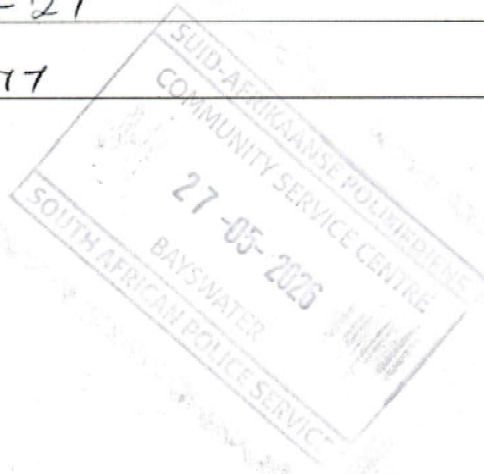
Signature of the Commissioner of Oaths:

2026-05-27

Date:

Designation:

Official stamp (below):



Abridged Curriculum Vitae
Hendrikus Johannes Beukes Butler, PhD

Department of Zoology & Entomology, University of the Free State, Bloemfontein, South Africa

Date of birth: 19 March 1966; Nationality: South African; Marital status: Married, three children

E-mail: butlerhj@ufs.ac.za Tel: 027 51 4012489

EMPLOYMENT: Lecturer

TERTIARY EDUCATION: **PhD Zoology** University of the Free State
 MSc Zoology University of the Free State
 BSc Hons Zoology University of the Free State
 BSc Zoology University of the Free State

ACADEMIC CONTRIBUTIONS AND COLLABORATIONS

Teaching Experience:

Teaching experience in **Animal biodiversity** (second year level)
Teaching experience in **Animal anatomy** (First- and second-year level)
Teaching experience in **Animal physiology** (First- and second-year level)
Teaching experience in **Animal behaviour** (Second-, third and Hons level)

Undergraduate students

First Year:

Biology Practical. First Year (BLG 114)	1995 - 2000
Zoology practical. First Year (DRK 124)	1995 - 1999
Biology practical. First Year (BLG 124)	2000 - 2002
Biology. First Year (BLG 124)	2000 – 2002
Biology practical. First Year (BLG 144)	2003, 2004
Biology. First Year (BLG 144)	2010 - 2017
Biology Lectures and Practical for schoolteachers from Randse Afrikaanse University. First and second year level.	2000, 2001
Biology. First Year (ZLGY 1663) 5 lectures	2025

Second Year:

Animal Behaviour. Second Year (DRK 226)	1997
Vertebrate Research Techniques. Second Year (DRK 262)	2000
Animal Behaviour. Second Year (DRK 222)	2000
Evolution and Distribution of Vertebrates (DRK 242)	2003, 2004
African Vertebrates. Second Year (DRK 224)	2006 – 2008
Exploring Life Sciences: From Passion to Profession (ENZO 2605)	2026
Introduction to Animal Physiology (ENZO 2665)	2026

Third Year:

Supervise Zoology Year Projects. Third Year	1999, 2000
African Vertebrates. Third Year (DRK 352)	2000 - 2004
Animal Behaviour. Third Year (ZLGY 3744)	2007 – 2025
Behavioural Ecology (ZLGY 3744)	2026

Honors:

Africa Ornithology. (DRK 602)	1999 – 2004
Animal Behaviour. (ZLGY 6864)	2007 – currently
Supervision of Research Projects (Hons).	27 students

Master's Degree Students

P.D.S. le Roux. Aspects of the Biology of Feral Pigeons (<i>Columbia livia</i>) in the Bloemfontein urban area.	2005 – 2007
L. Heyns. Using activity patterns and STR markers to distinguish between Blesbok (<i>Damaliscus pygargus phillipsi</i>) and Bontebok (<i>D. p. pygargus</i>) in the Free State.	2006 – 2010
D. du Plessis. Relative brain size in non-mammalian cynodonts and its implications for the evolution of endothermy.	2008 – 2010
A. Grobbelaar. Parasite induced behavioural changes in Fish.	2009 – 2011
M. van As. Livestock, Leopards and Brown Hyena: Conflicts of cohabitation in the Roodewalshoek Conservancy, Mpumalanga.	2008 – 2012
N. Jacobs. Functionality of colour differences in behavioural activities of Sable Antelope (<i>Hippotragus niger</i>).	2010 – 2015
P. Olivier. Colour variation and population dynamics of Bovidae in the Free State: Management implications in the game farm industry.	2010 – 2015
R. Wiid. Population control of Rock Hyrax (<i>Procavia capensis</i>) in Bloemfontein residential areas.	2011 – 2017
E. Coetzee. Geophagia among cattle.	2011 – 2017
K. Darker. Geophagia among African elephants (<i>Loxodonta africana</i>)	2019 – 2023
K. Sutherland. Taste responses of South African game species to chemical stimuli.	2018 – 2023
J. Viljoen. The contribution of inselbergs to diversity in the Free State	

grasslands.

2023 – current

Mini Dissertation Master of Environmental Management Supervisor

P.A. Hoffman. Area selection of game species around pans on
a game ranch in the Western Free State.

2014 – 2016

PUBLIC CONTRIBUTIONS

13 public Lectures and/or talks

Invited guest speaker; “Extreme Life: Exploring Life in the Extremes and the Extremes of Life.”

Production Ecology and Resource Conservation Graduate School, Wageningen,
Netherlands.
November 2012.

COMMITTEES

Occupational Health & Safety Committee
(Faculty of Natural and Agricultural Sciences)

1990 – 2017

Buildings Committee
(Faculty of Natural and Agricultural Sciences)
Inter-faculty Animal Ethics committee

2004 – 2018
2010 – 2025

MEMBERSHIPS

Animal Behaviour Society
South African Wildlife Society Management
Association (SAWMA)

2009 – 2016
2010 – currently

PUBLICATIONS

16 articles in peer reviewed journals
14 national conference contributions
8 international conference contributions
4 Book contributions
14 Unpublished technical reports

INTERNATIONAL VISITS

Deosai National Park (Himalayas, Pakistan)
Deosai National Park (Himalayas, Pakistan)
Dijon France
Botswana

September 1998
June 1999
July 2008
1996 – 2022

Wageningen Netherlands
Madagascar VAHATRA

November 2012
April 2015

OTHER ACADEMIC CONTRIBUTIONS

Organising committee of conferences

SAWMA Conference (Golden Gate)	2023
ZSSA Conference	2023

Karoo Ecology Research Unit (KERU)

- Established a research camp and laboratory on a private farm next to the Van der Kloof Dam.
- Giraffe research project.

TECHNICAL REPORTS

Amphibian and Reptile Survey; Anglo America, Kumba Iron Ore, Kolomela Mine.	2012 – currently
---	------------------

Beeshoek Mine, Postmasburg. Biodiversity Biomonitoring for EMX.	2025 – currently
---	------------------

Faunal biodiversity for Assmang (Pty) Ltd Black Rock Mine Operations, Hotazel, Northern Cape: ASSMANG Manganese	2024 – currently
---	------------------

Rock Hyrax Capture and Relocation on Black Rock Mine Operations (BRMO), Hotazel, Northern Cape.	2024
---	------

Bat acoustic survey; Anglo America, Kumba Iron Ore, Kolomela Mine (Postmasburg).	2026
--	------



Southern African Wildlife Management Association

P.O. Box 217, Bloubergstrand, South Africa 7436 E-mail Address: office@sawma.co.za Tel: 0+27 713523226



Membership Certificate

This is to certify that

Dr. Hennie Butler

currently is a subscribed member of the Southern African Wildlife Management Association until 28 April 2027.

E. M Marais
SAWMA Secretariat

Date: 2026-03-25





**agriculture, environmental affairs,
rural development and land reform**

Department:
agriculture, environmental affairs,
rural development and land reform .
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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1. Project title:

Nursery and pistachio processing plant on Portion 18 (Ptn of Ptn 15) of the farm Uitdraai No. 33, Prieska, Siyathemba Local Municipality, Northern Cape province.

2. Details of the specialist:

Project Specialist:	Prof Edward C. Netherlands		
Trading name (if any):	BioBase Environmental Pty LTD		
Business reg. no./ID. no.:	2024/104397/07		
Contact person:	E.C. Netherlands		
Physical address:	10 Ebenezer complex, 11 Deurmekaarbos Avenue, Bloemfontein, South Africa		
Postal address:	10 Ebenezer complex, 11 Deurmekaarbos Avenue, Bloemfontein, South Africa		
Postal code:	9301	Cell:	0791922833
Telephone:		Fax:	
E-mail:	ecnetherlands@gmail.com		
Qualifications:	PhD (Biology), MSc Environmental Sciences; Hons. Environmental Sciences; BSc Zoology & Botany		
Professional affiliation (s) (if any)	SACNASP; Herpetological Association of Africa (HAA) Executive Committee; Parasitological Society Of Southern Africa (PARSA)		

3. Details of the consultant

Project consultant/firm:	Digital Soils Africa (Pty) Ltd		
Business reg. no./ID. no.:	2012/111217/07		
Contact person:	Natalie Sharp		
Postal address:	45 Church Street, Walmer		
Postal code:	6070	Cell:	082 414 0472
Telephone:	082 414 0472	Fax:	
E-mail:	natalie@dsafrica.co.za		

Enquiries: G Letimela/ E-mail: gletimela@ncpg.gov.za |
A.T. Makaudi

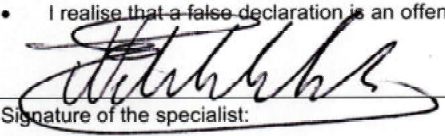
E-mail: eia@half.ncape.gov.za

Private Bag X6102, Kimberley, 8300
Tel. (053) 807 7430/Fax (053) 831 3530

4. Declaration by the specialist appointed in terms of the Environmental Impact Assessment Regulations, 2014 as amended.

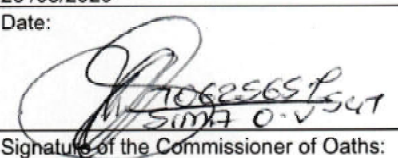
I, Edward Charles Netherlands, declare that --

- 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:

BioBase Environmental Pty LTD
Name of company (if applicable):

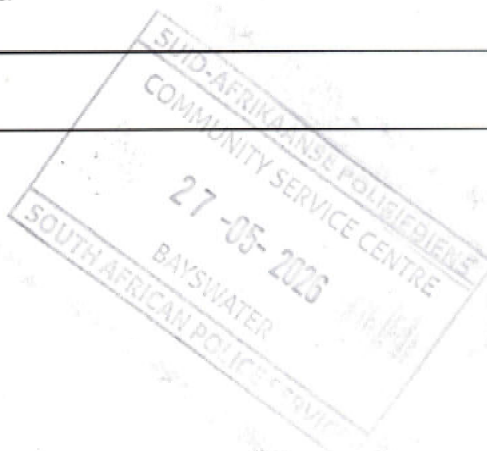
26 /05/2026
Date:


Signature of the Commissioner of Oaths:

2026-05-27
Date:

SERGEANT
Designation:

Official stamp (below):



ABRIDGED CURRICULUM VITAE – Edward Charles Netherlands, PhD

Department of Zoology and Entomology, PO Box 339, University of the Free State, 9300, South Africa

PROFILE

Tel. (w) +27 (0) 51 401 7585

Email: NetherlandsEC@ufs.ac.za

Date of birth: 1989-05-15

Nationality: South African

Languages: English (Native), Afrikaans (Fluent), Sesotho (Limited)

WEB LINKS:

Research Gate: <https://www.researchgate.net/profile/Edward-Netherlands>

Orcid ID: <https://orcid.org/0000-0003-1856-0586>

EMPLOYMENT & EDUCATION

CURRENT:

Associate Professor: Department of Zoology and Entomology, University of the Free State (UFS), RSA

TERTIARY EDUCATION:

PhD - Biology: KU Leuven & NWU (2015-2019)

MSc - Environmental Sciences (2013-2014)

BSc Honours - Environmental Sciences (2012)

BSc - Zoology, Botany & Tourism (2009 -2011)

SECONDARY EDUCATION:

Ficksburg High School: Matriculated – 2007

SPECIAL AWARDS:

2023: Finalist of the National Science and Technology Forum (NSTF) - TW Kambule-NSTF Awards: Emerging Researchers

2019: Parasitological Society of Southern Africa: Winner of the Senior WO Neitz Medal (Best PhD)

2018: Nation Research Foundation: Research Excellence for Next Generation Researchers Award (Best PhD)

2015: North-West University – Faculty Natural Sciences (2015): Winner of the S2A3 Medal (Best NWU MSc)

2015: Parasitological Society of Southern Africa (2015): Winner of the Junior WO Neitz Medal (Best MSc)

EDITORIAL ACTIVITIES:

Editorial board - **African Journal of Herpetology** - Print ISSN: 2156-4574 (2019 – current)

GUEST EDITOR:

African Journal of Wildlife Research - Print ISSN: 2410-7220; Online ISSN: 2410-8200 (2023)

African Zoology - Print ISSN: 1562-7020; Online ISSN: 2224-073X (2023-2025)

International Journal for Parasitology: Parasites and Wildlife - ISSN: 2213-2244 (2025)

LECTURING:

UFS: BLGY1663 Biology: Introduction to Zoology & Entomology – 1st year (2024)

UFS: ZLGY6862: Biodiversity – Excursion – Honours (2024 – current)

UFS: ZLGY3724: Life history strategies in arid environments - Third year (2022 – 2025)

UFS: ZLGY6844: Capita selecta – Herpetology – Honours (2022 – current)

NWU: Ectothermic vertebrates handling and ethics – Postgraduate (2019 – 2017)

NWU: OMSB 627: Herpetology in practice – Honours (2017 – 2021)

SUPERVISION:

Doctoral: 4 Current, 1 completed

Masters: 1 current, 8 completed

Honours: 9 completed

RESEARCH OUTPUTS

JOURNAL ARTICLES (Last 10/53):

1. Dutton, H.R., Jacobs, F.J., Beytell, P.C., **Netherlands, E.C.**, Du Preez, L.H., Bullard, S.A. (2026). New genus and species of Liolopidae Odhner, 1912 (Platyhelminthes: Digenea) infecting Nile crocodile, *Crocodylus niloticus* (Laurenti, 1768)(Crocodylia: Crocodylidae) in the Kavango River, Namibia. *Journal of Parasitology*. 112(1) 21–27. <https://doi.org/10.1645/25-36>
2. Barnard, M., Codron, D., Dutton, H.R., Bullard, S.A., H. du Preez, L.H., **Netherlands, E.C.** (2025). Life In Cold Blood: Exploring the cryptic diversity of species of Haemogregarina in Southern Africa's terrapins. *International Journal for Parasitology: Parasites and Wildlife*, 29, 101179. <https://doi.org/10.1016/j.ijppaw.2025.101179>
3. Jordaan, B.J., Alvaro, A., Cattaneo, G., Barnard, M., Epis, S., **Netherlands, E.C.** (2025). Unveiling Sauroleishmania in southern Africa: An investigation and supplementary description of Leishmania (Sauroleishmania) zuckermani from the gecko host Chondrodactylus bibronii. *International Journal for Parasitology: Parasites and Wildlife*, 28, 101154. <https://doi.org/10.1016/j.ijppaw.2025.101154>
4. Griesbaum, F., **Netherlands, E.C.**, Schäfer, M. (2025). First record of kin-cannibalism in Fornasini's Spiny Reed Frog, *Arixalus fornasini* (Anura: Hyperolidae), tadpoles. *Reptiles & Amphibians*, 32, e23418. <https://doi.org/10.17161/randa.v32i1.23418>
5. Du Preez, L.H., **Netherlands, E.C.**, Minter, L.R. (2025). A new Rain Frog (Anura: Brevicipitidae; Breviceps) from the KwaZulu-Natal Midlands, South Africa. *African Journal of Herpetology*, 74:2, 188-209. <https://doi.org/10.1080/21564574.2025.2478896>
6. Le Roux, C., Cook, C.A., **Netherlands, E.C.**, Truter, M., Smit, N.J. (2025). Molecular and morphological characterization of 1 known and 3 new species of fish parasitic Trypanosoma Gruby, 1972 from the south coast of South Africa. *Parasitology*, 152, 531–550. <https://doi.org/10.1017/S0031182025000496>
7. Van As, M., **Netherlands, E.C.**, Van As, J., Cook, C.A., Smit, N.J. (2025). Life cycle stages of *Hepatozoon ingwe* (Apicomplexa: Adeleorina: Hepatozoidae) in an *Ixodes* sp. tick vector (Arthropoda: Ixodida: Ixodidae) and an African leopard *Panthera pardus pardus*. *International Journal for Parasitology: Parasites and Wildlife*, 26, 101049. <https://doi.org/10.1016/j.ijppaw.2025.101049>
8. Cajiao-Mora, K., Dutton, H.R., Jacobs, F.J., Beytell, P.C., **Netherlands, E.C.**, Du Preez, L.H., Bullard, S.A. (2025). Supplemental description of *Stephanoprora ornata* Odhner, 1902 (Digenea: Echinochasmidae) infecting the Nile crocodile, *Crocodylus niloticus* (Crocodylidae) from Namibia with emendation of *Mesorchis* Dietz, 1909 and a phylogenetic analysis. *Journal of Helminthology*. 99, e20, 1–14. <https://doi.org/10.1017/S0022149X25000100>
9. Megía-Palma, R., Sánchez-Montes, G., **Netherlands, E.C.**, Palomar, G., Martínez-Solano, I. (2024). High prevalence of *Trypanosoma* infection in Iberian green frogs (*Pelophylax perezi*) and evidence of a negative relationship between blood parasites and two indices of frog body condition. *Basic and Applied Herpetology*. 00 (2024) 000-000. <http://dx.doi.org/10.11160/bah.294>
10. Jordaan, B.J., du Preez, L.H., **Netherlands, E.C.** (2024). Revisiting the diversity and phylogenetic relationships of trypanosomes (*Trypanosoma*) infecting pelomedusid (Pelomedusidae) freshwater turtles in Southern Africa. *Zoological Journal of the Linnean Society*. 202, zlae107. <https://doi.org/10.1093/zoolinnea/zlae107>

BOOKS & BOOK CHAPTERS:

1. Phaka FM, **Netherlands EC**, Kruger DJ, du Preez, LH (2017): A Bilingual Field Guide to the Frogs of Zululand. South African National Biodiversity Institute, Pretoria. 978-1-928224-19-8
2. Acosta AA, **Netherlands EC**, Retief F, de Necker L, du Preez L, Truter M, Alberts R, Gerber R, Wepener V, Malherbe W. Smit NJ. (2020). Conserving Freshwater Biodiversity in an African Subtropical Wetland: South Africa's Lower Phongolo River and Floodplain. In Managing Wildlife in a Changing World. IntechOpen. <https://doi.org/10.5772/intechopen.93752>
3. Vanhove MPM, Kmentová N, Luus-Powell WJ, **Netherlands EC**, de Buron I, Barger MA (2022): A snapshot of parasites in tropical and subtropical freshwater wetlands: modest attention for major players. In: Dalu T, & Wasserman RJ, (eds). Fundamentals of Tropical Freshwater Wetlands: From Ecology to Conservation Management. Academic Press, London. Chennai: Elsevier, 417–485. <https://doi.org/10.1016/B978-0-12-822362-8.00020-7>

CONFERENCES; SYMPOSIA; & WORKSHOPS (Last 10):

1. **Netherlands, E.C.*** Life Cycles and Vector Dynamics of Amphibian and Reptile Parasites. *2nd Wildlife Malaria NETwork (WIMANET) COST Action Workshop*, 25–28 August 2025, Vilnius, Lithuania. (**Invited speaker**).
2. **Netherlands, E.C.*** Blood parasites of amphibians and reptiles. *2nd Wildlife Malaria NETwork (WIMANET) COST Action Summer School*, 18–22 August 2025, Vilnius, Lithuania. (**Invited speaker**).
3. **Netherlands, E.C.*** The Biology and Interactions of Amphibian and Reptile Blood Parasites. *Faculty of Biological Sciences, Complutense University of Madrid*, 13 June 2025, Madrid, Spain. (**Invited speaker**).
4. **Netherlands, E.C.*** The Biology of Blood Parasites in Amphibians and Reptiles: Uncovering Host-Parasite Dynamics and Ecological Insights. *Department of Biosciences and Pediatric Clinical Research Center, University of Milan*, 23 May 2025, Milan, Italy. (**Invited speaker**).
5. **Netherlands, E.C.*** Life in Cold Blood: The Biology and Interactions of Amphibian and Reptile Blood Parasites. *Department of Biology and Biotechnology, University of Pavia*, 14 May 2025, Pavia, Italy. (**Invited speaker**).
6. **Netherlands EC.** The biology of blood parasites in amphibians and reptiles: Insights into host-parasite interactions and ecology. *VI International Conference on Malaria and Other Blood Parasites of Wildlife & III International Symposium of the Wildlife Diseases Research Network* 26–29 November 2024, Medellín, Colombia. (**Keynote speaker**).
7. **Netherlands EC***, Jordaan BJ, Du Preez LH & Van As J. Exploring the diversity of haemoparasites in *Smaug depressus* (flat dragon lizard), an endemic from the Soutpansberg mountain range in South Africa. *10th World Congress of Herpetology* 5–9 August 2024, Kuching, Sarawak, Malaysia.
8. **Netherlands EC**, Jordaan BJ, Du Buisson J, Haarhof T & Du Preez LH. Under the Dragon's Veil: investigating the diversity of blood parasites in the Flat dragon lizard (*Smaug depressus*) from the Soutpansberg mountain range. *51st Annual Congress of PARSA*, 17–20 September 2023, Muldersdrift.
9. **Netherlands EC**, Jordaan BJ, Du Buisson J, Haarhof T & Du Preez LH. Small dragons, big surprises: exploring the diversity of blood parasites in *Smaug depressus* (flat dragon lizard) from the Soutpansberg mountain range. *Zoological Society of Southern Africa (ZSSA)*, 25–29 September 2023, Central Drakensberg.
10. **Netherlands EC***, du Preez LH. Haemoparasites found parasitizing species of *Leptopelis* (Arthroleptidae) from southern Africa. *19th meeting of the African Amphibian Working Group (AAWG)*. Windhoek, Namibia, 22–23 November 2022.

GRANTS OBTAINED:

NRF: Knowledge, Interchange and Collaboration (KIC) (2025) – Grant No: KIC250326306724: 2nd Wildlife Malaria NETwork (WIMANET) COST Action Summer School and Workshop, 18–28 August 2025, Vilnius, Lithuania (R39,240.00).

NRF: Foundational Biodiversity Information Programme (FBIP) (2025/2027) – Grant No: FBIS250408309449: Dragon Blood: Exploring the Diversity of Blood Parasites in South Africa's Dragon Lizards (R249,700.00).

NRF: National Equipment Programme (NEP) (2024/2025) - Laser Microdissection microscope system (R2,988, 970.00 + R1,494,485.00 = R4,483,455.00)

Herpetological Association of Africa Professional Research Grant (2023): Research on *Breviceps* (R15 000.00).

Interdisciplinary Research Grant (2023/2024) – UFS: Greater Kruger Herptile and Human Health (R100,000.00).

Foundational Biodiversity Information Programme (2021/2022) – National Research Foundation (NRF), Grant No: 129114: DNA Barcoding of Ectotherm Blood Parasites from Southern Africa (R185,000.00): Outputs to date: 2× Peer reviewed paper

Foundational Biodiversity Information Programme (2020/2021) – National Research Foundation (NRF), Grant No: 120782: Anuran Diversity and Habitat Utilisation in the Vhembe Biosphere (R199,500.00): Outputs to date: 3× Peer reviewed papers

Parasitological Society of Southern Africa (2019) – Early-career Conference Support grant.

Foundation for the Promotion of Biodiversity Research in Africa (2019) - Botanic Garden Meise, Belgium Grant.

Foundational Biodiversity Information Programme (2017/2018) – National Research Foundation (NRF), Grant UID 98114: Amphibian biodiversity and eco-tourism (R155,000.00): Outputs: 1× Field guide; 4× Peer reviewed papers; 3× MSc degrees; 4× Conference proceedings



herewith certifies that

Edward Netherlands

Registration Number: 126419

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)

in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)

Effective **7 May 2025**

Expires **31 March 2027**



President of Council

Chief Executive Officer



Draft BAR



agriculture, environmental affairs,
rural development and land reform

Department:
agriculture, environmental affairs,
rural development and land reform .
NORTHERN CAPE PROVINCE
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

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

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

1. Project title:

Nursery and pistachio processing plant on Portion 18 (Ptn of Ptn 15) of the farm Uitdraai No. 33, Prieska, Siyathemba Local Municipality, Northern Cape province.

2. Details of the specialist:

Project Specialist:	Andri Conrad van Roodt
Trading name (if any):	Sparco's Environmental (Pty) Ltd
Business reg. no./ID. no.:	2012/111217/07
Contact person:	Andri van Roodt
Physical address:	Springfield 30, 5 Paddy Goodrich Street, Pentagon Park
Postal address:	N/A
Postal code:	9301
Telephone:	N/A
E-mail:	andri.vanroodt@gmail.com
Qualifications:	PhD Botany
Professional affiliation (s) (if any)	SACNASP T31582

3. Details of the consultant

Project consultant/firm:	Digital Soils Africa (Pty) Ltd
Business reg. no./ID. no.:	2012/111217/07
Contact person:	Natalie Sharp
Postal address:	45 Church Street, Walmer
Postal code:	6070
Telephone:	082 414 0472
E-mail:	natalie@dsafrica.co.za

4. Declaration by the specialist appointed in terms of the Environmental Impact Assessment Regulations, 2014 as amended.

I, André Corné van Nieuw, 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.

W. van Nieuw
Signature of the specialist:

Sparaxis Environmental (Pty) Ltd
Name of company (if applicable):

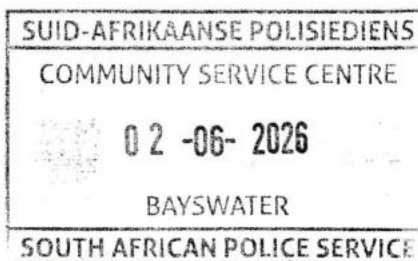
02/06/2026
Date:

P. J. de Waard
Signature of the Commissioner of Oaths:

2026-06-02
Date:

Sergeant
Designation:

Official stamp (below):



Curriculum Vitae

ANDRI CORNÈ VAN AARDT

850316 0043 08 4



PERSONAL INFORMATION

SURNAME	Van Aardt
FULL NAMES	Andri Cornè
TELEPHONE NUMBER	Cell phone: 083 667 0169 Work: 051 401 2641
E-MAIL ADDRESS	andri.vanaardt@gmail.com
GENDER	Female
DATE OF BIRTH	16 March 1985
NATIONALITY	South African Citizen
HOME LANGAUGE	Afrikaans
OTHER LANGUAGES	English (Read, Write and Speak)

QUALIFICATIONS

High School

SCHOOL	Hoërskool Staatspresident Swart, BRANDFORT
HIGHEST GRADE PASSED	Grade 12
YEAR	2003
SUBJECTS	Afrikaans, English, Biology, Physical Science, Mathematics, Computyping, Physiology.

Tertiary Education

INSTITUTE	University of the Free State
DEGREES	BSc Botany (2006) (Botany & Zoology) BSc Honours Botany (2007) MSc Botany (2010) with distinction PhD Botany (2016) – Vegetation ecology of the putative Palaeo-Kimberley and Palaeo-Modder rivers and their catchments, Free State, South Africa

Completed Soil Science as an undergraduate subject to complement my Ph.D. research.

Complementary Education

- Attended the African Pollen Database meeting, presented by the Institute de Recherche pour le Developpement, Bondy France.
- Workshop on Palaeofire knowledge for current and future ecosystem management. Presented by the Global Paleofire Working Group. Presented in Montreal, Canada.
- Workshop on Analysing palaeoecological data with R. Presented by Prof. Steve Juggins at the AFQUA 2015 Conference and workshops, Cape Town, South Africa.
- AllWet RES Summer School in Germany. Presented by DAAD Higher Education Cooperation Program. "Welcome to Africa", presented at various wetlands in Germany.
- Wetland Management: Introduction & Delineation Short Course (Rietvlei Nature Reserve, Pretoria) presented by the Centre for Environmental Management, UFS at Rietvlei Nature Reserve in Pretoria.
- GIS Intermediate Short Course at the Centre for Environmental Management at the University of the Free State, Bloemfontein, South Africa.
- Determination of the present ecological state within the eco-classification process Course at the Centre for Environmental Management, UFS in Bloemfontein, South Africa.
- GIS and GPS Course at the Centre for Environmental Management, UFS in Bloemfontein, South Africa.
- Aquatic Biodiversity Winter School at: The Institute for Aquatic Biodiversity in Grahamstown, South Africa.

Fieldwork experience

As a researcher and consultant in the field of vegetation ecology I am involved in various projects involving various vegetation types and biomes in South Africa. This includes plant community descriptions, ecological interpretation and mapping of vegetation. I have worked and conducted fieldwork in various provinces (Free State, Eastern Cape, Northern Cape, Limpopo, Mpumalanga) of our country. This fieldwork was conducted in nature reserves or on privately owned farms which most of the time require extensive ground truthing. During this fieldwork I usually collection plant specimens for identification and processing in a scientific manner. I am familiar with the use of various methods to conduct research and can select the appropriate methodology depending on the nature of the question that needs to be answered. I have compiled seven environmental impact assessment reports that deals with the specialist study of vegetation. I also compiled a technical report that determined the veld condition and grazing capacity for a mine. As a researcher I have also reported on my own research, that were submitted to various national and international scientific journals. I have also been involved in reviewing various articles related to my field of specialization which is vegetation ecology.

RESEARCH

Research Links

Orchid: <https://orcid.org/0000-0003-0227-7567>
ResearchGate <https://www.researchgate.net/profile/Andri-Van-Aardt>
Google Scholar <https://scholar.google.co.za/citations?user=q29rf6oAAAAJ&hl=en>

Peer Reviewed Publications

1. Sithole, J.V., Dayaram, A., **van Aardt, A.C.** 2025. Phytosociology of Golden Gate Highlands: A focus on Drakensberg-Amathole Afromontane Fynbos. *Koedoe* 67(1), a1857. doi.org/ 10.4102/koedoe.v67i1.1857
2. **Van Aardt, A.C.**, Scott, L., Grundling, P.-L., Grundling, A.T., Woodborne, S. 2024. Revisiting past savanna environments: Pollen analysis of the Colbyn wetland on the southern African central plateau. *Review of Palaeobotany and Palynology* IF 1.7. Q1
3. **Van Aardt, A.C.**, de Jager, J.C.L., van Tol, J.J. Submitted. Firebreaks and their effect on vegetation composition and diversity in grasslands of Golden Gate Highlands Park, South Africa. *Diversity* IF 2.5. Q2.
4. Gharbi, D., Berman, D., Neumann, F.H., Hill T., Sidla, S., Cilliers, S.S., Staats, J., Esterhuizen, N., Ajikah, L., Moseri, M., Quick, J.L., Hilmer, E., **Van Aardt, A.**, John, J., Garland, R., Finch J., Hoek W., Bamford M.s, Seedat, Y.R, Manjra, I.A, Peter, J. 2024. Ambrosia (ragweed) pollen – a growing aeroallergen of concern in South Africa. *World Allergy Organization Journal* IF 5.1. Q2
5. Goder-Goldberger, M., Gilead I., Boaretto E., Edeltin L., Horwitz L.K., Jacoby-Glass, Y., Lavi R., Neumann F.H., Porat, N., Toffolo, M., **Van Aardt, A.C.**, Zilberman, T., Crouvi, O. 2023. Living in an Ecotone: Late Middle Paleolithic occupations in the lower Besor Basin, north-western Negev Desert, Israel. *Antiquity* 97: 1-8. IF 1.953. Q1.
6. Esterhuizen, N., Berman, D., Neumann, F., Ajikah, L., Quick, L., Hilmer, E., **Van Aardt, A.**, Hoek, W., John, J., Garland, R., Hill, T., Finch, J., Bamford, M., Seedat, R., Manjra, A., and Peter, J. Accepted. The South African Pollen Monitoring Network: Insights from two years of national aerospora sampling (2019-2021). *Clinical and Translational Allergy* IF3.57. Q2
7. Lombard, M and **van Aardt A.C.** 2023. Method for generating foodplant fitness landscapes: With a foodplant checklist for southern Africa and its application to Klasies River. *Journal of Archaeological Sciences* 149: 1-12 IF 3.216.Q1
8. Scott, L., Neumann, F.H., **van Aardt, A.C.** and Botha, G.A. 2023. Palaeoenvironmental sequences surrounding Border Cave, South Africa, and review of conditions during Middle and Later Stone Age occupation. *Quaternary Science Reviews* 300:1-12 IF 4.112. Q1
9. Lombard, M and **Van Aardt, A.C.** 2022. Taking stock of foodplants growing in the Cradle of Humankind Fossil Hominin Site, South Africa. *African Archaeological Review* 39: 59-77 IF 1.29. Q1
10. Scott, L., Sobol, M., Neuman, F.H., Gil Romera, G., Fernández-Jalvo, Y., Bousman, C.B., Horwitz, L.K. and **Van Aardt, A.C.** 2022. Late Quaternary palaeoenvironments in the central semi-arid region of South Africa from pollen in cave, pan, spring, stream and dung deposits. *Quaternary International* 614: 84-97 IF 2.199. Q1

11. Brown, L.R., **Van Aardt, A.C.**, Janecke, B.B. 2020. A tribute to Pieter Johannes (Johann) du Preez. *Koedoe* 62(2), a1640. DOI: 10.4102/koedoe.v62i2.1640. IF 0.900. Q3 (Tribute)
12. Janecke, B.B., Van Tol, J.J., Smit, I.P.J., **Van Aardt, A.C.**, Riddell, E.S., Seaman, M.T., Swart, W.J., Du Preez, P.J. and Le Roux, P.A.L. 2020. Biotic and abiotic connections on a granite catena: Framework for multidisciplinary research. *Koedoe* 62(2), a1585 DOI: 10.4102/koedoe.v62i2.1600. IF 0.900. Q3
13. Theron E.J., **van Aardt A.C.**, du Preez P.J. 2020. Vegetation distribution along a granite catena, southern Kruger National Park, South Africa. *Koedoe* 62(2), a1588. DOI 10.4102/koedoe.v62i2.1588. IF 0.900. Q3
14. **Van Aardt A.C.**, Codron, D., Theron, E.J., du Preez P.J. 2020. Plant community structure and possible vegetation changes after drought on a granite catena in the Kruger National Park, South Africa. *Koedoe* 62(2), a1585 DOI: 10.4102/koedoe.v62i2.1585. IF 0.900. Q3
15. Scott L., **van Aardt A.C.**, Brink, J. S., Toffolo, M. B, Ochando, J. Carrión, J. S. 2020. Palynology of Middle Stone Age spring deposits in grassland at the Florisbad hominin site, South Africa. *Review of Palaeobotany and Palynology* 265: 13-26. IF 1.904. Q2
16. **Van Aardt, A.C.**, Scott, L and du Preez, P.J. 2017. Western Free State vegetation ecology: From past to present. *South African Journal of Botany* 109, 372. IF: 1.792. Q2 (Abstract)
17. **Van Aardt, A.C.**, Scott, L., Du Preez, P.J. 2016. Towards addressing the disjunction between palaeo- and modern ecology in the western Free State. *Quaternary International* 404: 190. IF: 2.481. Q1 (Abstract)
18. **Van Aardt, A.C.**, Bousman, C.B., Brink, J.S, Brook, G.A., Jacobs, Z., du Preez, P.J., Rossouw, L. and Scott, L. 2015. First chronological, palaeoenvironmental and archaeological data from the Baden-Baden fossil spring complex in the western Free State, South Africa. *Changing Climates, Ecosystems and Environments within Arid Southern African and Adjoining Regions: Palaeoecology of Africa*. CRC Press. PP117-152 (Chapter in a book)

Popular Journals

K.J. Brown, M.J. Power, M. Slowinski, **A.C. van Aardt**, O. Blarquez and P. Grondin. Workshop Report: Applying Palaeofire Records in Ecological Management. *Wildfire Magazine*. 27.1 February 2018

Conference Presentations

- **Van Aardt, A.C.**, de Jager, J.C.L., van Tol, J.J. Effect of annual burning on diversity and vegetation composition of Golden Gate Highlands National Park. 59th Annual Congress of the Grassland Society at Gariep Forever Resort 22-26 July 2024.
- **Van Aardt, A.C.**, Scott, L., Grundling, P-L., Grundling, A., Woodborne, S. Late Holocene paleoenvironmental reconstruction of the Savanna-Grassland ecotone, Gauteng, South Africa. XXIV Bienniel Congress Cango Valley, South Africa of the South African Society for Quaternary Research 19-24 May 2024.
- Sithole, J.V., Dayaram, A., **van Aardt, A.C.** 2024. Influence of Aspect on the Drakensberg Amathole-Afromontane Fynbos (Gd6) vegetation composition, Golden Gate Highlands National Park. 49th South African Association of Botanists (SAAB) Conference, Richardsbay Campus, University of Zululand, 7-11 January 2024.

- **Van Aardt, A.C.**, de Jager, J.C.L., Giddy, J.N., Dayaram., A. 2023. Karroid Islands in a sea of grasses, Free State Province, South Africa. 65th Annual Symposium of the International association of vegetation science, Coffs Harbour, Australia, 3 – 8 September 2023.
- Scott, L. and **van Aardt, A. C.** 2022. Updating the African Pollen Database (APD) for the Quaternary in the South African interior. workshop of the French Institute of South Africa (IFAS), Pleistocene Archaeology and Palaeoecology of the Free State, Florisbad, Free State, 14 July 2022.
- Müller, M., van Tol, J.J. **van Aardt, A.C.** 2022. Community distribution along topographical units in the Golden Gate Highlands National Park, Free State Province, South Africa. South African Mountain Conference, Champagne Sports Resort, KwaZulu-Natal, 14 – 17 March 2022
- McLean, C.C., van Tol, J.J., **van Aardt, A.C.**, Kotze, E., Edwards, A., Swart, W., Kotze, J.J. 2022. Quantifying soil degradation through microbial activity of alpine soils in the Northern Drakensberg, South Africa. South African Mountain Conference, Champagne Sports Resort, KwaZulu-Natal, 14 – 17 March 2022
- Ferreira, E.L., **van Aardt, A.C.**, Joubert, L. 2022. Possible effect of community composition on pollination rewards in three *Nemesia* species from Namaqualand. South African Association of Botanists 28th Annual Conference, 17-20 January 2022
- Nienaber, K, **Van Aardt, A.C.** Van Tol, J.J. 2021. Phytosociological classification of wetland vegetation in the Golden Gate Highlands National Park, Free State Province, South Africa. National Wetland Indaba 2021. Online. 20-21 October 2021
- Scott, L., Gil-Romera, G., Neumann, F. H., Sobol, M., Horwitz, L. K., **van Aardt, A.**, Fernandez-Jalvo, Y. 2019. Diverse modes of pollen taphonomy and late Quaternary palaeo-environments in the Kalahari. Session: Wonderwerk Cave and Related Research Projects in the Northern Cape Province. ASAPA 2019 (Association of Southern African Professional Archaeologists), Kimberley, South Africa, 2-4 July, 2019.
- **Van Aardt, AC**, du Preez, P.J. and Scott, L. 2019. Major plant communities and physical environment in the catchments of the putative palaeo-Kimberley and palaeo-Modder Rivers, Free State South Africa.
16th Kimberley Biodiversity Research Symposium in Kimberley
- **Van Aardt, A.C.**, Scott, L., Theron, E.J., and Rossouw, L. 2019. Charred Cuticles in Tswaing Crater lake deposits: A palaeoenvironmental indicator? Oral communications. XXII Biennial Congress of the South African Society for Quaternary Research in Mossel Bay.
- **Van Aardt, A.C.**, Scott, L., Brink, J., Toffolo, B., Tomas, J.O. and Carrion, J. 2018. Palynological reconstruction of middle Pleistocene environments at Florisbad, Free State Province, South Africa. Oral communication
Proceedings of the 20th Biennial Conference of the Palaeontological Society of Southern Africa in Bloemfontein.
- **Van Aardt, A.C.**, Scott, L and du Preez, P.J. 2017. Western Free State vegetation ecology: From past to present. Oral communication
43rd Annual Conference of the South African Association of Botanists, University of Cape Town, Cape Town, South Africa.
- **Van Aardt, A.C.**, Scott, L. and Du Preez, P.J. 2015. *Towards addressing the disjunction between palaeo- and modern ecology in the western Free State*. Poster.
AFQUA conference and workshops: The African Quaternary: environments, ecology and humans.

- **Van Aardt, A.C.**, Du Preez, P.J. and Scott, L. 2015. *Vegetation analysis of the catchments of two putative palaeo-rivers in the western Free State, South Africa*. Oral communication.
41st Annual Conference of the South African Association of Botanists (SAAB).
- **Van Aardt, A.C.**, Scott, L., Bousman, C.B., Brink, J.S., Jacobs, Z. and Du Preez, P.J. 2014. *Palynological analysis of the spring mound Baden-Baden in the western Free State, South Africa*. Poster.
From Past to Present: Changing Climates, Ecosystems and Environments of Arid Southern Africa; A Tribute to Louis Scott Conference.
- **Van Aardt, A.C.**, Du Preez, P.J., Scott, L. and Collins, N.B. 2013. *A vegetation and environmental analysis of the Palaeo-Kimberley, Palaeo-Modder Rivers and the surrounding area, Free State Province, South Africa*. Oral communication.
1st African Water Symposium on Water Conflict. Centre for Environmental Management, University of the Free State.
- **Van Aardt, A.C.**, Du Preez, P.J., Scott, L. and Collins, N.B. 2012. *A vegetation and environmental analysis of the Palaeo-Kimberley, Palaeo-Modder Rivers and the surrounding area, Free State Province, South Africa*. Oral communication and a poster.
9th Annual Inkaba yeAfrica GEO-FUTURE Workshop in Germany.
- **Van Aardt, A.C.** and Du Preez, P.J. 2011. *A vegetation and environmental analysis of the Palaeo-Kimberley, Palaeo-Modder Rivers and the surrounding area, Free State Province, South Africa*. Oral communication and a poster.
INKABA yeAfrica – 8th Annual Workshop at GeoSynthesis 2011 Conference in Cape Town.
- **Van Aardt, A.C.** and Du Preez, P.J. 2011. *Classification of the riparian Communities along the Vet River, Free State Province, South Africa*. Poster.
2nd Regional Conference of the Southern African Young Water Professionals at the CSIR international Convention Centre, Pretoria, South Africa.

Consulting and Technical Reports

Technical Reports

2025

Veld condition and Grazing capacity assessment for the Voorspoed Mine, Kroonstad, Free State Province by Dr A.C. van Aardt, J.V. Sithole and S. Crouse.

Environmental Impact Assessment reports

2025/2026

- An Ecological Report on the Flora: On the Farm Uitdraai Boerdery in the Northern Cape
- An Ecological Report on the Flora: On the following farms in the Northern Cape: Bloukrans: Portion 1 & 7 of farm Muishoek no.34, Goue Akker: Portion 6, 13 & 15 of farm Muishoek no.34, and Monterey: Portion 13 & 28 of farm Muishoek
- An Ecological Report on the Flora: On the following farms in the Northern Cape: Tweefontein: Remainder of farm Tweefontein 373, and Kalkfontein: Portion 4 (Portion of Portion 2) of farm Kalkfontein

- An Ecological Report on the Flora: On the farms Erf 1 and Erf 971 Prieska in the Northern Cape

2022

- An Ecological Report on the Flora: Remainder of Farm Naauwtesfontein No.78, Hopetown
- A Follow up Ecological Report on the Flora: Remainder of Farm Naauwtesfontein No.78, Hopetown
- An Ecological report on the Flora: On Portion 2 (A Portion of Portion 1) of the farm Clydesdale 156, Division of Herbert in the Northern Cape.

2021

- An Ecological Report on the Flora: Portion 18 (Portion of Portion 15) of the farm Uitdraai no 33, Prieska

Peer review, Committees and Memberships

Manuscripts reviewed

- Royal Society Open Science
- Plant Ecology
- Vegetation Classification and Survey
- South African Journal of Science
- Scientific Reports
- Bothalia
- Folia Geobotanica

Scientific Committees

Southern African Mountain Conference 2022 – reviewer of abstracts

The 5th National Global Change Conference 2023 – reviewer of abstracts

Southern African Mountain Conference 2025 – reviewer of abstracts

Memberships

- South African Association of Botanists since 2018
- South African Society for Quaternary Scientists since 2018
- South African Council for Natural Scientific Professions – Ecological and Botanical Sciences (131584) since 2021
- International Association for Vegetation Science has been part of the African Chapter since 2022

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Certified a true copy of the original document

Patson 05 March 2024

PATSON WALIWONA MANDA
HONEY PROKUREURS BLOEMFONTEIN
Commissioner of Oaths / Kommissaris van Ede
Practising Attorney / Praktiserende Prokureur R.S.A.



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LEGGING VAN 'N PROEFSKRIF GETITEL

VEGETATION ECOLOGY OF THE PUTATIVE PALAEO-KIMBERLEY AND
PALAEO-MODDER RIVERS AND THEIR CATCHMENTS,
FREE STATE, SOUTH AFRICA

THE DEGREE

DIE GRAAD

PHILOSOPHIAE DOCTOR

with specialisation in Botany
met spesialisasie in Plantkunde

HAS BEEN CONFERRED UPON
TOEGEKEN IS AAN

VAN AARDT, Andri Corné

AS WITNESS OUR RESPECTIVE SIGNATURES
AND THE SEAL OF THE UNIVERSITY
BELOW.

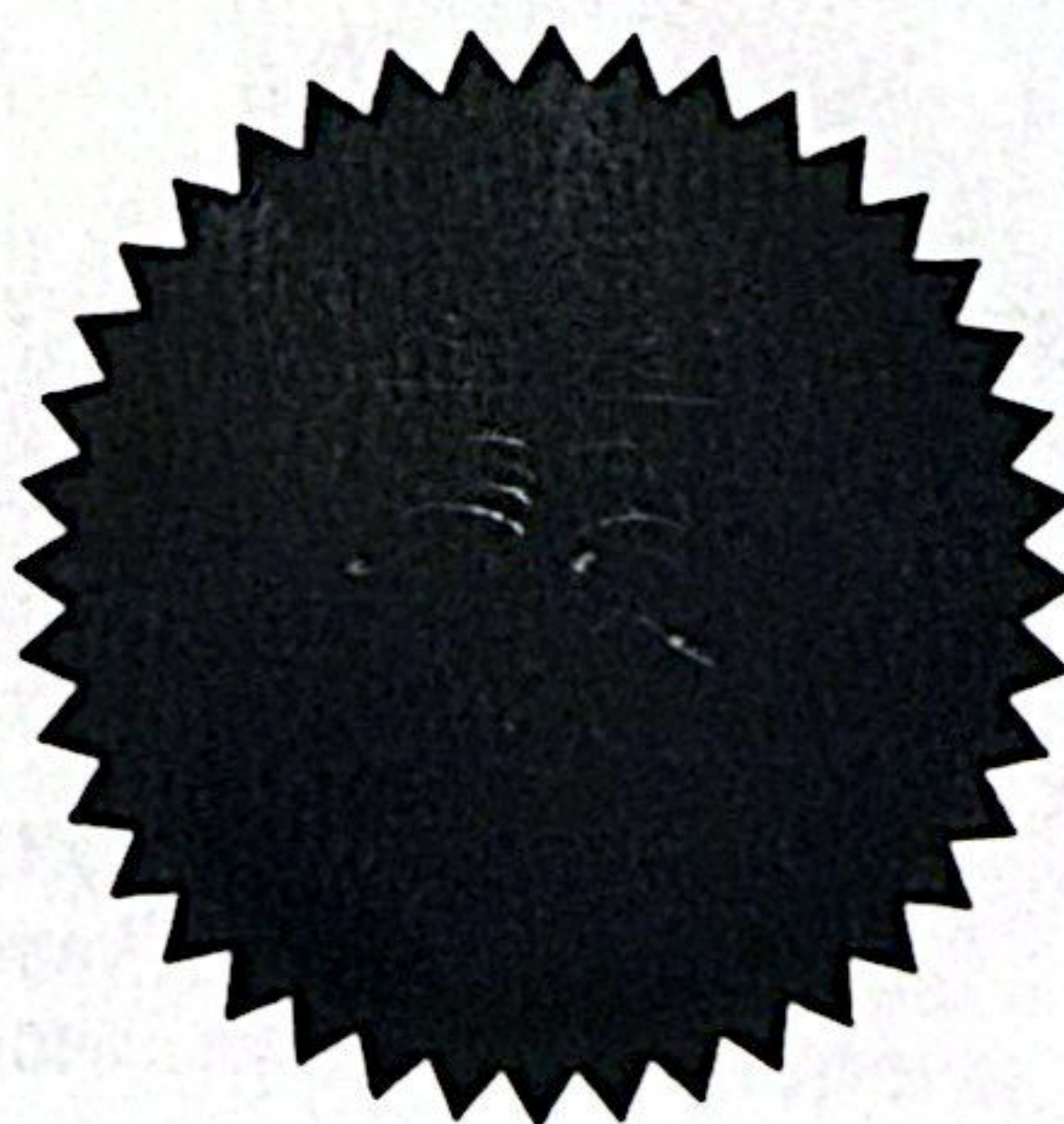
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DIE UNIVERSITEIT HIERONDER.

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2016-06-30
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herewith certifies that
Andri Corné van Aardt
Registration Number: 131584
is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Ecological Science (Professional Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective **8 September 2021**

Expires **31 March 2027**



A stylized, handwritten signature in black ink, likely belonging to the President of the Council.

President of Council

A stylized, handwritten signature in black ink, likely belonging to the Chief Executive Officer.

Chief Executive Officer



Appendix J: Additional Information

Appendix J1: DR&PW letter for road access

Draft BAR



Reference Number: L2.1.2.9 – PKS: THE FARM UITDRAAI, NO. 33 /TR07901/RE/1125

Enquiries: M.Sithole / O.Mothube

Date: 15 December 2025

MACROPLAN Town & Regional Planners

4A Murray Avenue

Upington, 8800

Attention: Justus Petrus Theron

**RE: DEVELOPMENT OF A PISTACHIO NURSERY AND PISTACHIO PROCESSING PLANT.
PORTION 15 OF THE FARM UITDRAAI, NO. 33, PRIESKA RD, SIYATHEMBA LOCAL
MUNICIPALITY, PIXLEY KA SEME DISTRICT. NORTHERN CAPE PROVINCE.**

Refer to your application letter dated 04 December 2025 with its attachments. Ref: (ENQ.A.PC)
251204 UITDRAAI BOERDERY (PTY.) LTD.

- The provincial road affected by your proposal is TR07901, which is a Class 2 rural high order road, with a road reserve width varying from 40m to 70m.

The Department of Roads and Public Works (DRPW) has no objection to the proposed development outlined in your application letter, provided that the conditions set forth in this letter are met.

- The applicant is required to submit a detailed layout plan, indicating all existing and proposed road access points from the affected public roads, for review before any development is carried out.

The following standard conditions must be complied with at all times in case of any work undertaken within the statutory road reserve or within a distance of 95 meters from the centerline of any building restriction road (advertising on Roads and Ribbon Development Act, no.21 of 1940) and within the statutory road reserve or within 5 meters from the statutory boundary of any public road (Roads Ordinance, 19 of 1976).

1. It is the applicant's duty to notify and meet all other affected stakeholders' requirements and interests in the proposed development.

2. The applicant shall be responsible for covering all costs associated with the proposed development.
3. Any other alterations and/or additional proposals post this response letter must be communicated to the DRPW for approval prior to implementation.
4. The conditions outlined in this response letter apply to both the current owner and any successor-in-title. If the property rights are transferred to another person or entity, it is your responsibility to ensure that the contents of this wayleave are communicated to your successor-in-title, as both the conditions of this wayleave and the associated property rights will be transferred and remain enforceable.
5. The DRPW does not permit the erection of any structures (e.g., cameras, advertising boards, etc.) on the fence and/or within the road building-restriction area.
6. This response letter does not exempt the applicant from complying with any other law that may be applicable to the proposed work and related activities.

Yours sincerely



Mr I. Bulane (Chief Director: Roads)

For and on behalf of

THE DEPARTMENT OF ROADS AND PUBLIC WORKS NORTHERN CAPE

