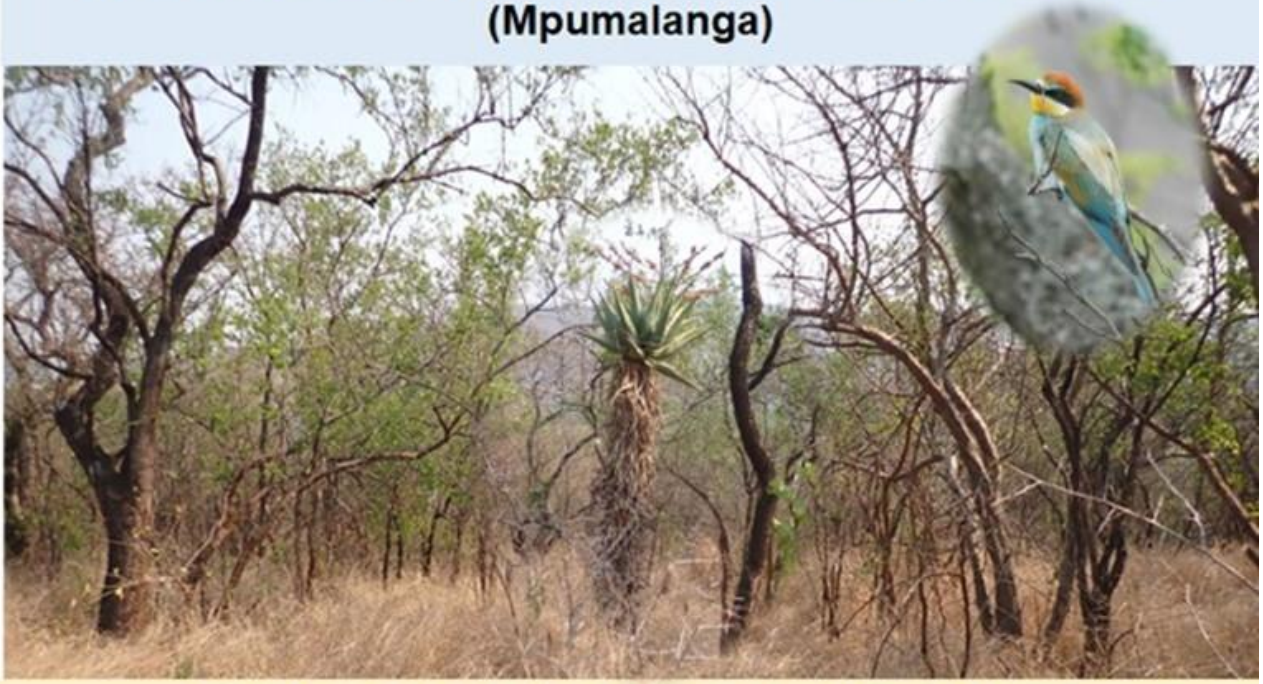
APPENDIX 4.4.2.
ECOLOGICAL ASSESSMENT:
TERRESTRIAL AND AQUATIC SYSTEMS

NAUDE'S RUST FARM: ALTERATION OF LAND FOR AGRICULTURAL USE.

An EIA for the development of 42 ha for orchards on Portion 272JU of the farm Naude's Rust in the Low's Creek area (Mpumalanga)



SPECIALIST STUDY: ECOLOGICAL ASSESSMENT.

DR ANDREW DEACON
November 2022

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Specialist Study: Ecological Assessment.

October 2022

Dr. Andrew Deacon (PhD Zoology)

Registered with the South African Council for Natural Scientific Professions
(Registration number: 116951)

Executive Summary

Rhengu Environmental Services were appointed to undertake an Environmental Impact Assessment for the Debushing Project on the Farm Naude's Rust 272 JU: Portions 17 and 21 (next to the R38 between Kaapmuiden and Lows Creek). This specialist ecological study forms part of the EIA process for the proposed project.

The applicant, Mr Walter Giuricich wishes to implement the alteration of land for agricultural use to establish macadamias and/or citrus. During the proposal period of the project, four different sections of the farm were considered to determine if land is arable for the project.

Project Specifics include:

- Debush natural bush on the following farm sections:
- GPS Latitude: 25º 38' 47.86″ Longitude: 31º 15' 32.88″
- GPS Latitude: 25º 39' 01.16″ Longitude: 31º 16' 19.33″
- GPS Latitude: 25º 38' 49.93″ Longitude: 31º 16' 45.45″
- GPS Latitude: 25º 38' 05.95″ Longitude: 31º 16' 43.66″

Four sites have been delineated as the preferred sections. Hectare coverage of the evaluated for bush clearing and orchard development:

Site	Area (ha)
1	23.6
2	5.5
3	13.0
4	12.4
Total	54.5

A total of two units consisting of untransformed vegetation/habitat and three units consisting of transformed vegetation/habitat were assessed. These five units are listed below, and each unit is later described in more detail.

Vegetation unit and land cover type:

Untransformed vegetation/habitat

1. Untransformed savannah woodland
2. Channelled valley bottom wetland with seepage

Transformed vegetation/habitat

3. Secondary savannah woodland (dams, agriculture and residential aspects)
4. Redundant infrastructure (old dam wall, demolished staff village, old sawmill)
5. Cleared woodland (borrow pit, agriculture)

Biota assemblages of the Naude's Rust project areas

Twelve extensive transects (400-3000m) were surveyed for potential habitat, vegetation and associated fauna. Specific habitat features were identified to provide an indication of available habitat for different animals favouring a specific biotope.

A total of 66 indigenous plant species were recorded during fieldwork as well as seven exotic species, some declared alien invaders. Seven Plants of Special Concern that have distribution ranges and habitat preferences, are expected in the study area (Grid: 2531CB).

Aquatic ecosystem

The main components of the aquatic ecosystem are the ephemeral drainage lines and flanking riparian zones on the macro-channel banks. The riparian corridors along the drainage lines are well-developed on all the stream banks.

The Naude's Rust drainage lines are part of a landscape changed considerably by agricultural activities. These drainage lines fulfil an important function in maintaining the narrow riparian zones which acts as migration corridors for wildlife and buffers for these riparian habitat types. The drainage lines also provide connectivity with the larger Low's Creek River system, which includes the important Crocodile River system.

During the process of riparian delineation, one transect was surveyed in the drainage line of Site 1, the only site with a distinguishable drainage system. According to the initial riparian buffer requirement, it became apparent that, to protect the Site 1 drainage lines in its current condition from any degradation, a buffer of 10 m wide on both embankments of the drainage line is required.

After analysing the fauna distribution data and habitat availability, 19 frog species, 74 reptile species, 203 bird species and 51 mammal species are expected to occur in the project area, a total of 347 animal species. The presence of these different faunal groups is however dependent on availability of potential habitat types in each distinct riverine biotope.

A final synopsis of habitat available in the project area and the preferred habitat for expected SSC faunal species, lists the species most likely to be present in the project area, or occasionally visit the area. Species of Special Concern with "Medium" to "Optimal" ratings to potentially utilise available habitats in the Naude's Rust project area, are listed below.

- Barberton girdled lizard *(Smaug warreni barbertonensis*)
- Wilhelm's flat lizard (*Platysaurus intermedius wilhelmi*)
- Distant's ground agama *(Agama aculeata distanti)*
- Knysna Turaco *(Tauraco corythaix)*
- Chorister Robin-Chat *(Cossypha dichroa)*
- Greater Double-collared Sunbird *(Cinnyris afer)*
- Lanner Falcon *(Falco biarmicus)*
- European Roller (*Coracias garrulus*)
- Martial Eagle *(Polemaetus bellicosus)*
- Tawny Eagle *(Aquila rapax)*
- Honey badger (*Mellivora capensis*)
- Serval *(Leptailurus serval*)

In the event that any threatened or near-threatened animal species are recorded within the study area in future, appropriate conservation measures should be developed in consultation with the relevant conservation authorities.

Mpumalanga Biodiversity Sector Plan (MBSP) and Threatened Ecosystems

According to the Mpumalanga Biodiversity Sector Plan the following Critical Biodiversity Areas and other important aspects of the study area include:

- Granite Lowveld- Threatened ecosystem status**:** Vulnerable.
- Ecological Support Areas - Protected area buffer - 2200 ha Boondocks Bushveld Reserve and Mountainlands Nature Reserve.

Corridors for Connectivity

Linkages are used as pathways by animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements and range expansion The linkages play an important role as part of the corridor network provided by the proposed buffers on the Naude's Rust Farm:

To prevent the corridor created by the drainage line in Site 1 become obstructed by vegetation clearing and development, a 10m buffer is proposed around the riparian zone. The buffered drainage line will create a corridor through Site 1 to the Crocodile Gorge Mountain foothills, which is considered an ONA.

Assessment of impacts

The potential impacts of the project on the biodiversity of the study area are assessed under seven broad impacts, namely:

- Impact 1: Clearing of approximately 42 ha of transformed and untransformed land types.
- Impact 2: Erosion and siltation.
- Impact 3: Habitat fragmentation.
- Impact 4: Disturbance to Fauna.
- Impact 5: Human interference impacting on biota.
- Impact 6: Linear structures: Impacts of roads and pipelines.
- Impact 7: Alien invasive vegetation.
- Impact 8: Loss of Red listed and protected fauna/flora species.

By making use of "best practice guidelines" during the construction- and operational phases, identify the best practical environmental options by avoiding loss of biodiversity and preventing disturbance to ecosystems, especially in CBAs, by applying the mitigation hierarchy and the land-use guidelines recommended. In particular:

Management actions should be implemented such as:

- the re-establishment of indigenous vegetation wherever possible;
- control of storm water run-off;
- ongoing repair- and stabilisation of any erosion;
- implement an alien plant control programme;
- make use of current roads or tracks as far as possible;
- implement a veld management plan for the conservation area, which emphasises the use of sustainable grazing and controlled fires;
- prevent erosion and sediment-laden water from entering the adjacent watercourses;
- generic buffers should be established around wetlands;
- strict management of potential sources of agrochemical pollution;
- avoid over irrigation;
- maintaining an intact riparian corridor.

The potential impacts of the project on biodiversity of the study area were assessed under eight broad impacts. By implementing all the suggested mitigation measures and managing the system as prescribed, on a continuous basis, all the impacts will be addressed to a satisfactory level. It is the reasoned opinion that the overall project outcome mitigates all current listed impacts satisfactorily to a "Low" impact level. Therefore, it is proposed that the project should be authorised with the provision that the mitigation measures prescribed in this document, where applicable, are included in the EMPr

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Abbreviations

BGIS	Biodiversity Geographic Information System
BODATSA	Botanical Database of Southern Africa
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Areas
cm	Centimetre
C-Plan	Conservation Plan
Dr	Doctor
E	East
e.g.	For example
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GGP	Gross Geographic Product
GIS	Geographic Information System
GPS	Global Positioning System
ha	Hectares
IUCN	International Union for Conservation of Nature
km	Kilometre
KNP	Kruger National Park
KML	Keyhole Markup Language
KMZ	Keyhole Markup language Zipped
LUDS	Land-Use Decision Support Tool
m	Metre
m^2	Square metre
m^3	Cubic metre
MBSP	Mpumalanga Biodiversity Sector Plan
MNCA	Mpumalanga Nature Conservation Act
Mr	Mister
MTPA	Mpumalanga Tourism and Parks Agency
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management & Biodiversity Act
NP	National Park
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
ONA	Other Natural Areas
PhD	Doctor of Philosophy
POSA	Plants of Southern Africa
Pr. Sci. Nat	Natural Scientific Professionals
Reg. no.	Registration number
S	South
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SARCA	South African Reptile Conservation Assessment
SCC	Species of Conservation Concern
TOPS	Threatened or Protected Species
WMA	Water Management Area

1. Introduction

Rhengu Environmental Services were appointed to undertake an Environmental Impact Assessment for the Debushing Project on the Farm Naude's Rust 272 JU: Portions 17 and 21 (next to the R38 between Kaapmuiden and Lows Creek). This specialist ecological study forms part of the EIA process for the proposed project.

This project and the report below, is based on the EIA guidelines provided in the Mpumalanga Biodiversity Sector Plan (MBSP, 2014). The Mpumalanga Tourism and Parks Agency (MTPA), as custodian of the environment in Mpumalanga, is the primary implementing agent of the MBSP for the province.

This report addresses the findings of the field surveys as well as a desktop review of the potentially occurring threatened flora and fauna that could potentially be found in the proposed development footprint.

Project Specifics include:

- Debush natural bush on the following farm sections:
- GPS Latitude: 25º 38' 47.86" Longitude: 31º 15' 32.88"
- GPS Latitude: 25º 39' 01.16" Longitude: 31º 16' 19.33"
- GPS Latitude: 25º 38' 49.93" Longitude: 31º 16' 45.45"
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The purpose of this assessment process is to investigate the impact of implementing such activities at Naude's Rust 272 JU: Portions 17 and 21.

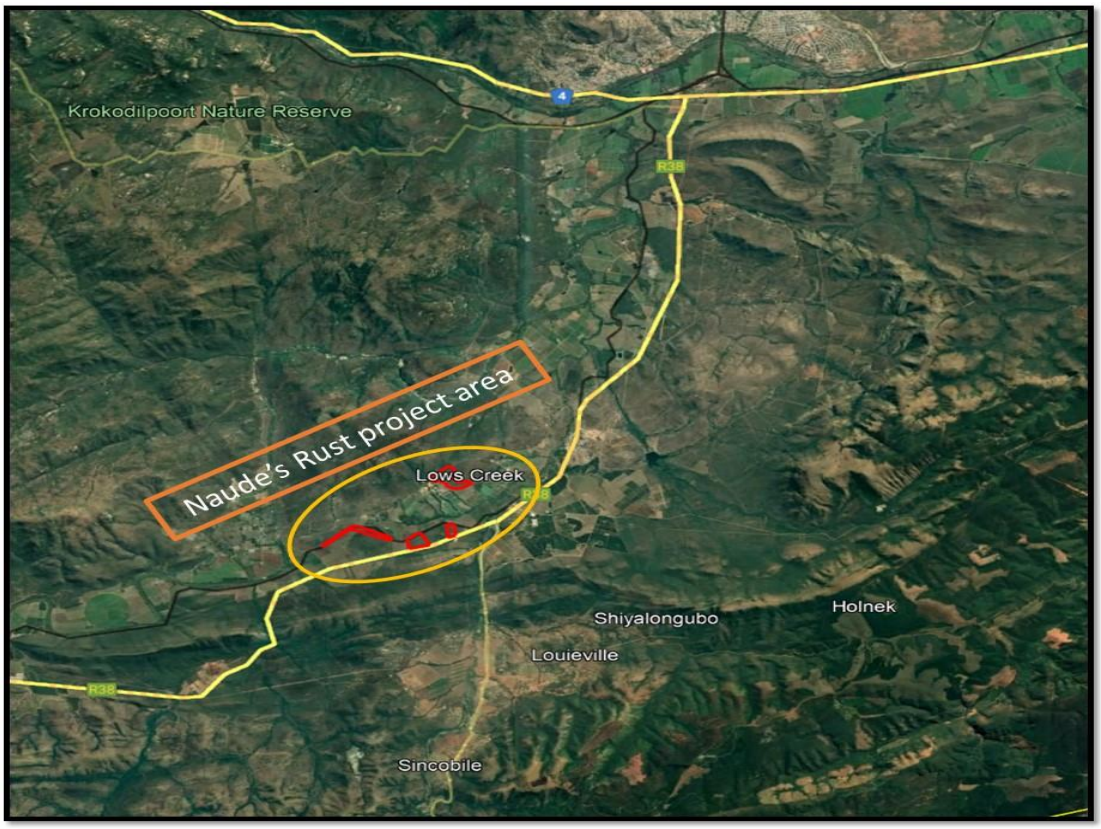


Figure 1: The location of the Naude's Rust Farm in the Lows Creek area.

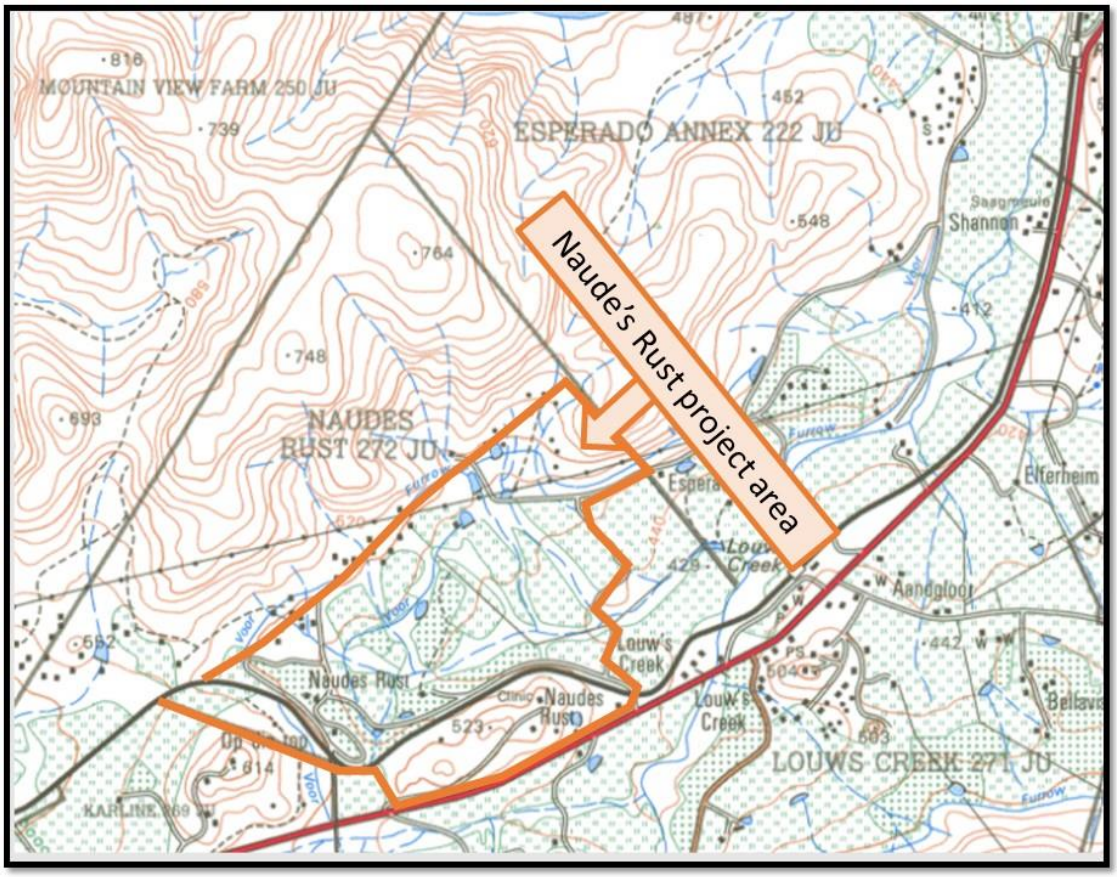


Figure 2: The Naude's Rust project area, illustrating the surrounding settlements and topography.

1.1 Legislative requirements

The new Environmental Impact Assessment Regulations came into effect on the 4 December 2014. These regulations were amended in 2017 and with this in mind it is proposed that the procedure as described in Chapters 4 and 6 of Notice 326 and Listed in Government Gazette No. 40772, published on 7 April 2017 is followed. Notice is given in terms of Regulation 41 of this notice to conduct the following activities:

Property Description and Location: Naude's Rust Debushing Project on the Farm Naude's Rust 272 JU: Portions 17 and 21 (next to the R38 between Kaapmuiden and Lows Creek).

In terms of Government Notice 325 and 324 an Environmental Impact Assessment is required in terms of the following listed activities that the applicant wishes to implement:
Government Notice: No: 325 of 7 April 2017 Gazette Number: 40772:
Activity 15: The clearance of an area of 20ha or more of indigenous vegetation.
Government Notice: No: 324 of 7 April 2017 Gazette Number: 40772:
Activity 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

1.2 Terms of Reference

This project proposal is prepared for a Specialist Study: An Environmental Evaluation for the proposed bush clearing (42 ha) on the Naude's Rust farm (272 JU).

The Environmental Evaluation concerns the fauna (vertebrates) and flora and associated habitat types of the three delineated footprints (Regulated Zones). The following services/specialist components will be addressed:

- This specialist ecological study will form part of the Environmental Impact Assessment process of the proposed development in the project area.
- Literature review: Applicable documentation will be studied and reviewed.
- Background studies regarding species distribution, habitat preference and species status will be updated.
- A site survey will be conducted to determine the current state of the biodiversity environment on site. The following services/specialist components will be addressed:
    - Specialist Studies for the Terrestrial Ecology according to the MTPA Minimum Requirements:
        - Vegetation studies
        - Faunal studies: Mammals; Birds; Reptiles; Frogs.
    - Evaluate the sensitivity of biota surveyed in both the terrestrial and wetland habitats (if present), on site.
    - Highlight floral and faunal species present on site and determine whether any Threatened or Protected Species (ToPs) or Red Data species are present; this should include species identified on-site as well as those that could potentially be found on the property.
    - Evaluate the sensitivity of the habitat for fauna. Establish and delineate buffer zones and migration corridors in riparian habitat and also establish passage devices for aquatic species at migration obstacles.
    - Ground-truth the desktop level findings regarding the provincial C-Plan and provide an opinion regarding the conservation status and actual conditions in situ.
    - Provide a general biodiversity sensitivity map for the project area. This should include any proposed buffer zones and "no-go" zones for development.
- Management aspects:
    - Identification and quantification of risks to biodiversity.
    - The development of management criteria for each risk.
- Indicate in the report any opportunities, constraints and fatal flaws to the study and the project, including gaps in available information and make recommendations going forward.

Mapping

All sensitivity maps will be provided as KMZ files (delineated edges, no-go area, buffer zones).

1.3 Project Description

Orchard development

Developing the current areas of indigenous vegetation will ensure that Portions 17 and 21 of Naudes Rust 272JU of the farming operations remain a viable and profitable entity and achieve economies of scale in terms of employment, machinery and market share. Additionally, the macadamia processing facility in Low's Creek and the citrus facility at Eureka will obtain security of supply from the immediate local area and allow it to expand as increased volumes come available ensuring job opportunities and local investment in the area as per the economic vision described above.

The farm presently has 100ha of existing arable land which traditionally was farmed with papaya, bananas, sugarcane and vegetables - these crops are extremely water dependent and hence the current registered 120ha (778,800m³) of water rights was suitable for those historical crops planted however with the planned change to macadamias and/or citrus the water demand will be lower which permits additional areas to be farmed, thus increasing income for the property and creating additional employment and increased services required for the farming operations. This will in return maximise return on investment for the property owners.

Alternatives were assessed during this survey and all options were discussed during the course of this investigation. The alternatives were identified as not being suitable due to topography and soil conditions (rocky outcrops). The project sites are fixed and the proponents do not own similar land elsewhere. In terms of compatibility of land uses this development will fit in with current agricultural developments in the area and surrounding farms. The locations are thus regarded as ideal. The project site is surrounded in all directions with similar land uses.

The access to the Project Areas from the R38 Provincial tar road is functional and does not require any changes or upgrading. Construction vehicles and equipment will have unhindered access to the project sites.

The applicant, Mr Walter Giuricich wishes to implement the alteration of land for agricultural use to establish macadamias and/or citrus, areas suitable for these crops. During the proposal period of the project, four different sections of the farm were evaluated to determine if land is arable for the project. Figure 3 shows a merged Google Earth screenshot, illustrating the four sites proposed. The hectare coverage of these sections can be seen in Table 1.

Table 1: Hectare coverage of the proposed project sites.

Site	Area (ha)
1	23.6
2	5.5
3	13.0
4	12.4
Total	54.5

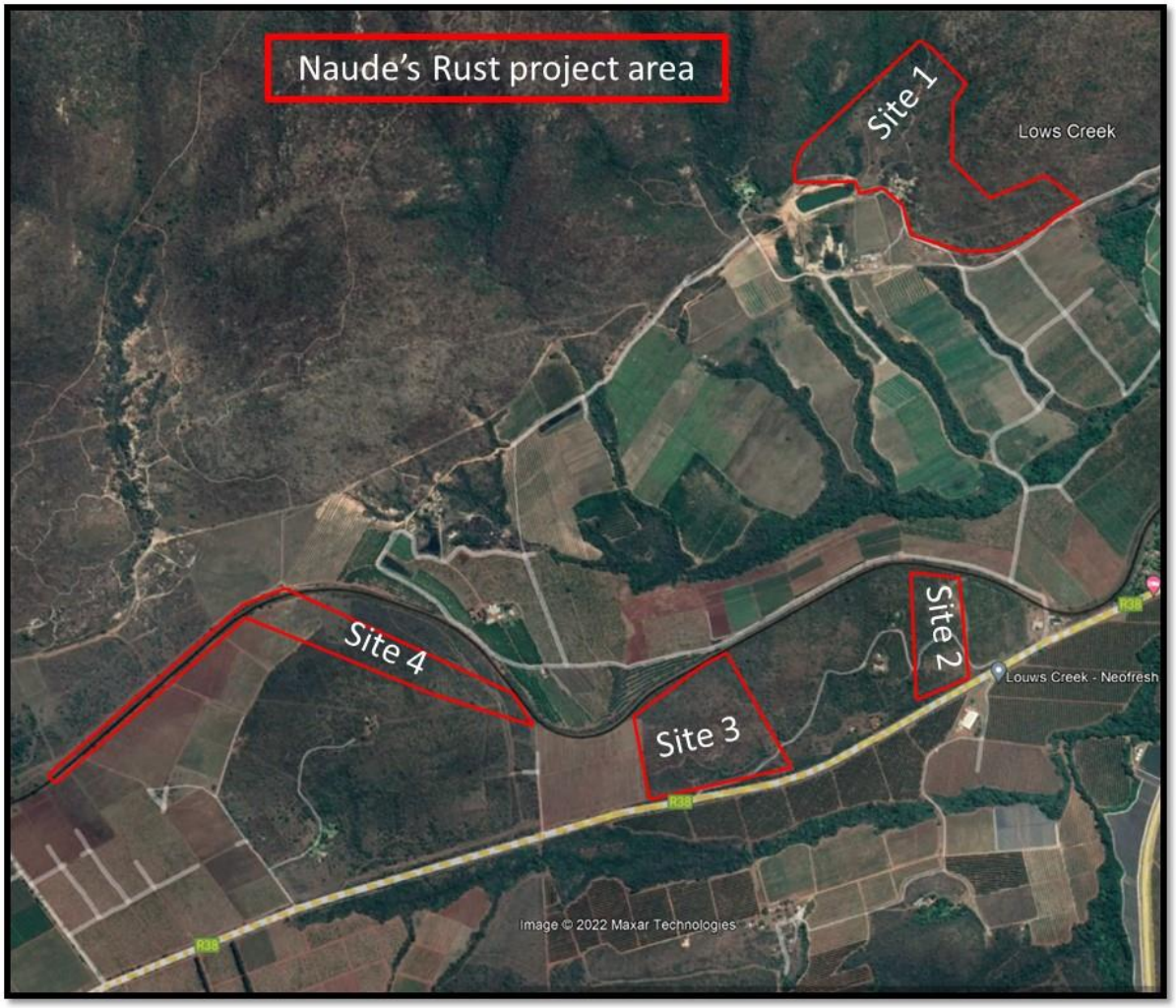


Figure 3: A merged Google Earth screenshot illustrating the four sites earmarked for the proposed bush clearing and orchard development.

1.4 Assumptions, Limitations and Knowledge gaps

Assumptions, Limitations and Knowledge gaps associated with this study include the following: The assumption has been made that:

- This study is completed with the assumption that the evaluation of the effects of bush-clearing and its associated impacts (influence on sensitive areas and biota) is the principal aspect of concern.
- Spatial GIS shape files received from the client that demarcate the proposed infrastructure development footprints are accurate.
- Project proponents will always strive to avoid and mitigate potentially negative project related impacts on the environment, with impact avoidance being considered the most successful approach, followed by mitigation. It further assumes that the project proponents will seek to enhance potential positive impacts on the environment.
- Wetland areas within transformed landscapes, are often affected by disturbances that restrict the use of available wetland indicators, such as hydrophytic vegetation or soil indicators (e.g., as a result of the dominance of alien vegetation and canalisation). This might influence the delineation process; however expert knowledge will generally overcome most of these discrepancies.
- Due to the relatively brief duration of the two field surveys (two days in total) conducted during a single growing season, the species list provided for the area cannot be regarded as comprehensive. Only species of plants visible and/or flowering at that time were detected. It is possible that plants which flower at other times of the year are under-represented.
- Red List species are, by their nature, usually very rare and difficult to locate. Compiling the list of species that could potentially occur in an area is limited by the paucity of collection records that make it difficult to predict whether a species may occur in an area or not. The methodology used in this assessment is designed to reduce the risks of omitting any species, but it is always possible that a species that does not occur on a list may be located in an area where it was not formerly known to exist.
- The lists of fauna for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. Due to the nature and habits of most faunal taxa it is unlikely that all species would have been observed during a site assessment of limited duration. Therefore, site observations are compared with literature studies where necessary.
- Animal species, especially birds, are mostly highly mobile and often migrate seasonally. Any field assessment of relatively short duration is therefore unlikely to record anything more than the most common species that happen to be on site at the time of the survey. Such field surveys are generally a poor reflection of the overall diversity of species that could potentially occur on site.

1.5 Details of the Author

Dr Andrew Deacon (PhD Zoology) worked as a researcher at Scientific Services, South African National Parks (SANParks, 1989 - 2012). He was initially employed as an Aquatic ecologist to coordinate the multidisciplinary KNP Rivers Research Programme, but later was tasked to manage the monitoring and research programmes for small vertebrate ecology in 15 South African National Parks (including Addo-, Kalahari- and Kruger NP).

As a recognised scientist in the fields of Ichthyology and Terrestrial Ecology, he is currently engaged as a specialist consultant regarding ecological studies. He was involved in numerous research programmes and projects, and produced EIA specialist reports (aquatic or terrestrial ecology) for 82 projects. Additionally, he also participated in Aquatic ecosystem projects, Environmental Water Requirement Studies and Faunal and ecosystems monitoring projects.

Apart from multiple environmental projects in South Africa, he has worked on assignments in the Democratic Republic of the Congo, Zambia, Mozambique, Zimbabwe, Namibia and Swaziland. He completed: Wetland Introduction and Delineation Course – Centre for Environmental Management: University of the Free State. He is a registered Professional Natural Scientist (Pr. Sci. Nat.) in the fields of Ecological Science (Reg. no. 116951).

2. Methodology

Methods and approach

This report is based on the guidelines provided in the Mpumalanga Biodiversity Sector Plan Handbook (MTPA, 2014). According to the MBSP, "it is important to note that all decisions regarding land-use applications in Mpumalanga are going to be evaluated by the authorities using the CBA maps and data, so it makes sense to consider these proactively, either prior to, or during, the EIA process."

The methods used in this report were undertaken in accordance with the MTPA Minimum Criteria Guideline with special emphasis on Protected Species.

2.1 Riparian delineation

It is important to differentiate between wetlands and riparian habitats. Riparian zones are not wetlands, however, depending on the ecosystem structure, wetlands can be also be classified as riparian zones if they are located in this zone (e.g., valley bottom wetlands). Although these distinct ecosystems will be interactive where they occur in close proximity it is important not to confuse their hydrology and eco-functions.

Riparian delineations are performed according to *"A practical field procedure for identification and delineation of wetlands and riparian areas"* as amended and published by the Department of Water Affairs and Forestry (2005); (Henceforth referred to as DWAF Guidelines (2005).

Aerial photographs and land surveys were used to determine the different features and riparian areas of the study area. Vegetation diversity and assemblages were determined by completing survey transects along all the different vegetation communities identified in the riparian areas.

Riparian areas are protected by the National Water Act (Act 36 of 1998), which defines a riparian habitat as follows:

> *"Riparian habitat includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas."*

Riparian areas include plant communities adjacent to and affected by surface and subsurface hydrologic features, such as rivers, streams, lakes, or drainage ways. Due to water availability and rich alluvial soils, riparian areas are usually very productive.

Tree growth rate is high and the vegetation is lush and includes a diverse assemblage of species. The delineation process requires that the following be taken into account:

- Topography associated with the watercourse;
- Vegetation;
- Alluvial soils and deposited material.

A typical riparian area according to the DWAF Guidelines (2005) is illustrated in Figure 4.

In addition to the DWAF Guidelines (2005) and DWAF updated manual (2008), the unpublished notes: Draft riparian delineation methods prepared for the Department of Water Affairs and Forestry, Version 1 (Mackenzie & Rountree, 2007) were used for classifying

riparian zones encountered on the property according to the occurrence of nominated riparian vegetation species.

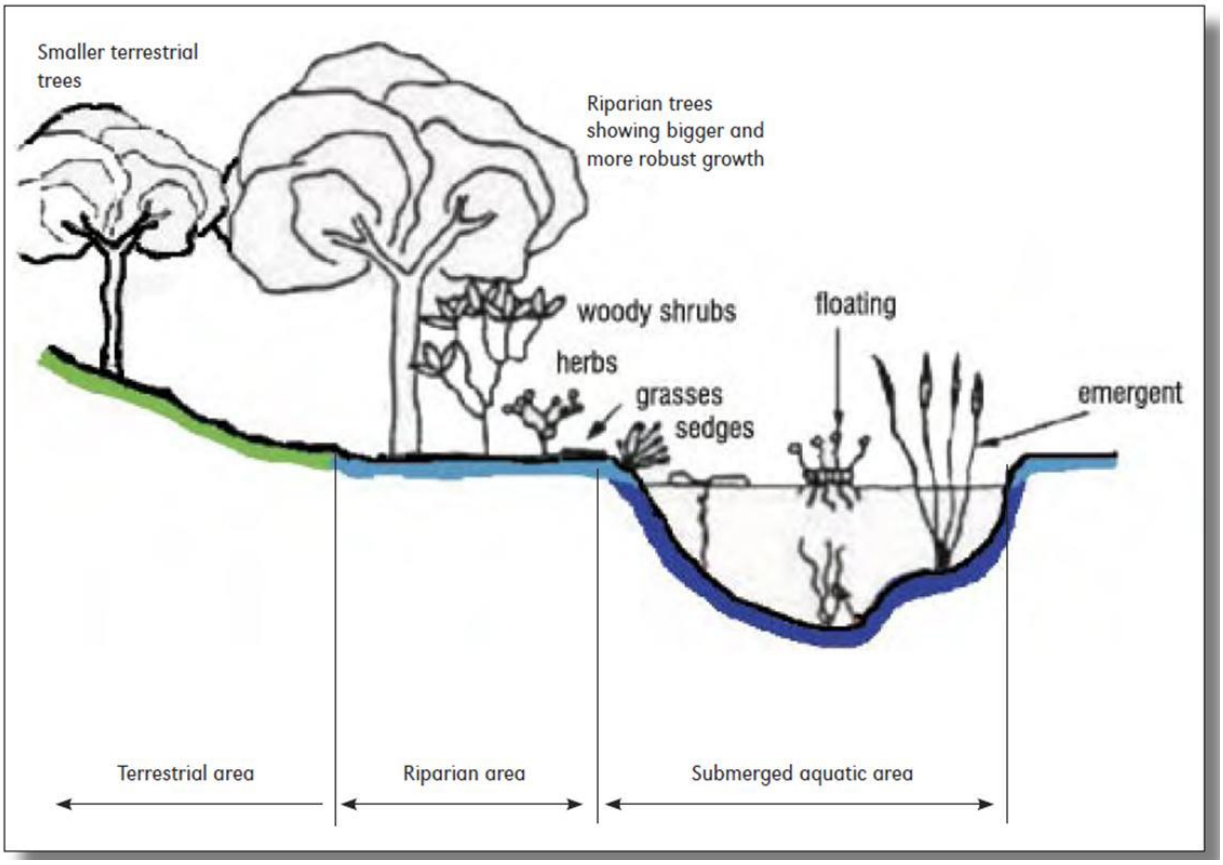


Figure 4: A cross section through a typical riparian area (DWAF Manual, 2008).

2.2 Buffers

Aquatic buffer zones are typically designed to act as a barrier between human activities and sensitive water resources thereby protecting them from adverse negative impacts. Buffer zones associated with water resources have been shown to perform a wide range of functions, and on this basis, have been proposed as a standard measure to protect water resources and associated biodiversity (Macfarlane et al, 2015). These functions include:

- Maintaining basic aquatic processes;
- Reducing impacts on water resources from upstream activities and adjoining land uses;
- Providing habitat for aquatic- and semi-aquatic species;
- Providing habitat for terrestrial species; and
- A range of ancillary societal benefits.

Due to their positioning adjacent to water bodies, buffer zones associated with streams and rivers will typically incorporate riparian habitat. Riparian habitat, as defined by the NWA, includes the physical structure and associated vegetation of the areas associated with a watercourse. These areas are commonly characterised by alluvial soils (deposited by the current river system) and are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas (Macfarlane et al, 2015).

However, the riparian zone is not the only vegetation type that lies in the buffer zone as the zone may also incorporate stream banks and terrestrial habitats depending on the width of the aquatic impact buffer zone applied. A diagram indicating how riparian habitat typically relates to aquatic buffer zones defined in this guideline is provided in Figure 5.

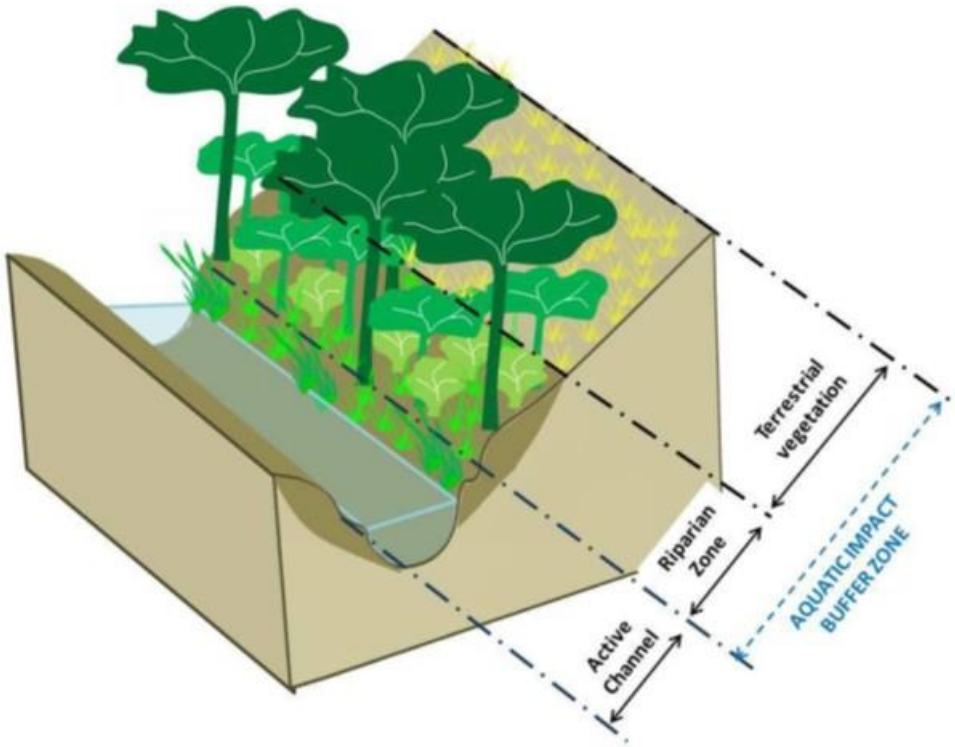


Figure 5: Schematic diagram indicating the boundary of the active channel and riparian habitat and the areas potentially included in an aquatic impact buffer zone (Macfarlane et al, 2015).

Once an aquatic impact buffer zone has been determined, management measures need to be tailored to ensure buffer zone functions are maintained for effective mitigation of relevant threat/s. Management measures must therefore be tailored to ensure that buffer zone functions are not undermined. Aspects to consider include:

- Aquatic impact buffer zone management requirements;
- Management objectives for the aquatic impact buffer zone; and
- Management actions required to maintain or enhance the aquatic impact buffer zone in line with the management objectives. Activities that should not be permitted in the aquatic impact buffer zone should also be stipulated.

2.3 Specialist assessment of terrestrial vegetation for the Naude's Rust bush clearing project

In accordance with the accepted proposal for this study, the botanical specialist study presented in the current report was to assess the footprint of the Naude's Rust development. The scope of work will include the Terrestrial- and Riparian Components as per the MTPA Minimum Criteria Guideline with special emphasis on Protected Species, including GPS coordinates for encountered species to facilitate obtaining the necessary permits.

Desktop

Vegetation communities and general land use patterns were identified prior to fieldwork using satellite imagery on Google Earth. Conservation-important plant species listed for the quarter-degree grid 2531CB in the Mpumalanga Tourism & Parks Agency's (MTPA) threatened species database, as well as the Plants of South Africa (POSA) data from the South African National Biodiversity Institute (SANBI), were used to produce a list of the most likely occurring species, which were searched for during fieldwork. Conservation-important plants include those listed as species of conservation concern by the SANBI Red List of South Africa or protected species as listed under the Mpumalanga Nature Conservation Act (MNCA) (No. 10 of 1998), or the National Environmental Management: Biodiversity Act Threatened or Protected Species (NEMBA ToPS) (No. 10 of 2004).

Fieldwork

Vegetation communities identified in the desktop phase were ground-truthed during a field visit in July and September 2022. The project area as well as the surrounding environment was surveyed on foot and dominant plant species were listed according to each of the vegetation communities.

The study area was broadly stratified into major classes on the basis of gradient, aspect, terrain units (e.g., crest, mid-slope and foot slope), rock cover, soils, land-use and vegetation physiognomy.

A total of 12 sites were surveyed and floristic data is summarised in Table 8. Environmental parameters recorded at each stand included the following:

- locality coordinates using a Global Positioning System (GPS) receiver;
- terrain unit (midslope, foot slope, etc.);
- estimated percentage surface rock cover; and
- any visible disturbances (e.g., grazing, fire, old lands).

This floristic classification was used only to guide the identification of the robust 'vegetation units' described in this report, which are based on qualitative and semi-quantitative floristic and habitat data gathered at the sites surveyed during the study.

Parameters such as geology, topography, etc. were also obtained from the relevant topographical-, geological- and soils maps.

For the purposes of this study, the most recent version of the Mpumalanga Biodiversity Conservation Plan (MBCP) map of ecological sensitivity was obtained from the Mpumalanga Tourism and Parks Agency and the boundaries of the study area were superimposed on this map. The MBCP divides the entire province into the following categories of importance in terms of biodiversity conservation value: 'Irreplaceable', 'Highly Significant', 'Important and Necessary', 'Least Concern' and 'No Natural Habitat Remaining'. No 'Irreplaceable' or 'Important and Necessary' areas occur within the study area.

2.4 Specialist assessment of terrestrial fauna for the Naude's Rust bush clearing project

A detailed desktop study on all faunal species recorded in the past was completed and includes a description of red data and protected status according to the IUCN red data list and the National Environmental Management Biodiversity Act (TOPS List). All applicable literature was reviewed and extensive background studies regarding species distributions, habitat preferences and species status were updated accordingly. The potential occurrence of threatened species was also evaluated from historical records, available literature, habitat availability and personal experience. The fauna species lists thus represent the majority of species occurring in the study area and provide a solid basis from which the project can continue to develop a comprehensive species list. The following detailed desktop studies and baseline animal assessment were conducted:

- Identification of all animal species expected to be present according to desktop studies of all relevant animal groups, namely birds; herpetofauna (amphibians and reptiles); and mammals. Potential occurrence of fauna in the study area was predicted based on knowledge of known habitat requirements of local fauna species.
- Lists of conservation-important mammals, birds, reptiles and frogs potentially occurring within the proposed agricultural development were prepared using data from the MTPA's threatened species database and applicable literature. The above data was captured mostly at a quarter-degree spatial resolution, but was refined by excluding species unlikely to occur within the study area, due to unsuitable habitat characteristics (e.g., altitude and land-use).
- Identification of all red data, protected and conservation important species per animal group and the compilation of distribution maps and GPS coordinates where recorded.
- Design management and monitoring programs to successfully monitor and manage all red data and protected and/or conservation important species.
- The assessment includes a review of all relevant literature, completion of field surveys, production of specialist reports and development of management recommendations.

2.5 Field surveys and habitat evaluation.

The current status of the faunal environment and an evaluation of the extent of site-related effects were determined using selected ecological indicators. At the same time all rare and endangered species, protected species, sensitive species and endemic species (conservation important faunal species) were identified and used to update and supplement existing studies. Ideally faunal surveys should cover the summer season, stretching from October to February. Surveys were conducted during July and September 2022.

Terrestrial vertebrate surveys

Amphibians, reptiles, birds and mammals were surveyed in pre-selected units. Emphasis was placed on fauna with high conservation value and their probability of occurrence in the unit. These include meticulous searches on fixed transects in all the representative biotopes to assess the presence/absence of amphibians, reptiles, birds and mammal species. Where necessary, special methods were implemented to augment the chances of finding species, including traps, nocturnal spotlight searches and identifying tracks and scats. Special emphasis is placed on finding threatened species.

- **Amphibian surveys**

Visual encounter surveys and audio monitoring are appropriate techniques for both inventory and monitoring of amphibian species. Both visual and auditory surveys were conducted along all transects, in plots, along streams and around ponds. Most amphibians are

detectable in this manner. To ensure a comprehensive inventory, all possible microhabitats were also searched, namely: soil, water, tree trunks, and beneath rocks, during both the day and at night.

- **Reptile surveys**

The most practical way to monitor reptiles, over large areas, is to sample along transects and systematically search encountered refuge areas. Transects were surveyed in different habitat types and all “cover” objects within a specified distance of the line turned over and checked. One particular strength of such transect monitoring is that it can be used to relate reptile abundance to habitat variables, such as vegetation and cover. The main objective of the survey is not to find as many reptiles as possible, but to get a reliable estimate of available habitat and quality of shelter and to compare these with expected reptiles and their required suite of habitat types.

- **Bird surveys**

Transects are probably the most widely used method of estimating the number of bird species in terrestrial habitats. Traditionally, observers will move along a fixed route undertaking surveys and recording the birds they see on either side of the route. For small birds, which are usually relatively numerous, a transect width of 10m on either side of the route (or 20-30m in open habitats) was found to be suitable for this study.

Transects were placed in such a way that all dominant soil and associated habitat types were adequately covered. Birds outside the transect band or those flying over were noted. Surveys always commenced at first light when avian activity was at its peak. Bird calls are equally important in bird surveys and especially important during point counts in rugged terrain and dense bush where visual observations are limited. Point surveys can also be used within wide open areas where birds can be spotted from a distance, for example pans and grassland flats.

- **Mammal surveys**

The same line-transects were surveyed on foot to monitor diurnal mammal species. Each sighting as well as the related vegetation features was recorded to establish habitat preferences. All major habitat types were assessed.

Visual sightings, as well as all signs of mammal presence (tracks and scats) were used as indicators of presence for some species.

- **Habitat surveys**

Representative habitat transects within the study area were surveyed. Macro- and micro-habitat surveys were executed to assess the quality of habitat and its potential to support various faunal species.

In assessing the habitat profiles in conjunction with the distribution data per species, accurate information on the probability of the species occurring in the relevant biotopes was obtained. Thus, a list of expected species for the different biotopes in the survey area was compiled and compared with the fauna observed during monitoring surveys.

The information obtained from the micro-habitat surveys was used to enhance the prediction abilities of the process. To this end, quality and quantity of habitat aspects provide an indication of species abundance, while presence or absence of habitat aspects indicates the probability of species occurrence. Habitat quality classifications could be a useful indication of resource utilisation (especially in adjacent areas).

2.6 Impact Assessment

2.7.1 Mpumalanga Biodiversity Sector Plan (MBSP) and Threatened Ecosystems

It is important to note that all decisions regarding land-use applications in Mpumalanga are going to be evaluated by the authorities using the CBA maps and data (Figure 6 and 7), so it makes sense to consider these proactively, either prior to, or during, the EIA process (MBSP Handbook, 2014).

The following are extracts from the MBSP Handbook (2014) provided as background to our approach: “Environmental assessment is used to determine the broad ‘environmental fit’, and ecological sustainability of proposed land-use changes. It also establishes the biodiversity context within which a change in land-use is being contemplated and against which its likely impacts (both site-based and cumulative) must be assessed. CBA maps and their associated land-use guidelines provide a proactive and scientific basis for assessing the potential impacts of proposed land-uses and play an important role in providing a biodiversity-sensitive perspective in this process.”

Preliminary systematic biodiversity plans will help ascertain whether any habitat modification will contribute to cumulative impacts and compromise biodiversity targets for specific ecosystems or species, or by contributing to habitat fragmentation and degradation of ecological processes.

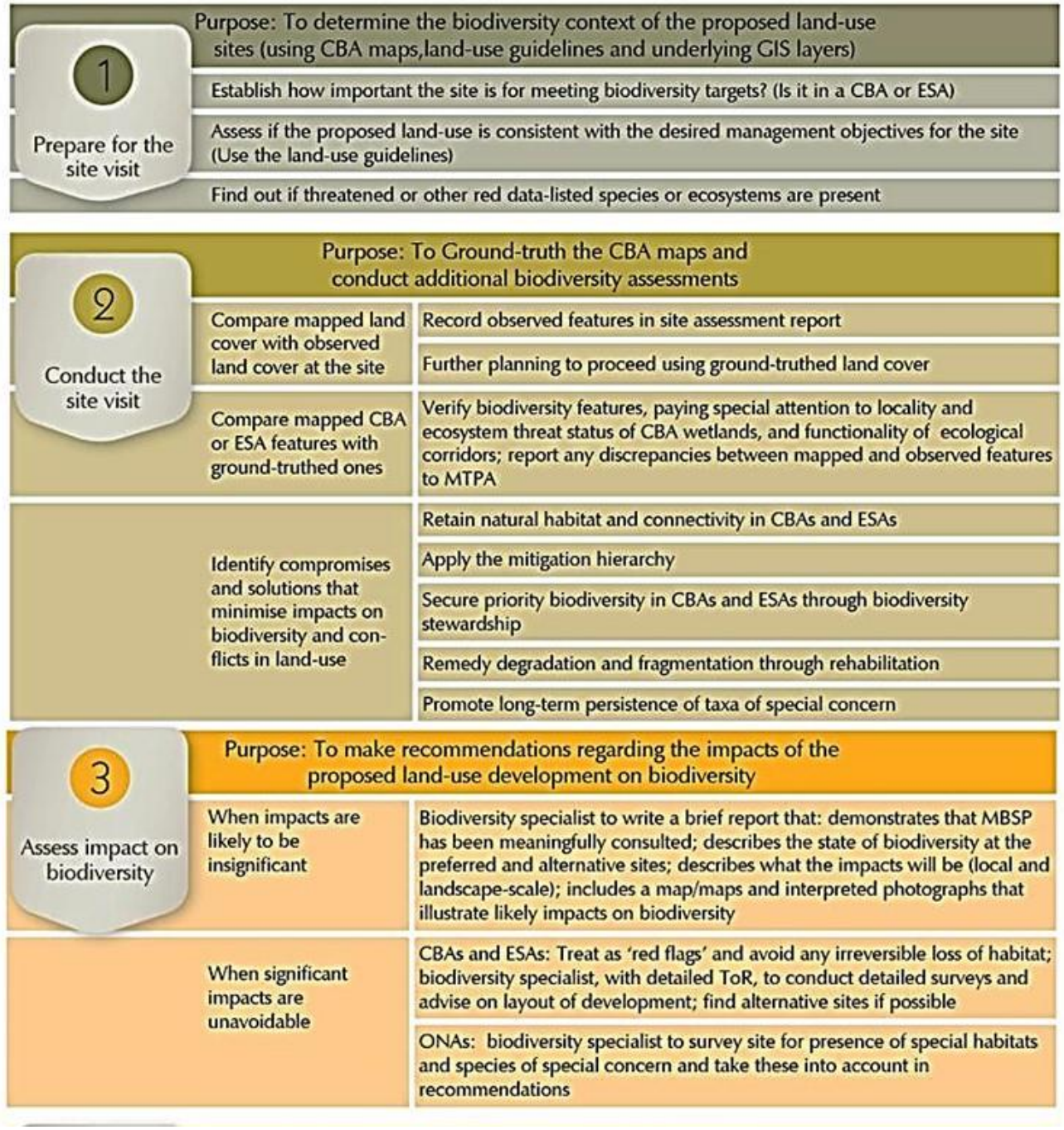


Figure 6: A summary of the first three steps to be followed in using the CBA maps proactively in environmental impact assessment.

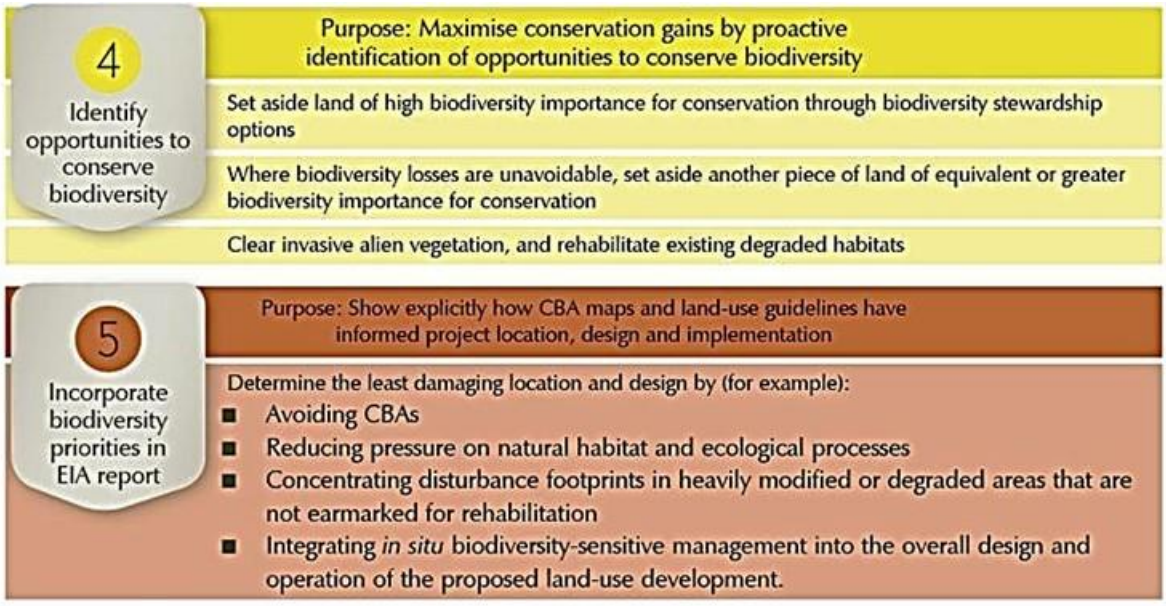


Figure 7: A summary of steps 4 and 5 to be followed in using the CBA maps proactively in environmental impact assessment.

Spatial data sets that indicate Critical Biodiversity Areas

To establish how important the site is for meeting biodiversity targets, a number of resources and tools are used as prescribed by the Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Biodiversity Sector Plan, 2014). Specifically, the Land-Use Decision Support Tool (LUDS) and the MBCP are extensively used to compile the LUDS Report (BGIS, 2016). LUDS was developed to facilitate and support biodiversity planning and land-use decision-making at a national and provincial level. Its primary objective is to serve as a guideline for biodiversity planning but should not replace specialist ecological assessments.

Critical Biodiversity Areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. If these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.

Land-Use Decision Support Tool (LUDS)

To establish how important the site is for meeting biodiversity targets, it is necessary to answer the following three simple but fundamentally important questions:

- How important is the site for meeting biodiversity objectives (e.g., is it in a **Critical Biodiversity Area** (CBA) or Ecological Support Area (ESA)?
- Is the proposed land-use consistent with these objectives or not (to be checked against the land-use guidelines)?
- Does the sensitivity of this area trigger the requirements for assessing and mitigating environmental impacts of developments, or in terms of the listed activities in the EIA regulations?

2.6.2 Habitat sensitivity assessment

The purpose of producing a habitat sensitivity map is to provide information on the location of potentially sensitive biodiversity features in the study area, including areas of natural vegetation, habitat types supporting important biodiversity features or high diversity, areas supporting important ecological processes and habitat suitable for any species of conservation concern.

An explanation of the different sensitivity classes is given in Table 2. Areas containing untransformed natural vegetation of conservation concern, high diversity or habitat complexity, Red List organisms or systems vital to sustaining ecological functions are considered potentially sensitive. In contrast, any transformed area that has no importance for the functioning of ecosystems is considered to potentially have low sensitivity.

Table 2: Explanation of sensitivity ratings.

Sensitivity	**Factors contributing to sensitivity**	**Example of qualifying features**
VERY HIGH	Indigenous natural areas that are highly positive for any of the following: • Presence of threatened species (Critically Endangered, Endangered, Vulnerable) and/or habitat critical for the survival of populations of threatened species. • High conservation status (low proportion remaining intact, highly fragmented, habitat for species that are at risk). • Protected habitats (areas protected according to national/provincial legislation, e.g., National Forests Act, Draft Ecosystem List of NEM:BA, Integrated Coastal Zone Management Act, Mountain Catchment Areas Act, Lake Areas Development Act) And may also be positive for the following: • High intrinsic biodiversity value (high species richness and/or turnover, unique ecosystems) • High value, ecological goods & services (e.g., water supply, erosion control, soil formation, • carbon storage, pollination, refugia, food production, raw materials, genetic resources, cultural value) • Low ability to respond to disturbance (low resilience, dominant species very old).	• CBA areas. • Remaining areas of vegetation type listed in Draft Ecosystem List of NEM:BA as Critically Endangered, Endangered or Vulnerable. • Protected forest patches. • Confirmed presence of populations of threatened species.

HIGH	Indigenous natural areas that are positive for any of the following: • High intrinsic biodiversity value (moderate/high species richness and/or turnover). Presence of habitat highly suitable for threatened species (Critically Endangered, Endangered, Vulnerable species). • Moderate ability to respond to disturbance (moderate resilience, dominant species of intermediate age). • Moderate conservation status (moderate proportion remaining intact, moderately fragmented, habitat for species that are at risk). • Moderate to high value ecological goods & services (e.g., water supply, erosion control, soil formation, carbon storage, pollination, refugia, food production, raw materials, genetic resources, cultural value). And may also be positive for the following: Protected habitats (areas protected according to national / provincial legislation, e.g. National Forests Act, Draft Ecosystem List of NEM:BA, Integrated Coastal Zone Management Act, Mountain Catchment Areas Act, Lake Areas Development Act).	• Habitat where a threatened species could potentially occur (habitat is suitable, but no confirmed records). • Confirmed habitat for species of lower threat status (near threatened, rare). • Habitat containing individuals of extreme age. • Habitat with low ability to recover from disturbance. • Habitat with exceptionally high diversity (richness or turnover). • Habitat with unique species composition and narrow distribution. • Ecosystem providing high value ecosystem goods and services.
MEDIUM-HIGH	Indigenous natural areas that are positive for one or two of the factors listed above, but not a combination of factors.	• Corridor areas. • Habitat with high diversity (richness or turnover). • Habitat where a species of lower threat status (e.g. (near threatened, rare) could potentially occur (habitat is suitable, but no confirmed records).
MEDIUM	Other indigenous natural areas in which factors listed above are of no particular concern. May also include natural buffers around ecologically sensitive areas and natural links or corridors in which natural habitat is still ecologically functional.	
MEDIUM-LOW	Degraded, secondary or disturbed indigenous natural vegetation.	
LOW	No natural habitat remaining.	

Table 3: The use of CBA maps in Environmental Impact Assessment and the reference to relevant sections present in the report.

Land-use planning and Decision-making	Reference
Step 1: Prepare for the site visit: Purpose: To determine the biodiversity context of the proposed land-use sites (using CBA maps, land-use guidelines and underlying GIS layers)	
Step 1.1 Establish how important the site is for meeting biodiversity targets? (Is it in a CBA or ESA?)	Critical Biodiversity Areas (under 5.4)
○ Step 1.1.1 Proposed land use	Project description (under 1.3)
○ Step 1.1.2 Environmental Impact Assessments (EIA) and Freshwater Ecosystem Priority Areas (FEPA)	Freshwater Ecosystem Priority Areas (FEPAs) (under 5.4)
○ Step 1.1.3 Description of the biophysical environment	3.2 Physiography of the study area
○ Step 1.1.4 Present Ecological State of the Naude's Rust	3.1 Present Ecological State of the study area
○ Step 1.1.5 Critical Biodiversity Areas	Critical Biodiversity Areas (under 5.4)
• Step 1.2 Assess if the proposed land-use is consistent with the desired management objectives for the site (Use the land-use guidelines)	Critical Biodiversity Areas (under 5.4)
○ Step 1.2.1 Critical Biodiversity Area in the Naude's Rust project area	Critical Biodiversity Areas (under 5.4)
• Step 1.3 Find out if threatened or other red data-listed species or ecosystems are present ○ Vegetation ○ Fish ○ Frogs ○ Reptiles ○ Birds ○ Mammals	4.3 Biota assemblages of the Naude's Rust project areas
Step 2: Conduct the site visit: Purpose: To Ground truth the CBA maps and conduct additional biodiversity assessments in the study area	4.2 Ecological survey transects in the Naude's Rust project area.
Step 2.1 Compare mapped land cover with observed land cover at the site	4.3.1 Vegetation units and land cover types within the study area

○ Step 2.1.1 Record observed features in site assessment report ▪ Ecological surveys - methods ▪ Aquatic habitat assessments ▪ Vegetation ▪ Aquatic biota ▪ Aquatic invertebrate assessment ▪ Fish communities ▪ Terrestrial fauna studies ▪ Amphibian surveys ▪ Reptile surveys ▪ Bird surveys ▪ Mammal surveys	2. Methodology 4.3 Ecosystems: Baseline description
○ Step 2.1.2 Results of Ecological Surveys	4. Results
Vegetation	4.1 Vegetation units and land cover types within the study area
▪ Observed vegetation	4.3.1 Vegetation communities
▪ Riparian delineation	4.3.1.2 Riparian delineation
○ Fauna surveys	
▪ Aquatic habitats and fauna	4.3 Ecosystems: Baseline description
▪ Aquatic habitat assessment	4.3 Ecosystems: Baseline description
▪ Aquatic invertebrate assessment	4.3 Ecosystems: Baseline description
▪ Fish Response Assessment Index	4.3 Ecosystems: Baseline description
▪ Terrestrial fauna	4.3.2 Surveys of Fauna
○ Frogs	4.3.2.1 Frogs
○ Reptiles	4.3.2.2 Reptiles
○ Birds	4.3.2.3 Birds
○ Mammals	4.3.2.4 Mammals
○ Step 2.1.3 Further planning to proceed using ground-truthed land cover	5.4 Land-use planning and Decision-making

Step 2.2 Compare mapped CBA or ESA features with ground-truthed ones	4.1 Vegetation units and land cover types within the study area
Step 2.3 Identify compromises and solutions that minimise impacts on biodiversity and conflicts in land-use	Critical Biodiversity Areas (under 5.4)
○ Step 2.3.1 Retain natural habitat and connectivity in CBAs and ESAs	Critical Biodiversity Areas (under 5.4) - Corridors for Connectivity
○ Step 2.3.2 Apply the mitigation hierarchy	5.6 Assessment of impacts
○ Step 2.3.3 Secure priority biodiversity in CBAs and ESAs through biodiversity stewardship	5.8 Conditions for inclusion in the environmental authorisation
○ Step 2.3.4 Remedy degradation and fragmentation through rehabilitation	5.8 Conditions for inclusion in the environmental authorisation
○ Step 2.3.5 Promote long-term persistence of taxa of special concern	5.8 Conditions for inclusion in the environmental authorisation
Step 3: Assess impact on biodiversity: Purpose: To make recommendations regarding the impacts of the proposed land-use development on biodiversity	5.6 Assessment of impacts
Step 3.1 When impacts are likely to be insignificant	5.6 Assessment of impacts
○ Step 3.2 When significant impacts are unavoidable	5.10 Reasoned opinion
○ Step 3.2.1 CBAs and ESAs	5.10 Reasoned opinion
○ Step 3.2.2 ONAs	5.10 Reasoned opinion
Step 4: Identify opportunities to conserve biodiversity: Purpose: Maximise conservation gains by proactive identification of opportunities to conserve biodiversity	5.4 Land-use planning and Decision-making
○ Step 4.1 Set aside land of high biodiversity importance for conservation through biodiversity stewardship options	5.4 Land-use planning and Decision-making
○ Step 4.2 Where biodiversity losses are unavoidable, set aside another piece of land of equivalent or greater biodiversity importance for conservation	5.4 Land-use planning and Decision-making
○ Step 4.3 Clear invasive alien vegetation and rehabilitate existing degraded habitats	5.4 Land-use planning and Decision-making
Step 5: Incorporate biodiversity priorities in EIA report: Purpose: Show explicitly how CBA maps and land-use guidelines have informed project location, design and implementation	5.4 Land-use planning and Decision-making
○ Step 5.1 Determine the least damaging location and design	5.4 Land-use planning and Decision-making

○ Step 5.1.1 Avoiding CBAs	5.4 Land-use planning and Decision-making
○ Step 5.1.2 Reducing pressure on natural habitat and ecological processes.	5.6 Assessment of impacts
○ Step 5.1.3 Concentrating disturbance footprints in heavily modified or degraded areas that are not earmarked for rehabilitation	5.6 Assessment of impacts
○ Step 5.1.4 Integrating *in situ* biodiversity-sensitive management into the overall design and operation of the proposed land-use development	5.6 Assessment of impacts

2.6.3 Impact Rating Methodology

It is the goal of the impact assessment process to determine the significance of potential environmental impacts associated with the proposed development. The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. Each impact was evaluated individually, however the possibility of a cumulative impact was also considered and evaluated accordingly.

The potential impacts or risks associated with the proposed development were assessed based on the following criteria:

- **Applicable phase: Construction, Operational, (Decommissioning)**
- **Nature of impact:** Provides a description of the expected impacts (Negative, neutral or positive)

The criteria used to determine impact consequence are presented in the tables below.

Table 4: Criteria used to determine the consequence of the impact

Rating	**Definition of Rating**	**Score**
A. Extent - the area over which the impact will be experienced		
Site	Confined to the site, or part thereof	1
Local	Effect limited to 3 to 5km of the site	2
Regional	Effect will have an impact on a regional scale.	3
B. Intensity - the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration - the timeframe over which the impact will be experienced and its reversibility		
Short-term	Up to 2 years	1
Medium-term	2 - 15 years	2
Long-term	>15 years	3

The scores are then combined (A+B+C) to determine the Consequence Rating (Table 5).

Table 5: Calculation of the consequence score.

Combined Score (A+B+C)	3-4	5	6	7	8-9
Consequence Rating	Very low	Low	Medium	High	Very high

The probability of the impact occurring needs to be considered in order for the final significance rating to be informed by the specific context.

Table 6: Probability Classification.

Probability - the likelihood of the impact occurring	
Improbable	<40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	>70%- 90% chance of occurring
Definite	>90% chance of occurring

The significance of the impact is attained by cross-referencing probability against consequence, as is listed below.

- **Significance:**
  - Low: Where the impact will have a relatively small effect on the environment and will not have an influence on the decision
  - Medium: Where the impact can have an influence on the environment and the decision and should be mitigated
  - High: Where the impact definitely has an impact on the environment and decision regardless of any possible mitigation

Table 7: Status and Confidence classification.

Status of Impact	
Indication whether the impact is adverse (negative) or beneficial (positive)	+ ve
	- ve
Confidence of Assessment	
The degree of confidence in predictions based on available information, the EAP's judgement and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity/development.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity/development.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity/development.
- **HIGH**: the potential impact **will** affect the decision regarding the proposed activity / development.
- **VERY HIGH**: the proposed activity should only be approved under special circumstances.

Significance post mitigation: Describes the significance after mitigation.
Mitigation: Provides recommendations for mitigation measures

3. Description of the study area

3.1 Present Ecological State of the study area

This report covers areas on the Farm Naude's Rust 272 JU: Portions 17 and 21 (next to the R38 between Kaapmuiden and Lows Creek), Mpumalanga. The study area is located within the quarter degree grid 2531CB. The site is located within the Ehlanzeni District Municipality, Mpumalanga Province.

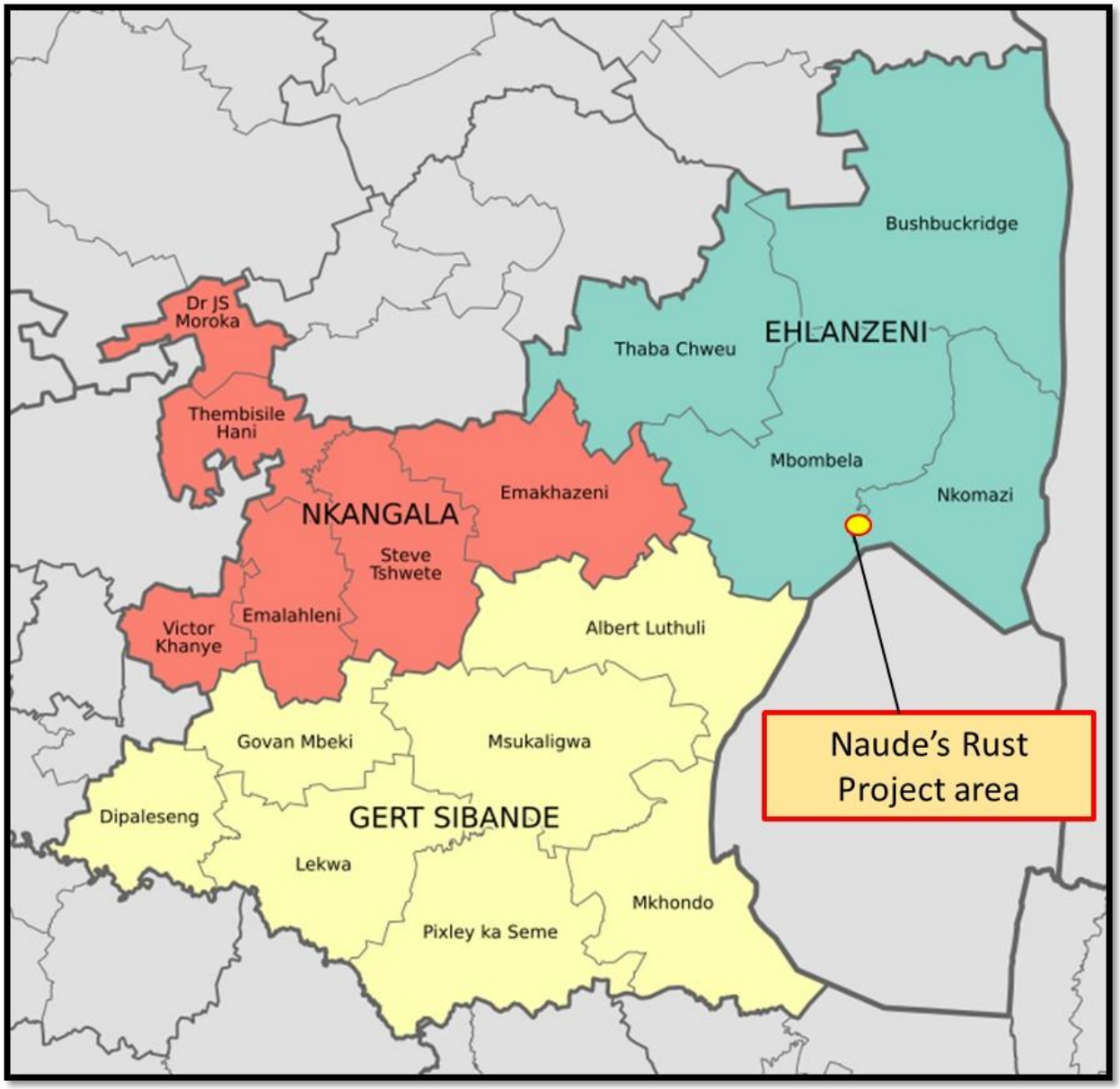


Figure 8: Location of the Farm Naude's Rust Project area.

Local Municipality

Umjindi Local Municipality which is the focus of this report falls under the Ehlanzeni District Municipality in the Komati River catchment of the Inkomati WMA. There are a number of towns and rural villages that make up the Municipality. The Ehlanzeni District Growth and Development Plan is of relevance and it describes the importance of the Maputo Development Corridor as it provides Ehlanzeni specifically Mbombela with the status of economic development node.

According to Statistics South Africa's September 2005 labour force survey, Agriculture was the fourth highest formal employer in the province: 11.5% of the province's formal employment. Forestry and other agricultural activities provide jobs far in excess of their contributions to Provincial GGP – the sector comprises 6.1% of total GGP yet provides 18.1% of the employment opportunities in the Province. Although resources in this sector are constrained, agriculture holds significant employment potential for the Province.

The Nkomazi Local Municipality is characterised by farms, manufacturing and tourism, as the main source of employment and economic activity. The employment sector or industries in which the people of Nkomazi are involved shows that the Agriculture Sector employs 22%. (Nkomazi Local Municipality, 2013). In the Mpumalanga Province the agriculture sector contributes about 14% to the economic activity. Associated land uses in the area include agriculture, nature conservation, cattle ranching, game breeding, tourist facilities and hunting" (Nkomazi Local Municipality, 2013).

Farming

The Low's Creek area is a historical farming area where farmers have traditionally established and grown short-term fruit and vegetable crops such as tomatoes, cabbage, beans, brinjals and butternuts. In the 1980's sugarcane was established and widely cultivated in the area but has been gradually removed due to water demand by the crop, increased input costs, distance from the mill and low returns achieved.

As a result of this many farmers investigated and experimented with crops which would give better returns, use less water and be able to be locally processed and exported. The most successful experimental crops identified were macadamias and citrus and the area has seen such large plantings volumes of both macadamias citrus that a processing plant was established in the Low's Creek area for the intake, processing and export of macadamia kernel and macadamia products and a packing facility was established at Eureka for the sorting and packing of citrus products for export.

With the continued growth within the local Nkomazi region, particularly through the establishment of the Maputo Corridor initiative, export and economic activities have increased substantially due to the location and ease of exporting through the Port of Maputo. The local Nkomazi & Mbombela Councils are very supportive of developments associated with the Maputo Corridor and the expansion of agriculture and sustainable land use envisaged by this project proposal under investigation compliments the regional vision that the authorities have for this area.

3.2 Physiography of the study area

The most recent vegetation map for South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2007), places the entire study area (Figure 9) within **Granite Lowveld (SVI 3).**

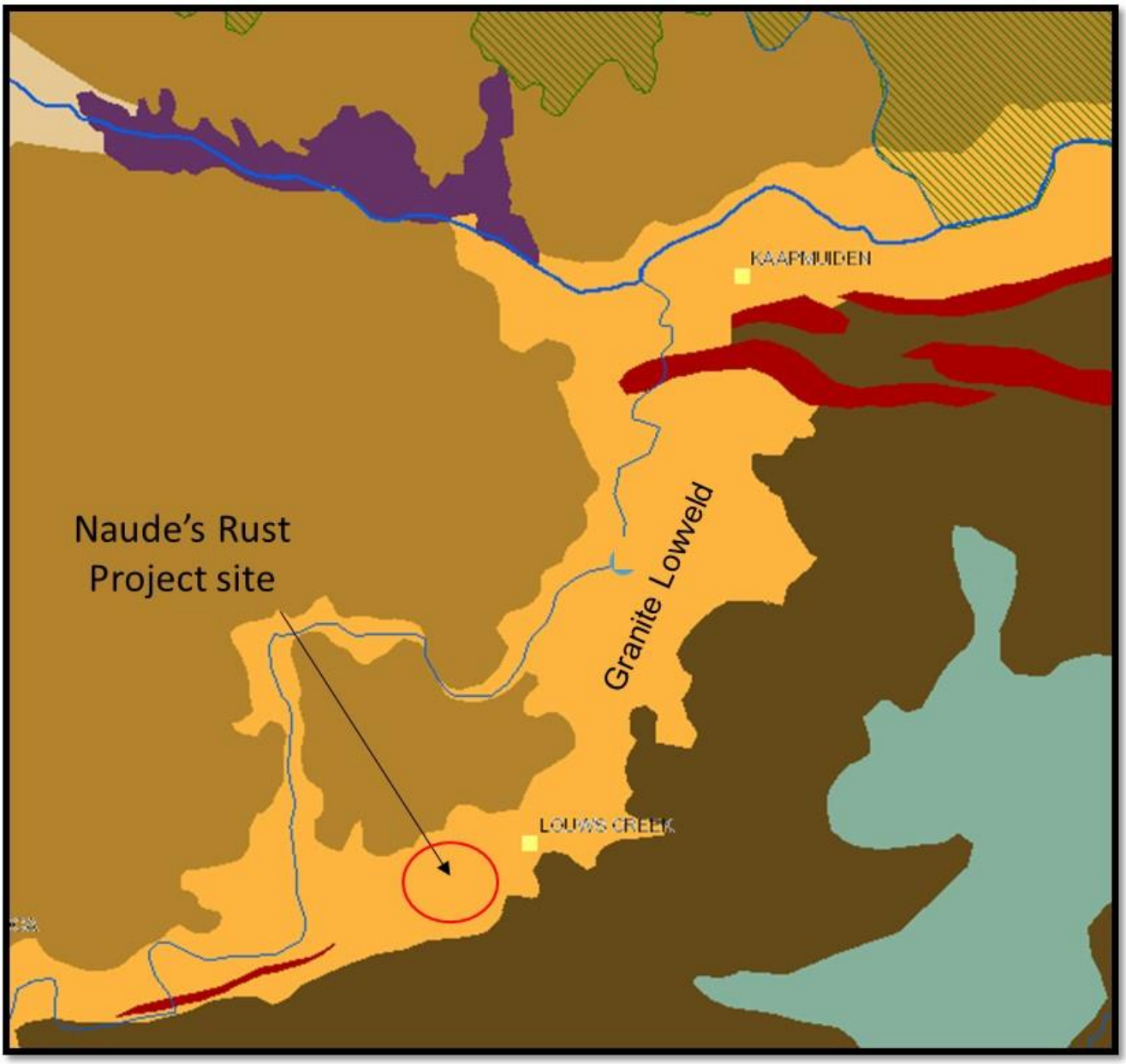


Figure 9: A broad-scale overview of the vegetation types in and around the Naude's Rust project area and the area being covered by the vegetation types (BGIS, 2018; Mucina & Rutherford, 2006).

Distribution: A north-south belt on the plains east of the escarpment from Thohoyandou in the north, with an eastward extension to Mica and Hoedspruit to the area east of Bushbuckridge. Substantial parts are found in the Kruger National Park spanning areas east of Orpen Camp southwards through Skukuza and Mkuhlu, including undulating terrain west of Skukuza to the basin of the Mbyamiti River. Altitude 250-700 m.

Vegetation & Landscape Features: Consists of tall shrubland with few trees to moderately dense low woodland on deep sandy uplands. Also includes dense thicket to open savanna in the bottomlands and a dense herbaceous layer on fine-textured soils.

Geology & Soils: From north to south, the Swazian Goudplaats Gneiss, Makhutswi Gneiss and Nelspruit Suite (granite gneiss and migmatite), and further south still, the younger Mpuluzi Granite (Randian) form the major basement geology of the area. Archaean granite and gneiss weather into sandy soils in the uplands and clayey soils with high sodium content in the lowlands.

Conservation: Vulnerable but Least Concern according to the MBSP Handbook. Target 19%. Some 17% statutorily conserved in the Kruger National Park. About the same amount conserved in private reserves, mainly the Selati, Klaserie, Timbavati, Mala Mala, Sabi Sand and Manyeleti Reserves. More than 20% already transformed, mainly by cultivation and by settlement development. Erosion is *low* to moderate.

The vegetation type represents tall shrubland with few trees to moderately dense low woodland on the deep sandy uplands. Dense thicket to open savanna occurs in the bottomlands. The dense herbaceous layer contains the dominant *Digitaria eriantha, Panicum maximum* and *Aristida congesta* on fine-textured soils, while brackish bottomlands support *Sporobolus nitens, Urochloa mosambicensis* and *Chloris virgata*. At seep lines where convex topography changes to concave, a dense fringe of *Terminalia sericea* occurs with *Eragrostis gummiflua* in the undergrowth.

4. Results

4.1 Vegetation units and land cover types within the study area

Vegetation/habitat types are mapped on the basis of available information (aerial photography, soil types, geology) and will consist of structurally distinct vegetation units (wetland, grasslands, woodland) as well as transformed areas (cultivated land, areas of alien vegetation). Vegetation/habitat units will be graded according to biodiversity value and conservation status.

The following broad-scale vegetation units are simply practical units that combine various plant communities which share structural and functional characteristics and have common management requirements.

A total of two units consisting of untransformed vegetation/habitat and three units consisting of transformed vegetation/habitat that will be associated with the EIA project, were identified. These five units are listed below, and each unit is later described in more detail.

Vegetation unit and land cover type:

Untransformed vegetation/habitat

1. Untransformed savannah woodland
2. Channelled valley bottom wetland with seepage

Transformed vegetation/habitat

3. Secondary savannah woodland (damming, agriculture and residential aspects)
4. Redundant infrastructure (old dam wall, demolished staff village, old sawmill)
5. Cleared woodland (borrow pit, agriculture)

Naude's Rust Site 1 (23.6 ha)

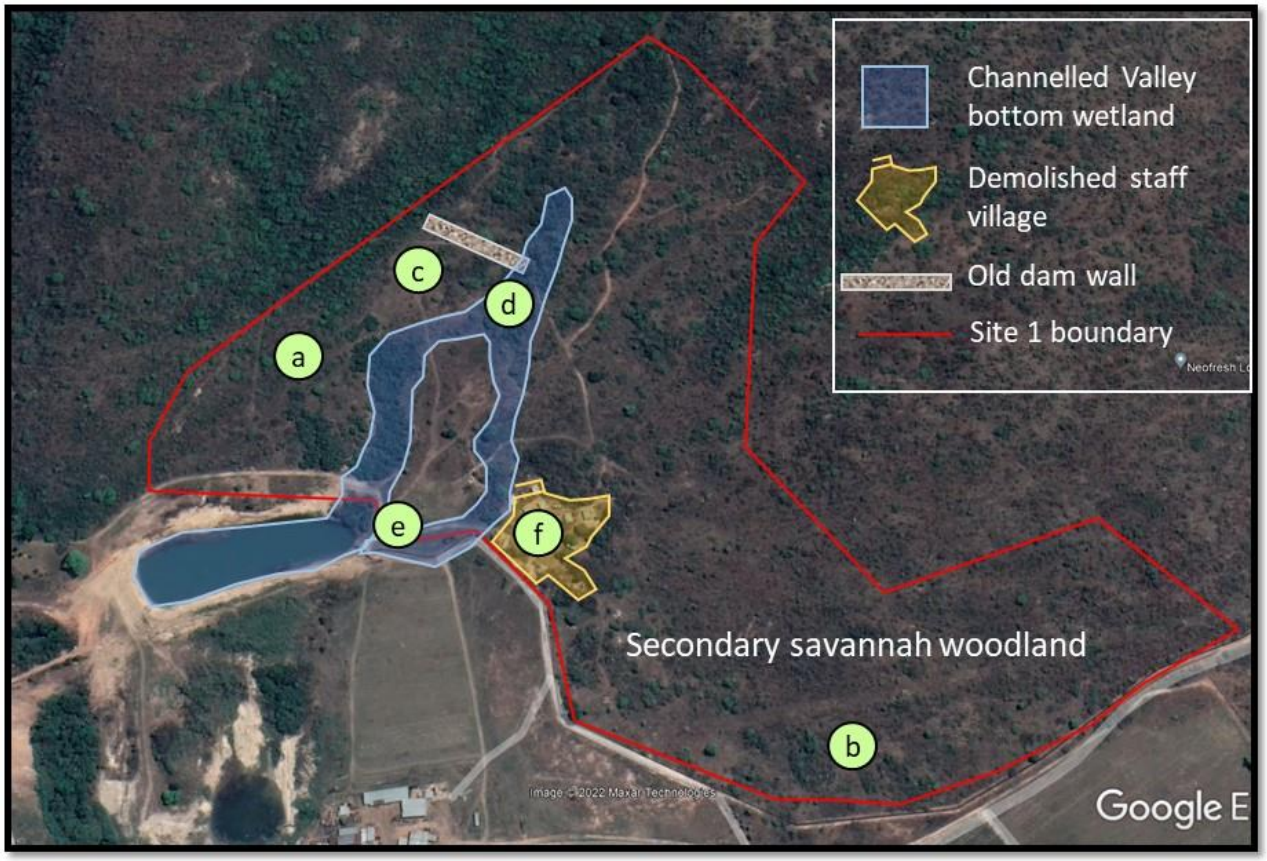


Figure 10: The land cover at Site 1 in the Naude's Rust project area (numbering a-f correspond with photos of the area in Figure 11).

For the description of Site 1, refer to Figure 10:

a. Although the field layer seems to be in an untransformed state, signs of earlier human impacts (dams, agriculture and residential aspects) are still visible.

b. The abundance of sicklebush (*Dichrostachys cinerea*) is a sign of earlier agricultural activities.

c. An old dam wall is obscured by dense plant growth, but the wetland vegetation present (reeds and sedges) indicates the wetter soil of the dam position.

d. The drainage line splits into two channels and then converge again into the artificial dam downstream.

e. The seepage wetland at the end of the drainage line is a sign that there are subsurface flows even during the drier months.

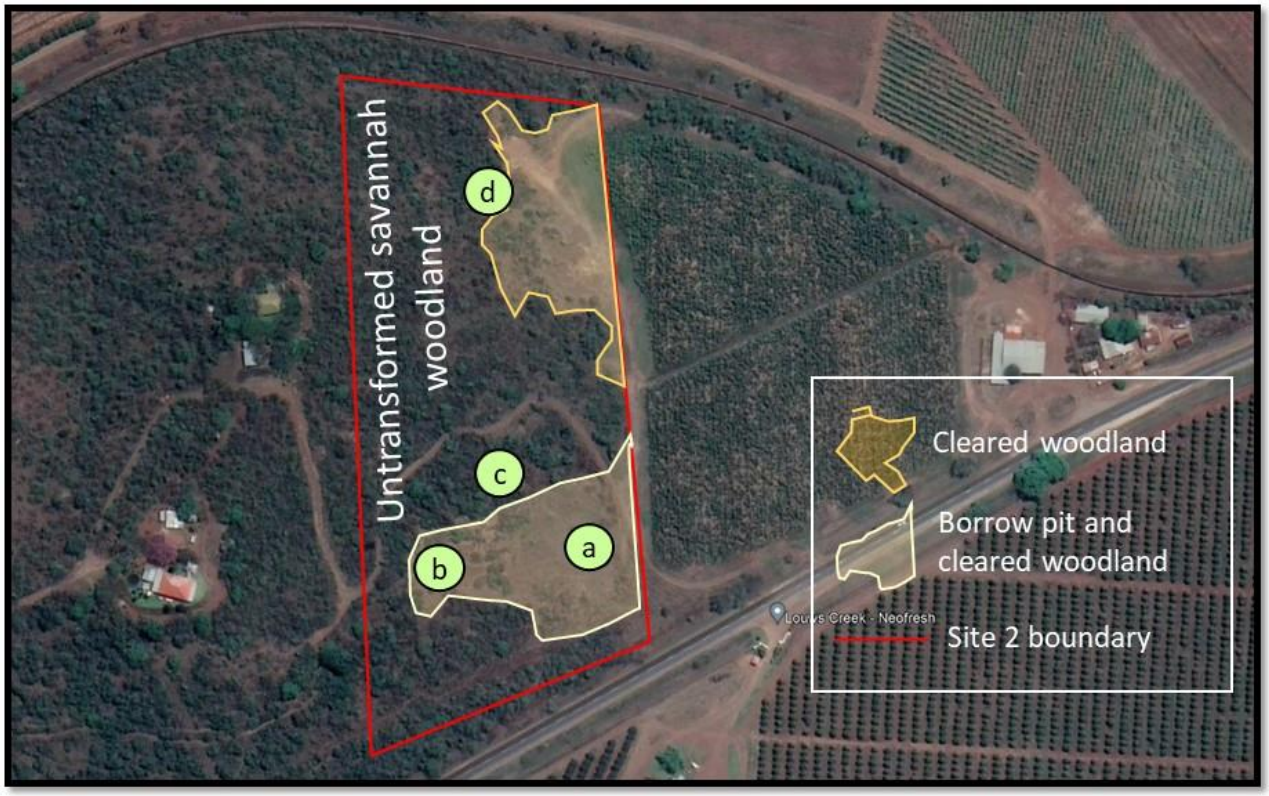
f. The remains of an old staff compound will be rehabilitated.

Figure 11: Site 1 in the Naude's Rust project area.

Site 1 is the largest of the 4 project sites (23.6 ha). The site is located inside the savannah woodland of the Crocodile Gorge Mountain foothills. The northern portion of the site is situated in the untransformed sloping foothills with inclines probably too steep for farming. The lower portion is situated on level land which was previously utilised by the farm for different purposes:

- The area to the east show signs of previous agricultural activities due to the presence of abundance of sicklebush (*Dichrostachys cinerea*). An irrigation canal and a dirt road form the boundary of Site 1 in the south.

- The remains of an old staff compound are still visible in the centre of the southern portion of the site (Figure 11f).
- A prominent drainage line dissects the area in the south-western portion of the site, directing seepage from the northern sloping portion of the catchment to an existing impoundment just outside the Site 1 demarcation (Figure 10).
- To the east of a drainage line, signs of historical habitation are visible. An old dam, ornamental plants and some foundations of a previous residence are present. Further east the woodland has been transformed by human activities and, apart from a current residence just outside the site boundary, many alien exotic plants are found in the area.



Naude's Rust Site 2 (5.5 ha)

Figure 12: The land cover at Site 2 in the Naude's Rust project area (numbering a-d correspond with photos of the area in Figure 13).

This site consists of approximately 60% untransformed savannah woodland and the rest consists of an old borrow pit, cleared areas and dirt roads. The untransformed woodland on the site represents the midslope vegetation type found in most of the surrounding land types.

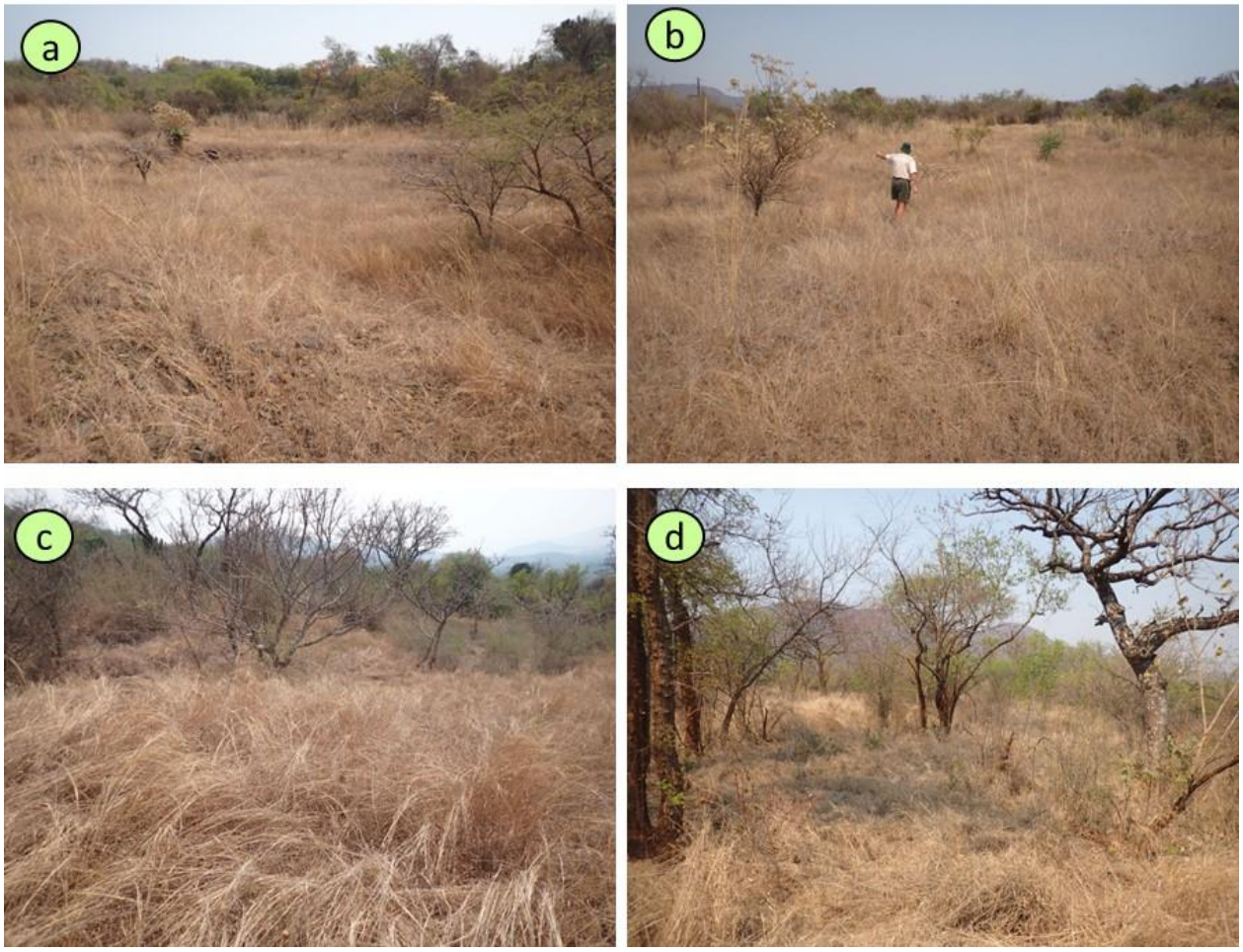


Figure 13: Site 2 in the Naude's Rust project area.

For the numbering of Site 2, refer to Figure 12:

a. The location of old borrow pit.
b. The opened area might be a sign of earlier agricultural activities.
c. Untransformed savannah woodland adjacent to the cleared woodland.
d. The untransformed savannah woodland on Site 2.

Naue's Rust Site 3 (13.0 ha)

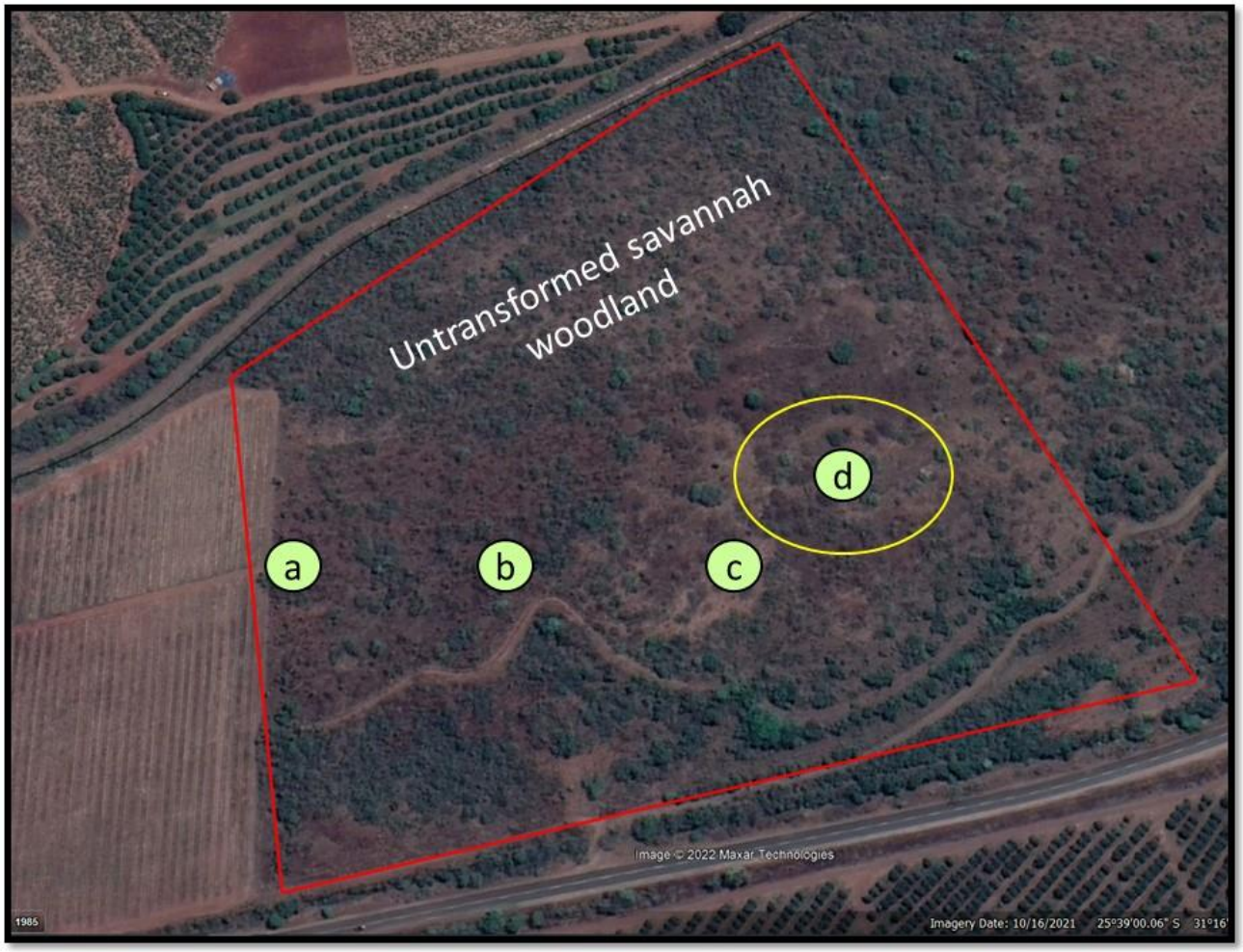


Figure 14: The land cover at Site 3 in the Naude's Rust project area (numbering a-f correspond with photos of the area in Figure 15).

For the description of Site 3, refer to Figure 14:

a. The untransformed savannah woodland at the foot slope of Site 3.
b. As the slope becomes steeper, the soil becomes rockier.
c. There will be areas which will be too steep to farm. The steeper sections could pose an erosion risk.
d. The yellow circle in Figure 14 indicates the area where the disturbed section of the sawmill (foundations of the old sawmill which burnt down in the late 1960's) and rondavels were since late 1960's (Van Wyk, 2022).

This site consists mainly of untransformed savannah woodland spread over the hilltop dominating the site. The woodland shows signs of a lowveld catena with tree species indicating the different slope areas. A small area seems to be moderately transformed by an old sawmill and associated structures.

Figure 15: Site 3 in the Naude's Rust project area (Photo supplied by R. Kalwa).

Naude's Rust Site 3 (13.0 ha)

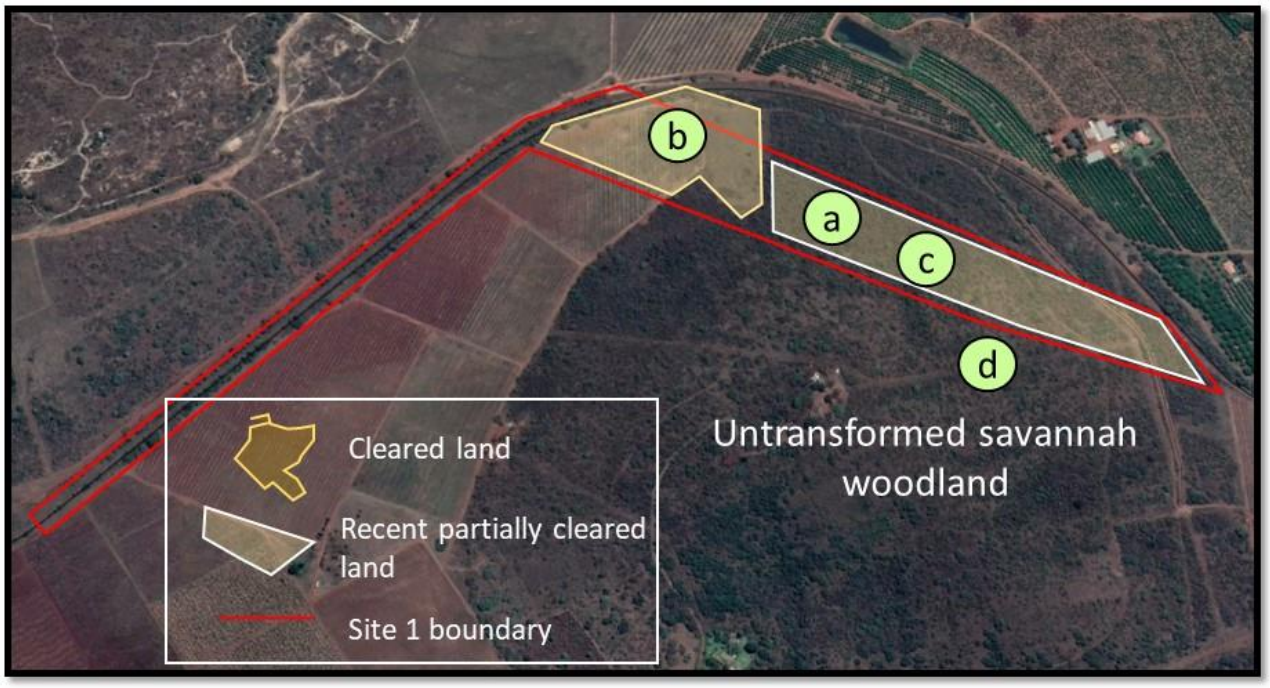


Figure 16: The land cover at Site 4 in the Naude's Rust project area (numbering a-f correspond with photos of the area in Figure 17).

For the description of Site 4, refer to Figure 16:

a. The partially cleared savannah woodland at Site 4. Only tall trees left after clearing.
b. The section cleared in 2021 by an unknown neighbour.
c. Recently bush clearing and the cleared woody vegetation left in piles.
d. The untransformed savannah woodland adjacent to the cleared land.

An area cleared by an uninformed neighbour will now also form part of the project. The areas cleared have been transformed in such a way that it will not be rehabilitated easily. The understorey has been cleared completely and only a few selected taller trees were left on the lands (Figure 14a).

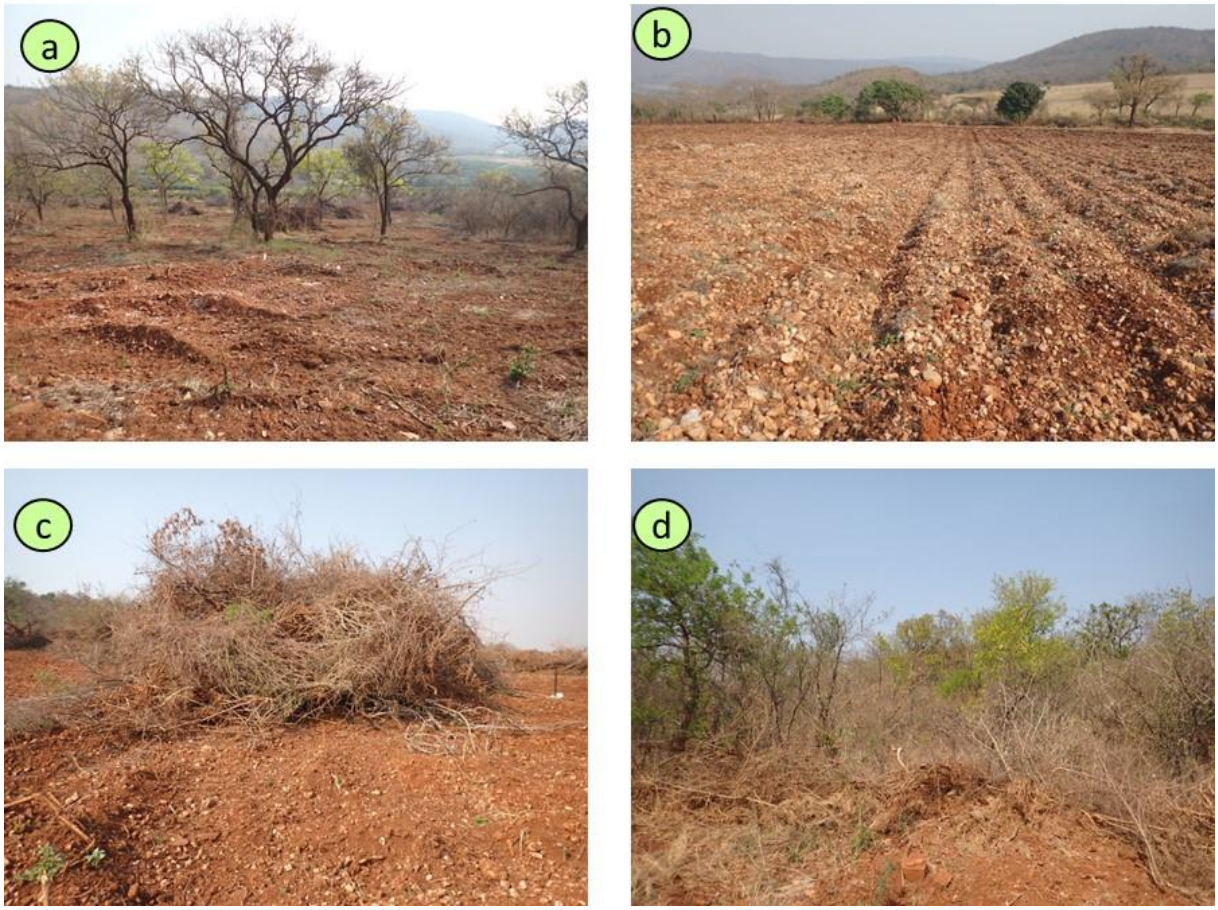


Figure 17: Site 4 in the Naude's Rust project area.

4.2 Ecological survey transects in the Naude's Rust project area.

A major component of this study is the characterisation of habitat types and associated fauna (obtained from regional distribution records) of the available landscape/environment. This information is used as a basis for predicting the potential impacts of the proposed project, and other human-induced activities, on the composition of threatened fauna in the study area. Representative survey sites were selected in all prominent vegetation types of the study area. Extensive transects (400-3000m) were then surveyed for potential habitat and all associated fauna. GPS readings provide fixed locations of these transects for future monitoring (Table 8; Figure 18).

Table 8: Description of transects or point counts conducted for habitat, micro-habitat, influences and impacts, birds, mammal signs and herpetofauna (July and September 2022).

Habitat	Coordinates		Length (m)	Total (m)
	Start	End		
Untransformed vegetation/habitat				
1. Untransformed savannah woodland				
Transect 7	25°38'51.73"S 31°16'47.91"E	25°38'52.59"S 31°16'44.39"E	103	
Transect 8	25°38'51.74"S 31°16'43.55"E	25°38'51.46"S 31°16'48.44"E	191	
Transect 9	25°38'58.22"S 31°16'13.67"E	25°39'3.70"S 31°16'15.27"E	171	
Transect 10	25°39'2.98"S 31°16'15.79"E	25°38'59.98"S 31°16'23.56"E	240	
Transect 11	25°38'59.46"S 31°16'23.31"E	25°38'56.00"S 31°16'16.55"E	218	
Transect 12	25°38'48.05"S 31°15'37.52"E	25°38'53.45"S 31°15'51.02"E	530	
			Total	**1453**
2. Channelled valley bottom wetland				
Transect 3	25°37'57.78"S 31°16'39.38"E	25°38'3.97"S 31°16'39.89"E	242	
			Total	**242**
Transformed vegetation/habitat				
3. Secondary savannah woodland				
Transect 1	25°38'5.48"S 31°16'37.25"E	25°38'4.87"S 31°16'30.23"E	217	
Transect 2	25°38'4.86"S 31°16'37.68"E	25°37'56.57"S 31°16'38.73"E	277	
Transect 5	25°38'11.13"S 31°16'47.70"E	25°38'9.28"S 31°16'56.91"E	272	
			Total	**766**
4. Redundant infrastructure				
Transect 4	25°38'3.83"S 31°16'42.89"E	25°38'6.62"S 31°16'41.37"E	95	
			Total	**95**
5. Cleared woodland				
Transect 6	25°38'52.62"S 31°16'48.65"E	25°38'53.51"S 31°16'44.71"E	115	
			Total	**115**

GPS coordinates, acquired in the field (Table 8), were added to Google Earth to illustrate and demarcate the four sites in the study area and survey transects. Twelve transects were completed to assess resident biota and their associated habitats. Specific habitat features were identified to provide an indication of available habitat for different animals favouring a specific biotope (specifically medium-sized fauna across all vertebrate groups).

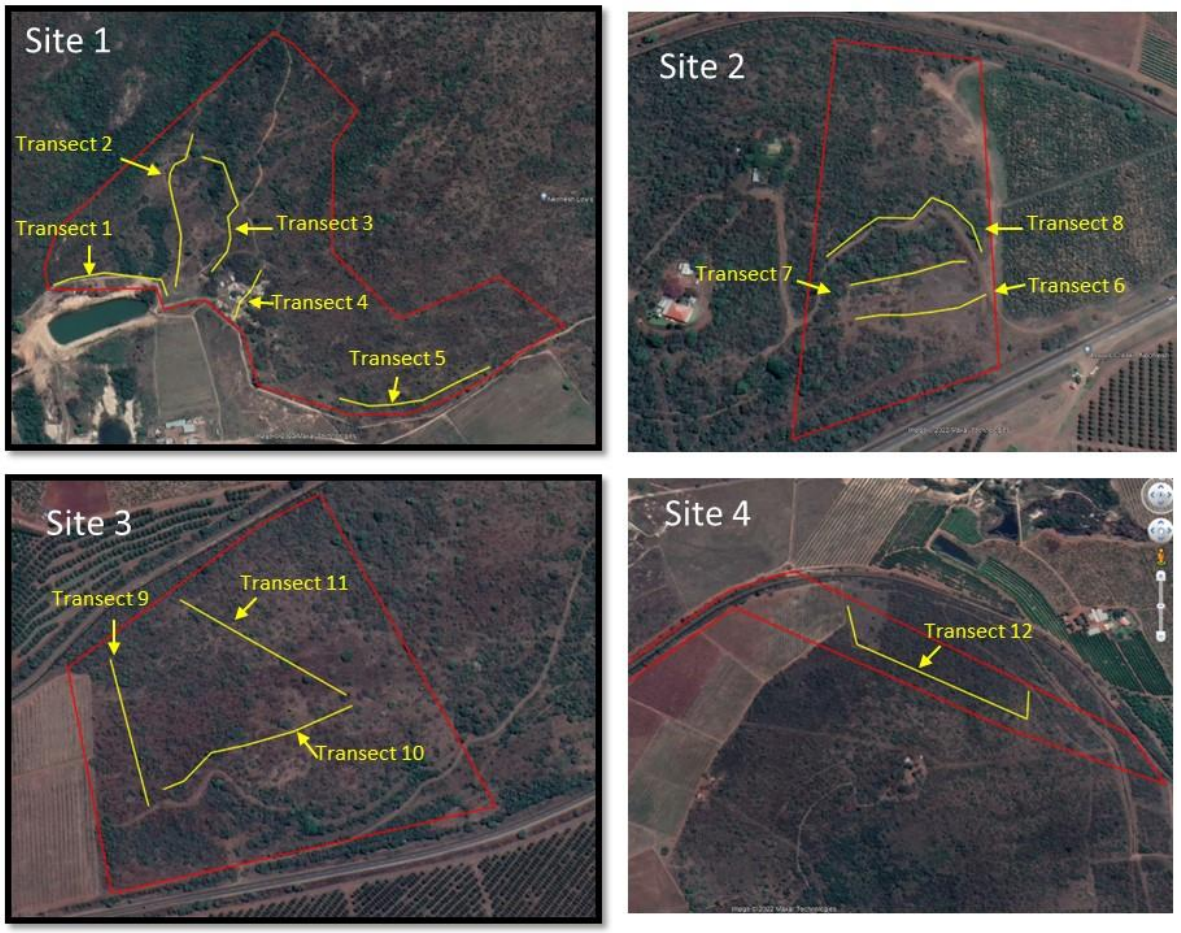


Figure 18: The localities of the detailed biota- and associated habitat transects at Sites 1 to 4 (see Table 8).

4.3 Ecosystems: Baseline description

According to the Biodiversity Protocol, the assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:

2.3.1 A description of the biodiversity and ecosystems on the site (terrestrial as well as aquatic), including;

(a) ecosystem types; and
(b) Presence of fauna and flora and composition of species communities, their habitat, distribution and movement patterns.

Four sites have been delineated as the preferred sections. The hectare coverage of these sections which include arable areas, are listed in Table 9.

Table 9: Hectare coverage of the evaluated for the agricultural development.

Site	Area (ha)

1	23.6
2	5.5
3	13.0
4	12.4
Total	54.5

Biota assemblages of the Naude's Rust project areas

The fieldwork component of this study was conducted during July and September 2022. The survey methods described herein make use of a habitat surrogate technique, where habitat type and availability are used as a baseline assessment, with species' presence used to verify habitat integrity. The specialist report includes detailed species lists obtained from an extensive background review and the field monitoring results, with emphasis on the following:

- Probability of occurrence of species with high conservation value and assessment of the availability of their habitat on the property, as well as potential risks or threats to these species.
- Detailed overview on the current biodiversity status of the area in terms of terrestrial and wetland biota.
- Status of habitat, habitat preference and probability of occurrence.

During the biodiversity assessments of the Naude's Rust landscape, different vegetation and land cover units were identified. By definition, ecosystem status reflects the ecosystem's ability to function naturally, at a landscape scale and in the long-term. Vegetation types provide a good representation of terrestrial biodiversity because most animals, birds, insects and other organisms are associated with specific vegetation types.

In order to establish a baseline of faunal occurrence, an assessment was made of the ecosystem template. The ecosystem template is a function of the geomorphology (abiotic) and the vegetation (biotic) structure of the area. By using expected occurrence records of known species distributions and preferred habitat type, the baseline integrity of the study could be established.

Ecosystem status reflects the ecosystem's ability to function naturally, at a landscape scale and in the long-term. The single biggest cause of biodiversity loss in South Africa is the loss and degradation of natural habitat. Vegetation types provide a good representation of terrestrial biodiversity, as they often reflect specific habitat types and associated animals, birds, insects and other organisms. The vegetation/land cover types were thus classified on the basis of structural and functional characteristics with the following objectives in mind:

- To assess the status of vegetation/land cover types impacted by development: due to either historical and/or present farming practices, residential occupation and/or mining practices;
- To assess the status of faunal assemblages in the study area, with emphasis on Species of Special Concern.

The next step is to establish the likelihood of Species of Special Concern, occurring in the vicinity (include degree of confidence). For this report, the category "Species of Special Concern" is considered to include all threatened taxa listed by South African Red Data lists (Species of Conservation Concern), Threatened or Protected Species (NEMBA) and all South African endemic taxa.

Conservation-important plant species listed for the quarter-degree grid 2531CB in the Mpumalanga Tourism & Parks Agency's (MTPA) threatened species database were used to produce a list of the most likely occurring species, which were searched for during fieldwork.

Due to their limited distribution and range in South Africa, endemic species are also included as species of special interest. Traditionally, an endemic species will have a global distribution restricted to >90% of the atlas region.

Species of special concern are those that have particular ecological, economic or cultural importance and include: those that are rare, endemic or threatened; species with unusual distributions; and medicinal and other indigenous species that are exploited commercially or for traditional use. A 'Species of Special Concern' is any species or subspecies of biota, native to the province that has entered a long-term state of decline in abundance or is vulnerable to a significant decline due to low numbers, restricted distribution, dependence on limited habitat resources, or sensitivity to environmental disturbance. These are species that are threatened, or, if not, their population number is a special concern of the following ecological foundations:

- Occur in small, isolated populations or in fragmented habitat and are threatened by further isolation and population reduction;
- Show marked population declines. Population estimates are unavailable for the vast majority of taxa. Species that show a marked population decline, yet are still abundant, do not meet the Special Concern definition, whereas a marked population decline in uncommon or rare species is an inclusion criterion;
- Depend on a habitat that has shown substantial historical or recent declines in size. This criterion infers the population viability of a species based on trends in the habitat types upon which it specialises;
- Occur only in or adjacent to an area where habitat is being converted to land uses incompatible with the animal's survival;
- Have few records, or which historically occurred here but for which there are no recent records; and
- Occur largely on public lands, but where current management practices are inconsistent with the species persistence.

Threatened faunal species represent a decline in biological diversity because of their numbers decreasing and their genetic variability is severely diminished. Rare species, as well as those of special concern carry challenges different to most other large and common species; characteristics of these species are:

- extremely small or localised range
- requiring a large territory
- having low reproductive success
- needing specialised breeding areas
- needing specialised feeding areas
- habitat specificity
- life-histories not captured completely in the area (migrants)

4.3.1 Vegetation communities

The vegetation communities of the Naude's Rust study area are classified as **Granite Lowveld.** Two untransformed vegetation communities were identified within the study area on the basis of distinctive vegetation structure (grassland, wetland, thicket, etc), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc). The detail of the species found in the project area are listed in Table 10.

Plant surveys

A total of 66 indigenous plant species were recorded during fieldwork (Table 10); as well as seven exotic species, some declared alien invaders.

Table 10: Plant species recorded during the 2022 fieldwork. Vegetation assemblages and relevant plant species at the Project Sites: 1 to 4 (Shaded cells indicate presence of the species).

Plant species	**1**	**2**	**3**	**4**
Trees				
African wattle (*Peltophorum africanum*)				
Apple-leaf (*Philenoptera violacea*)				
Black monkey orange (*Strychnos madagascariensis*)				
Buffalo-thorn (*Ziziphus mucronata*)				
Bushveld gardenia (*Gardenia volkensii*)				
Bushveld kubu-berry (*Mystroxylon aethiopicum schlechteri*)				
Common spike thorn (*Gymnosporia buxifolia*)				
Common tree Euphorbia (*Euphorbia ingens*)				
Dwarf boer-bean *(Schotia capitata)*				
False-horsewood (*Hippobromus pauciflorus*)				
Flame climbing bushwillow (*Combretum microphyllum*)				
Giant raisin (*Grewia hexamita*)				
Green-thorn *(Balanites maughamii)*				
Grey raisin *(Grewia monticola)*				
Hedge euphorbia (*Euphorbia tirucalli*)				
Jackal berry (*Diospyros mespiliformis*)				
Jacket plum (*Pappea capensis*)				
Knob thorn (*Vachellia nigrescens*)				
Koko tree (*Maytenus undata*)				
Lowveld bitter tea (*Gymnanthemum colorata*)				
Magic guarri (*Euclea divinorum*)				
Mallow raisin (*Grewia villos*a)				
Marula (*Sclerocarya birrea*)				

Monkey pod *(Senna petersiana)*				
Mountain karee (*Searsia leptodictya*)				
Natal guarri (*Euclea natalensis*)				
Northern Bushman's grape (*Rhoicissus tomentosa*)				
Potato bush (*Phyllanthus reticulatus*)				
Pride-of-De Kaap (*Bauhinia galpinii*)				
Puzzle bush (*Ehretia rigida*)				
Red bushwillow (*Combretum apiculatum*)				
Red ivory (*Berchemia zeyheri*)				
Red thorn (*Acacia gerrardii*)				
Russet bushwillow (*Combretum hereroense*)				
Sandpaper-bush (*Ehrethia amoena)*				
Scented-pod thorn (*Vachellia nilotica*)				
Sickle bush (*Dichrostachys cinerea*)				
Silver cluster-leaf (*Terminalia sericea*)				
Star-chestnut *(Sterculia rogersii)*				
Swazi thorn (*Vachellia swazica*)				
Sweet thorn *(Vachellia karroo)*				
Umbrella thorn (*Vachellia tortilis*)				
Weeping boer-bean (*Schotia brachypetala*)				
White-berry bush (*Flueggea virosa*)				
White-leaved raisin (*Grewia bicolor*)				
White thorn (*Acacia polyacantha*)				
Wild cotton (*Gossypium herbaceum*)				
Wild pear *(Dombeya rotundifolia)*				
Zebrawood (*Dalbergia melanoxylon*)				
Forbs				
Eyelashes (*Blepharis subvolubilis)*				
Cape honeysuckle (*Tecomaria capensis*)				
Caustic vine (*Sarcostemma viminale*)				
Hell-fire bean *(Mucuna coriacea)*				
Hibiscus pusillus				
Mother-in-law's tongue (*Sansevieria hyacinthoides*)				
Grass and sedges				
Curly-leaved dropseed (*Sporobolus nitens*)				
Common thatching grass *(Hyparrhenia hirta)*				
Broad-leaved curly leaf *(Eragrostis rigidior)*				
Guinea grass (*Panicum maximum*)				
Herringbone grass (*Pogonarthria squarrosa*)				
Natal red top (*Melenis repens*)				
Red grass (*Themeda triandra*)				
Sawtooth love grass (*Eragrostis superba*)				
Spear grass (*Heteropogon contortus*)				
Spreading three awn *(Aristida congesta barbicollis)*				
Alien invading plants				
*Bluemink (*Ageratum houstonianum*)				
*Bougainvillea (*Bougainvillea glabra)*				
*Christmas berry (*Lantana camara*)				
*Frangipani *(Plumeria rubra)*				
*Guava (*Psidium guajava*)				
*Sisal (*Agave sisalana*)				
*Syringa (*Melia azedarach*)				

*Triffid weed (*Chromolaena odorata*)				
*Yellow bells (*Tecoma stans*)				

The Threatened Species Programme | SANBI Red List of South African Plants website (previously named POSA) provides access to South African plant names (taxa), specimens (herbarium sheets) and observations of plants made in the field (botanical records). Data is obtained from the Botanical Database of Southern Africa (BODATSA)**,** which contains records from the National Herbarium in Pretoria, the Compton Herbarium in Cape Town and the KwaZulu-Natal Herbarium in Durban**.**

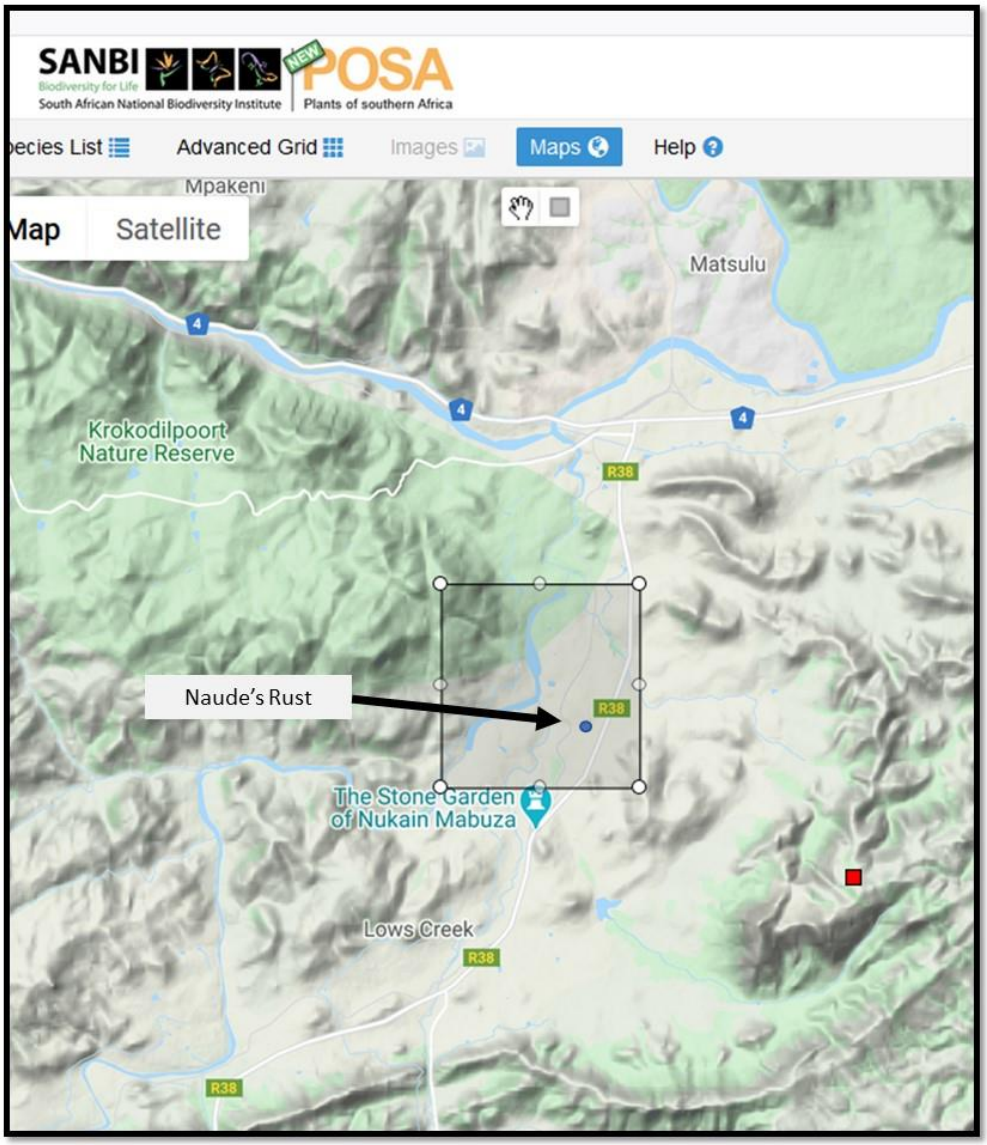


Figure 19: A map of the area searched on the POSA website, indicating the Naude's Rust project area and surrounds. The species listed in the MTPA threatened species database (2531CB grid) have been narrowed down to the area demarcated.

Species of Concern: Plants

During the survey, the following protected trees (Government Gazette, 2019; Department of Agriculture, Forestry and Fisheries, 2019) were observed in the project area:

- Apple-leaf (*Philenoptera violacea*)
- Marula (*Sclerocarya birrea*)
- Green-thorn *(Balanites maughamii)*
- Red ivory (*Berchemia zeyheri*)

Protected trees: Notice of the list of protected tree species under the National Forest Act, 1998 (Act No. 48 of 1998). “No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any manner require or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister of Agriculture, Forestry and Fisheries to an applicant and subject to such period and conditions as may be stipulated.”

Conservation-important plant species listed for the quarter-degree grid 2531CB in the Mpumalanga Tourism & Parks Agency's (MTPA) threatened species database (obtained from Mr. Mervyn Lötter) were used to produce a list of the most likely occurring species, which were searched for during fieldwork. The extensive list of species (fauna and flora) for the 2531CB grid have been narrowed down to the area demarcated in Figure 19 and listed below.

Naude’s Rust:

- Transvaal saffron *(Elaeodendron transvaalense)* (Conservation status for South Africa – Vulnerable; Conservation status for Mpumalanga – Vulnerable)
- Orange fire lily *(Cyrtanthus eucallus)* (Conservation status for South Africa – Vulnerable; Conservation status for Mpumalanga – Vulnerable; Endemic – South Africa)

Additionally, information which was obtained from the Screening Tool exercise, lists the environmental sensitivity of the project region (Figure 27) and also recorded certain Species of Special Concern (SSC) for the Animal and Plant species themes expected in the footprint. These assemblages were evaluated as part of the expected SSC lists.

Table 11: Sensitive and threatened species expected to occur in the project region according to the Environmental Screening Tool results (compare with Figure 27).

Theme	Sensitivity	Feature
Plant Species Theme	Medium	*Streptocarpus fasciatus*

Table 11 summarises the expected SSC plants, the habitat where they would be expected to occur and the threatened status per species.

Table 12: A lists of plants of special concern that have distribution ranges and habitat preferences that overlap with the study area (Grid: 2531CB).

Species	Habitat	Status
Transvaal saffron *(Elaeodendron transvaalense)*	Savanna or bushveld, from open woodland to thickets, often on termite mounds.	**Near-threatened**
Orange fire lily *(Cyrtanthus eucallus)*	Plants occur in scattered clumps in suitable habitat on large boulders or cliff faces.	**Vulnerable**
Streptocarpus fasciatus	Terrestrial: Scarp and mistbelt forest.	**Vulnerable**

Species of Special Concern - Synopsis

Near-threatened

CELASTRACEAE: Transvaal saffron *(Elaeodendron transvaalense)* (Conservation status for South Africa – Vulnerable; Conservation status for Mpumalanga – Vulnerable) (Figure 20).

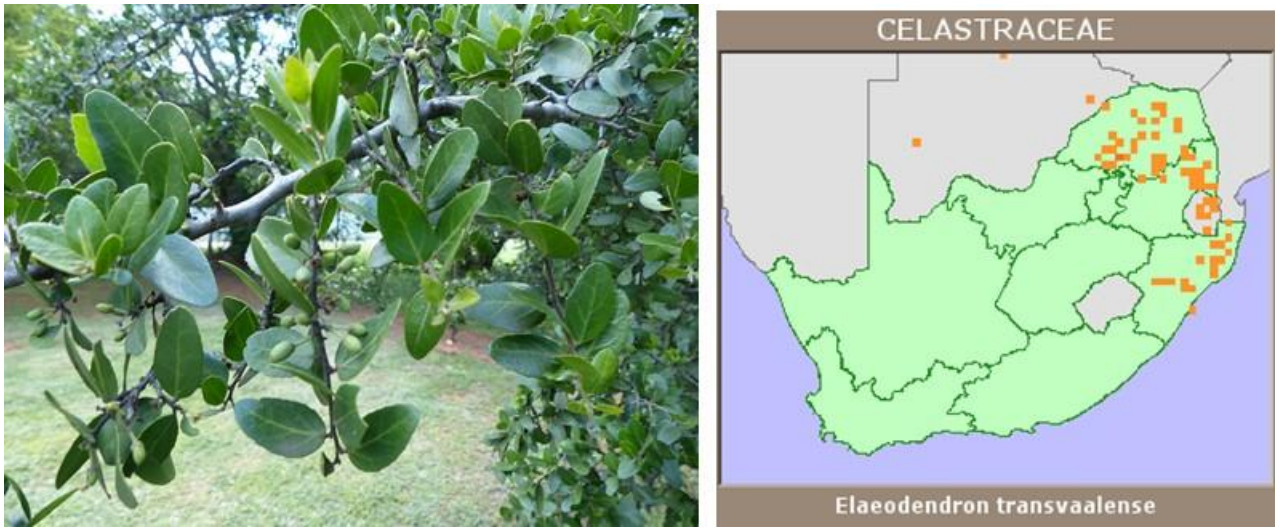


Figure 20: Transvaal saffron *(Elaeodendron transvaalense)*

A very popular species in the muthi markets and heavy exploitation and sub-population declines have been observed. Over-exploitation is likely to continue and the species is further threatened by poor wound recovery following bark-stripping. It is likely to experience a 20% decline over a moving window of 180 years (110 years in the past and 70 years into the future) (generation length suspected to be a minimum of 60 years.

Vulnerable

AMARYLLIDACEAE - Orange fire lily *(Cyrtanthus eucallus)* (Conservation status for South Africa – Vulnerable; Conservation status for Mpumalanga – Vulnerable; Endemic – South Africa) (Figure 21).

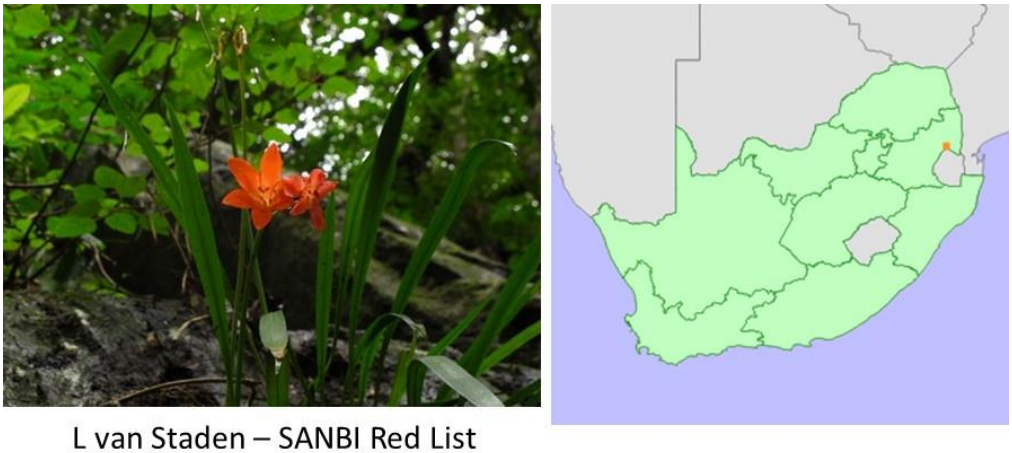


Figure 21: Orange fire lily *(Cyrtanthus eucallus)*.

Plants occur in scattered clumps in suitable habitat on large boulders or cliff faces. Only a few plants were seen during a recent survey of the only known locality, however, it is difficult to estimate the population size as the habitat is generally very inaccessible. Alien invasive species is a big problem in the riparian areas near Barberton and a potential threat to this species (M. Lotter, pers. comm.). Recent observations of plants at the only known locality recorded scattered alien plants in the area, but invasions are unlikely to be causing decline at present.

Vulnerable

Streptocarpus fasciatus (Conservation status for South Africa – Vulnerable; Conservation status for Mpumalanga – Vulnerable; Endemic – South Africa) (Figure 22).

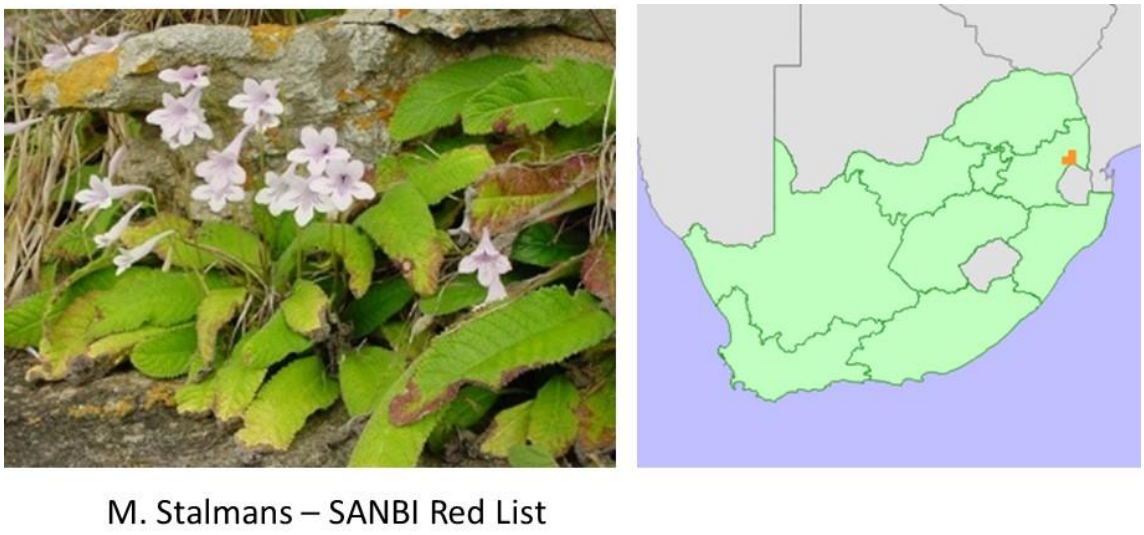


Figure 22: *Streptocarpus fasciatus.*

One known location is potentially threatened by alien plant invasion and habitat degradation as a result of deforestation for subsistence use: this shade dependent species might be impacted if its woodland habitat is cleared of woody species. Crocodile Gorge Mountain

Bushveld, Malelane Mountain Bushveld, Scarp Forest - Shady woodland, among granite boulders.

4.3.1.1 Riparian corridor

The extent of the riparian habitat.

Figure 23 represents a layout of the different components of the drainage line ecosystem. The main components of the system are the drainage lines and flanking riparian zones on the macro-channel banks. The riparian corridor along the drainage line is well-developed on all the stream banks.

The Naude's Rust drainage lines are part of a landscape changed considerably by agricultural activities. These drainage lines fulfil an important function in maintaining the narrow riparian zones which acts as migration corridors for wildlife and buffers for these riparian habitat types. The drainage lines also provide connectivity with the larger Low's Creek River system, which includes the important Crocodile River system.

Despite the fact that most of the project area consists of cultivated area and old lands (Figure 26), the drainage line and its associated riparian line classifies this vegetation unit to have a "Medium" sensitivity and value in terms of biodiversity conservation.

Since this river is an ephemeral river, a large percentage of the trees in the riparian zone are terrestrial species that opportunistically utilise the shallow water table of the system. Because of the increase in moisture, these trees grow larger than their terrestrial counterparts and are therefore incorporated into the dense riparian fringe.

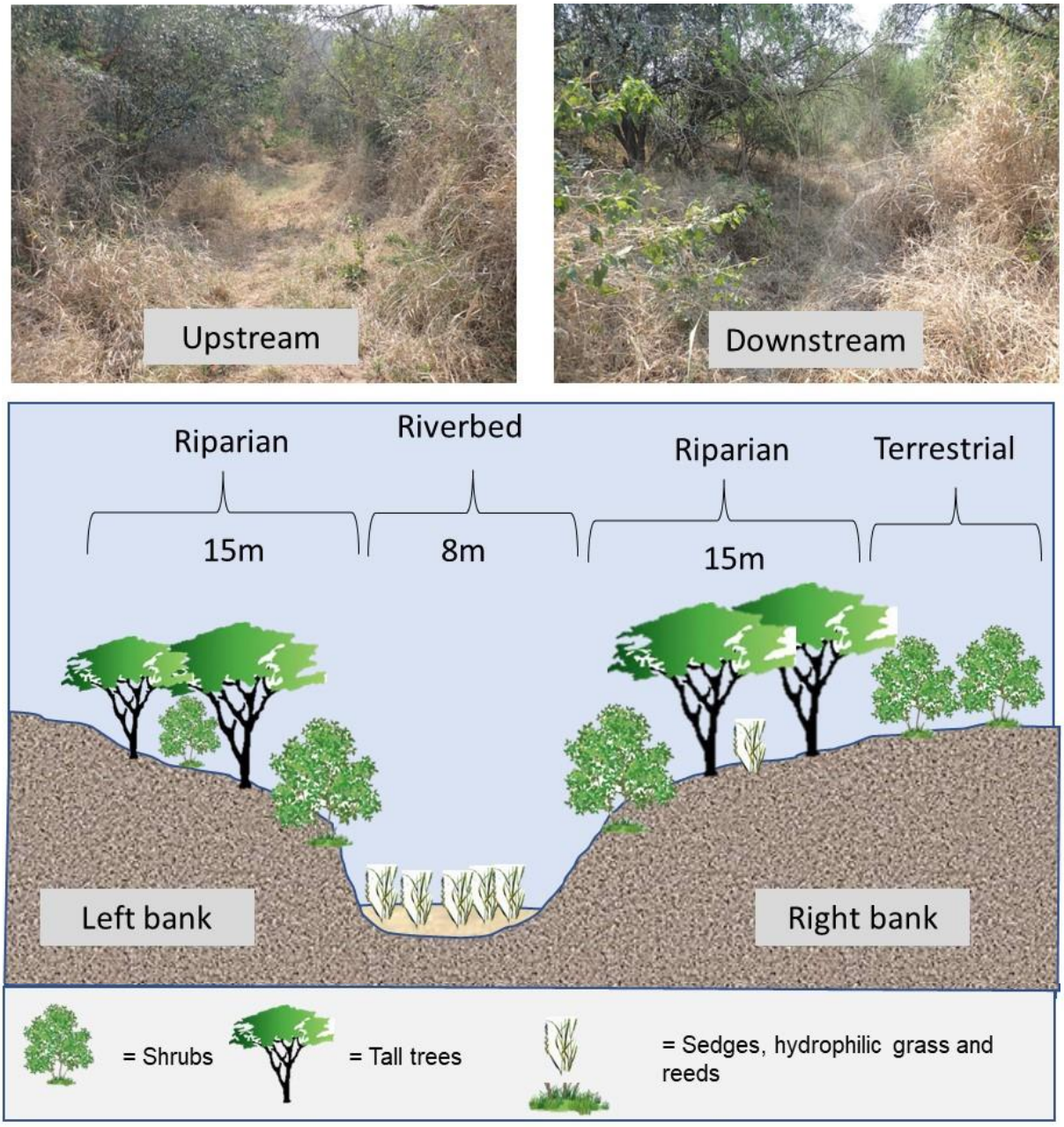


Figure 23: This figure illustrates the basic components of the drainage line setup evaluated during the survey.

4.3.1.2 Riparian delineation

During the process of riparian delineation, one transect was surveyed in the drainage line of Site 1, the only site with a distinguishable drainage line. Riparian delineation and habitat evaluation were undertaken according to the DWAF Guidelines (2005) and DWAF updated manual (2008).

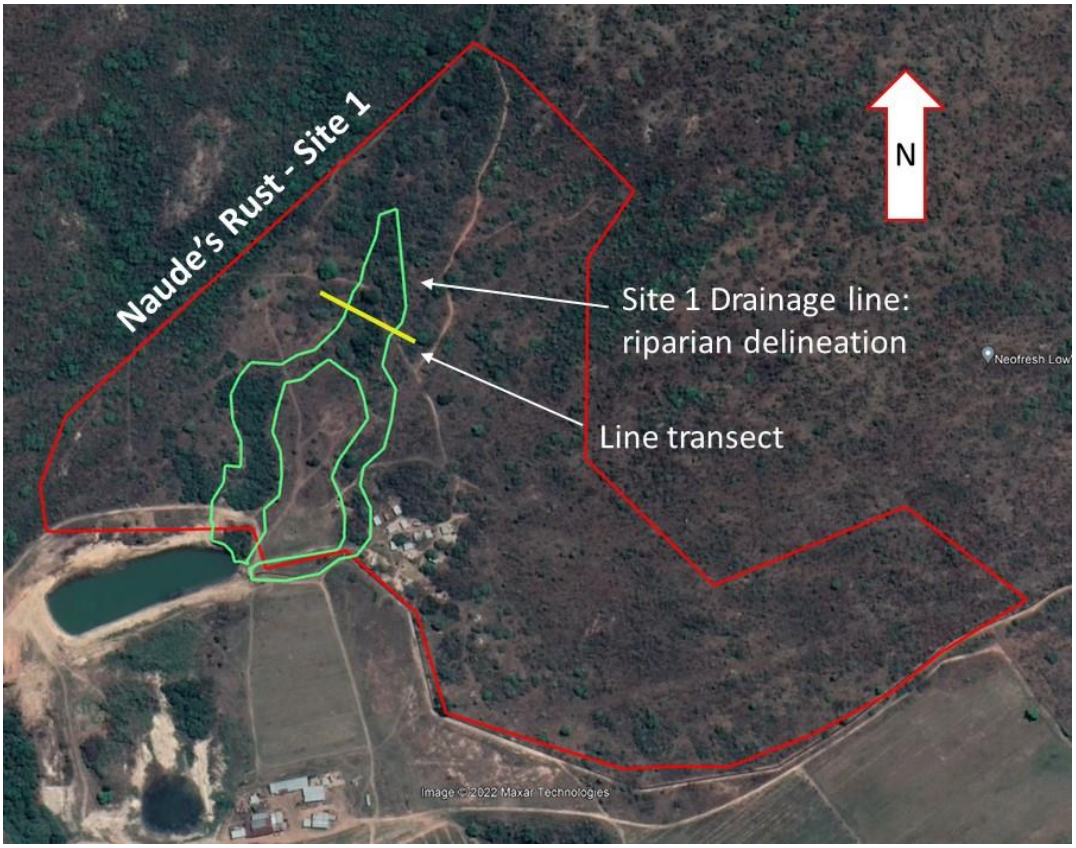


Figure 24: The riparian delineation completed for the Site 1 drainage line at Naude's Rust (Shape files are available on request).

During the survey of the Site 1 drainage line at Naude's Rust, the riparian delineation was done by surveying a transect through the drainage line (Figures 23), as well as inspecting the entire riparian corridor on both banks.

4.3.1.3 Buffer zones

The guidelines for land-use practices or activities that impact on water quantity in freshwater CBAs includes: Generic buffers should be established around streams within these catchments. These buffers can be refined based on a site visit and applying the DWS's wetland delineation tool.

Due to their positioning adjacent to water bodies, buffer zones associated with streams and rivers will typically incorporate riparian habitat. Riparian habitat, as defined by the NWA, includes the physical structure and associated vegetation of the areas associated with a watercourse (Macfarlane et al, 2015). However, the riparian zone is not the only habitat type that is present in the buffer as the zone may also incorporate stream banks and terrestrial habitat, depending on the width of the aquatic impact buffer zone applied. Therefore, the riparian zone must be delineated before the buffer zone is established.

Landscape connectivity may be achieved through several main types of habitat configurations that function as linkages for species, communities or ecological processes. Linkages are used as pathways by animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements and range expansion. Linkages also contribute to other ecological functions in the landscape and in particular, have an important role to play in providing habitat for plants and animals in human-dominated environments (Bennett, 2003).

Buffer zones have been used in land-use planning to protect natural resources and limit the impact of one land-use on another. Buffer zones will serve as a mitigating measure for impacts created by the development in the project area and the implemetation will be recapitulated in the mitigation section.

Buffer zones associated with water resources have been shown to perform a wide range of functions and on this basis, have been proposed as a standard measure to protect water resources and associated biodiversity. These functions include:

- Maintaining basic aquatic processes;
- Reducing impacts on water resources from upstream activities and adjoining land uses;
- Providing habitat for aquatic and semi-aquatic species;
- Providing habitat for terrestrial species; and
- A range of ancillary societal benefits.

Determining the required buffer width is largely an exercise of assessing the situation and linking it to an acceptable level of risk. Determining appropriate management measures for aquatic impact buffer zones is largely dependent on the threats associated with the proposed activity adjacent to the water resource. These threats include:

- Increases in sedimentation and turbidity;
- Increased nutrient inputs;
- Increased inputs of toxic organic and heavy metal contaminants; and
- Pathogen inputs.

In determining the buffer zone requirements for river ecosystems, the process involves a number of steps in order to establish the buffer around the proposed riverine site. The following aspects were addressed specifically for the two seasonal drainage lines (according to the steps suggested in Macfarlane, 2017):

Step 1: Define objectives and scope to determine the most appropriate level of the assessment.

Determine the Most Appropriate Level of Assessment

Step 2: Map and categorise water resources in the study area

Step 3: Refer to the DWS management objectives for mapped waterresources or develop surrogate objectives.

Determine the PES and Anticipated Trajectory of Water Resource Change

Step 4: Assess the risks from proposed developments and define mitigation measures necessary to protect mapped water resources in the study area:

- Do a Risk Assessment for Potential Impacts of Planned Activities on Water Resources.
- Assess threats of planned activities on water resources and determine desktop buffer requirements.
- Determine the Risk Posed by Proposed Activities on Water Resources.

- Assess the Sensitivity of Water Resources to Threats Posed by Lateral Land Use Impacts.

The sensitivity of water resources to lateral impacts is another factor affecting the level of risk posed by a development. A more risk-averse approach is therefore required when proposed developments take place adjacent to water resources that are sensitive to lateral impacts, as opposed to the same development taking place adjacent to a water resource which is inherently less sensitive to the impacts under consideration.

According to the initial buffer requirement, it became apparent that, to protect the Site 1 drainage lines in its current condition from any degradation, a buffer of 10 m wide on both embankments of the drainage line is required.

Final aquatic impact buffer requirements (including practical management considerations) for both sites and all the segments:

- Rehabilitation and Operational Phases: 10 m
- Final aquatic impact buffer requirement: 10 m

Step 5: Assess risks posed by proposed development on biodiversity and identify management zones for biodiversity protection.

Step 6: Delineate and demarcate final buffer zone requirements.

Once protection requirements for water resources and associated biodiversity have been established, the buffer zone requirements have to be finalised and delineated on a layout plan and in-field.

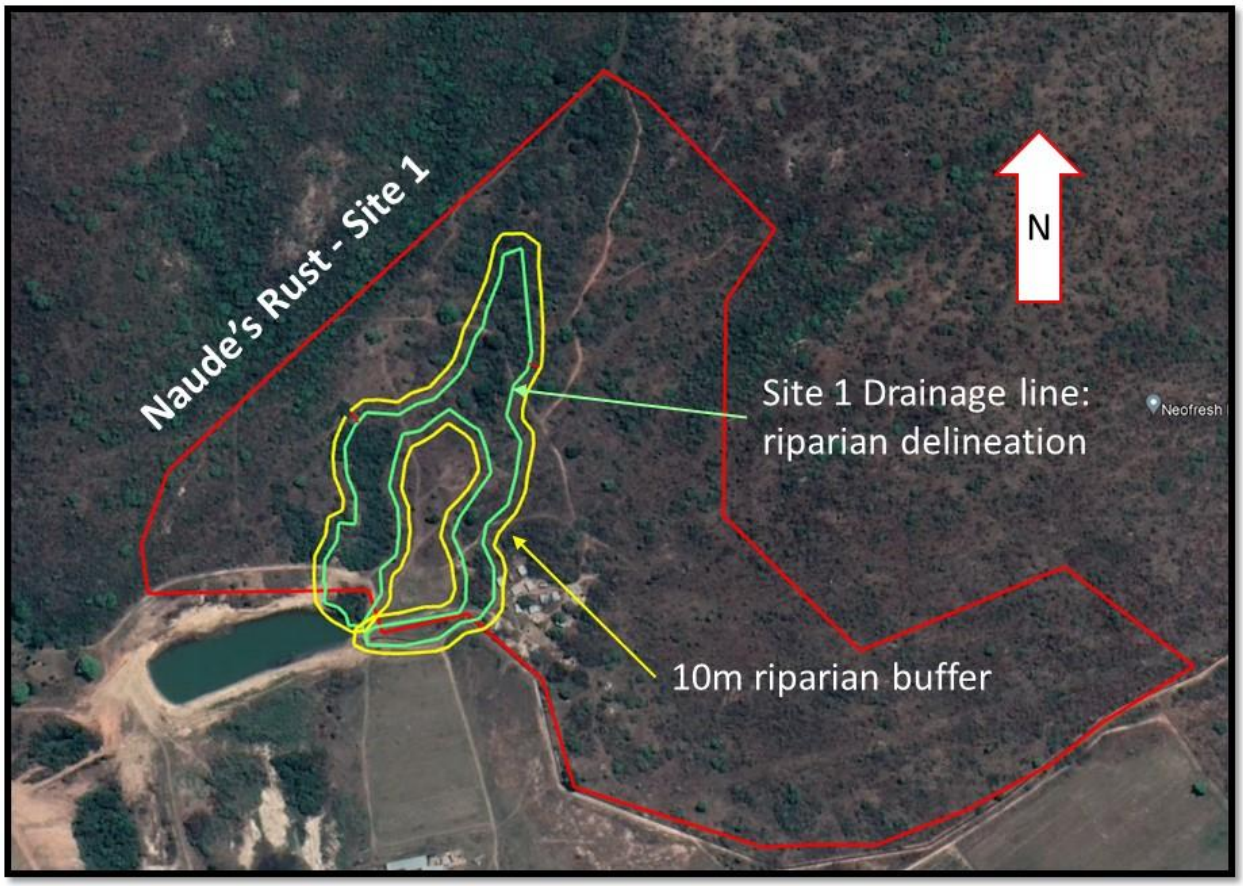


Figure 25: This figure outlines the proposed buffer of 10m (Appendix 2).

Step 7: Document management measures necessary to maintain the effectiveness of the final buffer zone areas.

Once a final buffer zone area has been determined, appropriate management measures need to be documented to ensure that the water quality enhancement and other buffer zone functions, including biodiversity protection, are maintained or enhanced. These measures should ideally be integrated in the environmental management programme (EMPr) for the proposed development, as it includes a requirement to assign clear responsibilities for buffer zone management at both the construction- and operation phases. Although management measures will be specific to each site, some guidance is provided to ensure that management measures cater adequately for key buffer zone functions.

The shapefiles for the final buffer zones of the Site 1 drainage line at Naude's Rust (Figure 24 and 25) are available on request.

Step 8: Monitor implementation of buffer zones.

It is vital to monitor the effectiveness of the final buffer zone area and the associated recommended management practices.

The implementation and management of the final buffer area areas should be monitored throughout the duration of rehabilitation to ensure that the effectiveness of the final buffer zone areas is maintained and that management measures are implemented appropriately. Regular inspections during the operational phase should also be undertaken to ensure that functions are not undermined by inappropriate activities.

4.3.2 Surveys of Fauna

4.3.2.1 Frogs

Frog surveys

According to the 2004 Frog Atlas (Minter, *et al* 2004), the Naude's Rust project area is situated in the Bushveld District. The Bushveld District has a relatively high species richness (>30 species per grid cell), decreasing westwards, but is moderate in endemic species (7-10 species) (Minter *et al*, 2004). The associated frog distribution maps, confirms 28 frog species are expected to be present in the study area. Of these expected frog species, very few will be present in the drier savannah biotopes due to a lack of surface water or wetlands. During the surveys none of the expected species were encountered in the project area.

Species of Special Concern: Frogs

Species of special concern consists of threatened, endemic and rare species. According to the South African Frog Atlas map (Minter, *et al.* 2004) the study area potentially contains 7-10 endemic species. Using distribution maps and habitat quality, no endemic species are expected to occur in the Naude's Rust project area. Currently no threatened frog species is expected to occur in the area.

4.3.2.2 Reptiles

Current knowledge of reptiles within the study area is derived from the Reptile Atlas Project (Bates, *et al.* 2014). In compiling the expected reptile lists, the detailed distribution records by Jacobsen (1989) of the herpetofauna of the old Transvaal were used together with the distribution maps. The Animal Demographic Unit's reptile atlas project data (ADU, 2010), collated in the Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland, was also referenced (Bates, et al. 2014).

Surveys in primary habitat

According to the distribution of reptiles in South Africa, 74 species have distribution ranges extending into the region. According to the South African Reptile Atlas (ADU, 2010), there are 3 endemic reptile species that have distribution ranges overlapping the study area and expected in the riverine habitats (SA endemic - Including Lesotho & Swaziland):

- Barberton girdled lizard *(Smaug warreni barbertonensis*)
- Wilhelm's flat lizard (*Platysaurus intermedius wilhelmi*)
- Distant's ground agama *(Agama aculeata distanti)*

There is one South African Threatened or Protected Species (TOPS) expected to be present in the region:

- Southern African python (*Python natalensis*). NEMBA TOPS (2015): Protected,

4.3.2.3 Birds

Surveys in untransformed habitats

If bird distribution and local habitat are evaluated, it is clear that a total of 203 species of birds are likely to utilise the remaining habitat of the Naude's Rust study area. During the period July to September 2022, the untransformed habitat of Naude's Rust was surveyed for bird species. A total of 36 bird species were observed in the project area:

1. Hadeda Ibis (*Bostrychia hagedash*)
2. Ring-necked Dove (*Streptopelia capicola*)
3. Laughing dove (*Spilopelia senegalensis*)
4. Red-eyed Dove (*Streptopelia semitorquata*)
5. Emerald-spotted Wood Dove (*Turtur chalcospilos*)
6. Purple-crested Turaco (*Tauraco porphyreolophus*)
7. Klaas's Cuckoo (*Chrysococcyx klaas*)
8. Speckled mousebird (*Colius striatus*)
9. Red-faced Mousebird *(Urocolius indicus)*
10. Black-collared Barbet (*Lybius torquatus*)
11. Crested Barbet (*Trachyphonus vaillantii*)
12. Brown-hooded Kingfisher (*Halcyon albiventris*)
13. Golden-tailed Woodpecker (*Campethera abingoni*)
14. Lesser Striped Swallow *(Cecropis abyssinica*)
15. Fork-tailed Drongo (*Dicrurus adsimilis*)
16. Black-headed Oriole (*Oriolus larvatus*)
17. Dark-capped Bulbul (*Pycnonotus tricolor*)
18. Sombre Greenbul (*Andropadus importunus*)
19. Arrow-marked Babbler (*Turdoides jardineii*)
20. Greater Honeyguide (*Indicator indicator*)
21. Yellow-breasted Apalis (*Apalis flavida*)
22. Red-faced Cisticola (*Cisticola erythrops*)
23. Tawny-flanked prinia (*Prinia subflava*)
24. African Paradise Flycatcher (*Terpsiphone viridis*)
25. Yellow-throated Longclaw (*Macronyx croceus*)
26. Black-backed puffback (*Dryoscopus cubla*)
27. Southern Boubou *(Laniarius ferrugineus)*
28. Grey-headed Bushshrike *(Malaconotus blanchoti)*
29. Gorgeous Bushshrike *(Chlorophoneus quadricolor*)
30. Orange-breasted Bushshrike *(Chlorophoneus sulfureopectus)*
31. Black-crowned Tchagra (*Tchagra senegala*)
32. White-bellied Sunbird *(Cinnyris talatala*)
33. Spectacled Weaver (*Ploceus ocularis*)
34. African Firefinch (*Lagonosticta rubricata*)
35. Common Waxbill (*Estrilda astrild*)
36. Yellow-fronted Canary (*Crithagra mozambicus*)

Species of Special Concern: Birds

In this document, the category “Species of Special Concern” is considered to include all threatened taxa listed by South African Red Data lists and all South African endemic taxa. Through comparisons with expected bird lists, a total of 11 bird species expected to be found in the area are listed as “Species of Special Concern”. If bird distribution and local habitat are evaluated, all the Species of Special Concern birds are likely to utilise the different biotopes of the study area.
Currently three endemic bird species are expected to occur in the area:

- Knysna Turaco *(Tauraco corythaix)*
- Chorister Robin-Chat *(Cossypha dichroa)*
- Greater Double-collared Sunbird *(Cinnyris afer)*

A sub-section of the 2531CB quarter-degree grid square was demarcated and used to present a more realistic component of the species of special concern (SSC) assemblage in the project area vicinity (MTPA threatened species database). No birds relating to SSC were recorded for the area.
The following threatened bird species (IUCN, 2014; NEMBA, 2014; Red Data Book, 2015) can make use of the project area habitat for feeding, perching or nesting:

- African White-backed Vulture *(Gyps africanus)* - IUCN 2015: Critically Endangered; SA Red Data (Taylor 2015): Critically Endangered. NEMBA TOPS (2015 - Endangered
- Secretary bird (*Sagittarius serpentarius*) - IUCN 2017 VU Vulnerable; SA Red Data (Taylor 2015): Vulnerable. NEMBA (TOPS 2007): Vulnerable species.
- Tawny Eagle *(Aquila rapax)* - SA Red Data (Taylor 2015): Endangered; NEMBA TOPS (2015): Endangered species; IUCN 2015 Status: Least concern.
- Martial Eagle *(Polemaetus bellicosus)* - IUCN 2015 Status: Near-threatened; SA Red Data (Taylor 2015): Endangered; NEMBA TOPS (2015): Endangered species.
- African Crowned Eagle *(Stephanoaetus coronatus)* - IUCN 2015 Status: Near-threatened. SA Red Data (Taylor 2015): Vulnerable. NEMBA (TOPS 2007): Vulnerable species. Mpumalanga: Vulnerable.
- Lanner Falcon *(Falco biarmicus)* - IUCN 2017 Status: Least concern (Global). SA Red Data (Taylor 2015): Vulnerable; Fairly common resident.
- European Roller (*Coracias garrulus*) - IUCN 2018 Least concern; SA Red Data (Taylor 2015): Near-threatened; Fairly common non-breeding Palaearctic migrant. Population trend: decreasing.

Species of Special Concern habitat requirements

Viability and estimated population size: Birds

Comparing the habitat requirements of Species of Concern with habitat availability in the biotopes, the following units have habitat assemblages that correspond with the optimal requirements of these birds, which will have a direct influence on their viability and estimated population size. The reporting rates supplied by the ADU Atlas report provide an indication of the population sizes of these birds in the area:
Comparing the habitat requirements of Species of Concern with habitat availability in the Naude's Rust project area, the following habitat assemblages correspond with the requirements of these birds.

The potential of the area to supply habitat – "Optimal" for expected SSC.

None

The potential of the area to supply habitat – "Good" for the following species.

1. **Untransformed savannah woodland**
   - Lanner Falcon *(Falco biarmicus)*
   - European Roller (*Coracias garrulus*)
2. **Channelled valley bottom wetland with seepage**
   - None

The potential of the area to supply habitat – "Medium" for the following species.

1. **Untransformed savannah woodland**
   - Martial Eagle *(Polemaetus bellicosus)*
   - Tawny Eagle *(Aquila rapax)*
2. **Channelled valley bottom wetland with seepage**
   - None

The potential of the area to supply habitat – "Poor" for the following species.

1. **Untransformed savannah woodland**
   - Secretary bird (*Sagittarius serpentarius*)
2. **Channelled valley bottom wetland with seepage**
   - African White-backed Vulture *(Gyps africanus)*
   - African Crowned Eagle *(Stephanoaetus coronatus)*

A final synopsis of habitat available in the project area and the preferred habitat for expected SSC bird species, lists the species most likely to be present in the project area, or occasionally visit the area. Bird species with "Medium" to "Optimal" ratings to potentially utilise available habitats in the Naude's Rust project area, are listed below:

- Lanner Falcon *(Falco biarmicus)*
- European Roller (*Coracias garrulus*)
- Martial Eagle *(Polemaetus bellicosus)*
- Tawny Eagle *(Aquila rapax)*

4.3.2.4 Mammals

Of all the mammal species that have distribution ranges in the region, 128 coincide with the Naude's Rust project area (Friedman & Daly, 2004).

Under natural conditions the area had the potential to accommodate larger mammal species. However, due to persecution by humans and habitat loss, some of the expected larger game species are most likely lost to the area:

- Leopard (*Panthera pardus*)
- Nyala (*Tragelaphus angasii*)
- Waterbuck (*Kobus ellipsiprymnus*)

If available habitat types in the Naude's Rust project area are evaluated, only 51 mammal species are likely to occur in the project area (excluding the three large species).

During the 2022 surveys, signs and/or sightings of 5 mammal species were recorded on the farm:

- Vervet monkey (*Cercopithecus aethiops*)
- Chacma baboon (*Papio ursinus*)
- Red duiker (*Cephalophus natalensis)*
- Bushbuck (T*ragelaphus scriptus*)
- Cape Porcupine *(Hystrix africaeaustralis)*

Species of Concern: Mammals

Of the 51 expected mammal species in the study area, not all of them will remain resident as many are nomadic and will visit the area when conditions are favourable. The larger more mobile species will not be resident, but many of the smaller species will settle in the area and use the habitat available.

Three (3) of the species which have distribution ranges overlapping with the project area, and suitable habitat available, are listed as Species of Special Concern and all are considered threatened:

- Serval *(Leptailurus serval*) - SA Red Data (Child 2016): Near threatened; NEMBA (TOPS 2015): Protected species. IUCN (2016) Least concern.
- Honey badger (*Mellivora capensis*) - **NEMBA (TOPS) 2007: Protected species.** IUCN (2014) Least concern. SA Red Data (Child 2016): Least concern.
- Temminck's ground Pangolin (*Smutsia temminckii*) - **IUCN (2016) Vulnerable. SA Red Data (Child 2016): Vulnerable. NEMBA (TOPS 2015): Vulnerable species.**

Viability of habitat for SSC Mammals at Naude's Rust

Comparing the habitat requirements of Species of Concern with habitat availability in the Naude's Rust project area, the following habitat assemblages correspond with the requirements of these mammal species.

The potential of the area to supply habitat – "Optimal" for expected SSC.

None

The potential of the area to supply habitat – "Good" for the following species.

1. Untransformed savannah woodland

Honey badger (*Mellivora capensis*)

2. Channelled valley bottom wetland with seepage

Serval *(Leptailurus serval*)

The potential of the area to supply habitat – "Medium" for the following species.

None

The potential of the area to supply habitat – "Poor" for the following species.

1. Untransformed savannah woodland

Temminck's ground Pangolin (*Smutsia temminckii*)

A final synopsis of habitat available in the project area and the preferred habitat for expected SSC mammal species, lists the species most likely to be present in the project area, or occasionally visit the area. SSC species with "Medium" to "Optimal" ratings to potentially utilise available habitat in the Naude's Rust project area, are listed below:

- Honey badger (*Mellivora capensis*)
- Serval *(Leptailurus serval*)

4.3.2.5 Summary of all vertebrate fauna

After analysing the fauna distribution data and habitat availability, 19 frog species, 74 reptile species, 203 bird species and 51 mammal species are expected to occur in the project area, a total of 347 animal species. The presence of these different faunal groups is however dependent on the availability of potential habitat types in each distinct riverine biotope.

Assessing the conservation status of species has become a critical aspect of monitoring trends in biodiversity conservation at both a national- and global level, but identifying threatened species using internationally accepted criteria and through a standardised process is also a useful tool for the conservation of priority species.

Proposed developments that will involve a change of land use may cause loss of natural habitat or alteration of such habitat. Habitat destruction and habitat change are the greatest threats to fauna in South Africa. In terms of some of the principles of the National Environmental Management Act (Act 107 of 1998) (NEMA, 1998), sustainable development requires the consideration of disturbance and loss of biodiversity, which should be avoided or, if that is not possible, should be minimised and mitigated.

According to the project brief, the Red Data listed and endemic species requires a monitoring programme to assess their numbers and status in the project area. Ten Species of Special Concern that have a high probability of occurring in the region, are expected to frequent the Naude's Rust project area. In the event that any threatened or near-threatened animal species are recorded within the study area in future, appropriate conservation measures should be developed in consultation with the relevant conservation authorities.

A final synopsis of habitat available in the project area and the preferred habitat for expected SSC faunal species, lists the species most likely to be present in the project area, or occasionally visit the area. SSC species with “Medium” to “Optimal” ratings to potentially utilise available habitats in the Naude’s Rust project area, are listed below:

- Barberton girdled lizard *(Smaug warreni barbertonensis*)
- Wilhelm's flat lizard (*Platysaurus intermedius wilhelmi*)
- Distant's ground agama *(Agama aculeata distanti)*
- Knysna Turaco *(Tauraco corythaix)*
- Chorister Robin-Chat *(Cossypha dichroa)*
- Greater Double-collared Sunbird *(Cinnyris afer)*
- Lanner Falcon *(Falco biarmicus)*
- European Roller (*Coracias garrulus*)
- Martial Eagle *(Polemaetus bellicosus)*
- Tawny Eagle *(Aquila rapax)*
- Honey badger (*Mellivora capensis*)
- Serval *(Leptailurus serval*)

5. Impact Assessment

5.1 Present Ecological State of the Project Area

Figure 26 illustrates the land cover surrounding the Naude's Rust project area. Most of the project area is transformed by cultivation and old lands.

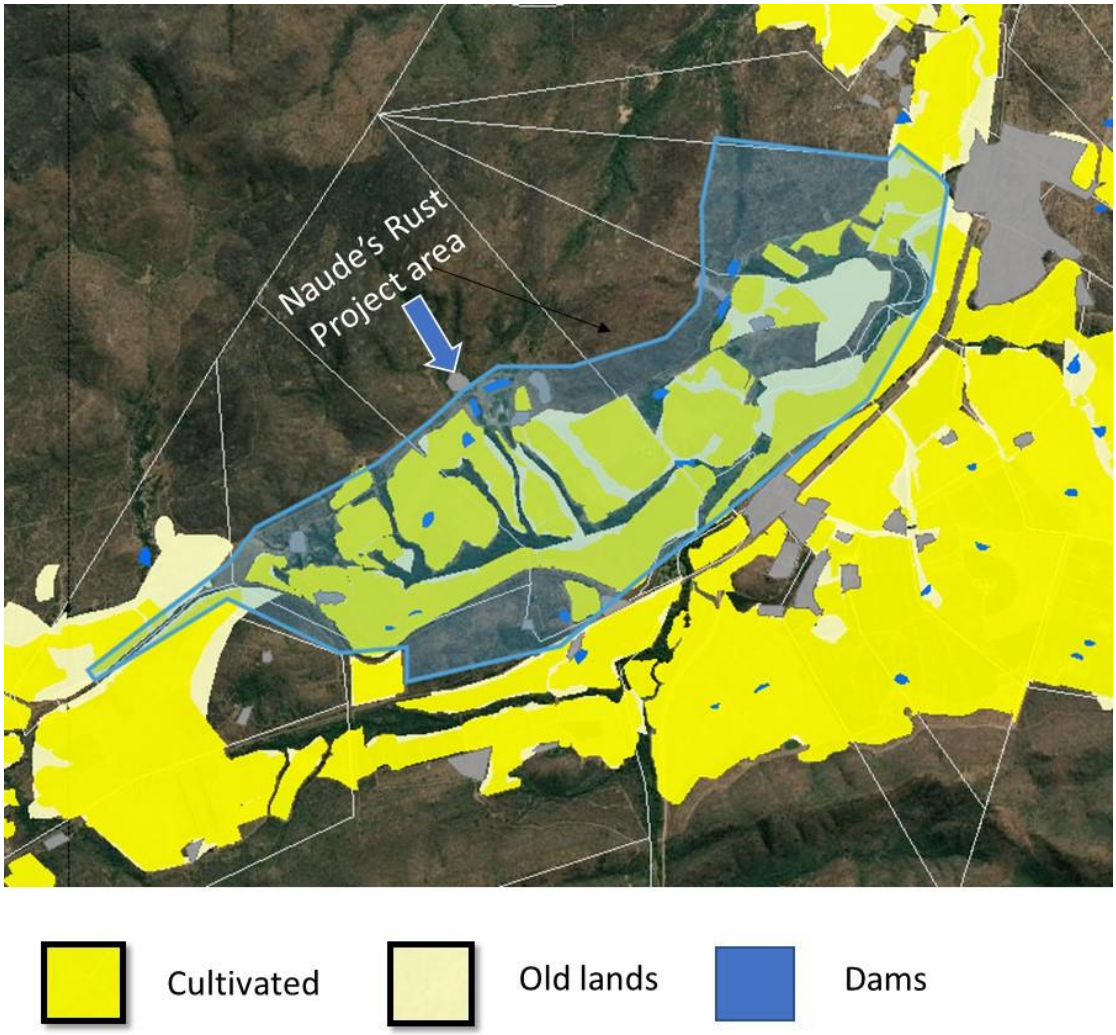


Figure 26: The land cover for the Naude's Rust project area obtained from the Mpumalanga LUDS maps (BGIS, 2015).

5.2 Environmental screening results and assessment outcomes

Screening Report

The National Web based Environmental Screening Tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014, as amended to screen their proposed site for any environmental sensitivity.

The Screening Tool also provides the site-specific EIA process and review information, for example, the Screening Tool may identify if an industrial development zone, minimum information requirement, Environmental Management Framework or bio-regional plan applies to a specific area.

Finally, the Screening Tool allows for the generation of a Screening Report referred to in Regulation 16 (1)(v) of the Environmental Impact Assessment Regulations 2014, as amended whereby a Screening Report is required to accompany any application for Environmental Authorisation and as such the tool has been developed in a manner that is user friendly and no specific software or specialised GIS skills are required to operate this system.

A screening report was undertaken for an environmental authorisation as required by the 2014 EIA regulations, evaluating the proposed development footprint for environmental sensitivity. Following is an abstract from the original Screening Tool application:

The following sections include a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmental sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

Proposed Development Area Environmental Sensitivity

The following summary of the development footprint environmental sensitivities is identified. Only the highest environmental sensitivity is indicated. The footprint environmental sensitivities for the proposed development footprint as identified, are indicative only and must be verified on site by a suitably qualified person before the specialist assessments identified below can be confirmed.

Table 13: The development footprint environmental sensitivities (Figure 27).

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme	**X**			
Animal Species		**X**		
Aquatic Biodiversity Theme	**X**			
Archaeological and Cultural Heritage Theme	**X**			
Civil Aviation Theme			**X**	
Defence Theme				**X**
Plant Species Theme			**X**	
Terrestrial Biodiversity Theme				**X**

Table 14: Sensitivity features of the project area.

Theme	Sensitivity	Feature
Agriculture Theme	Medium	Land capability; Moderate to High
Animal species theme	High	Aves: *Stephanoaetus coronatus*
	Medium	Aves: *Terathopius ecaudatus* *Ciconia nigra* *Aquila rapax* Mammalia: *Cercopithecus albogularis schwarzi* *Lycaon pictus* *Crocidura maquassiensis* *Dasymys robertsii* Sensitive species 5
Aquatic biodiversity	Low	Very High sensitivities - Wetlands (Figure 27).
Archaeological and Cultural Heritage Theme	Very high	Within 2km of a Grade II Heritage site
Plant Species Theme	Medium	"Medium" Sensitive species *Faurea macnaughtonii* *Ocotea kenyensis* *Prunus africana* Sensitive species 1252 Sensitive species 738 Sensitive species 575 Sensitive species 1083 Sensitive species 1248
Terrestrial Biodiversity Theme	Low	Low sensitivity

The Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. Such species have had their names obscured and are listed as sensitive plant unique number or sensitive animal unique number (Table 14).

Should such species appear in the Screening Tool report, the Environmental Assessment Practitioner (EAP) is required to obtain the listing of all sensitive species with their unique identifier from SANBI which will release the actual species name in order for the specialist to ensure that the sensitive species do not occur in the project area. The name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain (Eiadatarequests, 2022)

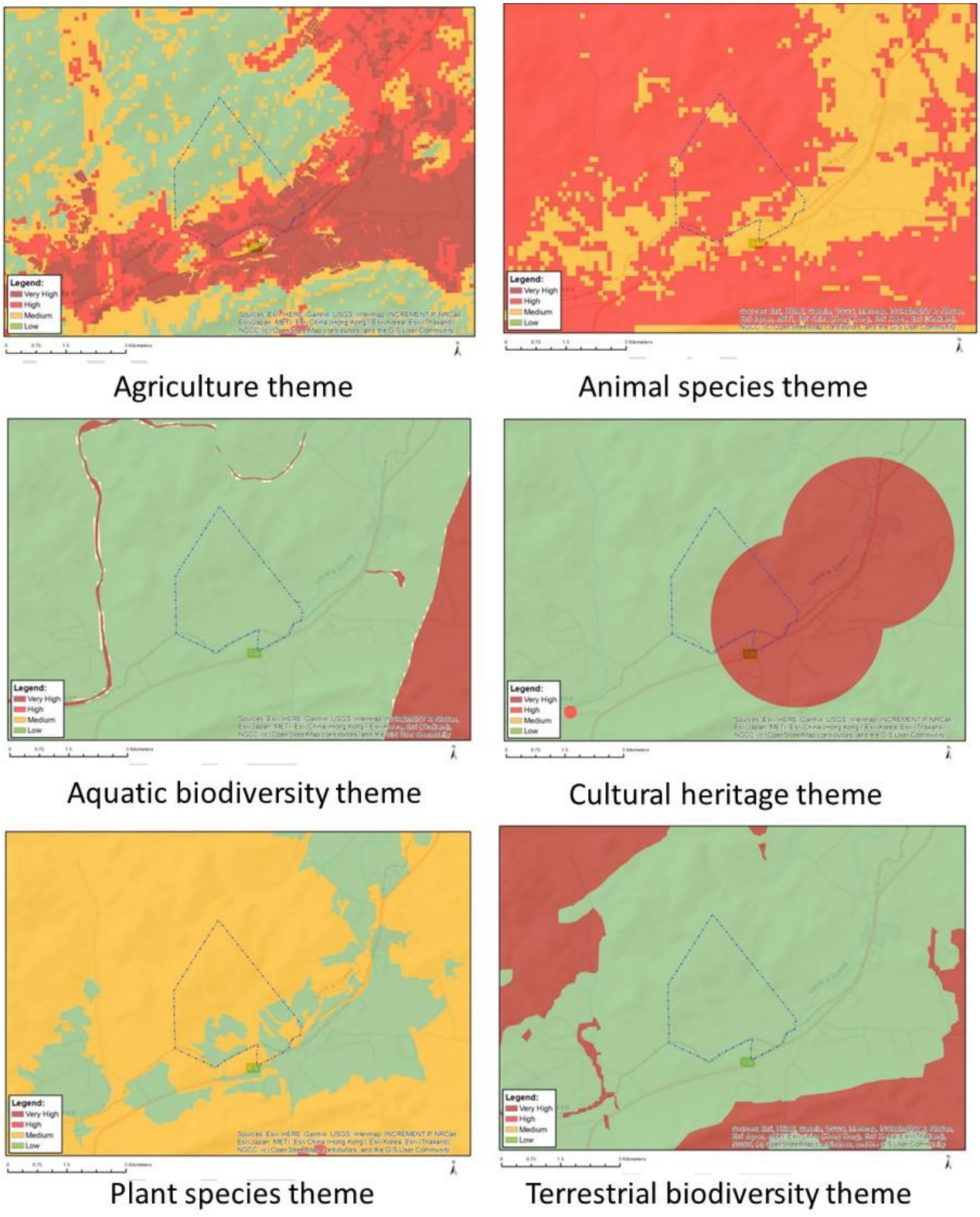


Figure 27: Maps of relative theme sensitivity for important for selected themes (Table 14).

The list of fauna and flora species listed in the sensitivity theme list (Table 14), as well as the overall SSC listings (Section 4.3) were taken into account during the site surveys, but none were observed in the relative restricted site areas.

5.3 Sensitivity mapping

Sensitivity assessments identify those sections of the study area that have high conservation value or that may be sensitive to disturbance. Sensitivities could be determined based on:

- Areas containing untransformed natural vegetation and associated faunal habitat;
- irreplaceability of the vegetation type and associated faunal habitat;
- ecological importance of vegetation and faunal habitat;
- high diversity or complexity of faunal habitat;
- observations of the abundance and diversity of floral and faunal species present at the time of the assessment;
- occurrence of Species of Conservation Concern (SCC);
- systems vital to sustaining ecological functions;
- presence or absence of CBAs and ESAs;
- degree of disturbance encountered as a result of historical activities.

In contrast, any transformed area that has no importance for the functioning of ecosystems is considered to have a low sensitivity.

An ecological sensitivity map of the project area was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various relevant reports. This includes delineating the different vegetation and habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties. Additionally, values and potential presence of vegetation and fauna species diversity, as well as species of conservation concern, were evaluated.

Five, broad-scale botanical biodiversity ‘sensitivity’ categories were identified and were developed for practical mapping purposes. They are intended as a summary of the perceived botanical biodiversity value and sensitivity, of mapped broad-scale vegetation and land-cover type units. Based on the assessment, the sensitivity of the project footprint can be divided into five categories of sensitivity: Very high, High, Moderate, Low and Negligible. These categories are listed as biodiversity sensitivity categories in Table 15.

Table 15: Important parameters relating to faunal diversity and landscape sensitivity listed in the different vegetation and land cover types in order to establish the biodiversity sensitivity and value of the project area.

Vegetation/ Land cover type unit	Status and sensitivity of vegetation type	CBA Category	Expected faunal species and SSC	Faunal biodiversity value and sensitivity	Overall ecological value and sensitivity
1. Untransformed savannah woodland	**Granite Lowveld**	Partially in ESA Protected Area Buffer	9 SSC species	High	**High**
2. Channelled valley bottom wetland with seepage		Other natural areas	3 SSC species	Medium	**Medium**
3. Secondary savannah woodland		Moderately modified	0 SSC species	Medium-Low	**Medium-Low**
4. Redundant infrastructure		Heavily modified	0 SSC species	Low	**Low**
5. Cleared woodland		Heavily modified	0 SSC species	Low	**Low**

5.4 Land-use planning and Decision-making

The use of CBA maps in Environmental Impact Assessments

Ideally, all land-users and people who make decisions about land and the use of natural resources should be aware of spatial biodiversity priorities, and should know how to take these into consideration in their planning and decision-making processes. This is so that they can proactively identify the ecological opportunities and constraints within a landscape and use these to locate different land-uses appropriately (Cadman *et al.*, 2010).

Systematic biodiversity planning provides a powerful set of tools (maps and land-use guidelines) that facilitate this in a wide range of sectors, at both the policy-making and operational decision-making levels. The Mpumalanga Biodiversity Sector Plan represents the biodiversity sector's input to a wide range of planning and decision-making processes, frameworks and assessments in multiple land-use sectors (MBSP Handbook, Lötter *et al.* 2014).

Mpumalanga Biodiversity Sector Plan (MBSP) and Threatened Ecosystems

The Mpumalanga Biodiversity Sector Plan (MBSP) (Mpumalanga Tourism & Parks Agency, Mbombela (Nelspruit). provides maps of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) for the entire province, which is referred to as the CBA Map in the MBSP.

Critical Biodiversity Area (CBA) maps and their associated land-use guidelines are used to determine the biodiversity context of a proposed land-use site, ahead of making the first site visit. Although the CBA maps supply crucial guidelines for the assessment, additional background information is required to develop a broader understanding of the study area. A number of resources and tools are therefore used to establish how important the proposed development site is for meeting biodiversity targets. Specifically, the Land-Use Decision Support Tool (LUDS) and the Mpumalanga Biodiversity Sector Plan (MBSP) are extensively used to compile reports (BGIS, 2015). LUDS was developed to facilitate and support biodiversity planning and land-use decision-making at a national and provincial level.

The conservation status of the SVl3 Granite Lowveld is “Vulnerable” with a target of 19%. It has been greatly transformed (20%), mainly by cultivation and by settlement development. (Mucina & Rutherford 2006).

The Naude’s Rust project area falls within the planning domain of the Mpumalanga Biodiversity Sector Plan. The potential impact of the development on Critical Biodiversity Areas should be considered in detail as these areas have been identified through systematic conservation planning exercises and represent biodiversity priority areas which should be maintained in a natural to near natural state in order to safeguard biodiversity patterns and ecological processes.

These detailed records, together with the latest mapping and remote sensing data on vegetation, land use and water resources, have been combined and subjected to sophisticated analyses. For the finer components of a conservation plan, the MBSP maps were consulted and the detail added to the sensitivity assessment of the study area.

The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. Critical Biodiversity Areas (CBAs) are areas of the landscape that need to be maintained in a natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. If these areas are not maintained in a natural or near-natural state then biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses.

Its primary objective is to serve as a guide for biodiversity planning but should not replace specialist ecological assessments. To maintain an area in a ‘natural’ state, a variety of biodiversity-compatible land uses and resource uses should be followed.

The MBSP maps the distribution of the province's known biodiversity into seven categories. These are ranked according to ecological- and biodiversity importance and their contribution to meeting the quantitative targets set for each biodiversity feature. The categories are:

- Protected areas - already protected and managed for conservation;
- Irreplaceable areas - no other options available to meet targets—protection crucial;
- Highly significant areas - protection needed, very limited choice for meeting targets;
- Important and necessary areas - protection needed, greater choice in meeting targets;
- Ecological corridors – mixed natural and transformed areas, identified for long term connectivity and biological movement;
- Areas of Least Concern – natural areas with most choices, including for development; and
- Areas with No Natural Habitat Remaining – transformed areas that make no contribution to meeting targets.

It must first be established how important the site is for meeting biodiversity targets. To do this, it is necessary to answer the following three simple but fundamentally important questions:

- How important is the site for meeting biodiversity objectives (e.g. is it in a CBA or Ecological Support Area (ESA)?
- Is the proposed land-use consistent with these objectives or not (to be checked against the land-use guidelines)?
- Does the sensitivity of this area trigger the MTPA requirements for assessing and mitigating environmental impacts of developments, or in terms of the listed activities in the EIA regulations?

Table 16: The key results of the LUDS Report as extracted for the Naude's Rust project area from national datasets available from BGIS.

National Data Set	**Aspect**	**Present**
National terrestrial information: Farm Naude's Rust 272 JU: Portions 17 and 21, Mpumalanga.		
South African District	Ehlanzeni	
South African municipal boundaries	Municipality name: Umjindi	MP323
Quarter-degree grid square		2531CB
Terrestrial CBAs		
Bioregion	**National vegetation map**	**Status**
Savanna Biome (Lowveld)	SVl3 Granite Lowveld	Threatened ecosystem status: Vulnerable
Ecological Support Areas	Protected area buffer	2200 ha Boondocks Bushveld Reserve and Mountainlands Nature Reserve
Aquatic Critical Biodiversity Areas		
Water Management Area (WMA)	Inkomati WMA	
Sub Water Management Area	Crocodile Catchment	
Ecoregion 1	North-Eastern Highlands	4.04

Critical Biodiversity Areas

Overlaying the BGIS Critical Biodiversity Areas map onto the Naude's Rust project area, resulted in the compilation of Figures 28 to 29 and Table 16. According to these maps and LUDS Report (Table 16) the project area falls into the following sensitive areas:

- Terrestrial:
  - Ecological Support Area: Protected area buffer
  - Vulnerable Ecosystem Status: Granite Lowveld

With these landscape properties, it is paramount to approach the construction- and operation phases of the entire project with caution.

Ecological Support Areas: Those areas that play a significant role in supporting ecological functioning of Critical Biodiversity Areas and/or delivering ecosystem services, as determined in a systematic biodiversity plan. A Critical Biodiversity Area map is a map of Critical Biodiversity Areas and Ecological Support Areas based on a systematic biodiversity plan. Critical Biodiversity Areas and Ecological Support Areas are areas that require safeguarding to ensure the continued existence of biodiversity, ecological processes and ecosystem services. A Critical Biodiversity Area map, often developed at provincial level, provides the basis for a biodiversity sector plan.

A CBA map of the study area was compiled by using the Biodiversity Geographic Information System (BGIS) maps as illustrated in Figure 28. Every attempt should be made during all phases of the project development not to have an impact on these areas. While determining the area and distribution of a core habitat is important, it is equally important that appropriate management measures be defined to ensure the core habitat continues to function effectively.

The goal is to maximise connectivity in CBAs and ESAs, the retention of intact natural habitat and avoid fragmentation: Design project layouts and select locations that minimise loss and fragmentation of remaining natural habitat and maintain spatial components of ecological processes, especially in ecological corridors, buffers around wetlands, CBAs and ESAs. Activities that are proposed for CBAs must be consistent with the desired management objectives for these features and should not result in fragmentation.

Figure 26 illustrates the Present Ecological State of the project area as illustrated by the LUDS programme (BGIS, 2015) for Mpumalanga. It indicates the current and historically cultivated areas.

Figures 28 and 29 illustrates the Critical Biodiversity areas for the Naude's Rust project area as compiled from the LUDS programme (BGIS, 2015) for Mpumalanga. Most of the area have been totally transformed by agriculture ("Heavily Modified"), with only small patches of Other Natural Areas (ONAs) in between. Site 1 is on the edge of a large portion of ONA which indicates natural environment on the edge of the Crocodile Gorge Mountain.

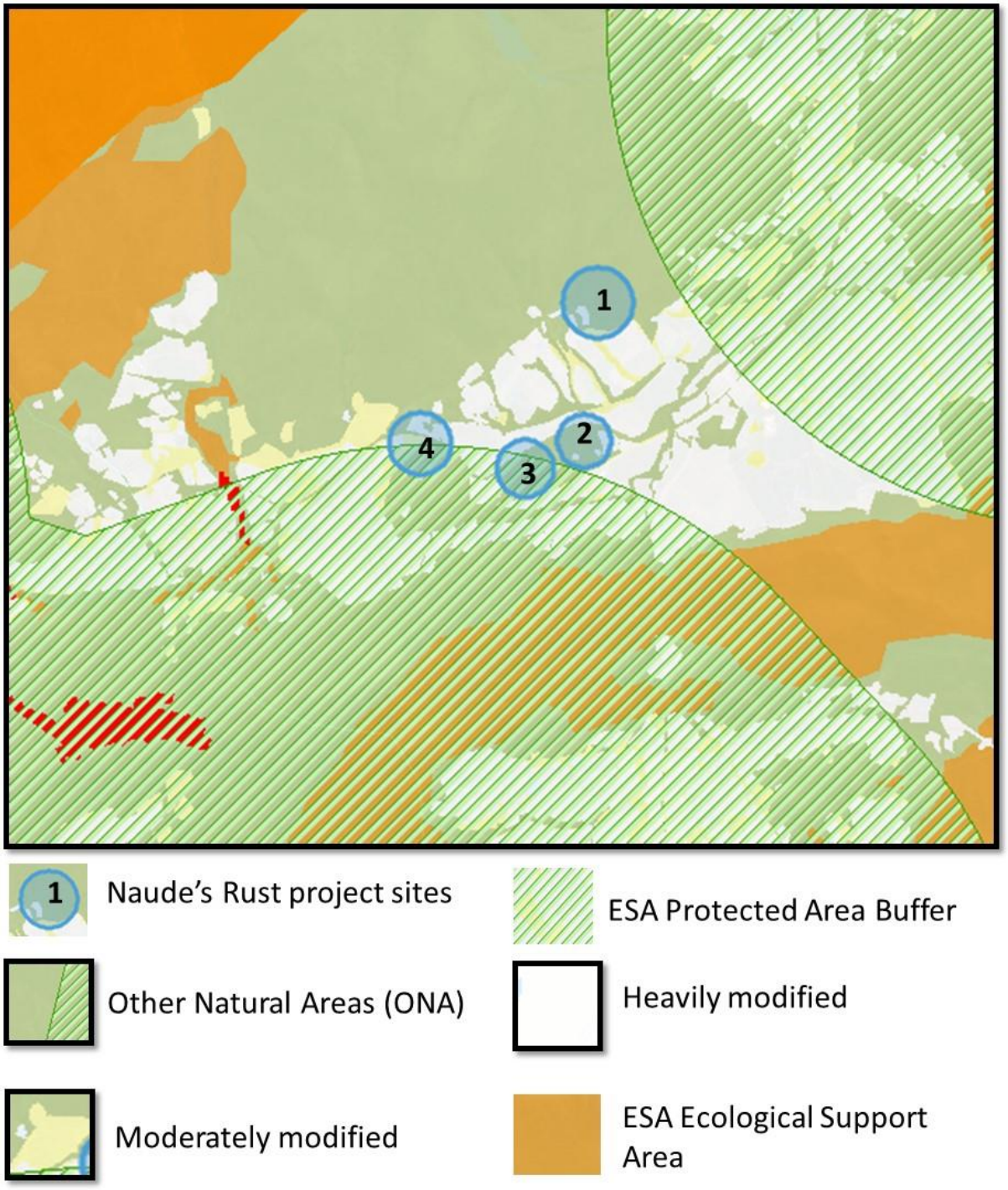


Figure 28: The Critical Biodiversity areas for the Naude's Rust project area as illustrated by the LUDS programme (BGIS, 2015) for Mpumalanga.

Figure 28 illustrates the Terrestrial Critical Biodiversity areas for the Naude's Rust project area, illustrating the ESA Protected Area Buffer around the 2200 ha Boondocks Bushveld Reserve (buffer to the north) and Mountainlands Nature Reserve (buffer to the south) illustrated by the LUDS programme (BGIS, 2015) for Mpumalanga.

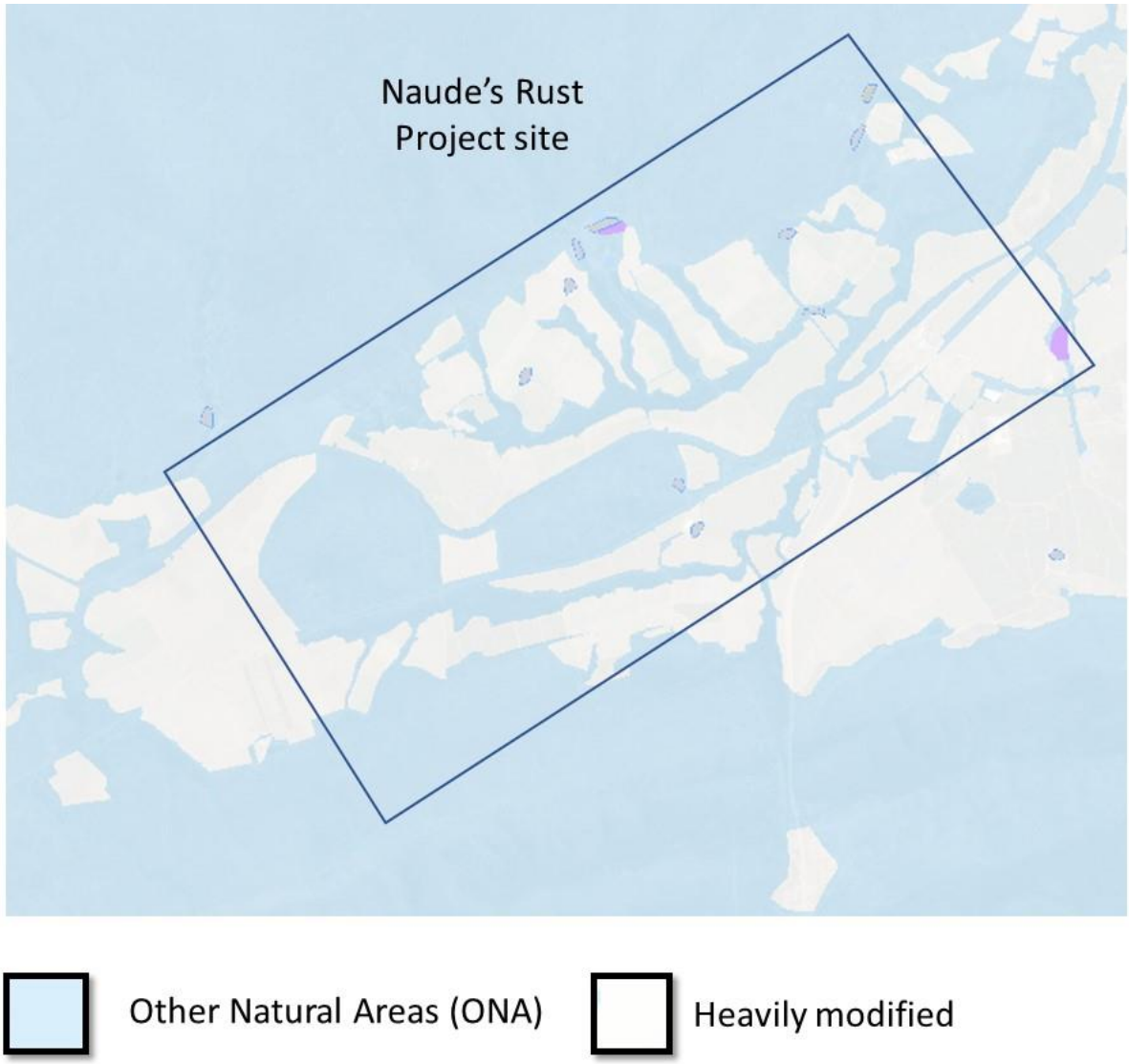


Figure 29: A map obtained from the 2014 Mpumalanga Biodiversity Sector Plan to indicate the Freshwater CBAs and ESAs in the project area, (blue dot). Light blue = Other Natural Areas; White = Heavily Modified Areas (Mpumalanga Biodiversity Sector Plan, 2014).

5.5 Corridors for Connectivity

Landscape connectivity may be achieved through several main types of habitat configurations that function as linkages for species, communities or ecological processes. Linkages are used as pathways by animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements and range expansion. Linkages also contribute to other ecological functions in the landscape and, in particular, have an important role to play in providing habitat for plants and animals in human-dominated environments (Bennett, 2003).

Figure 30 illustrates a network of corridors provided by the proposed buffers around the Site 1 drainage line on the Naude's Rust farm. These corridors create a connection between most of the intact drainage lines on the farm with the natural environment of the Crocodile Gorge Mountain foothills. This network will provide viable corridors and dwellings for animals.

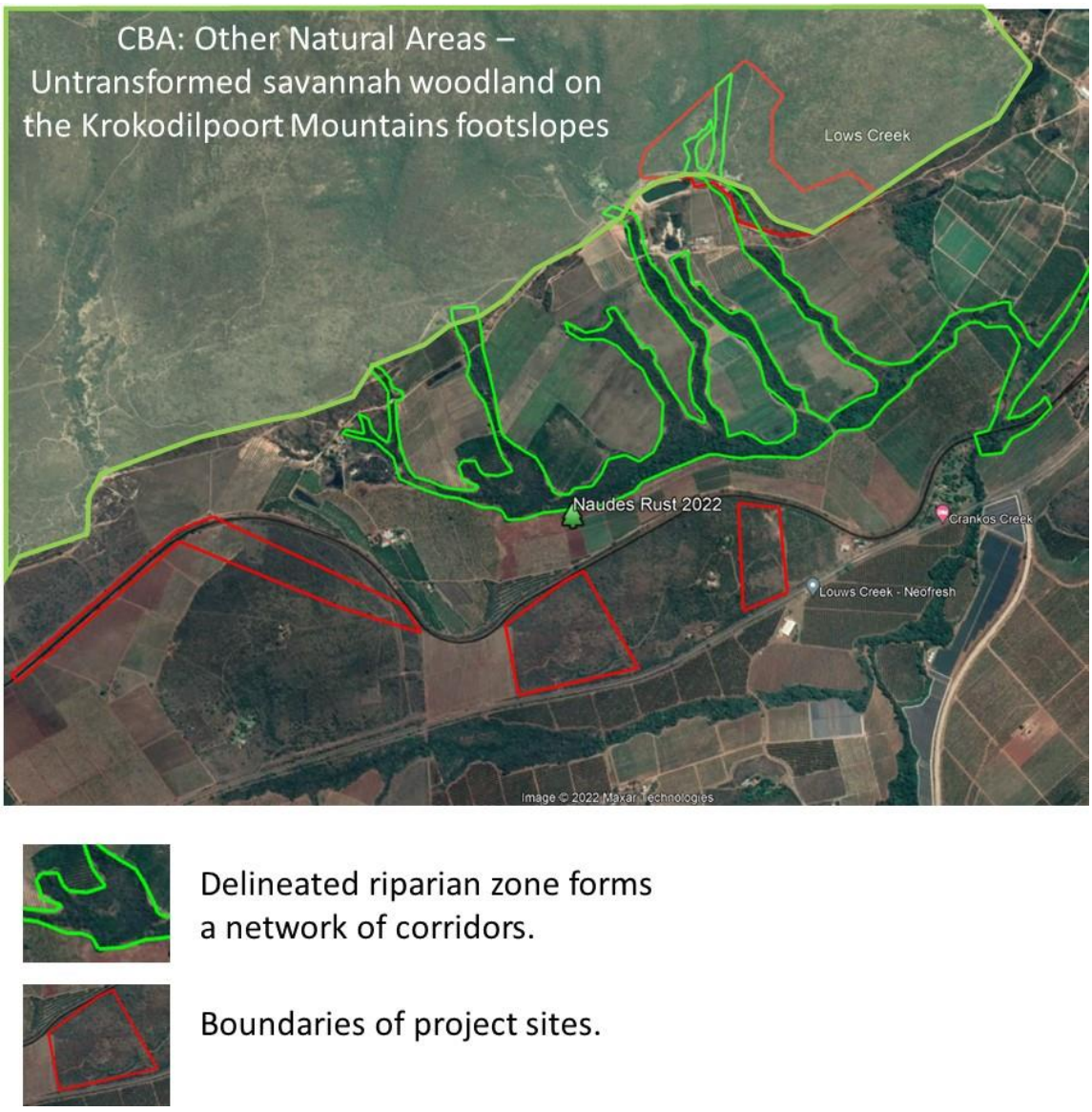


Figure 30: Corridors created by intact drainage lines form an ideal network for connectivity (network defined by the green lines). The new areas intended for development (Sites 1 to 4) are indicated as proposed (red polygons).

5.6 Assessment of impacts

The potential impacts of the project on the biodiversity of the study area are assessed under seven broad impacts, namely:

- Impact 1: Clearing of approximately 42 ha of transformed and untransformed land types.
- Impact 2: Erosion and siltation.
- Impact 3: Habitat fragmentation.
- Impact 4: Disturbance to Fauna.
- Impact 5: Human interference impacting on biota.
- Impact 6: Linear structures: Impacts of roads and pipelines.
- Impact 7: Alien invasive vegetation.
- Impact 8: Loss of Red listed and protected fauna/flora species.

The impact assessment of all the other perceived impacts provided below, describes each broad impact, determines the significance of the impact and lists summarised mitigation and monitoring measures for each impact.

Impact 1: Clearing of approximately 42 ha of transformed and untransformed land types.

Applicable Phase: Clearing phase
Applicable activity: Clearing of transformed and untransformed habitat for orchards.

Nature of impact: This impact refers to the loss of transformed and untransformed habitat assemblages. The clearing of vegetation within the agricultural footprint will result in the permanent removal of approximate 30 ha of Untransformed Savannah woodland. The proposed clearing of these biotopes was mapped on areas identified in the Mpumalanga Biodiversity Sector Plan. Sites 3 and 4 are partially included in the ESA Protected Area Buffer around the Mountainlands Nature Reserve, while Site 1 is inside the ONA of the Crocodile Gorge Mountain foothills.
The clearance of vegetation for orchard establishment and associated infrastructure will result in the direct loss of vegetation and indirect loss of habitat that will decrease the viability of biota by reducing the size of populations that can be supported on the project site.

Mitigation of Impact 1:
Mitigation Description: Avoid environmentally sensitive areas identified on the Sensitivity Mapping exercise and have a high regard for all the buffers introduced to protect these areas.

The drainage line in Site 1 has been delineated and a 10m buffer added around the riparian zone. The buffer should be respected and no development must take place inside the buffered area.

Before clearing, demarcate the extent of the orchards footprint and ensure that clearing impacts are contained within this area and do not affect areas of natural habitat. Limit the removal of vegetation to the development footprint only.

Table 17: Clearing of land: Criteria used to determine the consequence of the impact.

ISSUE:	**Clearing of land**
Project Phase	**Clearing and Operation**
Nature	Negative
Extent	Site (1)
Intensity	Medium (2)
Duration	Long term (3)
Consequence	Medium (6)
Probability	Definite
Degree to which impact cannot be reversed	High
Degree to which Impact may cause irreplaceable loss of resources	Medium
Confidence level	High
Significance Pre- Mitigation	**Medium (-ve)**
Significance Post Mitigation	**Medium (-ve)**
Degree of Mitigation	Medium
Preferred Alternative	Only clear low sloping areas and refrain from the steeper slopes due to the possibility of erosion.

- **Significance Post Mitigation: Medium -** Where the impact can have an influence on the environment and the decision and should be mitigated.

Impact 2: Erosion and siltation.

Applicable Phase: Clearing and operational phases

Applicable activity: Clearing vegetation for orchards and linear structures.

Nature of impact: Erosion of cleared areas and siltation of water courses.

During both site preparation and of clearing fields for the orchards, as well as the construction of access roads and trenching for pipelines, soil erosion may increase and result in sediment input into the drainage lines and eventually into the Low's Creek River. This will result in elevated instream turbidity levels and changes in instream habitat conditions.

These activities could also result in infilling of the river channel and transport and deposition of sediment downstream. Inadequate storm water erosion-control in the newly-established fields and along linear structures could result in sediment-laden water entering the adjacent watercourses.

Furthermore, both vegetation clearing (exposed soil surfaces) and compacted surfaces (access roads) may alter the hydrological nature of the area by increasing the surface run-off velocities, while reducing the potential for any run-off to infiltrate into the soils, which escalates the potential for erosion and sedimentation to occur. Recharge of groundwater and surface run-off patterns may also be altered.

Some of the sites are situated on hilly ground and other on foot-slopes of mountainous areas. Only develop in areas where slopes are in the recommended range for irrigated lands. Slopes with a steep incline will be prone to erosion and silting up the drainage lines.

Mitigation of Impact 2:

Clearing and development should take place during the driest time of the year, however storm events can happen at any time. Clearing time should be kept as short as possible and planting or rehabilitation of cleared or excavated areas should commence as soon as the development activity is completed.

Management actions should be implemented, i.e., the re-establishment of indigenous vegetation wherever possible, control of storm water run-off and ongoing repair and stabilisation of any erosion. Where steeper slopes are cleared of vegetation, stop-boards should be erected at the commencement of clearing to prevent wash-off down-slope. Only clear low sloping areas and refrain from the steeper slopes due to the possibility of erosion.

Strict measures must be taken to prevent erosion and sediment-laden water from entering the adjacent watercourses. Storm water management measures are to be included in roadways especially at water course crossings. The vegetated riparian buffer zone should remain intact along all watercourses to facilitate the containment of sediment-laden run-off from orchards.

Sediment basins (including debris basins, desilting basins, or silt traps) shall be installed on the project site in conjunction with the initial grading operations and maintained through the development process to remove sediment from runoff waters.

Sediment traps are considered temporary structures and often placed at the site on an “as needed” basis by field personnel. Construct traps of rock (mixed with smaller stone), rock-filled fibre bags, or use approved commercial sediment trap products installed and spaced according to manufacturer’s instructions.

Silt fences and straw bales are used to form silt traps and dykes to keep sediment from washing downstream during excavation and other activities that disturb soil at crossings and that could lead to temporary sediment flushing.

Table 18: Erosion and siltation: Criteria used to determine the consequence of the impact.

ISSUE:	**Erosion and siltation**
Project Phase	**Clearing and Operation**
Nature	Negative
Extent	Local (2)
Intensity	Medium (2)
Duration	Medium-term (2)
Consequence	Medium (6)
Probability	Possible
Degree to which impact cannot be reversed	Medium
Degree to which Impact may cause irreplaceable loss of resources	Medium
Confidence level	Medium
Significance Pre- Mitigation	Medium (-ve)
Significance Post Mitigation	Low (-ve)
Degree of Mitigation	Medium
Preferred Alternative	

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact 3: Habitat fragmentation.

Applicable Phase: Clearing and operational phases

Applicable activity: The clearance of vegetation will cause habitat fragmentation.

Nature of impact: Fragmentation will interfere with migration corridors and linking biotopes.

The clearance of vegetation will cause habitat fragmentation. Fragmentation is a process whereby large tracts of the natural landscape are gradually developed and subdivided until only patches of original habitat remain. Habitat fragmentation is a less obvious consequence of development, reducing both the quantity and quality of habitat.

Fragmented habitat will create isolated subpopulations of animals, disrupt individual behaviour, prevent gene flow between populations, prevent species interaction and inhibit ecological processes. The patches are often too small and too far apart to support the basic survival and reproductive needs of many wildlife species during various stages of their life cycle or in different times of the year. When a species' habitat is separated by distances that make movement from one patch to another impossible, the impacts on the genetic health of the population are significant and reduce a species ability to reproduce and withstand stress.

Mitigation of Impact 3:

A network of corridors is provided by drainage lines on the Naude's Rust Farm. To prevent the corridor created by the drainage line in Site 1 becoming obstructed by vegetation clearing and development, a 10m buffer is proposed around the riparian zone. The buffered drainage line will create a corridor through Site 1 to the Crocodile Gorge Mountain foothills.

This network will provide viable corridors and dwellings for animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements, and range expansion. The network, which includes the buffered drainage line, will be a sanctuary for both animals and plants, which includes a number of Red listed and protected species.

Table 19: Habitat fragmentation: Criteria used to determine the consequence of the impact.

ISSUE:	**Habitat fragmentation**
Project Phase	**Clearing**
Nature	Negative
Extent	Site (1)
Intensity	Medium (2)
Duration	Long-term (3)
Consequence	Medium (6)
Project Phase	Clearing
Probability	Probable
Degree to which impact cannot be reversed	Medium
Degree to which Impact may cause irreplaceable loss of resources	Medium
Confidence level	High
Significance Pre- Mitigation	Medium (-ve)
Significance Post Mitigation	Low (-ve)
Degree of Mitigation	High
Preferred Alternative	

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact 4: Disturbance to Fauna

Applicable Phase: Clearing phase

Applicable activity: Clearing activities may lead to the disturbance of fauna.

Nature of impact: This impact refers to the human-related disturbances of fauna that reside on the site.

Clearing activities may lead to disturbance of fauna that reside on the site. Increased levels of noise, pollution, disturbance, and human presence during the clearing phase, will be detrimental to fauna. Retreating mammals would likely move away from the area, particularly during the clearing phase as a result of the noise and human activities present.

Mitigation of Impact 4:

The disturbance factor will be high during the bush clearing activities.
During the operational phase of the project, fewer people partake in the farming activities in the orchards and thus the visual disturbance and noise is lower. This also pertains to the movement and the noise factor of farming vehicles and other implements.

During all phases it is important to establish no-go zones for both workers and their vehicles, especially in the untransformed habitats. People presence and movement in the drainage line buffer areas will disturb animals, chances of interference (poaching and collecting) with both plants and animals, trampling of plants and pet dogs are all possible adverse influences that impacts on the local ecology.

Table 20: Disturbance to fauna**:** Criteria used to determine the consequence of the impact.

ISSUE:	**Disturbance to fauna**		
Project Phase	**Clearing**	**Operation**	
Nature	Negative	Negative	
Extent	Site (1)	Site (1)	
Intensity	Medium (2)	Low (1)	
Duration	Short-term (3)	Long-term (3)	
Consequence	Medium (6)	Low (5)	
Project Phase	Clearing	Operation	
Probability	Possible	Possible	
Degree to which impact cannot be reversed	High	Low	
Degree to which Impact may cause irreplaceable loss of resources	Medium	Low	
Confidence level	High	High	
Significance Pre-Mitigation	Medium (-ve)	Medium (-ve)	
Significance Post Mitigation	Low (-ve)	Low (-ve)	
Degree of Mitigation	Medium	Medium	
Preferred Alternative			

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact 5: Human interference impacting on biota.

Applicable Phase: Clearing and operational phases

Applicable activity: People presence may lead to collecting, persecution, poaching and the presence of pets which will have an impact on local biota.

Nature of impact: Human interference and utilisation impacting on biota.

Disturbance or persecution of fauna during the clearing phase may occur. Poaching of animals (hunting with dogs, snares and trapping) – especially game birds (francolin and guinea fowl) and small mammals (steenbok and duiker).

Some mammals (hedgehogs, pangolin) and reptiles, such as tortoises would be vulnerable to illegal harvesting or poaching during the clearing phase. Indiscriminate persecution of snakes and other reptiles due to superstition and fear may occur.

Predation on wildlife by wandering pet dogs and cats. Domestic pets, particularly cats, may prey excessively on wildlife, such as ground-nesting birds. Pet dogs running free will eventually scare away all mammals (even nocturnal) that are able to survive by hiding in the dense woodland/outcrop habitats.

Other activities such as the unsustainable collecting of wood for fire (both dead logs and chopping down trees), sedges and thatching grass, rocks and boulders for building, clay from termite mounds for building, sand mining, etc., will impact on the diversity of viable aspects of habitat.

Mitigation of Impact 5:

The collection, hunting or harvesting of animals at the project site should be strictly forbidden. No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the project site and adjacent areas.

There should be a stringent and dedicated control to prevent collection, poaching, hunting or harvesting of animals. All personnel should be informed not to harm or collect species such as snakes and tortoises.

Faunal species encountered during construction activities should be removed by the ECO from the immediate site and relocated to an adjacent, suitable area.

Poaching could be a significant threat. If any external labour teams are used during soil preparation and planting, then these teams should preferably be accommodated off site; if this is not possible then teams should be carefully monitored to ensure that no unsupervised access to plant and animal resources takes place. Site access to be controlled and no unauthorised persons should be allowed onto the site.

Any slow-moving fauna (particularly tortoises, hedgehogs, golden moles and subterranean species) disturbed during the clearing phase should be relocated to another site and not harmed in any way.

Check open trenches daily for trapped animals (e.g., bullfrogs, hedgehogs and reptiles), which should be caught and relocated according to the specifications of a relevant specialist.

Limit construction impacts to the development footprints only. Ensure that unnecessary impacts on natural habitat do not occur, e.g., driving around in the grassland or wetland. Highlight all prohibited activities to workers using training workshops.

Table 21: Human interference impacting on biota**:** Criteria used to determine the consequence of the impact.

ISSUE:	**Human interference impacting on biota**	
Project Phase	**Clearing**	**Operation**
Nature	Negative	Negative
Extent	Site (1)	Site (1)
Intensity	Medium (2)	Low (1)
Duration	Long-term (3)	Long-term (3)
Consequence	Medium (6)	Low (5)
Project Phase	Clearing	Operation
Probability	Possible	Possible
Degree to which impact cannot be reversed	High	Low
Degree to which Impact may cause irreplaceable loss of resources	Medium	Low
Confidence level	High	High
Significance Pre- Mitigation	Medium (-ve)	Medium (-ve)
Significance Post Mitigation	Low (-ve)	Low (-ve)
Degree of Mitigation	Medium	Medium
Preferred Alternative		

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact 6: Linear structures: Impacts of roads and pipelines

Applicable Phase: Clearing and operational phases

Applicable activity: Impacts created by the linear structures on the ecology of the farm.

Nature of impact: Clearing of areas along the linear structures results in erosion and siltation, being barriers and an increase in alien invasive vegetation.

During both site preparation and construction, particularly for construction of access roads and trenching for pipelines may increase soil erosion and result in sediment input into the river. This will result in elevated instream turbidity levels and changes in instream habitat conditions. These activities could also result in infilling of the river channel and transport and deposition of sediment downstream.

The potential increase in alien invasive plants will impact on habitat integrity.

Vehicle movement generating dust during operational activities will impact on sensitive habitats.

Mitigation of Impact 6:

Refrain from creating unnecessary new orchard roads or tracks, make use of current routes as far as possible.

Management actions should be implemented such as the re-establishment of indigenous vegetation wherever possible, control of storm water run-off and ongoing repair and stabilisation of any erosion. Where steeper slopes are cleared of vegetation, stop-boards should be erected at the commencement of the clearing to prevent wash-off down-slope.

Refrain from incorporating continuous low solid barricades such as road curbs or steep-walled ditches that might act as barriers to smaller vertebrates moving or migrating through the area. Check open trenches daily for trapped animals (e.g., bullfrogs, hedgehogs and reptiles), which should be carefully caught and relocated according to the specifications of a relevant specialist.

Develop and implement an alien plant control programme for the study area in order to prevent the further degradation of the faunal habitat.

Table 22: Roads and pipelines: Criteria used to determine the consequence of the impact.

ISSUE:	**Roads and pipelines**
Project Phase	**Construction and Operation**
Nature	Negative
Extent	Site (1)
Intensity	Medium (2)
Duration	Medium-term (2)
Consequence	Low (5)
Project Phase	Construction and Operation
Probability	Possible
Degree to which impact cannot be reversed	Low
Degree to which Impact may cause irreplaceable loss of resources	Low
Confidence level	High
Significance Pre- Mitigation	Low (-ve)
Significance Post Mitigation	Low (-ve)
Degree of Mitigation	Medium

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact 7: Alien invasive vegetation.

Applicable Phase: Clearing and operational phases

Applicable activity: The invasion of weeds and exotic plants.

Nature of impact: Competition.

Alien Plant Infestation within Orchard areas

The spread of alien plants causes a gradual change in the structure and diversity of the vegetation. This can lead to a substantial change in the character of the ecosystem and habitat within the area. Exotic invader plants and trees deteriorate the natural environment and reduce biodiversity.

Key factors in weed invasion appear to be:

- Soil disturbance (e.g., tracks, clearing, erosion).
- The presence of adjoining agricultural land with weed species.
- Too-frequent fires.

If a seed-base of invasive alien species is present, an invasion by these species could increase as bare soil is exposed.

The disturbance to the vegetation and soils, during the clearing and orchard preparation phase, could increase the risk of an alien plant invasion, especially where soils are exposed. Some of the natural vegetation along roads and pipelines and orchard areas will be lost

during the orchard establishment phase of the project. Loss of habitat adjacent to roads and pipelines may result in an increase in alien invasive plant species. Roads and traffic may facilitate the invasion of weeds and exotic plants as seeds attached to undercarriages in mud and dirt may transport seeds from a large catchment and move them across the landscape rapidly.

Inappropriate maintenance activities during the operational phase would also promote the invasion or dominance of alien plant species at the site. A high abundance of alien plant species within the site would impact adjacent plant communities and promote the invasion of alien species into the intact vegetation. Alien species are already present on the farm and will colonise any area of disturbance should they not be actively controlled.

The spread of alien invasive species is an ongoing problem as alien plants in the surrounding landscape and the gum and wattle plantation act as a long-term source of seeds and future spread. In terms of the Conservation of Agricultural Resources Act (CARA, Act No. 43 of 1984), alien species must be managed and controlled in terms of their respective categories. All aggressive alien species, as indicated above, should be removed.

Mitigation of Impact 7:

An alien invasive plant management- and control plan should be put in place for both the construction- and operational phases on the farm. A programme for the eradication, or at least control, of alien plants present within the project area must be developed.

The Contractor and Farm Manager, during orchard establishment, and the various construction phases, should ensure that immediate removal of alien invasive species (seedlings) is implemented as these species establish themselves rapidly within disturbed areas. Mechanical removal is preferred, and should follow the guidelines laid down in an alien plant management and control plan.

Alien plant removal should include in the natural biotopes not impacted by the development.

Table 23: Alien invasive vegetation**:** Criteria used to determine the consequence of the impact.

ISSUE:	**Alien invasive vegetation**
Project Phase	**Clearing and Operation**
Nature	Negative
Extent	Regional (3)
Intensity	Medium (2)
Duration	Medium-term (2)
Consequence	High (7)
Project Phase	Construction and Operation
Probability	Possible
Degree to which impact cannot be reversed	Low
Degree to which Impact may cause irreplaceable loss of resources	Medium
Confidence level	High
Significance Pre- Mitigation	Medium (-ve)
Significance Post Mitigation	Low (-ve)
Degree of Mitigation	High

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact 8: Loss of Red listed and protected fauna/flora species.

Applicable Phase: Clearing and operational phases

Applicable activity: Clearing and operation of the project having an influence on the presence of protected fauna/flora species.

Nature of impact: Displacement of protected fauna/flora species.

Several Red listed and protected faunal and plant species are expected to be present in the project area. Seven plant species of concern are expected to occur in different habitat types on the farm.

Species of Concern: Plants

Protected trees (Government Gazette, 2019; Department of Agriculture, Forestry and Fisheries, 2019) present in the project area:

- Apple-leaf (*Philenoptera violacea*)
- Marula (*Sclerocarya birrea*)
- Green-thorn *(Balanites maughamii)*
- Red ivory (*Berchemia zeyheri*)

Conservation-important plant species listed for the quarter-degree grid 2531CB:

- Transvaal saffron *(Elaeodendron transvaalense)*
- Orange fire lily *(Cyrtanthus eucallus)*
- *Streptocarpus fasciatus*

Of all the faunal Species of Special Concern, 12 species of animals have a “Medium” to “Optimal” probability of occurring in the different habitat types of the project area.

- Barberton girdled lizard *(Smaug warreni barbertonensis*)
- Wilhelm's flat lizard (*Platysaurus intermedius wilhelmi*)
- Distant's ground agama *(Agama aculeata distanti)*
- Knysna Turaco *(Tauraco corythaix)*
- Chorister Robin-Chat *(Cossypha dichroa)*
- Greater Double-collared Sunbird *(Cinnyris afer)*
- Lanner Falcon *(Falco biarmicus)*
- European Roller (*Coracias garrulus*)
- Martial Eagle *(Polemaetus bellicosus)*
- Tawny Eagle *(Aquila rapax)*
- Honey badger (*Mellivora capensis*)
- Serval *(Leptailurus serval*)

The main impact that probably will have an adverse impact on the SCC species, is the process of clearing fields for planting of crops. The main reason for this involves the clearance of 30 ha of Untransformed Savannah woodland and a small area of old lands that have recovered to a certain level.

Nineteen Species of Special Concern (SCC) that have a high probability of occurring in the region, are expected to frequent the Naude's Rust farm. The four sites proposed to be cleared for agriculture, consists mainly of savannah woodland. Most of the mammal and bird SCC will be able to move out of the areas during clearing process due to their size and mobility. Burrowing frogs and reptiles will be affected by vegetation clearing.

Mitigation of Impact 8:

The areas earmarked for development consist mostly of savannah woodland. Where total vegetation clearing is going to take place:

i. Specified faunal species not able to move away, must be captured and relocated to suitable habitat in the area (preferably).
ii. The operations must be handled by specialists with expertise in the field of relocations.
iii. Species data (GIS point locality, species name and date) must be forwarded to the MTPA.

It is suggested that any species caught during the process, should be translocated in the area towards the west, the Crocodile Gorge Mountain foothills. Relocation plans of plants of conservation importance should be included and this relocation should be undertaken by specialists that have expertise in the area of relocations.

Table 24: Red listed and protected species**:** Criteria used to determine the consequence of the impact.

ISSUE:	**Red listed and protected species**
Project Phase	**Construction and Operation**
Nature	Negative
Extent	Local (2)
Intensity	Medium (2)
Duration	Long-term (3)
Consequence	High (7)
Project Phase	Construction and Operation
Probability	Possible
Degree to which impact cannot be reversed	Medium
Degree to which Impact may cause irreplaceable loss of resources	High
Confidence level	High
Significance Pre- Mitigation	Medium (-ve)
Significance Post Mitigation	**Low (-ve)**
Degree of Mitigation	Low

- **Significance Post Mitigation: LOW -** the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.

Impact Assessment Summary

Table 25: A summary of the impact assessment post mitigation.

No	Issue and aspect	Phases	Significance without mitigation	Significance with mitigation
1	Clearing of approximately 42 ha of transformed and untransformed land types.	Clearing and Operation	**Medium (-ve)**	**Medium (-ve)**
2	Erosion and siltation.	Clearing and Operation	**Medium (-ve)**	**Low (-ve)**
3	Habitat fragmentation	Clearing and Operation	**Medium (-ve)**	**Low (-ve)**
4	Disturbance to Fauna.	Clearing	**Medium (-ve)**	**Low (-ve)**
5	Human interference impacting on biota.	Clearing and Operation	**Medium (-ve)**	**Low (-ve)**
6	Linear structures: Impacts of roads and pipelines.	Clearing and Operation	**Low (-ve)**	**Low (-ve)**
7	Alien invasive vegetation.	Clearing and Operation	**Medium (-ve)**	**Low (-ve)**
8	Loss of Red listed and protected fauna/flora species.	Clearing and Operation	**Medium (-ve)**	**Low (-ve)**

5.8 Conditions for inclusion in the environmental authorisation

These conditions are based on the identification of mitigation measures and solutions that minimise impacts on biodiversity and conflicts in land-use by making use of use of CBA maps in the Environmental Impact Assessment.

a) **Retain natural habitat and connectivity in CBAs and ESAs**: The avoidance of environmentally sensitive areas identified during the Sensitivity Mapping exercise is regarded as the single most effective possible mitigation measure for mitigating impacts on the ecology of the project area.

- Avoid environmentally sensitive areas identified on the Sensitivity Mapping exercise.
- Maximise connectivity in CBAs and ESAs, the retention of intact natural habitat and avoid fragmentation: The buffered drainage line at Site 1 connects the riparian corridor to the Crocodile Gorge Mountain ONA.

b) Apply the mitigation hierarchy?
By making use of “best practice guidelines” during the construction- and operational phases, identify the best practical environmental options by avoiding loss of biodiversity and disturbance to ecosystems, especially in CBAs, by applying the mitigation hierarchy and the land-use guidelines recommended. In particular:

Management actions should be implemented such as:
- the re-establishment of indigenous vegetation wherever possible;
- control of storm water run-off;
- ongoing repair- and stabilisation of any erosion;
- implement an alien plant control programme;

- make use of current roads or tracks as far as possible;
- implement a veld management plan for the conservation area, which emphasises the use of sustainable grazing and controlled fires;
- prevent erosion and sediment-laden water from entering the adjacent watercourses;
- generic buffers should be established around wetlands;
- strict management of potential sources of agrochemical pollution;
- avoid over irrigation;
- maintaining an intact riparian corridor.

c) Remedy degradation and fragmentation through rehabilitation:

- A network of corridors will be established by the farm drainage lines and connect most of the farm with the Crocodile Gorge Mountain ONA:
  - Buffers around drainage lines;
- Planting or rehabilitation of cleared or excavated areas should commence as soon as the development activity is completed.
- Clear invasive alien vegetation and rehabilitate existing degraded habitats.

d) Secure priority biodiversity in CBAs and ESAs through biodiversity stewardship

Set aside land of high biodiversity importance for conservation through biodiversity stewardship options. Where biodiversity losses are unavoidable, set aside another piece of land of equivalent or greater biodiversity importance for conservation:
It is not foreseen that the Crocodile Gorge Mountain ONA will be affected in any future farming practises.

e) Promote long-term persistence of taxa of special concern

It is not foreseen that the Crocodile Gorge Mountain ONA will be affected in any future farming practises and the taxa of special concern can escape to this safe haven.

f) Integrating *in situ* biodiversity-sensitive management into the overall design and operation of the proposed land-use development

The owners will create a strict conservation ethic relating to the natural Crocodile Gorge Mountain ONA with its vast stretches of untransformed woodland.

5.9 Monitoring requirements

Environmental performance monitoring should be designed to ensure that mitigation measures are implemented. The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of the Environmental Authorisation (EA), as well as monitoring and reporting on the implementation of the approved EMPr.

A monitoring programme for the biodiversity associated with the project, would ideally be to record the reaction of the biota to changes in the environment due to the impacts of the project.

- Before the clearing of untransformed habitats, a botanist must be part of the identification-, relocation or removal programme of plant species of conservation importance.
- Establish an effective record keeping system regarding veld condition, alien vegetation presence and burning should be included in as a monitoring programme:
- Establish an effective record keeping system for each area where soil is disturbed for whatever purposes. The monitoring will evaluate whether the erosion and sedimentation control techniques that are employed throughout the site preparation activities are effective in minimising erosion of exposed areas and sedimentation of site surface water.

- The large number of Red Data listed and endemic species (26 species have a high probability of occurring on the Naude's Rust farm) necessitates a monitoring program to assess their numbers and status in the project area. An inventory system should be established in a concerted effort with regular staff working in the project area to identify Red Data or Species of Special Concern and record these species. In the event that any threatened or near-threatened animal species are recorded within the study area in future, appropriate conservation measures should be developed in consultation with the relevant conservation authorities.

5.10.1 Reasoned opinion

The potential impacts of the project on biodiversity of the study area were assessed under eight broad impacts. By implementing all the suggested mitigation measures and managing the system as prescribed, on a continuous basis, all the impacts will be addressed to a satisfactory level. It is the reasoned opinion that the overall project outcome mitigates all current listed impacts satisfactory to a "Low" impact level. Therefore, it is proposed that the project should be authorised with the provision that the mitigation measures prescribed in this document, where applicable, are included in the EMPr

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APPENDIX 4.4.3.
HERITAGE IMPACT ASSESSMENT REPORT

SPECIALIST REPORT

PHASE 1 ARCHAEOLOGICAL/HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED NAUDE'S RUST DEBUSHING PROJECT ON PORTIONS 17 & 21 OF THE FARM NAUDE'S RUST 272JU, KAAPMUIDEN - LOWS CREEK AREA, MPUMALANGA PROVINCE

REPORT COMPILED FOR

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OCTOBER 2022

ADANSONIA HERITAGE CONSULTANTS

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EXECUTIVE SUMMARY

A Phase 1 Heritage Impact Assessment (HIA) regarding archaeological and other cultural heritage resources was conducted on the footprint for the Naude's Rust debushing project, on *portions 17 & 21 of the farm NAUDE'S RUST 272JU*, between Kaapmuiden and Lows Creek.

The study area is situated on topographical map 1:50 000, 2531CB (Kaapmuiden), which is in the Mpumalanga Province. This area falls under the jurisdiction of the Ehlanzeni District Municipality, and Nkomazi Local Municipality.

The National Heritage Resources Act, no 25 (1999) (NHRA), protects all heritage resources, which are classified as national estate. The NHRA stipulates that any person who intends to undertake a development, is subjected to the provisions of the Act.

The applicant, Mr. Walter Giuricich, in co-operation with Rhengu Environmental Services, is requesting the debushing of four sections on the farm Naude's Rust, for agricultural purposes. The four sections will cover an area of approximately 28ha. The arable areas of Naude's Rust were historically disturbed by commercial farming activities since at least 1968. The area is ideal for agricultural development, with large commercial farms to the north, south, east and west.

The proposed development is situated to the north of the R38 between Kaapmuiden and Lows Creek. Swaziland is situated approximately 30 km to the south. The farm is currently zoned as agricultural.

The survey revealed a number of recent structures which have no historical significance, as well as a single fragment of a Late Iron Age (LIA), clay potsherd, which was observed within a disturbed road section. No graves were identified during the survey, which was also confirmed by the owner.

It is recommended that the owner be made aware that distinct archaeological material or human remains may only be revealed during the debushing operation. Due to the dense grass cover in some of the sections, it is recommended that the debushing/earthmoving activities be monitored by a qualified archaeologist, who will assess any finds should it be necessary. Based on the survey and the findings in this report, Adansonia Heritage Consultants state that there are no compelling reasons which may prevent the proposed debushing on the four sections, to continue.

Disclaimer: *Although all possible care is taken to identify all sites of cultural significance during the investigation, it is possible that hidden or sub-surface sites could be overlooked during the study. Christine Rowe trading as Adansonia Heritage Consultants will not be held liable for such oversights or for costs incurred by the client as a result.*

……..
CHRISTINE ROWE
OCTOBER 2022

CONTENTS

PHASE 1 ARCHAEOLOGICAL/HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED NAUDE'S RUST DEBUSHING PROJECT ON PORTIONS 17 & 21 OF THE FARM NAUDE'S RUST 272JU, KAAPMUIDEN - LOWS CREEK AREA, MPUMALANGA PROVINCE

A. BACKGROUND INFORMATION TO THE PROJECT

The owner of the farm Naude's Rust 272JU in the Kaapmuiden - Lows Creek area is requesting the debushing of four sections on portions 17 & 21 on the farm Naude's Rust 272JU. [1] The four sections are numbered from one (1) to four (4) respectively, and covers a total area of 28ha. [2] Large sections on the farm have historically been used for agricultural purposes since at least the 1960's, and the wider area is well known for extensive farming of fruit, vegetables and sugarcane (see maps 2 & 3: Aerial map & Google image). The farmers continue to investigate and experiment with crops which could give better returns and use less water. [3]

The study area is situated on portions 17 & 21 of the farm NAUDE'S RUST 272JU, just north of the R38 between Lows Creek and Kaapmuiden, [4] and is approximately 15km south of the N4 national road.

Adansonia Heritage Consultants were appointed by RHENGU ENVIRONMENTAL SERVICES, to conduct a Phase 1 heritage impact assessment (HIA) on archaeological and other heritage resources on the study area. A literature study, relevant to the study area as well as a foot survey was done, to determine that no archaeological or heritage resources will be impacted upon (see map 10: Topographical Map: 2531CB -1968 & 1984).

The aims of this report are to source all relevant information on archaeological and heritage resources in the study area, and to advise the client on sensitive heritage areas as well as where it is viable for the development to take place in terms of the specifications as set out in the National Heritage Resources Act no., 25 of 1999 (NHRA). Recommendations for maximum conservation measures for any heritage resources will also be made. The study area is indicated in maps 1 - 14, and Appendix 1 & 2.
This study forms part of an EIA, Consultant: RHENGU ENVIRONMENTAL SERVICES., P.O. Box 1046, Malelane, 1320, Cell: 0824147088/ e-mail: rhengu@mweb.co.za

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1 Notice of Environmental Impact Assessment, Rhengu Environmental Services, p. 1

2 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.

3 Needs & Desireability of the clearing of indigenous vegetation for crop production, Rhengu Environmental Services, p. 1.

4 Notice of Environmental Impact Assessment, Rhengu Environmental Services, p. 1

- Type of development: Debushing of land for agricultural purposes. Four sections were identified for the debushing project to the extent of 28ha, and are located on portion 17 & 21 of the farm NAUDE'S RUST 272JU, in the Lows Creek/Kaapmuiden area, Mpumalanga Province.
- The study areas are mostly natural, with also invasive species. There is recent infrastructure development, and the farm is zoned as agricultural – no rezoning will take place.
- Location of Province, Magisterial district / Local Authority and Property (farms): The area falls within the Mpumalanga Province under the jurisdiction of the Ehlanzeni District Municipality and Nkomazi Local Municipality.
- Land owner: Mr. Walter Giuricich, KUDU & ESPERIA FARMS (Pty) Ltd., (E-mail:walter@ivorymacs.co.za / Cell: 082 967 6757).

Terms of reference: As specified by section 38 (3) of the NHRA, the following information is provided in this report.

a) The identification and mapping of heritage resources where applicable;
b) Assessment of the significance of the heritage resources;
c) Alternatives given to affected heritage resources by the development;
d) Plans for measures of mitigation.

Legal requirements:

The legal context of the report is grounded in the National Heritage Resources Act no. 25, 1999, as well as the National Environmental Management Act (1998) (NEMA) (as amended):

- In terms of Government Notice R546, a basic Environmental Impact Assessment is required in terms of listed activities.

- **Section 38 of the NHRA**

This report constitutes a heritage impact assessment investigation linked to the environmental impact assessment required for the development. The proposed development is a listed activity in terms of Section 38 (1) of the NHRA. Section 38 (2) of the NHRA requires the submission of a HIA report for authorisation purposes to the responsible heritage resources agency, (SAHRA).

Heritage conservation and management in South Africa is governed by the NHRA and falls under the overall jurisdiction of the South African Heritage Resources Agency (SAHRA) and its provincial offices and counterparts.

Section 38 of the NHRA requires a Heritage Impact Assessment (HIA) to be conducted by an independent heritage management consultant, for the following development categories:

- Any development or other activity which will change the character of a site:
  - exceeding 5000m² in extent;
  - the rezoning of a site exceeding 10 000m² in extent;

In addition, the new EIA regulation promulgated in terms of NEMA (as amended), determines that any environmental report will include cultural (heritage) issues.
The end purpose of this report is to alert RHENGU ENVIRONMENTAL SERVICES, as well as the clients, interested and affected parties about existing heritage resources that may be affected by the proposed development, and to recommend mitigation measures aimed at reducing the risks of any adverse impacts on these heritage resources. Such measures could include the recording of any heritage buildings or structures older than 60 years prior to demolition, in terms of section 34 of the NHRA and also other sections of this act dealing with archaeological sites, buildings and graves.

The NHRA section 2 (xvi) states that a “heritage resource” means any place or object of cultural significance, and in section 2 (vi) that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Apart from a heritage report assisting a client to make informed development decisions, it also serves to provide the relevant heritage resources authority with the necessary data to perform their statutory duties under the NHRA. After evaluating the heritage scoping report, the heritage resources authority will decide on the status of the resource, whether the development may proceed as proposed or whether mitigation is acceptable, and whether the heritage resource require formal protection such as a Grade I, II or III, with relevant parties having to comply with all aspects pertaining to such a grading.

- **Section 34 of the NHRA**

Section 34 of the NHRA stipulates that no person may alter, damage, destroy, relocate etc., any building or structure older than 60 years, without a permit issued by SAHRA or a provincial heritage resources authority. This section does not apply since no structure older than 60 years was identified in the study area during the survey.

- **Section 35 of the NHRA**

Section 35 (4) of the NHRA stipulates that no person may, without a permit issued by SAHRA, destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object. This section may apply to any significant archaeological sites that may be discovered. In the case of such chance finds, the heritage practitioner will

assist in investigating the extent and significance of the finds and consult with an archaeologist about further action. This may entail removal of material after documenting the find or mapping of larger sections before destruction. One fragment of a Late Iron Age (LIA) potsherd was observed in a disturbed road section.

- **Section 36 of the NHRA**

Section 36 of the NHRA stipulates that no person may, without a permit issued by SAHRA, destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority. It is possible that chance burials might be discovered during development of the road infrastructure or agricultural activities. No graves were identified during the survey and the owner, confirmed this.

- **Section 37 of the NHRA**

This section deals with public monuments and memorials but does not apply in this report.

- **NEMA**

The regulations in terms of Chapter 5 of the National Environmental Management Act, (107/1998 / as amended), provides for an assessment of development impacts on the cultural (heritage) and social environment and for specialist studies in this regard.

B BACKGROUND TO ARCHAEOLOGY AND HISTORY OF THE STUDY AREA

- **Literature review, museum databases & previous relevant impact assessments**

Very little contemporary research has been done on prehistoric African settlements in the study area. No Early or Later Stone or Iron Age sites were recorded by Bergh.[5] The SAHRA database was consulted and a few Specialists AIA reports revealed no significant archaeological (Stone Age or Iron Age) sites.

STONE AGE

- The Stone Age is the period in human history when people produced stone tools. The Stone Age in South Africa can be divided in three periods:
- Early Stone Age (ESA): +- 2 million – 150 000 years ago;
- Middle Stone Age (MSA): +- 150 000 – 30 000 years ago;
- Later Stone Age (LSA): +- 40 000 – 1850AD.

IRON AGE

- The Iron Age is the period in time when humans manufactured metal artifacts. According to Van der Ryst & Meyer, [6] it can be divided in two separate phases, namely:
- Early Iron Age (EIA) +- 200 – 1000 AD;
- Late Iron Age (LIA) +- 1000 – 1850 AD.

Archaeological surveys by heritage practitioners in the immediate and wider area revealed mainly burial sites and historic features (see below).

In order to place the areas in and around Kaapmuiden/Lows Creek to Nelspruit and north towards Bushbuckridge in an archaeological context, primary and secondary sources were consulted. Ethnographical and linguistic studies by early researchers such as Ziervogel and Van Warmelo shed light on the cultural groups living in the area since ca 1600. Historical and academic sources by Küsel, Meyer, Voight, Bergh, De Jongh, Evers, Myburgh, Thackeray and Van der Ryst were consulted, as well as historical sources by Makhura and Webb.

Primary sources were consulted from the Pilgrim's Rest Museum Archives for a background on the pre-history and history of the study area. The author was involved in a *Desktop Study for Proposed Eskom Powerlines, Hazyview – Dwarsloop* in 2008, *Inspection of Umbhaba Stone-walled settlement, Hazyview,* in 2001, as well as a *Phase 1 Archaeological and Heritage Impact Assessment for 132Kv Powerlines from Kiepersol substation (Hazyview), to the Nwarele substation (Dwarsloop (2002),* as well as a *Phase 1 Archaeological and*

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5 J.S. Bergh, *Geskiedenis Atlas van Suid-Afrika Die Vier Noordelike Provinsies*, pp. 4-7.

6 Van der Ryst, M.M, & Meyer, A, Die Ystertydperk in *Geskiedenis Atlas van Suid-Afrika Die Vier Noordelike Provinsies,* pp. 96 – 98.

Heritage Impact Assessment for a proposed traffic training academy, Calcutta, Mkhuhlu, Bushbuckridge (2013*).* The SAHRA database for archaeological and historical impact assessments was consulted and revealed a few reports for the Komatipoort region, which are listed below. One report for Bushbuckridge (F. Roodt), and one for Acornhoek (JP Celliers) revealed no archaeological sites of significance. Two reports by Dr. J. Van Schalkwyk (NCHM) revealed only historical sites close to the Komatipoort – Mozambique border.[7] Reports by Birkholz and Van Vollenhoven for the Nelspruit area revealed historical/recent structures and graves but no archaeological features.

Later Stone Age sites in the Kruger National Park date to the last 2500 years and are associated with pottery and microlith stone tools.[8] The only professionally excavated Early Iron Age site in the immediate area, besides those in the Kruger National Park, is the Plaston site towards the west, dating ca 900 AD.[9] No other archaeological excavations have been conducted to date within the study area, which have been confirmed by academic institutions and specialists in the field.[10] [11] A stone walled settlement with terracing was recorded by C. van Wyk (Rowe) close to Hazyview,[12] as well as several others further west and north-west,[13] outside of the study area. Research has been done by the Pilgrim's Rest Museum on San rock art as well as rock art made by Bantu speakers in the Escarpment area, but none was recorded to date in the Lows Creek area.[14]

Several early ethnographical and linguistic studies by early researchers such as D. Ziervogel and N.J. Van Warmelo, revealed that the study area was inhabited by mainly Swazi groups from before the 18th century.[15] [16] However, when concentrating on ethnographical history, it is important to include a slightly wider geographical area in order for it to make sense. The whole district is divided in two, with the Drakensberg Escarpment in the west, and the Low Veld (in which the study area is situated) towards the east. Today, we found that the

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7 National Cultural History Museum, 2002., Archaeological Survey of a section of the Secunda-Mozambique Gas Pipeline, Barberton District, Mpumalanga & J. Van Schalkwyk, 2008., HIA Report: Proposed new Lebombo Port of Entry and Upgrade of Komatipoort Railway Station, Mpumalanga (SA) & Mozambique.

8 J.S. Bergh (red)., *Geskiedenis Atlas van Suid Afrika: Die vier Noordelike Provinsies,* p. 95.

9 M.M. Van der Ryst., Die Ystertydperk, *in J.S. Bergh (red)., Geskiedenis Atlas van Suid Afrika: Die vier Noordelike Provinsies.* p. 97.

10 Personal information: Dr. J. Pistorius, Pretoria, 2008-04-17.

11 Personal information: Dr. MS. Schoeman, University of Pretoria, 2008-03-27.

12 C. Van Wyk, *Inspection of Umbhaba Stone-walled settlement, Hazyview,* pp. 1-2.

13 PRMA: Information file 9/2.

14 PRMA: Information file 9/2.

15 N.J. Van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa.* pp. 90-92 & 111.

16 H. S. Webb, The Native Inhabitants of the Southern Lowveld, *in Lowveld Regional Development Association, The South-Eastern Transvaal Lowveld.* p. 16.

boundaries of groups are intersected and overlapping.[17] Languages such as Zulu, Xhosa, Swazi, Nhlanganu, Nkuna, sePedi, hiPau and seRôka, are commonly spoken throughout this area.[18]

The Swazi under Mswati II (1845), commenced on a career of largescale raids on the prosperous tribal lands to the north of Swaziland. His regiments such as the *Nyatsi* and the *Malelane* brought terror to African homes as far afield as Mozambique.[19] During their northern expansion they forced the local inhabitants out of Swaziland, or absorbed them.[20] There is evidence of resistance, but the Eastern Sotho groups who lived in the northern parts of Swaziland, moved mainly northwards.[21] This appears to have taken place towards the end of the 18th century,[22] when these groups fled from Swaziland to areas such as Nelspruit, Bushbuckridge, Klaserie, Blyde River and Komatipoort.[23]

Mswati II built a line of military outposts from west to east of the upper Komati River and the Mlambongwane (Kaap River). At each outpost he stationed regiments to watch and stop the BaPedi returning to their old haunts.[24] Shaka in the course of his military actions, came into conflict with Zwide Mkhatshwa (1819). Nonwithstanding Zwide's numerical superiority, Shaka defeated him. The remnants of Zwide's tribe fled into the Eastern Transvaal where they settled. They ultimately found a new kingdom in Gaza land, which extended from just north of the current Maputo, up the east coast as far as the Zambezi River.[25] Soshangane was a very powerful chief of the Gaza people, even though he was under the rule of Zwide. Soshangane decided to leave and was given full passage through Swaziland. He passed on his way through the Komati gorge, today known as Komatipoort, taking with him a great booty of cattle and women. Meanwhile more Shangane arrived and by 1896 some 2000 refugees settled between Bushbuckridge and Acornhoek where they are still living today. With the establishment of the Sabie Game Reserve (later known as the Kruger National Park), the BakaNgomane, their Shangaan protégés and Swazis who lived within its borders, were evicted in 1902, and went westward into Klaserie and Bushbuckridge areas, or south of the Crocodile River and established themselves in the Tenbosch and Coal Mine (Strijdom Block) areas (east of the current study area), west and south of Komatipoort. The Swazi of

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17 N.J. van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa*, p. 51.

18 M. De Jongh (ed)., *Swatini,* p. 21.

19 Bornman H., *The Pioneers of the Lowveld* p 11.

20 A.C. Myburgh, *The Tribes of Barberton District*, p. 10.

21 N.J. Van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa.* p. 111.

22 H. S. Webb, The Native Inhabitants of the Southern Lowveld, *in Lowveld Regional Development Association, The South-Eastern Transvaal Lowveld.* p. 14

23 *Ibid.,* p. 16.

24 Bornman, H., *The Pioneers of the Lowveld* p. 12.

25 Bornman, H., *The Pioneers of the Lowveld*, p.17.

Khandzalive moved to Mjejane or Emjejane, the current name for Hectorspruit.[26] (See also: Map 1: 1935 Map of Van Warmelo).
Several circular stone-walled complexes and terraces as well as graves have been recorded in the vicinities of Hazyview [27], Bushbuckridge, Graskop and Sabie. Clay potsherds and upper as well as lower grinding stones, are scattered at most of the sites.[28] Many of these occur in caves as a result of the Swazi attacks on the smaller groups.

The only early trade route mentioned, which crossed this section, was a footpath used by the African groups from Delagoa Bay towards Bushbuckridge (Magashulaskraal as it was previously named), along the Sabie River, up the Escarpment, and further north to the Soutpansberg.[29] There is however, no physical evidence left of this early route.

Van Warmelo based his 1935 survey of *Bantu Tribes of South Africa* on the number of taxpayers in an area. The survey does not include the extended households of each taxpayer, so it was impossible to indicate how many people were actually living in one area.[30]

The author was involved in desktop studies and surveys in the **wider area**, such as:

- *Study for the Proposed Eskom Powerlines, Hazyview – Dwarsloop* (2008);
- *Inspection of Umbhaba Stone-walled settlement, Hazyview,* (2001);
- a *Phase 1 Archaeological and Heritage Impact Assessment for 132Kv Powerlines from Kiepersol substation (Hazyview), to the Nwarele substation Dwarsloop (2002);*
- a *Phase 1 Archaeological and Heritage Impact Assessment for a proposed traffic training academy, Calcutta, Mkhuhlu, Bushbuckridge* (2013*);*
- *Phase 1 Archaeological and Heritage Impact Assessment for the proposed Nkambeni cemetery in Numbi, Hazyview (2013);* no features of significance were identified;
- *Phase 1 Archaeological and Heritage Impact Assessment for a Development on the farm Agricultural Holding no 56 JU, White River (2013)* was done in the wider area;
- *Phase 1 Archaeological and Heritage Impact Assessment for proposed agricultural development on the farm SIERAAD, Komatipoort area, (2013)* revealed one possible Late Stone Age borer which was identified in a soil sample, one meter below the surface*;*
- *Phase 1 AIA / HIA for proposed debushing of natural land for agricultural use: Portion 10 of the farm Thankerton 175JU, Hectorspruit, Mpumalanga Province (2013);* revealed

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[26] Bornman, H., *The Pioneers of the Lowveld*, p.19.

[27] PRMA: Information file 9/2.

[28] D. Ziervogel, *The Eastern Sotho, A Tribal, Historical and Linguistic Survey,* p. 3.

[29] L. Changuion & J.S. Bergh, Swart gemeenskappe voor die koms van die blankes, *in J.S. Bergh (red)., Geskiedenis Atlas van Suid Afrika: Die vier Noordelike Provinsies.* p. 104.

[30] N.J. van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa*, p.9.

some Later Stone Age artifacts which were all out of context and a burial site*.*

- *Phase 1 AIA / HIA for proposed debushing of natural as well as disturbed land for agricultural use: Portion 2 of the farm Herculina 155JU, Hectorspruit area, Mpumalanga Province*; no significant archaeological or historical features were identified.
- Letter of recommendation for the exemption from a Phase 1 AIA / HIA *for the proposed new position for the Gutshwa substation, Gutshwa (near White River) (2016);*
- Recommendation: Archaeological Material discovered on a building site at stand no 134 (Lugedlane Development), Mjejane Game Reserve, Lodwichs Lust 163JU, Hectorspruit (2016).
- Report on Grave site found at the Lugedlane Development site, Mjejane Game Reserve, Lodwichs Lust 163JU, Hectorspruit (2016).
- Phase 1 AIA / HIA for a *proposed agricultural development on the farm Krokodilspruit 248JT, White River, Mpumalanga Province* – some archaeological features as well as graves were observed.
- *Phase 1 AIA / HIA for proposed establishment of macadamia plantation on portion 1 of the farm PEEBLES 31JU,* White River, Mpumalanga Province;

The author was involved in desktop studies and surveys in the **immediate area,** such as:

- *Phase 1 AIA / HIA for proposed Residential Township, Tekwane Extension 2, Portion 7 of Tekwane 537JU, Kanyamazane, Mpumalanga Province (2014);* the entire area was transformed agricultural lands which revealed a few upper grinders*;*
- *Phase 1 AIA / HIA for proposed Reservoir, Bulk sewer and bulk water pipelines, Portion 7 of Tekwane 537JU, Kanyamazane, Mpumalanga Province (2014);* mostly disturbed residential areas which revealed no features of significance*;*
- Report on Grave site found at *portion 7 of the farm Tekwane 537 JU, in way of amended Bulk Sewer Pipeline, Kanyamazane, Mpumalanga Province (2017)* – Large graveyard identified.
- Phase 1 AIA / HIA *for the proposed construction of a 0.75ML/D water treatment plant and bulk line on government land at Makoko Village (near White River) Kabokweni, Mpumalanga Province (2017) residential township,*
- *Letter of recommendation for the exemption from a phase 1 AIA & HIA investigation: Proposed construction of a bridge on the D233 road in Louieville, Nkomazi local Municipality, Mpumalanga*, (April 2018). – no archaeological sites were observed.
- Phase 1 AIA / HIA for the *proposed 2ha development of the Msogwaba Youth Development Centre on a portion of the farm Nyamasaan 647JU, Msogwaba, Mpumalanga province* - no significant archaeological sites were observed (2018).
- DESKTOP *Heritage Impact Assessment for the proposed Tekwane Hub residential*

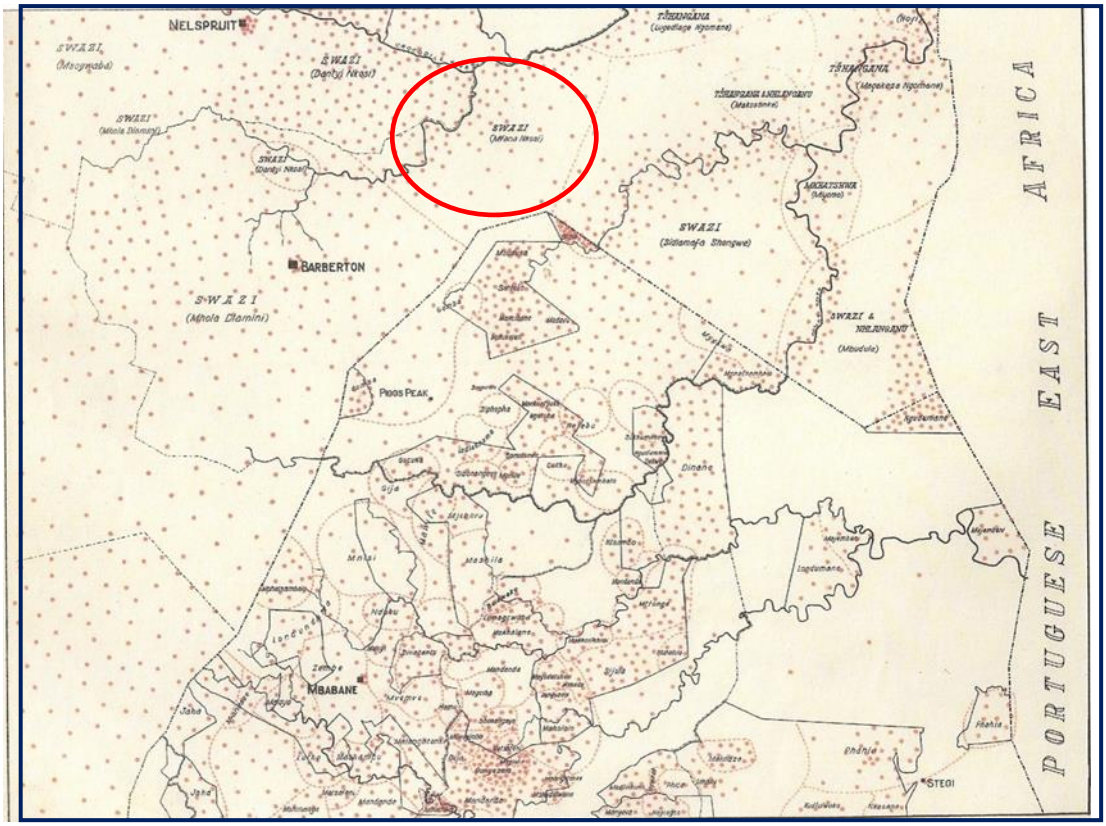
development on Portion 9 of the farm Tekwane 573JU, Mbombela, City of Mbombela, Mpumalanga (2019).

- DESKTOP *HIA for the proposed construction of a gravity outfall sewer line through a wetland, UMP Township & Portion 74 of the farm Friedenheim 282JU, Mbombela, City of Mbombela, Mpumalanga* (2020).
- Phase 1 AIA / HIA for the proposed Louws Creek Dam Project: *Construction of an irrigation dam om portions of the remaining extent of the farm Esperado 253JU & portions 1 & 2 of Esperado Annex 222JU, Louws Creek-Kaapmuiden area, Mpumalanga Province* (2020)

The SAHRA database for archaeological and historical impact assessments was consulted and revealed other recent Archaeological Impact Assessment reports in the wider and immediate areas:

- National Cultural History Museum, J. Van Schalkwyk: Archaeological survey of a section of the Secunda- Mozambique Gas pipeline, Barberton District, Mpumalanga (2002), revealed one historic structure.
- J. Van Schalkwyk: *Proposed new Lebombo Port of Entry and upgrade of Komatipoort railway station between Mpumalanga (SA) and Mozambique (2008)* – Some historic buildings were identified but no archaeological remains;
- A. Van Vollenhoven: *Report on a cultural Heritage Impact Assessment for the proposed Kangwane Antracite Mine, Komatipoort (2012)* – An archaeological site with Middle and Late Stone Age tools were identified as well as some Iron Age artifacts and decorated pottery. Mitigation measures were recommended by exclusion from the development or a Phase 2 study.
- JP Celliers: *Report on Phase 1 Archaeological Impact assessment on erven at Komatipoort 182 JU Extension 4, Komatipoort (2012)* – Revealed two pieces of undecorated sherds of pottery which was of low significance. It was recommended that any earthmoving activities be monitored by a qualified archaeologist.
- A. Van Vollenhoven: *Archaeological Impact Assessment for Border site at Komatipoort (2012)* – Revealed historic remains linked to the Steinaeker's Horse regiment during the South African War.
- A. Van Vollenhoven: *A Report on a basic assessment relating to cultural heritage resources for the proposed ESKOM Tekwane North line and substations, Mupumalanga Province (2013)* – revealed historic remains of low significance and a cemetery.
- P. Birkholz: *HIA for the proposed development of the Karino Interchange located east of Mbombela, Mpumalanga Province (2017)* – Historical buildings and structures were revealed but no archaeological sites of features were identified.

- A. Van Vollenhoven: HIA for Aurecon, 15 June 2012, *Basic Assessment for the Environmental Impact Assessment for the Friedenheim Office Complex, Nelspruit, Mpumalanga*. – revealed no graves or archaeological sites. Recent buildings were observed.



MAP 1: Van Warmelo: 1935: The study area is indicated by the red oval.

Tsonga groups: The Nhlanganu and Tšhangana

The Nhlanganu and Tšhangana (also generally known as the Shangaan-Tsonga)[31] form part of the larger Tsonga group of which the original group occupied the whole of Mozambique (Portuguese East Africa), and it has been recorded that by 1554, they were already living around the Delagoa Bay area (Maputo).[32] They fled from the onslaughts of the Zulu (Nguni) nation from the Natal area, and great numbers of emigrants sought safety in the "Transvaal" as recently as the 19th century, especially in the greater Pilgrim's Rest district (including the study area that we are concerned with). The Tsonga also moved west from Mozambique into the "Transvaal". They have never formed large powerful tribes but were mostly always subdivided into loosely knit units, and absorbed under the protection of whichever chief

[31] M. De Jongh (ed)., *Swatini,* p. 24.

[32] N.J. Van Warmelo, Grouping and Ethnic History, *in Schapera I., The Bantu-Speaking Tribes of South Africa. An Ethnographical survey,* p. 55.

would give them land.[33] They were originally of Nguni origin.[34] The term "Shangaan" is commonly employed to refer to all members of the Tsonga division.[35]

The **Nhlanganu** occupied the Low Veld area in their efforts to escape the Zulu raids during 1835-1840. They lived side by side with the Tšhangana, and the differences between the two are inconsiderable. They have mixed extensively with other tribes.[36]
The **Tšhangana** are also of Nguni origin who fled in the same way as the Nhlanganu, and settled in the "Transvaal" a little later than the former. Most of the Tsonga were subjects to *Soshangane,* who came from Zululand.[37] The downfall of *Ngungunyana* (son of *Soshangane*) saw his son seeking sanctuary in the "Transvaal", and the latter became known as *Thulamahashi,*[38] the name that is still used for the area east of Busbuckridge.

The historical background of the study area confirmed that it was occupied since the 17th century by the Tsonga groups (Nhlanganu and Tšhangana). These groups have intermarried extensively or were absorbed by other groups in time.[39]

Swazi

The Swazi people descend from the southern Bantu (Nguni) who migrated from central Africa in the 15th and 16th centuries.[40] The differences between the Swazi and the Natal Nguni were probably never great, their culture as far as is known from the comparatively little research being carried out, does not show striking differences. Their language is a 'Tekeza' variation of Zulu, but through having escaped being drawn into the mainstream of the Zulus of the *Shaka* period, they became independent and their claim to be grouped apart as a culture is now well founded.[41]

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33 N.J. Van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa*, pp. 90-91.
34 N.J. Van Warmelo, Grouping and Ethnic History, *in Schapera I., The Bantu-Speaking Tribes of South Africa. An Ethnographical survey,* p. 55.
35 N.J. Van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa*, p. 92
36 *Ibid.,*.pp. 91-92.
37 N.J. Van Warmelo, Grouping and Ethnic History, *in Schapera I., The Bantu-Speaking Tribes of South Africa. An Ethnographical survey,* p. 57.
38 N.J. Van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa*, p. 92.
39 M. De Jongh (ed)*., Swatini,* p. 40.
40 Swaziland: Internet access: http://en.wikipedia.org/wiki/Swaziland p.1.
41 N.J. Van Warmelo, *A Preliminary Survey of the Bantu Tribes of South Africa*, p. 83.

HISTORY OF THE FARM NAUDE'S RUST – relevant extracts:

The farm NAUDES RUST is situated in the Lows Creek area. It was already used as an agricultural farm since 1924 when Ernst Wallisch farmed with grenadella, paw-paw, litchis and bananas. [42] Burgert Naude bought a farm named PERL, and married Mynie Bornman. Burgert was a cousin of the well-known Tom Naude, Member of Parliament for Pietersburg and brother of Colonel Koos Naude, chief of the Police. He farmed with cattle and planted maize, which was regurlarly destroyed by Kudu. He later moved from this farm (PERL), to Lows Creek where he bought land and named the farm **Naude's Rust, 272JU**. Very little is known about Burgert Naude and what he did on Naude's Rust. [43]

A certain Naas Ferreira bought the farm PERL and made a canal to water his crops. The canal started at the farm Bon Accord below Eureka station, to PERL, and later extended the canal to the farm Lovedale which he bought in 1924. [44]

Ernst Wallisch bought the farm WAAIHEUWEL at Lows Creek (next to Naude's Rust). He experienced a shortage of water for his crops and piped water from the Daylight Mine for the farm. In 1951, a Ms Miemie van der Hoff (who was involved in the establishment of the Malelane clinic), requested a clinic for Lows Creek, and all the farmers assisted in some way or the other to get the clinic built, and it was opened on 26 November 1952. [45] The Clinic is still operational and situated on Naude's Rust.

Wycliffe James Hulley moved to Lows Creek in 1940. Charles Dryer sold a portion of Naude's Rust 272JU to Wycliffe, just west of Lows Creek. Wycliffe attempted to establish an economical viable farm. Water supply was pumped from the Lows Creek, but as it was not enough, Wycliffe decided to construct a canal (which took many years to build), to draw water from a farm several kilometers up river. (This initiative, no doubt was copied from the work done by Naas Ferreira and Ernst Wallisch). Hulley also served on many committees in the region as well as the Lows Creek Irrigation Board. [46]

The farm NAUDES RUST was owned by Barry Hulley from 1945, son of Wycliffe. The next owner was Ralph Dehrmann who purchased the farm in 1960. The Claasens purchased the property around 1981. Boeta Claasen still lives on the property (he is now 86), and his son Neels also lives on the property as he is the bailiff for the Irrigation Board. [47]

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42 Bornman, H., *On a Lowveld Farm*, p. 114.
43 Bornman, H., *On a Lowveld Farm*, p. 64.
44 Bornman, H., *On a Lowveld Farm*, p. 65.
45 Bornman, H., *On a Lowveld Farm*, p. 114.
46 Bornman, H., *On a Lowveld Farm*, p. 115 & 116.
47 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.

The writer Hans Bornman's family also lived on Naude’s Rust, but the house (on a hill) is currently in disrepair and vandalized. [48] Other infrastructure on the farm, included a sawmill, hostel, dams, sheds and residences.

[48] Personal Communication, Mr. W. Giuricich, Owner of Naude’s Rust, 2022-10-10.

C. DESCRIPTION OF THE AREA TO BE AFFECTED BY THE PROPOSED DEVELOPMENT

Mr. Giuricich of KUDU & ESPERIA FARMS (Pty) Ltd., is requesting the debushing of four sections on portions 17 & 21 of the farm Naude's Rust 272JU in the Kaapmuiden - Lows Creek area. [49] The four sections are numbered from one (1) to four (4) respectively, (see below), and covers a total area of 28ha. [50] Large sections on the farm have historically been used for agricultural purposes since at least the 1960's, and the wider area is well known for extensive farming of fruit, vegetables and sugarcane (see maps 2 & 3: Aerial map & Google image of wider area).

The general study area consists of the mountainous bushveld of eastern Mpumalanga. The landscape is characterised by wooded hills and slopes, intersected by large perennial rivers and smaller streams. Typical trees which can be found in this section, are Marula, Knobthorn, Mountain Seringa, Yellow flametree (Peltophorum), Candelabra tree (Euphorbia ingens), Buffalo thorn etc. [51] The general geology of the area consists of granite and gneiss, mostly of the Nelspruit suite, forming hills with large boulders. Soils are shallow, comprised of Glenrosa/Mispah soil types. [52]

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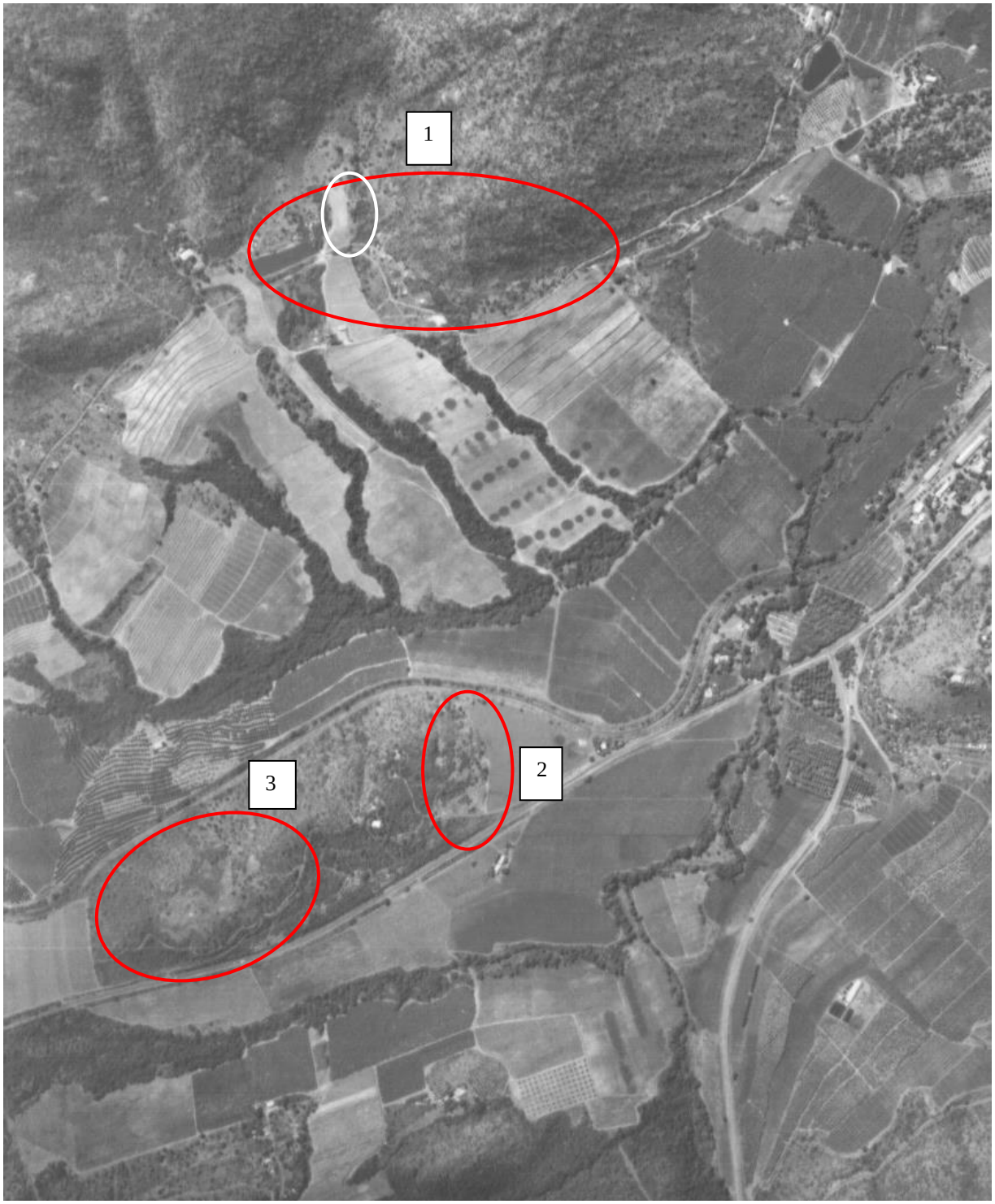
49 Notice of Environmental Impact Assessment, Rhengu Environmental Services, p. 1

50 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.

51 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.

52 Nelspruit area: Friedenheim Housing project, AEB, p. 2. Access: 2020-02-25.



MAP 2: (AERIAL PHOTOGRAPH 1:30 000: 25/05/1988, no. 498/245): The study areas (1, 2 & 3), are indicated by the red ovals. The white oval indicates a cultivated section in study area 1. Please note the extensive agricultural activities in the area at this time (1988). (Aerial photograph provided by Mr. Giuricich).

STUDY AREA 1: 8ha (see figs. 1 – 18) Maps 4, 5 & 11.
Study area 1 is situated in the northern section of the farm and is in the extent of 8ha. [53] This section is situated at the foot of a hill (in the north) and consists of indigenous as well as alien vegetation (see figs. 1 – 6, 13 – 14, 16 – 17). This section borders a dam in the south as well as a concrete water canal (figs. 3, 7).

The western and central sections (of study area 1), are infested with pioneer species, such as Sickle bush (*Dichrostachys cinerea)*, which occurs in the bushveld particularly on disturbed or overgrazed areas [54] (figs. 2, 4 & 5). This area was historically disturbed by extensive cattle grazing in the past. [55]

The remains of a large compound/hostel can be seen directly north of the water canal and stretches very far into the central and eastern areas (figs. 5, 6, 16 & 17). The compound was built around 1982, with an estimated of 30 dwellings, and the hostel had about 8 units. The compound fell into disrepair over the years and was demolished by the owner in June 2022 [56] (figs. 7, 9, 10, 11, 13, 14). A pit toilet is still visible (fig. 12). A shed, in the fallow land (fig. 8), and three additional buildings at the foot of the hill were visible in 2004, but cannot be traced on google images after 2010, these were all part of the compound in previous years (maps 2, 4 & 11). Mr. Claasens demolished various buildings in previous years, on the farm. [57]

The dam was built around 1950 and enlarged around 1985, [58] and holds water for the canals (fig. 3). A concrete block of unknown nature, was observed in the eastern section, just above the canal (fig. 18).

A powerline cuts through the southern part of the study area (fig. 17).

Apart from one fragment of a Late Iron Age clay potsherd, (fig. 15), no other archaeological, historical features or graves were observed in study area 1.

STUDY AREA 2: 6ha (see figs. 19 – 27) Maps 4, 6 & 12.
Study area 2 (6ha), is situated on the eastern slope of a small hill. [59] This section was very overgrown during the field survey, but the google image of 2004, indicate that large sections were already disturbed by quarry activities previously. Indigenous vegetation has established

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53 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.
54 Van Wyk, B., & Van Wyk P., Field Guide to Trees of Southern Africa, 1997, p. 500.
55 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.
56 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.
57 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.
58 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.
59 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.

since then (maps 4 & 12), figs. 19, 20, 23. This section, which is directly north of the R38 provincial road, borders a small banana plantation as well as the Lows Creek Clinic, which is also situated on the farm Naude's Rust, as well as the railway line in the north. The Clinic was established in the early 1950's by the surrounding community, and was opened on 26 November 1952. [60]

Two round structures (although completely overgrown), were observed during the survey, and were concrete water tanks which supplied the clinic with water (figs. 21 – 23). The date of these concrete structures could not be established. These old round concrete tanks were in use until the 1980's, thereafter they were replaced by modern plastic JoJo tanks within the clinic fence. [61]

The eastern section of the study area was disturbed by large quarries (which can be seen in map 12). Sections have recovered with vegetation but the quarries/gravel pits are still visible. Figs. 24 -26, show clearly the current and historical disturbances. The quarries/gravel pits were used since 1999/2000, by the previous owners of the farm. There were no crops on these sections previously. [62]

No archaeological, historical features or graves were observed during the field survey in study area 2.

STUDY AREA 3: 8ha (see figs. 28 – 39) Maps 4, 7 & 13.
Study area 3 is situated in the southern section of the farm, on the western side of a small hill (opposite side of study area 2). Study area 3 is in the extent of 8ha. [63] This section consists of indigenous as well as alien vegetation (see figs. 28 & 29). The railway line is situated towards the north (fig. 30). Parts of the northern section has been de-bushed of mainly pioneer species, such as Sickle bush (*Dichrostachys cinerea*, which occurs in the bushveld particularly in disturbed or overgrazed areas), [64] (figs. 30 & 32).

The vegetation on study area 3 was dense, apart from a large section which had recently burnt, and which made visibility in this section, excellent (figs. 33 & 34). It was established that there were foundations of an old sawmill, as well as rondavels, at the top of the hill (figs. 35, 39). Fragments of human habitation in the form of glass, bottles, rusted tins and iron objects were observed in the surrounding area (figs. 36 – 38). The access road to the

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60 Bornman, H., *On a Lowveld Farm*, p. 114.
61 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.
62 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.
63 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.
64 Van Wyk, B., & Van Wyk P., Field Guide to Trees of Southern Africa, 1997, p. 500.

sawmill was originally from the eastern side (figs. 30, 3, 7). The sawmill was established in the 1960's and burned down in 1974. It was never rebuilt. According to the owner, the material smouldered for about 10 years thereafter. The foundations which were visible during the survey, belong to buildings/offices for the sawmill, and beyond that, was the yard where the work occurred. There were a few pits around the sawmill, which were filled with scrap metal. [65]

The rondavel foundations were the remains of staff quarters, for the staff which used to work at the sawmill (fig. 39). These structures also fell into disrepair or were demolished when the sawmill burned down. [66]

No archaeological, historical features or graves were observed during the field survey in study area 3.

STUDY AREA 4: 6ha (see figs. 40 – 45) Maps 4, 8 & 14.

Study area 4 is situated in the western section of the farm and is in the extent of 6ha. [67] This section (a thin strip of land between a hill and the railway line), has been cleared illegally by the neighbors. The cleared piece of land, made visibility from an archaeological perspective, excellent. This section is situated at the foot of a hill and south of the railway line (see figs. 40 - 44). The western section has previously been disturbed by citrus cultivation (fig. 45). A concrete water canal cuts through this section in the east, from south to north (figs. 41 & 42).

No archaeological, historical features or graves were observed during the field survey in study area 4.

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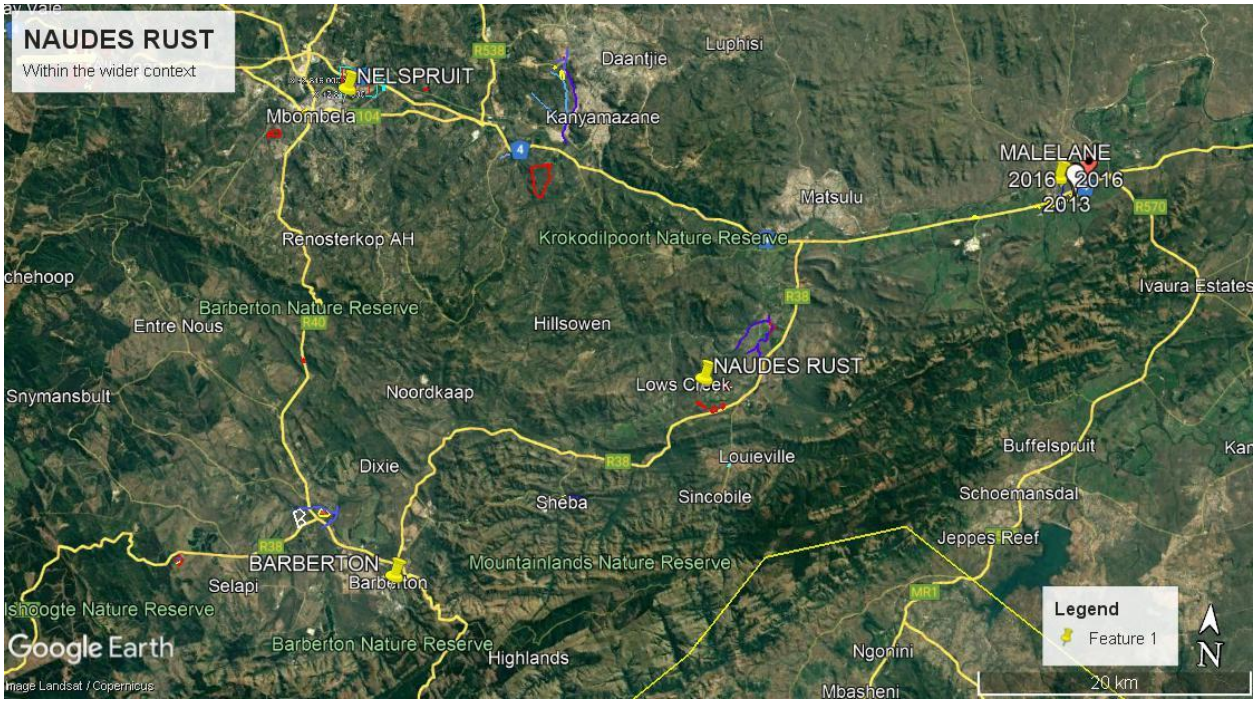
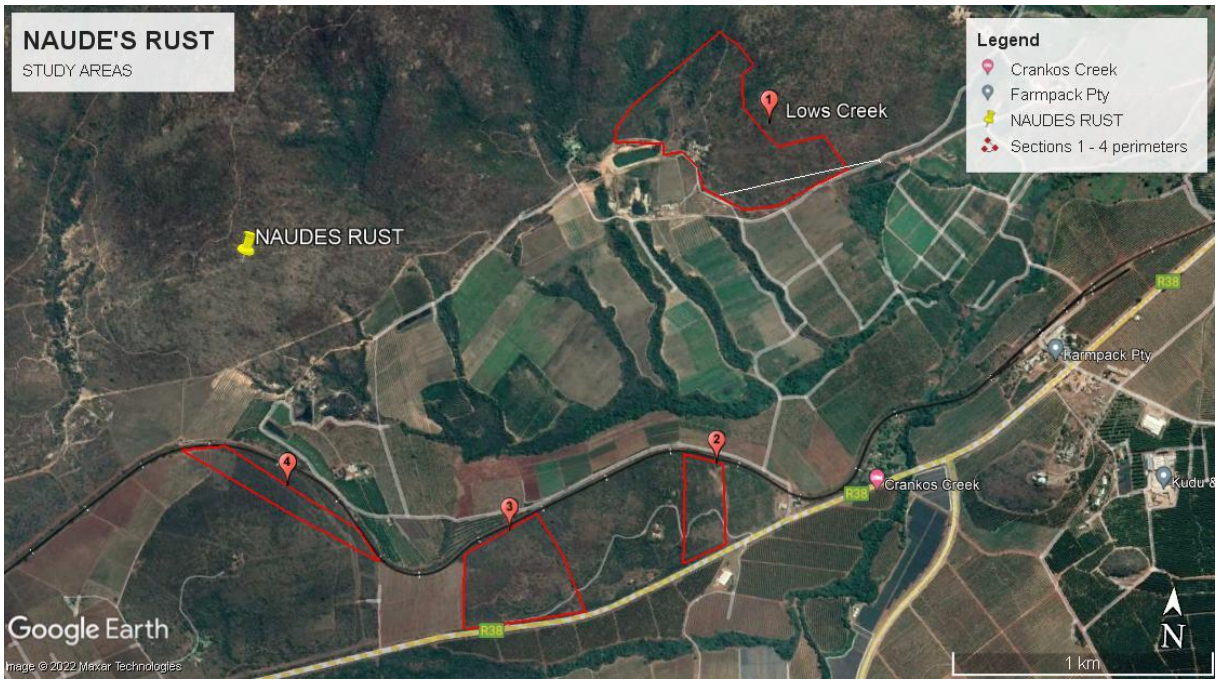
65 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.

66 Personal Communication, Mr. W. Giuricich, Owner of Naude's Rust, 2022-10-10.

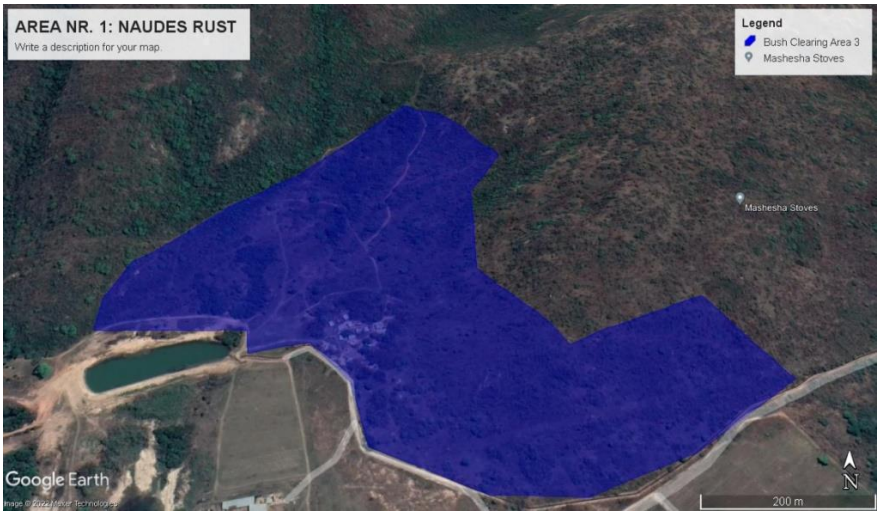
67 Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.



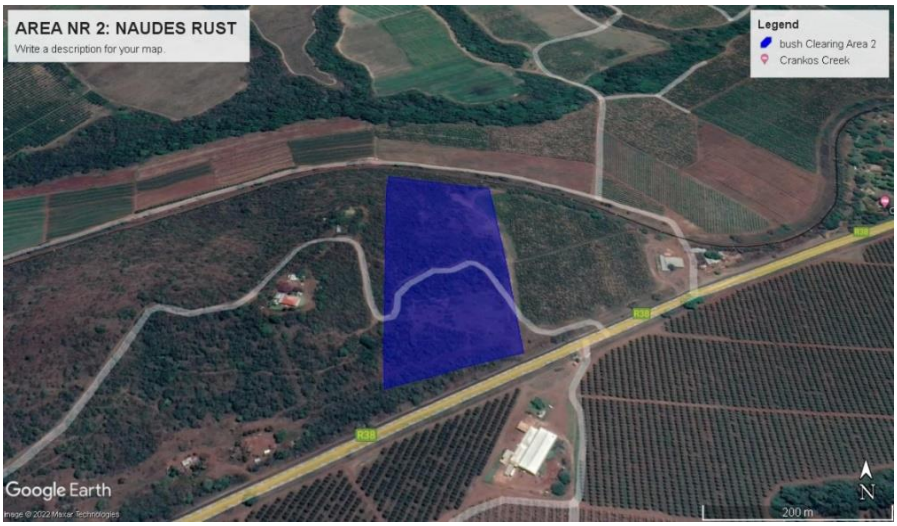
MAP 3: Naude's Rust within the wider context.



MAP 4: The study area is indicated by the red lines, 1, 2, 3 & 4. Please note the historically disturbed farmlands in the surrounding area. The black line represents the railway.

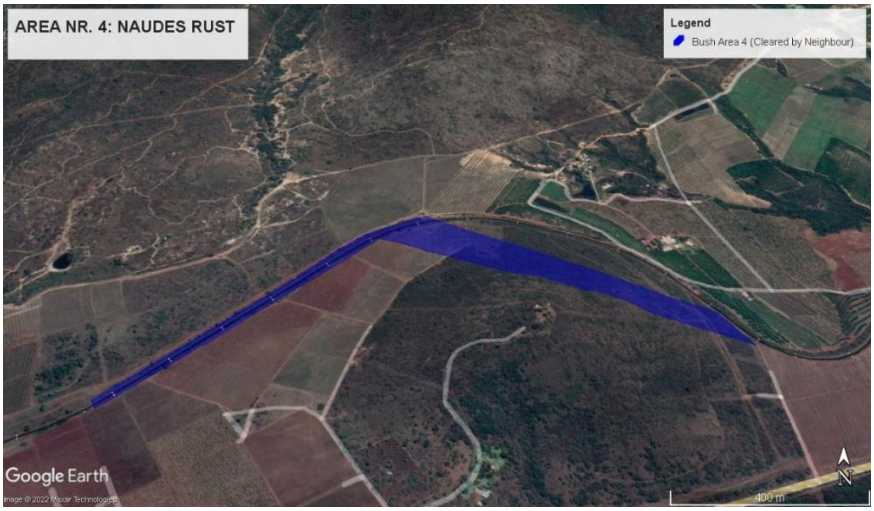


MAP 5: Study area 1 is in the extent of 8ha. (Map provided by Rhengu Environmental Services).



MAP 6: Study area 2 is 6 ha. (Map provided by Rhengu Environmental Services).

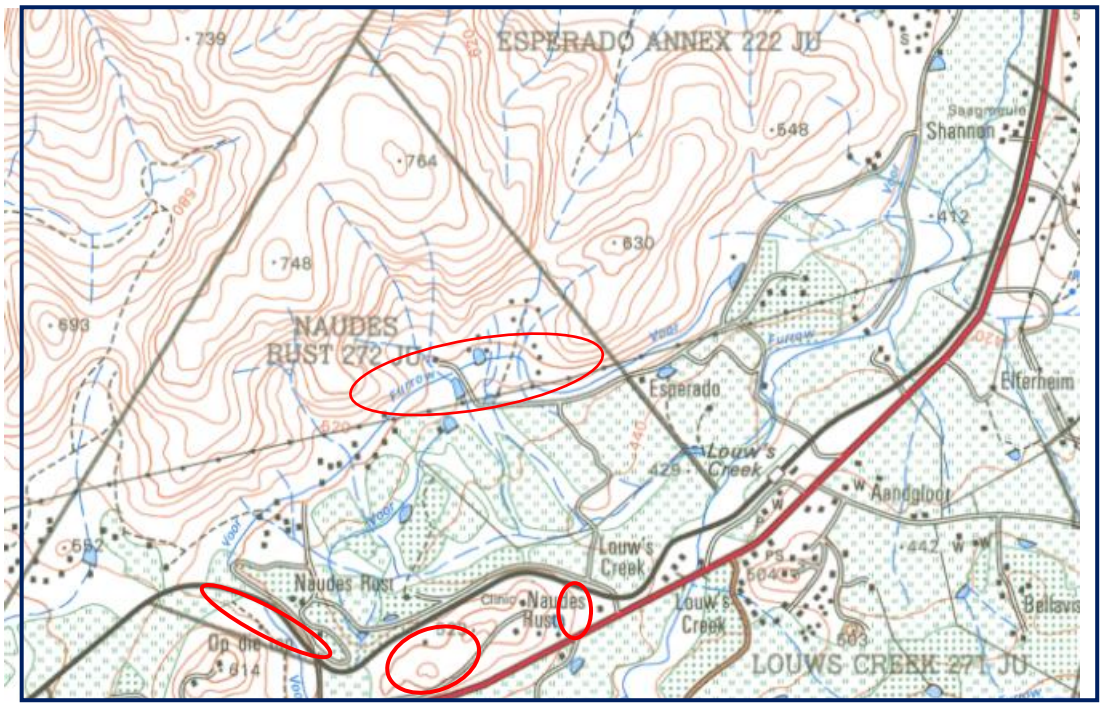
MAP 7: Study area 3 is in the extent of 8ha. (Map provided by Rhengu Environmental Services).



MAP 8: Study area 4 is 6ha and is situated between the foot of a hill, and the railway line. (Map provided by Rhengu Environmental Services).

Sections within the study area are partly natural and partly covered with invasive vegetation. All open or disturbed areas (gravel pits, quarries), were investigated for any remains of archaeological or historical nature, but nothing was observed.

MAP 9: The 1926 topographical map does not indicate any black settlements within or near the study area. A footpath to the north of the railway line, cuts roughly through the middle of the farm (not within any of the study areas)



MAP 10: 1984 Topographical map: The study area is within red ovals. No black settlements were recorded in the immediate area. Extensive historical cultivated lands are visible.

NAUDE's RUST is indicated on the 1984 (1: 50 000) topographical map 2531CB (map 10). This map shows the extent of farming operations in the area, and on the property in the past.

D. LOCALITY

The proposed project site is located on portions 17 & 21 of the farm NAUDE's RUST 272JU (see map 10). The study area is just north of the R38 between Lows Creek and Kaapmuiden, [68] and is approximately 15km south of the N4 national road. It is approximately 30km north of Swaziland. The site falls under the Nkomazi Local Municipal jurisdiction, which in turn falls within the Ehlanzeni District Municipality, in the Mpumalanga Province (see maps 3 - 8). Large areas surrounding the farm have historically been disturbed by commercial agricultural farms.

- **Description of methodology:**

An historical Aerial map (1988, map 2), 1984 topographical map, (2531CB, map 10), as well as the 1926 topographical map (map 9), and Google images of the site (maps 3 - 8), indicate the study area of the proposed development. These were intensively studied to assess the current and historically disturbed areas and infrastructure. The historical Google Images show extensive agricultural disturbances on Naude's Rust, in the past. In order to reach a comprehensive conclusion regarding the cultural heritage resources in the study area, the following methods were used:

- The desktop study consists mainly of archival sources studied on distribution patterns of early African groups who settled in the area since the 17th century, and which have been observed in past and present ethnographical research and studies.
- Literary sources, books and government publications, which were available on the subject, have been consulted, in order to establish relevant information.
- Several specialists currently working in the field of anthropology and archaeology have also been consulted on the subject.
  -Literary sources: A list of books and government publications about prehistory and history of the area were cited, and revealed some information;
  -The archaeological database of SAHRA as well as the National Cultural History Museum were consulted. Heritage Impact Assessment reports of specialists who worked in the area were studied and are quoted in section B.
- Naude's Rust is primarily a commercial farming concern, with small sections of natural vegetation in the hills and along drainage lines.
- A site visit with interested and affected parties was held on 20 September 2022.
- The fieldwork and survey were conducted extensively on foot and with a vehicle. Existing roads and small paths were mainly used to access areas (See Appendix 1: Tracks & Paths).

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[68] Notice of Environmental Impact Assessment, Rhengu Environmental Services, p. 1.

- The terrain was mainly dense and visibility was restricted. However, section 3 has burnt recently, which made visibility, excellent, and section 4 was de-bushed, so no restrictions were experienced within these sections. Aerial and google maps indicated previously disturbed sections, where the visibility was restricted (see Appendix 2).
- The relevant data was located with a GPS instrument (Garmin Etrex) datum WGS 84, and plotted. Co-ordinates were within 4-6 meters of identified sites.
- Evaluation of the resources which might be impacted upon by the footprint, was done within the framework provided by the National Heritage Resources Act, no. 25 (1999);
- Personal communication with relevant stakeholders on the specific study areas were held during the site visits. [69] The owners are familiar with the properties and confirmed that they have never encountered any graves or archaeological features on the properties. Environmental practitioner Mr. R. Kalwa, [70] was consulted during the research.
- GPS co-ordinates were used to locate the site and for possible heritage features within the study area (Co-ordinates provided by RHENGU Environmental Services)**:** (See Maps 3 – 8 for perimeters of the sites).

GPS CO-ORDINATES		
Location	**South**	**East**
Naude's Rust 1	S 25° 38' 03.87"	E 31° 16' 43.64"
Naude's Rust 2	S 25° 39' 00.46"	E 31° 16' 22.96"
Naude's Rust 3	S 25° 38' 49.94"	E 31° 16' 48.45"
Naude's Rust 4	S 25° 38' 07.16"	E 31° 17' 01.18"

[69] Personal information: Mr. Walter Giuricich, Owner of Naude's Rust, 2022-10-24.

[70] Personal communication: Ralf Kalwa, Rhengu Environmental Services, 2022-10-08.

E. DESCRIPTION OF IDENTIFIED SITES

The applicant is requesting to debush natural sections on portions 17 & 21 of the farm NAUDE's RUST 272JU. The footprint of the study area, is located on four small sections as described in Chapter C, above (1, 2, 3, & 4), which will cover a total area of approximately 28ha. It will affect partly natural vegetation as well as historically disturbed lands and access roads (see map 4). [71]

The study area falls within Kaapmuiden/Lows Creek area which has historically been known for commercial agricultural farming. Large sections on the adjacent properties are already cultivated with bananas, paw paw, sugarcane and macadamias (see map 3). Modern topographical maps also clearly show extensive historical farming activities in the surrounding areas (map 10 - 1984). The 1926 topographical map (map 3) does not indicate any historic settlements directly in the study area. The 1935 map by Van Warmelo indicated the groups living in the area as mainly of Swazi decent (map 1). The study area consists of arable sections on the foot, or partly against or on top of low hills.

The study areas are indicated in maps 3 - 14. **Study area 1** was located at the foot of a low hill. It consisted of natural vegetation, previous cultivated land, pioneer vegetation, mainly sickle bush, and the remains of a large compound/hostel which was demolished in June 2022. There is a dam to the west, and this section borders a water canal in the south. The original dirt water canal system was removed when the concrete canal system was built in 1965 -1966. The terrain of the study area varied from fairly even to difficult, closer to the hill. The yellow section on map 11, indicate overgrazing in the past, and the brown section, the disturbed cultivated areas since at least 2004. Existing tracks within the study area was used to access this section. No archaeological material or deposits, graves, historical features or structures were observed during the survey.

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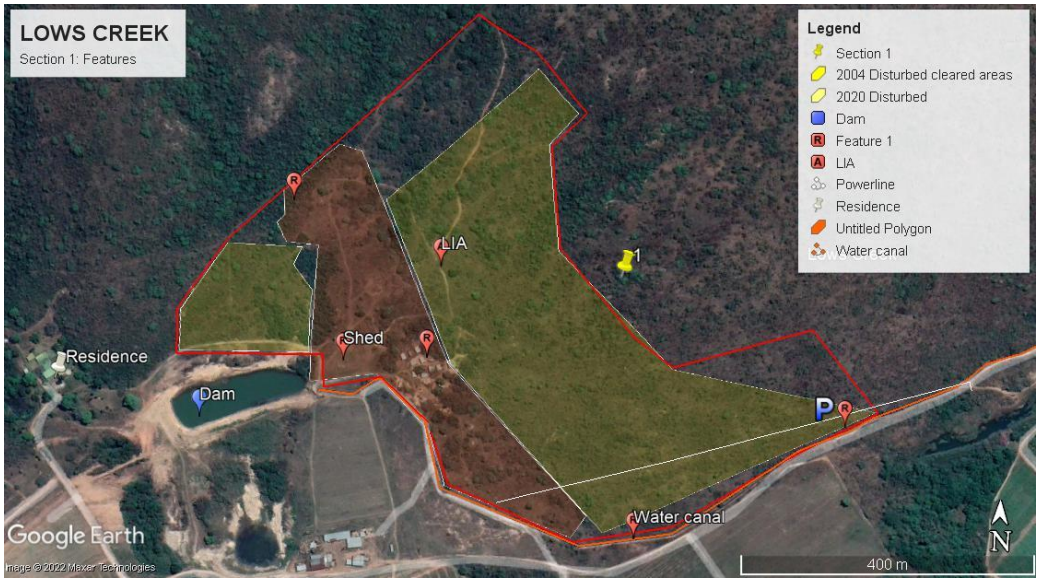
[71] Notice of Environmental Impact Assessment, Rhengu Environmental Services, p. 1.



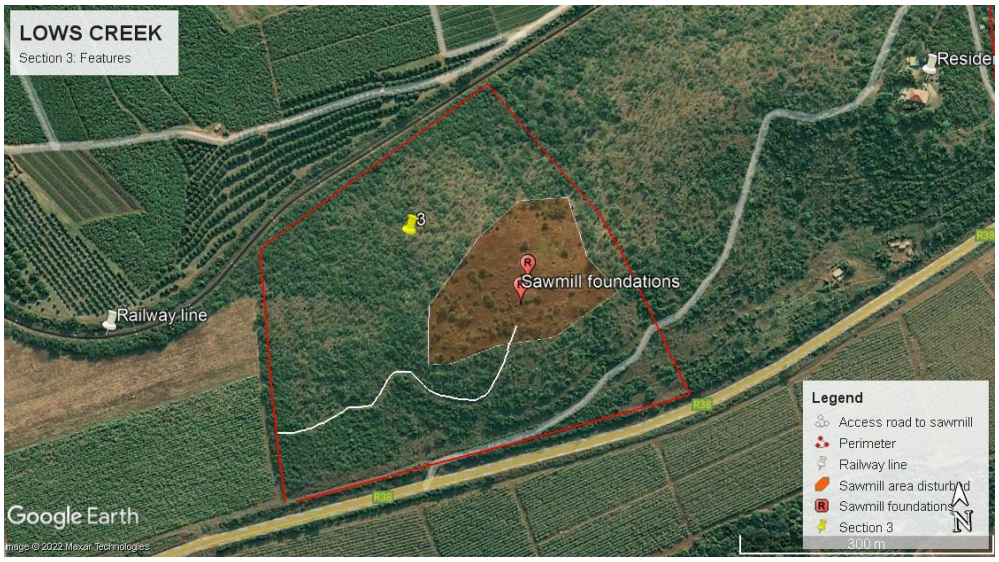
MAP 11: Study area 1: The area was used as a cattle farm and overgrazing resulted in the low vegetation (as seen on google images), in previous years. The brown section indicates the disturbed cultivated area as well as the hostel.

MAP 12: Study area 2: The quarry to the south and a section of the gravel pit was already seen on the 2010 google image. The gravel pit was extended in 2015 (yellow) and 2021 (brown).

Study area 2 was very overgrown with dense natural vegetation, however the larger part of this section was (and sections are still) used for quarries and gravel pits. The large quarry to the south was already visible in 2010, and a section of the gravel pit towards the north-east. The gravel pit was extended in 2015 (yellow) and in 2021 (brown – see map 12). This section borders a banana plantation in the east, the railway line in the north, existing residences in the west, and the R38 provincial road, in the south. A gravel road cuts through this section.

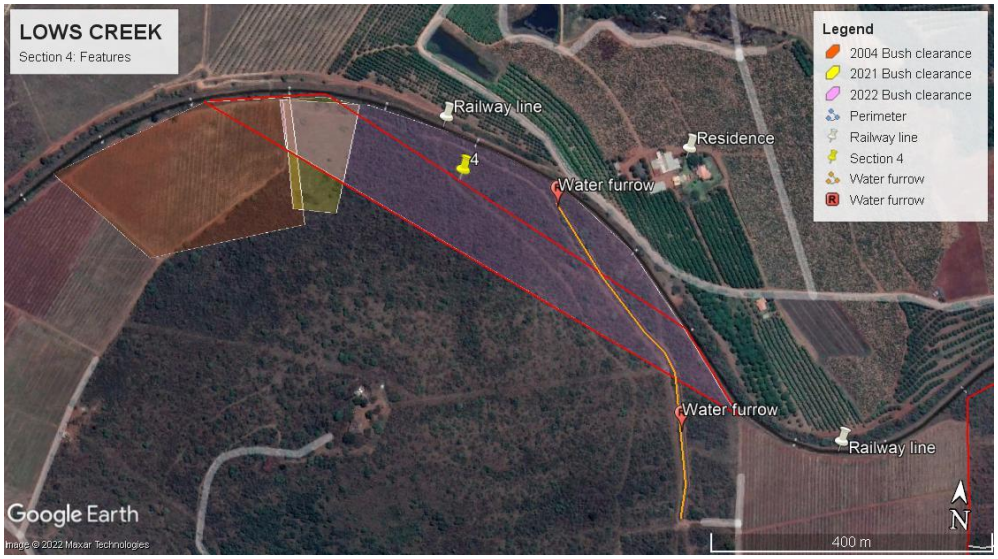
All disturbed sections were investigated for possible signs of an archaeological or historical nature.

No archaeological material or deposits, graves, historical features or structures were observed, and the disturbed areas were all sterile.



MAP 13: Study area 3: The brown area indicates where the disturbed section of the sawmill and rondavels were, since the late 1960's.

Study area 3 was situated on top of a small hill, and the natural vegetation was dense and overgrown, apart from a large section which had burnt recently. Sections in study area 3 consisted of pioneer vegetation (mainly sickle bush). The burnt sections were investigated and visibility here was excellent, and is indicated in brown, in map 13 (disturbed sawmill area). Study area 3 borders a natural section in the east, the R38 provincial road in the south, the railway line in the north, and an existing cultivated section in the west (fig. 29).



MAP 14: Study area 4: Bush clearance already took place in 2004 (brown section) to prepare the area for citrus orchards. Further bush clearance took place in 2021 (yellow section) and in 2022 (pink section).

Study area 4 was a thin strip of natural vegetation which was cleared of bush in 2022. Due to this, visibility was excellent. The section in the far west was already cleared for citrus cultivation in 2004, and a small section was cleared in 2021 (yellow section) (see map 14). This section is close to the railway line in the north, and also borders the railway line in the west. There is a concrete water canal that cuts through the eastern section and this section is against a small hill in the south (figs. 41 - 42).

The terrain in general was mostly accessible, even with dense vegetation cover. Paths and roads made some sections more accessible for the survey. The visibility in these sections were excellent (Appendix 1 & 2).

The following features were observed during the survey (please see Appendix 2 & maps):

Site / Feature	Description / Comments	Site / Location
Naude's Rust 1		
LIA clay **potsherd**	Was observed within a disturbed road section. Un undecorated, and very brittle fragment.	25°38'00.90"S 31°16'41.97"E 462m
Three structures to the north which formed part of the hostel (Google image 2004)	According to Mr. Giuricich these formed part of the hostel area, but has long been demolished, and is currently not visible.	25°37'58.31"S 31°16'35.69"E 514m
Shed just east of the dam (Google image 2004)	According to Mr. Giuricich this was a shed to keep equipment, but has long been demolished, and is currently not visible. It was situated in the previously cultivated area.	25°38'05.06"S 31°16'36.98"E 491m
Hostel / Compound	The remains of the hostel/compound area were demolished in June 2022 – remains are still visible.	25°38'05.17"S 31°16'40.95"E 493m
Concrete block	A square concrete block of unknown origin/use, was noted towards the eastern section.	25°38'08.11"S 31°17'59.76"E
Water canal – built in 1965 - 1966	Section 1 borders a concrete water canal from west to south.	West: 25°38'06.35"S 31°16'36.94"E 486m Exit: 25°38'06.60"S East 31°17'02.82"E 466m
Naude's Rust 2		
Concrete water tanks	The concrete water tanks were providing the Lows Creek Clinic with water up to the 1980's.	25°38'49.62"S 31°16'48.23"E 466m
Large quarry (south)	The large quarry towards the south east, was already in use by the previous owners since 1999 / 2000	25°38'53.03"S 31°16'46.65"E 469m
Gravel pit (north)	The gravel pits towards the north-east were already in use by the previous owners since 1999 / 2000	Start: 25°38'48.52"S South 31°16'47.38"E / 469m Exit: 25°38'44.84"S North 31°16'45.88"E / 459m
Naude's Rust 3		
Sawmill area with associated cultural material (glass / tins / bottles / iron)	The foundation of a sawmill is still visible with fragments of glass, bottles, tins and iron pieces in the area	25°39'00.21"S 31°16'22.49"E 516m
Rondavel area	The rondavels are no longer visible and was demolished years ago.	25°38'56.41"S 31°16'23.41"E 494m
Naude's Rust 4		
Water canal	A water canal cuts through this section in the east	South 25°38'57.70"S 31°15'57.74"E 503m Exit: North 25°38'53.13"S 31°15'53.53"E 502m

The farm owner and previous residents were interviewed to find out if they were aware of any archaeological, historical features or graves. They confirmed that they, or their farm workers had no knowledge of any burial sites or other heritage related features on the property. [72]

No archaeological sites of significance, stone walls or historic structures or graves were identified, and was confirmed by the applicant.

[72] Personal information: Mr. Walter Giuricich, Owner of Naude's Rust, 2022-10-24.

F. DISCUSSION ON THE FOOTPRINT OF THE PROPOSED DEVELOPMENT

ACT	***COMPO-NENT***	***IMPLICATION***	***RELEVANCE***	***COMPLIANCE***
NHRA	S 34	Impact on buildings and structures older than 60 years	None older than 60 years	None
NHRA	S35	Impacts on archaeological heritage resources	One fragment of LIA clay potsherd -	Out of context – no significance
NHRA	S36	Impact on graves	None present	None
NHRA	S37	Impact on public monuments	None present	None
NHRA	S38	Developments requiring an HIA	Development is a listed activity	HIA done
NEMA	EIA regulations	Activities requiring an EIA	Development is subject to an EIA	HIA is part of EIA

- **Summarised identification and cultural significance assessment of affected heritage resources: General issues of site and context:**

Context		
Urban environmental context	No	NA
Rural environmental context	No	NA
Natural environmental context	No	NA
Formal protection (NHRA)		
(S. 28) Is the property part of a protected area?	No	NA
(S. 31) Is the property part of a heritage area?	No	NA
Other		
Is the property near to or visible from any protected heritage sites	No	NA
Is the property part of a conservation area of special areas in terms of the Zoning scheme?	No	NA
Does the site form part of a historical settlement or townscape?	No	NA
Does the site form part of a rural cultural landscape?	No	NA

Context		
Does the site form part of a natural landscape of cultural significance?	No	NA
Is the site adjacent to a scenic route?	No	NA
Is the property within or adjacent to any other area which has special environmental or heritage protection?	No	NA
Does the general context or any adjoining properties have cultural significance?	No	NA

Property features and characteristics		
Have there been any previous development impacts on the property?	Yes	Historically disturbed agricultural land
Are there any significant landscape features on the property?	No	NA
Does the property have any rocky outcrops on it?	Yes	Small hills
Does the property have any fresh water sources (springs, streams, rivers) on or alongside it?	Yes	Drainage lines towards the Lows Creek

Heritage resources on the property		
Formal protection (NHRA)		
National heritage sites (S. 27)	No	NA
Provincial heritage sites (S. 27)	No	NA
Provincial protection (S. 29)	No	NA
Place listed in heritage register (S. 30)	No	NA
General protection (NHRA)		
Structures older than 60 years (S. 34)	No	NA
Archaeological site or material (S. 35)	Yes	One fragment of LIA potsherd – no significance
Graves or burial grounds (S. 36)	No	NA
Public monuments or memorials (S. 37)	No	NA
Other		
Any heritage resource identified in a heritage survey (author / date / grading)	No	NA
Any other heritage resources (describe)	No	Outside of the study area: Foundations of old house (Bornman house) - no date

NHRA S (3)2 Heritage resource category	***ELEMENTS***	***INDICATORS OF HERITAGE SIGNIFICANCE***										***RISK***
		Historical	Rare	Scientific	Typical	Technological	Aesthetic	Person or community	Landmark	Material condition	Sustainability	
Buildings / structures of cultural significance	No	No	No	No	No	No	No	No	No	No	No	NA
Areas attached to oral traditions / intangible heritage	No	No	No	No	No	No	No	No	No	No	No	NA
Historical settlement/ townscapes	No	-	-	-	-	-	-	-	-	-	-	NA
Landscape of cultural significance	No	-	-	-	-	-	-	-	-	-	-	NA
Archaeological sites	No	-	-	-	-	-	-	-	-	-	-	NA
Grave / burial grounds	No	-	-	-	-	-	-	-	-	-	-	NA
Areas of significance related to labour history	No	-	-	-	-	-	-	-	-	-	-	NA
Movable objects	No	-	-	-	-	-	-	-	-	-	-	NA

- **Summarised recommended impact management interventions**

NHRA S (3)2 Heritage resource category	***SITE***	***IMPACT SIGNIFICANCE Cultural significance rating***		***Impact management***	***Motivation***
		Cultural significance	***Impact significance***		
Buildings / structures of cultural significance	No	None	None	-	NA
Areas attached to oral traditions / intangible heritage	No	None	None	-	NA
Historical settlement/ townscape	No	None	None	-	NA
Landscape of cultural significance	No	None	None	-	NA
Archaeological sites	No	None	None	One fragment of LIA potsherd	No impact – in disturbed area
Grave / burial grounds	No	No	None	-	NA

NHRA S (3)2 Heritage resource category	***SITE***	***IMPACT SIGNIFICANCE Cultural significance rating***		***Impact management***	***Motivation***
Areas of significance related to labour history	No	None	None	-	NA
Movable objects	No	None	None	-	NA

ACT	***COMPONENT***	***IMPLICATION***	***RELEVANCE***	***COMPLIANCE***
NHRA	S 34	Impact on buildings and structures older than 60 years	None present	None
NHRA	S35	Impacts on archaeological heritage resources	One LIA fragment of a potsherds in disturbed section	No significance
NHRA	S36	Impact on graves	None present	None
NHRA	S37	Impact on public monuments	None present	None
NHRA	S38	Developments requiring an HIA	Development is a listed activity	Full HIA
NEMA	EIA regulations	Activities requiring an EIA	Development is subject to an EIA	HIA is part of EIA

G. STATEMENT OF SIGNIFICANCE & EVALUATION OF HERITAGE RESOURCES

Section 38 of the NHRA, rates all heritage resources into National, Provincial or Local significance, and proposals in terms of the above is made for all identified heritage features.

- **Evaluation methods**

Site significance is important to establish the measure of mitigation and / or management of the resources. Sites are evaluated as *HIGH (National importance), MEDIUM (Provincial importance) or LOW, (local importance),* as specified in the NHRA. It is explained as follows:

- **National Heritage Resources Act**

The National Heritage Resources Act no. 25, 1999 (NHRA) aims to promote good management of the national estate, and to enable and encourage communities to conserve their legacy so that it may be bequeathed to future generations. Heritage is unique and it cannot be renewed, and contributes to redressing past inequities.[73] It promotes previously neglected research areas.

All archaeological and other cultural heritage resources are evaluated according to the NHRA, section 3(3). A place or object is considered to be part of the national estate if it has cultural significance or other special value in terms of:

(a) its importance in the community, or pattern of South Africa's history;

(c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;

(g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

(h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa.[74]

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[73] National Heritage Resources Act, no. 25 of 1999. p. 2.

[74] National Heritage Resources Act, no. 25 of 1999. pp. 12-14

- **The significance and evaluation of the archaeological and cultural heritage features in the study area**

None of the features which were identified during the survey, was older than 60 years.

SITE	***CULTURAL / HERITAGE FEATURES***	***SIGNIFICANCE***	***MEASURES OF MITIGATION***
Naude's Rust 1			
LIA potsherd	One undecorated, and very rough / brittle fragment. Was observed within a disturbed road section – out of an archaeological context.	No significance	None
Three structures (foundations)	According to Mr. Giuricich these were part of the hostel area, but has long been demolished, and is currently not visible – built after 1982.	No significance	None
Shed (foundation)	According to Mr. Giuricich this was a shed to keep equipment, but has long been demolished, and is currently not visible. It was situated in the cultivated area – built after 1982	No significance	None
Hostel/Compound	The remains of the hostel / compound area were demolished in June 2022 – It was built in approximately 1982. Remains are still visible	No significance	None
Concrete block	A square concrete block of unknown origin / use, was noted towards the eastern section	No significance	None
Water Canal	Section 1 borders a concrete water canal from west to south, which was built in 1965 -1966 – will not be impacted upon.	Not older than 60 years	None
Naude's Rust 2			
Concrete water tanks	The concrete water tanks were providing the Lows Creek Clinic with water up to the 1980's.	No date could be determined but they hold no historical significance	None
Naude's Rust 3			
Sawmill area	The foundations of a sawmill are still visible with fragments of glass, bottles, tins and iron pieces in the area – established in the late 1960's	No significance	None
Rondavel area	The rondavels are no longer visible and was demolished years ago – established in the late 1960's	No significance	None
Naude's Rust 4			
Water Canal	Water canal cuts through section from south to north. Canal was built in 1965 -1966 – will not be impacted upon.	Not older than 60 years	None

Summary:

None of the remains above, including the fragment of LIA clay potsherd, have any cultural value which could link them as of outstanding importance to a certain community (NHRA 3.3a); or its potential to yield social, cultural or spiritual information or to link it to a particular community which may contribute to an understanding of South Africa's cultural heritage (NHRA 3.3c & g).[75]

[75] National Heritage Resources Act, no. 25 of 1999.

No archaeological sites of significance, stone walls or historic structures or graves were identified during the survey, and the applicant, who was interviewed, had no knowledge of any such features on the farm. [76]

It is not believed that any archaeological or historical features will be impacted upon by the proposed footprint of the agricultural development.

[76] Personal information: Mr. Walter Giuricich, Owner of Naude's Rust, 2022-10-24.

- H. RECOMMENDATIONS & CONCLUSION

Archaeological material or graves are not always visible during a field survey and therefore some significant material may only be revealed during debushing activities of the proposed agricultural development.

It is recommended that the owner be made aware that distinct archaeological material or human remains may only be revealed during further de-bushing or construction activities. Based on the survey and the findings in this report, Adansonia Heritage Consultants state that there are no compelling reasons which may prevent the proposed development to continue, but it is recommended that debushing activities be monitored by a qualified archaeologist and that an assessment be done should any archaeological material be found.

Adansonia Heritage Consultants cannot be held responsible for any archaeological material or graves which were not located during the survey.

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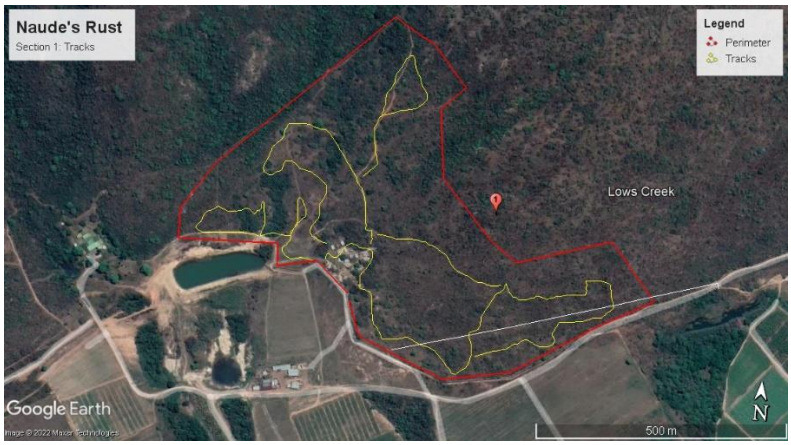
APPENDIX 1:

TRACKS & PATHS USED DURING THE SURVEY



Section 1

Section 2

Section 3


Naude's Rust
Section 4: Tracks
Legend
Perimeter
Tracks
Google Earth
Image © 2022 Maxar Technologies
300 m
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Section 4

APPENDIX 2:
PHOTOGRAPHIC DOCUMENTATION LOWS CREEK 2022

STUDY AREA 1:

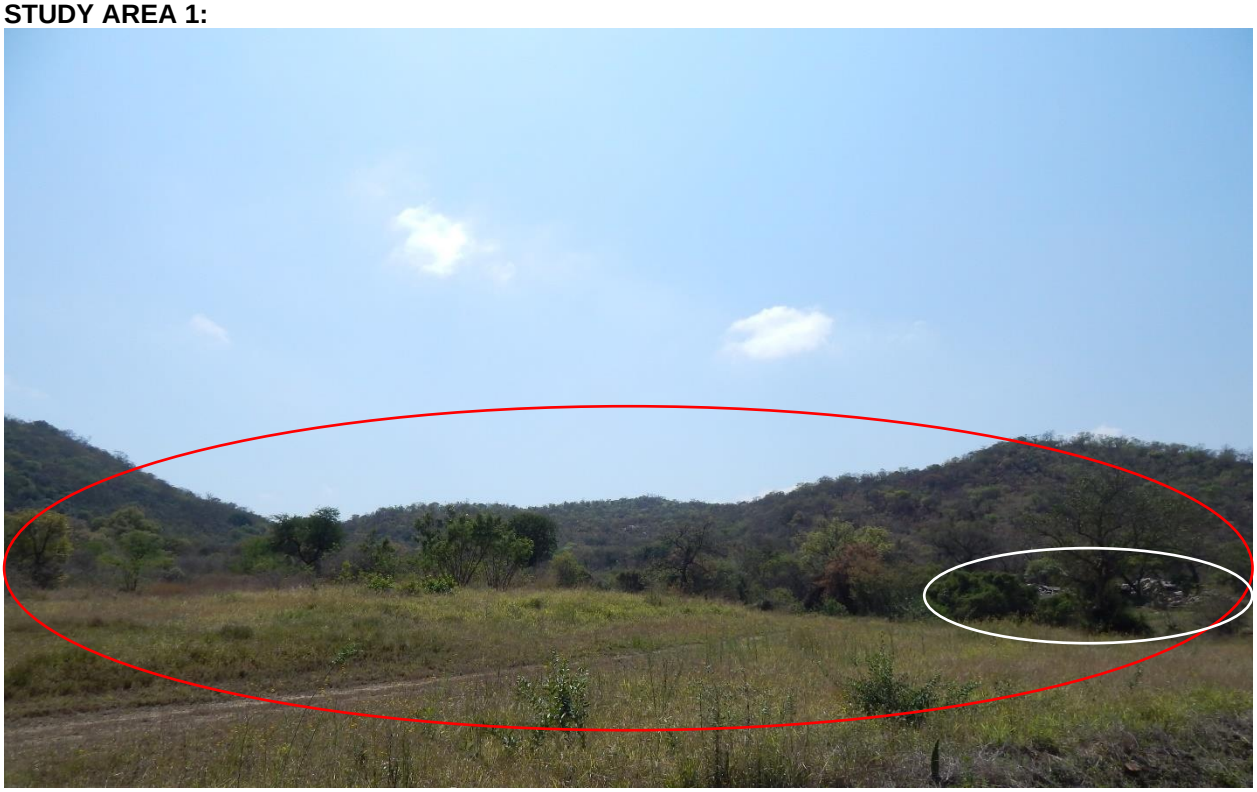


Fig. 1: Study area 1: The general study area facing north. The dam is to the left and the hostel is indicated with the white oval.

Fig. 2: The western section was overgrown, but also infested with Sickle Bush.

Fig. 3: A dam forms the southern boundary in the western section.

Fig. 4: Sickle bush has taken over large areas in the western section.

Fig. 5: View from west towards the central section. Note the grey Sickle bush. This area leads to more hostel houses.

Fig. 6: The Central section was overgrown with indigenous as well as alien vegetation.

Fig. 7: A long concrete water canal forms the southern boundary of study area 1.

Fig. 8: Area of an old cultivated field, bordering the canal in the south, where the foundations of a shed can be found.

Fig. 9: A large hostel was present on the farm but was recently demolished by the owner.

Fig. 10: The hostel / compound area is of a recent nature and is of no significance.

Fig. 11: Stone foundations towards the east, indicate where more compound/hostel houses were, before they were demolished. It is currently covered with alien vegetation.

Fig. 12: A pit toilet is still visible near the hostel, and close to the southern border.

Fig. 13: The central section was overgrown. Paths were cleared to give access to various parts in this section.

Fig. 14: A view of the central section towards the east.

Fig. 15: A single clay potsherd was observed within a disturbed road section.

Fig. 16: A general view of the eastern section, in study area 1.

Fig. 17: A large powerline cuts through this section.

Fig. 18: A concrete foundation was observed in the eastern section, a few metres from the water canal, but the previous or current owners did not know what the use of this structure was.

STUDY AREA 2

Fig. 19: Study area 2 is indicated by the red oval (Photo taken by Rhengu Environmental Services).

Fig. 20: A general view of study area 2. Apart from large disturbances in this section (google images & aerial maps), the vegetation was dense and visibility was difficult.

Fig. 21: Concrete/brick water tanks were observed in the eastern section of the study area. Water for the Clinic, was supplied from here in the past.

Fig. 22: Detail of the round concrete/brick stand.

Fig. 23: A general view of the state of the vegetation at these concrete stands during the survey. The arrows point out the features.

Fig. 24: A gravel pit was observed in the north eastern section of the study area. This pit is still in use today.

Fig. 25: This gravel pit stretches to the northern border of the study area.

Fig. 26: A large overgrown quarry was observed in the south-eastern section of the study area. This quarry is no longer in use.

Fig. 27: The road through study area 2.

STUDY AREA 3

Fig. 28: Study area 3 is indicated by the red oval (Photo taken by Rhengu Environmental Services).

Fig. 29: The study area is bordering a fallow agricultural land in the west. Study area 3 is indicated by the red oval.

Fig. 30: The general state of the vegetation in study area 3. Some sections were burnt, which made visibility excellent. This was the old access road to a sawmill at the top of the hill. Photo was taken from the eastern border of the study area.

Fig. 31: The overgrown state of the study area in the west.

Fig. 32: Sickle bush has infested large sections in the northern section. Bush clearing has taken place along the railway line and access road.

Fig. 33: A large section has burnt recently which made visibility excellent.

Fig. 34: A section at the top of the study area, which has recently burnt.

Fig. 35: The foundations of an old sawmill, which burnt down in the 1980's.

Fig. 36: Visible evidence of iron remains which were used at the sawmill.

Fig. 37: Domestic items which indicate habitation.

Fig. 38: More domestic items on the site.

Fig. 39: Areas which were levelled for the rondavels where people stayed, who worked at the sawmill.

STUDY AREA 4

Fig. 40: General view of the study area 4, which has already been cleared from the indigenous bush cover. This is the view from the east, towards west.

Fig. 41: A concrete water canal cuts through this section in the east. View towards the eastern boundary.

Fig. 42: Another view of the concrete water canal.

Fig. 43: View of the middle section of study area 4. View from west towards east.

Fig. 44: View towards the hill in the south. (Photo taken by Rhengu Environmental Services).

Fig. 45 The western section was historically a citrus orchard and was previously disturbed.

APPENDIX 5.
ENVIRONMENTAL MANAGEMENT PROGRAMME

LOWS CREEK AGRICULTURE PROJECT: CLEARING OF NATURAL- AND TRANSFORMED LAND FOR AGRICULTURAL USE AND CLEARANCE OF AN AREA OF 21HA ON THE FARM NAUDES RUST 272 JU PORTIONS 17 AND 21: LOWS CREEK AREA, MPUMALANGA
PROJECT REFERENCE: 1/3/1/16/1E-427

1. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr): DEVELOPMENT ACTIVITIES

1.1. The environmental management programme will address the development phase of the proposed activity. This will include the site establishment, the installation of services (irrigation, water meters), the construction of the irrigation infrastructure and development of the orchards.

1.2. The EMPr will primarily be used by the applicant/development teams under the guidance of the ECO. For this purpose the EMPr must serve a number of functions. These are:

- Instructions and conditions included in the EMPr must be written in a clear, down to earth language.
- All aspects of the EMPr must be practical and unambiguous.
- Instructions and conditions must be concise and to the point.
- Aspects of the EMPr must reflect the recommendations and mitigation measures listed in the Environmental Impact Assessment Report/s.
- Aspects of the EMPr must reflect the recommendations and mitigation measures listed in the Specialist Studies and the comments by Interested and Affected Parties/Government Departments.
- The EMPr must be used to monitor compliance to the conditions stipulated in the Authorisation of the Project as issued by DARDLEA.
- Aspects of the EMPr can be referred to in an Operational Management Programme (OMPr) during future Environmental Audit Assessments.
- The EMPr must ensure the protection of the natural environment and cover all aspects of rehabilitation/sustainable reparation of the impacted sites.
- The EMPr will guide the process from initiation until sign off the project.
- **Note:** The EMPr will remain a dynamic document which can be updated with approval by DARDLEA.

1.3. The implementation of the EMPr will be guided by an Environmental Control Officer (ECO).

- The applicant/developer is responsible for the appointment of the ECO.
- The name and contact details of the ECO must be submitted to DARDLEA once the project commences.
- All Interested and Affected Parties (I&AP's) must be informed of the name and contact details of the ECO.

1.4. Monitoring and Auditing

The Environmental Control Officer (ECO) will ensure that all the **conditions** as set out in the **Environmental Authorisation (EA**) **and any other requirements as issued by DARDLEA or any other applicable Department, e.g. DWS/IUCMA**, are met and implemented as stipulated.

The ECO must submit to DARDLEA, an **audit report** on the activities of the development. Audit reports will be made available to I&AP's on request. The frequency of submission will be determined by DARDLEA.

The role of the ECO and independent audit teams are well defined within the framework of Integrated Environmental Management (IEM). The developer, together with the ECO will ensure **compliance** in terms of this process**.**

The **Final Layout Map as compiled by Dr. Andrew Deacon (Appendix 1)** describes the delineation of the buffer- and the riparian zones. The ECO must ensure that the development team implement this delineation.

1.5. Initial Role-players: Contact Details:

1. Developer/Applicant/Representative: Walter Giuricich	Cell: 082 967 6757
2. ECO: To be appointed	Cell: To be confirmed.
3. EAP: Ralf Kalwa	Cell: 082 414 7088

2. DEVELOPMENT PHASE: ENVIRONMENTAL MANAGEMENT PROGRAMME

This programme must be read in conjunction with the **Contract Documents** for the project. This environmental management programme will address the development/preparation phase of the proposed development as described in Environmental Impact Assessment Reports.

KEY ISSUES: EMPr

This programme is designed for the entire development period and includes the rehabilitation of areas where development/storage activities took place.
The Contractor/Applicant together with the Environmental Control Officer (ECO) will be responsible to ensure that all construction workers, sub-contractors, suppliers and relevant personnel associated with the development:

- Understand the contents of the Environmental Management Programme (EMPr).
- Ensure that all the construction personnel are fully aware of all environmental issues relating to the development activities.
- Adhere to all the precautionary and mitigating measures described in the EMPr.
- Ensure that all the construction personnel understand the implications and stipulations of the Environmental Rules and Regulations described in the Development Contract.
- The ECO shall instruct the Applicant/Developer to suspend the works if the Contractor and/or any Sub-Contractors do not comply with the contents of the EMPr.
- The ECO will submit audit reports to DARDLEA, the Contractor, the Developer and applicable Government Departments.
- The EMPr describes the responsibilities of all the staff during the development phase.
- The ECO will oversee the operations and ensure compliance with the EMPr.

Non-Compliance: The Contractor/Applicant is deemed NOT to have complied with the EMPr, the Environmental Authorisation and the EIA if:

- Within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the Specifications of the EMPr;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the ECO within a specific time;
- The Contractor fails to respond adequately to complaints from the public;

Prior to construction: The Contractor/Applicant, in liaison with the ECO will submit a final layout plan of the development site indicating all of the following: storage areas, hazardous substances storage area (if applicable), different stockpile areas, material stores, waste disposal areas, on site offices, workshops, ablutions, access roads, no go areas etc. This construction site layout plan must be submitted to DARDLEA and the ECO prior to site establishment. Once the layout is approved by the ECO the Contractor will be required to sign acceptance of the EMPr and commence with the development. **Note:** Contractor = Farmer/Installation of Irrigation Systems (pump houses, valve chambers) etc.

2. DEVELOPMENT PHASE: ENVIRONMENTAL MANAGEMENT PROGRAMME: The ECO will monitor compliance of this EMPr		
ACTIVITY	**MANAGEMENT/MITIGATION ACTION**	**RESPONSIBLE PERSON**
1. Site Establishment and Logistics.	**1. Site Office and Logistics**: Establish a site office for the development. The Farmer's Office/Maintenance Shed can serve this purpose. The following procedures and equipment must be made available at the office: • Copies of the EIA and the EMPr. • Copy of the Environmental Authorisation. • Copies of the Development/Site Layout Plan. • A Complaints Register. • A Corrective Actions and Site Incident Register. • An Emergency/Evacuation Procedure. • A Monitoring- and Audit Register. • Emergency Contact Numbers including but not limited to telephone contact details for medical doctors; hospitals; emergency helicopters; emergency fire management; the ECO and Project/Site Manager. • Fire Extinguishers. • First Aid Kit. • A register of all applicable Standard Operational Procedures and Method Statements (e.g., handling of hazardous materials) of materials and equipment that are used and stored on site.	**Contractor**
	2. Final Walk Inspection (Pre-Construction): A final walk through the site with the ECO to point out the presence sensitive areas, e.g., Special Plants/Habitat/Drainage Line/Buffer Areas, or any other aspect which requires protection has to be undertaken prior to site establishment.	
	• All staff must be trained to respect the importance of rare/conservation significant plants and artefacts. This is specifically applicable to the no go areas around the drainage lines, rocky outcrops and buffer areas.	
	• Special features (rocky outcrops; large indigenous trees; rivers; wetland; etc.) are indicated on the final layout map and must be demarcated on site prior to construction. Damage to such features must be rehabilitated to the satisfaction of the ECO and the developer.	
	• All drainage lines must be demarcated to ensure that all machinery is kept out of these zones.	
	• **Timing**: All development should take place in the period April-October.	
	3. Demarcation: Demarcate the boundaries of the total development site for management purposes using steel droppers/standards spaced at regular intervals with a combination of nylon rope/barrier tape between the droppers. **This will be required in the vicinity of the riparian zones and sites with special plants of concern.**	

	• The Contractor shall maintain the demarcation line and ensure that materials used for construction on site do not blow on or move outside the site or pose a threat to any neighbours or adjoining property owners.	
	• Where applicable, structures must be located in such a manner as to reduce visual intrusion and minimal disturbance to neighbouring properties. Make use of coloured netting or corrugated cladding to hide unsightly features.	
	• Construction activities are restricted within these boundaries, thus all construction equipment, materials and personnel will remain within this demarcated area at all times.	
	• Ensure that access to the site including related infra-structure and machinery is restricted to authorised personnel only.	
	4. Site Control: Limit the construction/development site to existing infrastructure and or to disturbed areas.	
	• Ensure that only approved workers and Sub-Contractors are accommodated and allowed access to the site.	
	5. Site Facilities: The construction site and storage areas must be safeguarded against fire. • Ensure that the Contractors Site is fully functional in terms of water- and sewerage supply (temporary toilets) prior to the contractors coming on site.	
	• Contractor to be held responsible for providing construction-, drinking- and washing water for all the activities on site.	
	6. Access Routes and Control: No temporary access routes and haul roads are required for this activity. • No vehicle movement outside demarcated areas/routes/existing roads is permitted without authorisation from the ECO.	
	• Dust control measures, i.e., dampening access routes with water, must be implemented where necessary.	
	• Damage to any existing roads as a result of construction activities will be repaired to the satisfaction of the ECO and the Developer.	

	7. Storage- and Material Laydown Areas: The need for laydown/storage areas will be minimal however irrigation piping, pumps, cement, re-inforcing etc. will require a site when these materials are delivered and until these items are installed/used.	
	• All equipment, materials; pipelines etc. must be stored at the farm maintenance centre.	
	8. Site Closure: Once the development period is completed the following conditions will apply:	
	• The Contractor shall ensure that all temporary structures/facilities, equipment, materials and waste used for construction activities are removed after completion of development.	
	• The contractor shall clear and clean the construction site to the satisfaction of the ECO and the developer upon completion of the development.	
	• Remove all components of demarcation when the development phase is completed.	
	• Rehabilitate disturbed areas. This will include but not be limited to: • Break up any hardened soil surfaces allowing seeds and rainwater an opportunity to penetrate the soil surface. • Brush pack/landscape bare areas and reduce the potential run off of water. • Shape/level off any unnatural areas to fit in with the surrounding landscape.	
	Site Closure: Should the site be closed for a period of more than one week, a report on compliance will be lodged with the ECO, and the following will be confirmed: • Stores will be left at as low a volume as practically possible with no leaks. • The store area will be secure and locked. • Fire extinguishers will be serviced and accessible. • The area will be secure from accidental damages. • Emergency- and contact numbers will be available and prominently displayed. • Toilets will be empty and secured. • Refuse bins will be empty and secured. • Access to the site must be limited to authorised personnel only. • Security staff will patrol and guard the site.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
2. Site Biodiversity Management. (The ECO must be consulted at all times during this process).	**1. Vegetation Management**: Vegetation clearing/removal must be undertaken in a judicious and responsible manner. • The ECO is requested to conduct a final walk through the demarcated footprint (Sites 1-4) to ensure that no protected trees or plants of special concern will be affected. • Six weeks prior to the vegetation being cleared all Protected Tree Species (where applicable) must be clearly marked by the ECO and MTPA/DFFE Permits must be obtained to ensure permitted removals and/or translocations.	**Contractor and ECO where applicable.**
	• **Vegetation Clearing:** During the clearing of vegetation (21ha) in the project area most vertebrates will move away from the project site. • During this activity the project team may encounter slow moving reptiles and smaller mammals. • These animals should be allowed to move away unharmed or be assisted and relocated to the natural areas of the farm/riparian zone.	
	• **Riparian Corridor:** All drainage lines and riparian zones as identified by the Dr. Deacon will be kept intact. All riparian zones will act as a corridor for migrating fauna.	
	2. Alien Invader Plants: Control of alien invasive species will be undertaken on the development footprint in line with the requirements of the Conservation of Agricultural Resources Act. The ECO will identify plants (where applicable) which require removal and management.	
	• Alien invasive plant material will be preferentially removed through mechanical means (e.g., chainsaw, hand-pulling of smaller specimens).	
	• Chemical control is only required as a last resort or as a support mechanism to control coppicing and sprouting.	
	• All exotic plants must be identified and earmarked for removal. The ECO will assist with identifications (where applicable).	
	• A number of workers must be used to remove the vegetation i.e., 4/6 workers. ECO to monitor.	
	• If during the establishment period, any noxious or excessive weed growth occurs, such vegetation will be removed by the contractor.	
	3. Fauna and Flora Management: Collection of firewood/seeds/fruit/plants/animals or any biological material (where applicable) is strictly prohibited.	
	• No animals including snakes should be killed or injured by workers during the construction- and or the operational phases of the project.	
	• No poaching will be allowed on site.	

	• The Contractor is not allowed to deface, paint or mark and/or damage natural features/vegetation on the site.	
	4. Topsoil Protection: Topsoil will have to be removed/moved from all areas where irrigation pipelines are to be installed.	
	• Topsoil to be handled twice only; once to strip and stockpile (in low heaps of 1m) in the Right of Way (ROW) next to the trench and secondly to replace along the contour, level, shape and scarify.	
	• The topsoil must be replaced as soon as possible.	
	• Topsoil may not be compacted, nor should any object be stored or stockpiled upon it.	
	• No vehicle traffic will be allowed on the topsoil.	
	• The Contractor shall prevent pollution incidents on the topsoil. ECO to monitor.	
	5. Biodiversity Protection: **See Appendix 4.4.2.: Summary of Impact Mitigation on Biodiversity Components**: **ECO to monitor and control**: • **Impact 1: Clearing of approximately 42 ha of transformed and untransformed land types.** • **Mitigation of Impact 1:** • **Mitigation Description:** Avoid environmentally sensitive areas identified as described in the Sensitivity Map (Final Site Development Map) and implement all the buffers as per this map to protect these areas. • **Buffer Zones**: The drainage line in Site 1 has been delineated and a 10m buffer added around the riparian zone. The buffer zones should be honoured and no development must take place inside the buffered area. • **Demarcation:** Before clearing, demarcate the extent of the orchards footprint and ensure that clearing impacts are contained within this area and do not affect areas of natural habitat. • Limit the removal of vegetation to the development footprint only.	**Contractor and ECO where applicable.**

	• **Impact 2: Erosion and Siltation.** • **Mitigation of Impact 2:** • **Seasonal Aspects**: Clearing and development should take place during the driest time of the year, however storm events can happen at any time. Clearing activities should be kept as short as possible and planting or rehabilitation of cleared or excavated areas should commence as soon as the development activity is completed. • **Anti-Erosion Measures**: Management actions should be implemented, i.e., the re-establishment of indigenous vegetation wherever possible, control of storm water run-off and ongoing repair and stabilisation of any erosion. Where steeper slopes are cleared of vegetation, stop-boards should be erected at the commencement of clearing to prevent wash-away down the slopes. • Only clear low sloping areas and refrain from the steeper slopes due to the possibility of erosion. • **Sediment Control**: Strict measures must be taken to prevent erosion and sediment-laden water from entering the adjacent watercourses. Storm water management measures are to be included in roadways especially at water course crossings. • The vegetated riparian buffer zone should remain intact along all watercourses to facilitate the containment of sediment-laden run-off from orchards. • Sediment basins (including debris basins, desilting basins, or silt traps) shall be installed at the project sites in conjunction with the initial grading operations and maintained through the development process to remove sediment from runoff waters. • Sediment traps are considered temporary structures and often placed at the site on an “as needed” basis by field personnel. Construct traps of rock (mixed with smaller stone), rock-filled fibre bags, or use approved commercial sediment trap products installed and spaced according to manufacturer’s instructions. • Silt fences and straw bales can be used to form silt traps and dykes to keep sediment from washing downstream during excavation and other activities that disturb soil at crossings and that could lead to temporary sediment flushing.	

	• **Impact 3: Habitat Fragmentation.** • **Mitigation of Impact 3:** • **Ecological Corridors**: A network of corridors is provided by drainage lines on the Naude's Rust Farm. To prevent the corridor created by the drainage line in Site 1 becoming obstructed by vegetation clearing and development, a 10m buffer is proposed around the riparian zone. The buffered drainage line will create a corridor through Site 1 to the Crocodile Gorge Mountain foothills. • This network will provide viable corridors and dwellings for animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements and range expansion. • The network, which includes the buffered drainage line, will be a sanctuary for both animals and plants, which includes a number of Red listed and protected species.	
	• **Impact 4: Disturbance to Fauna.** • **Frogs**: Currently no threatened frog species is expected to occur in the area. • **Other Fauna**: No special species of concern listed in the sensitivity theme list were observed in the project sites. • **Mitigation of Impact 4:** • The disturbance factor will be high during the bush clearing activities. • **Manage People Movements**: During the operational phase of the project, fewer people participate in the farming activities in the orchards and thus the visual disturbance and noise impact is lower. This also applies to the movement and the noise factor of farming vehicles and other implements. • **No-Go Zones**: During all phases it is important to establish and maintain no-go zones for both workers and their vehicles, especially in the untransformed habitats. • People presence and movement in the drainage line buffer areas will disturb animals, chances of interference (poaching and collecting) with both plants and animals, trampling of plants and pet dogs are all possible adverse influences that impacts on the local ecology.	

	• **Impact 5: Human Interference Impacting on Biota.** • **Nature of Impact:** Human interference and utilisation impacting on biota. • **Mitigation of Impact 5:** • **Upgrade the Security on the Farm:** The collection, hunting or harvesting of animals at the project site should be strictly forbidden. No animals should be intentionally killed or destroyed and poaching and hunting should not be permitted on the project site and adjacent areas. • There should be a stringent and dedicated control to prevent collection, poaching, hunting or harvesting of animals. All personnel should be informed not to harm or collect species such as snakes and tortoises. • Faunal species encountered during construction activities should be removed by the ECO from the immediate site and relocated to an adjacent, suitable area. • Poaching could be a significant threat. If any external labour teams are used during soil preparation and planting, then these teams should preferably be accommodated off site; if this is not possible then teams should be carefully monitored to ensure that no unsupervised access to plant- and animal resources takes place. Site access to be controlled and no unauthorised persons should be allowed onto the site. • **Animals have the Right of Way**: Any slow-moving fauna (particularly tortoises, hedgehogs, golden moles and subterranean species) disturbed during the clearing phase should be relocated to another site and not harmed in any way. • **Trench Monitoring**: Check open trenches daily for trapped animals (e.g., bullfrogs, hedgehogs and reptiles), which should be caught and relocated according to the specifications of a relevant specialist. • **Demarcation**: Limit construction impacts to the development footprints only. • Ensure that unnecessary impacts on natural habitat do not occur, e.g., driving around in the grassland or riparian zone. Highlight all prohibited activities to workers using training workshops and toolbox talks.	

	• **Impact 6: Linear Structures: Impacts of Roads and Pipelines.** • **Mitigation of Impact 6:** • **Use Existing Routes**: Refrain from creating unnecessary new orchard roads or tracks, make use of current routes as far as possible. • **Manage Run-Off**: Management actions should be implemented such as the re-establishment of indigenous vegetation wherever possible, control of storm water run-off and ongoing repair and stabilisation of any erosion. Where steeper slopes are cleared of vegetation, stop-boards should be erected at the commencement of the clearing to prevent wash-off down-slope. • **Allow Movement of Fauna**: Refrain from incorporating continuous low solid barricades such as road curbs or steep-walled ditches that might act as barriers to smaller vertebrates moving or migrating through the area. Check open trenches daily for trapped animals (e.g., bullfrogs, hedgehogs and reptiles), which should be carefully caught and relocated according to the specifications of a relevant specialist. • **Alien Invader Plants**: Develop- and implement an alien plant control programme for the project area in order to prevent the further degradation of the faunal habitat.	
	• **Impact 7: Alien Invasive Vegetation**. • **Mitigation of Impact 7:** • **Implement a Control Plan**: An alien invasive plant management- and control plan should be put in place for both the construction- and operational phases on the farm. A programme for the eradication, or at least control, of alien plants present within the project area must be developed. • **Ongoing Process**: The Contractor and Farm Manager, during orchard establishment, and the various construction phases, should ensure that immediate removal of alien invasive species (seedlings) is implemented as these species establish themselves rapidly within disturbed areas. Mechanical removal is preferred and should follow the guidelines laid down in an alien plant management and control plan. • **Include Buffer- and No Go Areas**: Alien plant removal should include in the natural biotopes not impacted by the development.	

	• **<u>Impact 8: Loss of Red Listed and Protected Fauna/Flora Species</u>**. • **<u>Mitigation of Impact 8</u>:** • The areas earmarked for development consist mostly of savannah woodland. • **<u>Relocate</u>**: Specified faunal species not able to move away, must be captured and relocated to suitable habitat in the area (preferably). • The operations must be handled by specialists with expertise in the field of relocations. All relocations must be permitted by the MTPA and or DFFE. • Species data (GIS point locality, species name and date) must be forwarded to the MTPA. • It is suggested that any species caught during the process, should be translocated in the area towards the west i.e, the Crocodile Gorge Mountain foothills. • Relocation plans of plants of conservation importance should be included and this relocation should be undertaken by specialists that have expertise in the area of relocations. • **<u>Ecological Corridors</u>**: A network of corridors is provided by drainage lines on the Naude's Rust Farm. To prevent the corridor created by the drainage line in Site 1 becoming obstructed by vegetation clearing and development, a 10m buffer is proposed around the riparian zone. The buffered drainage line will create a corridor through Site 1 to the Crocodile Gorge Mountain foothills. • This network will provide viable corridors and dwellings for animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements and range expansion. • The network, which includes the buffered drainage line, will be a sanctuary for both animals and plants, which includes a number of Red listed and protected species.	

	• **Biodiversity Monitoring Requirements**: • **Measuring Mitigation**: Environmental performance monitoring should be designed to ensure that mitigation measures are implemented. The monitoring programme should clearly indicate the linkages between impacts, indicators to be measured, measurement methods and definition of thresholds that will signal the need for corrective actions. • **ECO:** The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of the Environmental Authorisation (EA), as well as monitoring and reporting on the implementation of the approved EMPr. • **Monitoring Programme**: A monitoring programme for the biodiversity associated with the project, would ideally be to record the reaction of the biota to changes in the environment due to the impacts of the project. • **Aspect Nr. 1: Removals under Supervision**: Before the clearing of untransformed habitats, a botanist/ECO must be part of the identification-, relocation or removal programme of plant species of conservation importance. • **Aspect Nr. 2: Maintain Records**: Establish an effective record keeping system regarding veld condition, alien vegetation presence and burning programmes. • **Aspect Nr. 3: Red Data List**: The large number of Red Data listed and endemic species (26 species have a **high probability of occurring** on the Naude's Rust farm) necessitates a monitoring program to assess their numbers and status in the project area. An inventory system should be established in a concerted effort with regular staff working in the project area to identify Red Data or Species of Special Concern and record these species. In the event that any threatened or near-threatened animal species are recorded within the study area in future, appropriate conservation measures should be developed in consultation with the relevant conservation authorities. • **Aspect Nr. 4: Vegetation clearing or disturbing soil**: Establish an effective record keeping system for each area where soil is disturbed for whatever purposes. The monitoring will evaluate whether the erosion and sedimentation control techniques that are employed throughout the site preparation activities are effective in minimising erosion of exposed areas and sedimentation of site surface water. • **Aspect Nr. 5: Exotic and alien invasive plants**: To anticipate and evaluate imminent or potential risks to the project area regarding exotic- and alien invasive plants, as well as pathways of invasion, a monitoring programme should be developed in order to create effective mechanisms to manage or mitigate these. Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. It is important to evaluate the effectiveness of control methods and to monitor the cleared areas on a regular basis to identify emergent seedlings and to remove those immediately.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
3. Project Specifics and Excavation Management: Trenching; Backfilling and Levelling. (Pipelines etc.).	**1. Excavation**: During excavation topsoil has to be stockpiled as specified in low 1m heaps next to the trench in the Right of Way (ROW). • Excavation of soil to solid ground to be done carefully and to ensure proper drainage.	**Contractor and ECO where applicable.**
	• Remove soil/sand and debris and expose all rocky material.	
	• Excess (spoil) excavated rocky material (rock and boulders) to be used for erosion control/cladding where applicable or for purposes of landscaping.	
	2. Backfilling: The Contractor shall backfill according to the requirements of progressive reinstatement, i.e., reinstatement of disturbed areas to topsoil profile on an ongoing basis, immediately after selected construction activities are completed, which will allow for passive rehabilitation.	
	• All soils must be returned into the trench in the sequence in which they were excavated.	
	3. Levelling: Excess sand/soil (after construction) must be filled in and landscaped into natural sandbanks blending in with the topography of the surroundings.	
	• Excess stockpiled building material must be removed completely and all areas levelled.	
	• Excess sand and soil resulting from levelling activities of the work area to be stored in low heaps on the access road/or already disturbed areas.	
	• Excess topsoil to be spread evenly over the area in a manner that blends in with the natural topography.	
	• When the bulk of material stockpiles have been cleared, the disturbed areas are to be levelled and cleared of any unnatural foreign material manually using shovels and rakes.	
	4. Trenching: This activity is limited to the pipeline installations. • Trenching will be minimised through the use of single trenches.	
	• Trench routes with permitted working areas will be clearly defined and marked with painted stakes prior to excavation.	
	• All trenches must be clearly marked (Flags; coloured posts; reflective banners; lights) in order to alert people to the potential hazard thereof.	
	• All open trenches must be patrolled on a minimum of a daily basis to ensure that animals, e.g., lizards, small rodents, have not become trapped. Such animals will be removed and released. A log must be placed at strategic spots each afternoon to allow any animal that accidentally falls into the trench an opportunity to escape.	
	• Stripping and separation of topsoil will occur as stipulated in the EMPr above.	

	• Soil will be excavated and used for re-filling trenches using the **rollover method**, i.e., progressive re-instatement: This entails the following approach: • Soil from the first trench section will be stockpiled. • Soil excavated from subsequent trench lengths will be used to backfill once the pipelines have been laid on an ongoing basis. • The final trench length will be re-filled using the originally stockpiled soil.	
	• Trench lengths will be kept as short as practically possible.	
	• Trenches will be re-filled to the same level as, or slightly higher to allow for settlement of the surrounding land surface to minimise erosion. Excess soil will be stockpiled in an appropriate manner.	
	• Immediately after refilling, the disturbed areas will be stabilised.	
	• The Contractor will not pollute any eco-system as a result of construction activities. All cement mixing activities must take place on an impermeable layer, e.g., metal sheet or plastic. No mixing of cement may take place directly on the soil surface.	
ACTIVITY	**MANAGEMENT/MITIGATION ACTION**	**RESPONSIBLE PERSON**
4. Waste Management: Solid Waste.	**1. Litter and Builders Waste**: All waste to be disposed of off-site at an approved landfill site. • Contractor not to dispose of any waste and/or construction debris through burning or by burying.	**Contractor**
	• Contractor to supply tamper proof waste bins throughout the site at locations where construction workers are working.	
	• Tamper-proof refuse bins to be emptied on a daily basis. Refuse bins not to be used for any other purpose.	
	• Contractor has to designate specific areas for staff to enjoy their lunches and tea and he must provide for access to adequate refuse bins at these sites.	
	• All litter must be removed off site daily and deposited at the designated waste collection point near the Maintenance Yard.	
	• Waste includes cigarette boxes, cigarette butts, paper, plastic bags, tin, glass, wires, cable ties, and organic waste e.g., peels and bones.	
	• Under no circumstances will cigarette butts be discarded anywhere on the development site.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
5. Waste Management: Liquid Waste.	**1. Construction Water**: Construction water refers to all water affected by construction activities. • No River/Stream/Natural Drainage Line must be used for cleaning of tools and equipment. This includes the washing of clothes and bathing/recreational purposes.	**Contractor**
	• All washing of equipment to be undertaken at the designated facilities in the Farm Maintenance Site Yard.	
	• Water from any other cleaning operations in the Site Yard to be collected in a "conservancy" tank removed from site and disposed of in the agreed manner.	
	• Water and slurry to be contained to prevent the pollution of the ground surrounding the mixing and/or disposal points.	
	• No spills to be channelled into natural environment. Contractor to take reasonable precautions to prevent pollution of the ground- and water resources.	
	• Contractor to ensure that no fuels (petrol/diesel), oils, lubricants and/or other chemicals are discarded onto the ground. Use drip trays in all potentially risky situations, e.g., refuelling a mobile generator.	
	2. Sewerage Management: Adequate temporary (e.g., Enviro-loos) ablution facilities to be put in place on sites located near to working areas. • 1 Enviro-loo per 10 workers.	
	• Toilet paper must be provided by the contractor.	
	• All toilets must be checked daily and serviced accordingly by an accredited service provider.	
	• No spillages into the surrounding environment will be allowed.	
	• The entrances to the toilets must be adequately screened from public view.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
6. Waste Management: Hazardous Waste (The use of hazardous materials are not envisaged during the development phase, however unforeseen events may occur which are not known to the EAP at this stage of the process. This aspect is therefore included as a precautionary measure).	**1. Hazardous Waste Process**: The EAP has not been made aware of any hazardous substances that may be used during the development construction process. To ensure that the EMPr maximises the implications of the precautionary approach the following conditions are included in the event that substances such as fuel (mobile generator); paints; varnishes; chemicals for alien plant control etc. are used at any stage of the development. • A Contractor staff member must be designated to manage this process.	**Contractor**
	• Contractor to comply to all national, regional, and local legislation with regards to the storage, transport, use and disposal of petroleum, chemicals, harmful and hazardous materials and substances.	
	• Contractor to provide the ECO with a list of all petroleum, chemical, harmful and hazardous materials and substances on site, together with all the storage, handling and disposal procedures for these materials. A register must be kept at the site office containing all the written/prescribed handling procedures.	
	• Contractor to be responsible for training and education of workers that will be working with these materials. Training to include the proper use, handling and disposal of the substances.	
	• Storage of chemicals to be safe, tamper proof and under strict control.	
	• Storage and handling of fuels, lubricants, chemicals and other hazardous substances to be protected by placing an impermeable liner, e.g., bund beneath the above ground storage containers in order to prevent accidental contamination of the soil.	
	• The contractor will ensure that there is a supply of absorbent material (or absorption blankets) readily available on site to absorb, break down and where possible control any spillages that may occur. The amount and type of absorbent material must be appropriate to the volumes of hazardous liquids on site.	
	• Any accidental chemical/fuel spills to be addressed and reported immediately to the ECO. The ECO will inform the applicable authorities and initiate a containment- and control programme as applicable.	
	• Contractor to be responsible for establishing an emergency procedure for dealing with spills/releases of fuels, chemicals, hazardous substances and medical emergencies. All spills/accidents to be recorded (in the Incident Register) and reported to the ECO. The cleanup of spills and any damage caused shall be for the Contractor's account.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
7. Access Roads.	**1. Existing Roads**: The farm is well serviced with all-weather farm roads to the various sections and facilities on the property. The proposed project and all deliveries will make use of these access routes.	**Contractor**
	• Adhere to the local speed limit on the farm (40km/h) at all times.	
	• Contractors to limit the number of deliveries where possible through appropriate advance planning.	
	• Contractors will be required to submit a delivery timetable to the ECO.	
	• Construction personnel should only use authorised paths and roads.	
	• Any damage caused by the construction activities to any access or public roads must be rehabilitated thoroughly upon completion of the construction.	
ACTIVITY	**MANAGEMENT/MITIGATION ACTION**	**RESPONSIBLE PERSON**
8. Construction Staff	**1. Staff Management**: The Code of Conduct for Contractors as described in the Tender Document will apply to all Construction Staff. • The EMPr will be included as a condition of the Tender Document.	**Contractor**
	• Contractor must adhere to all conditions of the Occupational Health and Safety Act.	
	• A Safety Plan must be submitted to the ECO prior to the commencement of construction.	
	• No contractor staff will be housed on the development site.	
	• All contractor staff will abide with the Rules and Regulations of the Project Site/Farm. This includes all aspects to gain entrance and to exit the property.	
	• All staff must use the water- and sewerage facilities judiciously and keep these facilities neat and clean.	
	• All staff must remain within the development footprint and behind the demarcated boundaries.	
	• No open fires will be allowed for cooking and or heating purposes.	
	• Staff must supply their own lunches and refreshments. No cooking will be allowed on site.	
	• Staff must respect the surrounding environment and prevent all littering and damage to fauna and flora.	
	• **Site Specifics: Induction Courses**: All staff will undergo an intensive induction course on worker safety and safety procedures for the various sections of the site.	
	• **EMPr**: The conditions of the Environmental Management Programme must be explained to all workers and staff on site.	
	• All staff on site must sign an acceptance of understanding the EMPr form prior to being allowed on site.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
9. Fire.	**1. Fire Management**: Contractor to take all the necessary precautions to ensure that no fires are caused as a result of activities on site. • A Contractor staff member must be designated to manage this process.	**Contractor**
	• Contractor to supply all facilities, site offices, workshop areas, storage areas, with approved fire-fighting equipment.	
	• All staff on site 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.	
	• The Contractor will advise the relevant authority of a fire outside of a demarcated area as soon as it starts and will not wait until he can no longer control it.	
	• All fire-fighting equipment to be maintained in good operating order.	
	• No open fires for heating or cooking are allowed on site.	
ACTIVITY	**MANAGEMENT/MITIGATION ACTION**	**RESPONSIBLE PERSON**
10. Accidents.	**1. Staff Safety**: Contractor to comply with the Occupational Health and Safety Act (OHASA) and any other labour regulations with regard to safety on site.	**Contractor**
	• Contractor to provide an Occupational Health and Safety Management Plan to the ECO for approval prior to the commencement of works in terms of the Construction Regulations.	
	• A Contractor staff member must be designated to manage this process.	
	• Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993).	
	• Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards, e.g., open trenches, will be suitably indicated (e.g., reflectors, lighting, and traffic signage).	
	• No unauthorised firearms or weapons of any kind will be permitted on the site.	
	• Contractor to ensure that all staff are familiar with all the emergency procedures.	
	• All staff must undergo a basic First Aid Course.	
	• Contractor to ensure that lists of all emergency telephone numbers/contact people are available and are posted at relevant locations, e.g., site office, at all times and that they are updated regularly.	
	• Contractor to be responsible for establishing an emergency procedure for dealing with medical emergencies. All incidents to be recorded (in the Incident Register) and reported to the ECO.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
11. Adverse Weather Conditions and Erosion Protection.	**1. Wet Weather: Overflows and Erosion Protection**: Development on this project will preferably take place during the period April-October.	**Contractor**
	• Contractor to set up a procedure for rapidly emptying any collection points to prevent them filling with rainwater.	
	• Contractor to ensure that no sumps (where applicable) are emptied unnecessarily. Special care to be taken during rainy periods/adverse weather conditions to prevent contents from overflowing.	
	• Contractor to ensure that a procedure is established for dealing with potentially polluted rainwater. Procedures/method statements must be filed in the register in the site office.	
	• Stockpiles of fine material such as sand, topsoil, etc. to be protected from rainfall run-off and wind.	
	• During construction, Contractor to protect all areas susceptible to erosion by installing all the necessary temporary and permanent drainage works ASAP. Contractor must also prevent water scouring of the slopes, embankments (where applicable) and any other areas.	
	• Correct any cause of erosion at the onset thereof through the most appropriate mechanism. Discuss any remedial actions with the resident ECO.	
ACTIVITY	**MANAGEMENT/MITIGATION ACTION**	**RESPONSIBLE PERSON**
12. Noise, Visual and Dust Impacts.	**1. Noise Impacts**: Contractor to use the equipment that is appropriate to the task in order to minimise the extent of damage to the environment and minimise the noise levels.	**Contractor**
	• The provisions of SABS 1200A will apply to all areas within audible distance of the site.	
	• Noise levels to be kept within acceptable limits for a conservation/agricultural area and not to be of such a nature as to detract from the experience of persons in the area.	
	• No amplified music will be allowed.	
	• Construction activities generating output levels of 85dB or more will be confined to the hours 07h00 to 17h00 Mondays to Fridays.	
	2. Dust: Dust to be controlled on site at all times.	
	• Dust emissions may occur during the clearing of vegetation and delivery of equipment and supplies on the farm roads to the project area.	
	• Contractor must control dust emissions using a water tanker as and when the impact arises.	

ACTIVITY	MANAGEMENT/MITIGATION ACTION	RESPONSIBLE PERSON
13. Cultural Artefacts.	**1. Handling of Unexpected Cultural Finds**: The proposed project does not traverse, impact and or influence aspects of historical value, however the following conditions are listed in the event that an unexpected find or artefact is unearthed. • An accredited archaeologist must oversee the excavation/clearing of vegetation process.	**Contractor**
	• Sensitise (during toolbox taks) the Contractor/labourers to be aware of the importance of cultural artefacts/fossils and implement the recommended procedure below in the event that such a discovery is made accidentally during construction.	
	• Should any artefact, historical site or fossil be discovered during excavations for irrigation trenches as well as in future, all works must cease with immediate effect. • A buffer of 30m must be established around the find.	
	• The find must be reported to the ECO and the Project Manager for the project. • These representatives will initiate an Action Plan in conjunction with an accredited archaeologist/palaeontologist (Contact SAHRA) to address the management and handling of the find.	
ACTIVITY	**MANAGEMENT/MITIGATION ACTION**	**RESPONSIBLE PERSON**
14. Site Clean Up and Closure.	**1. Removal and Clearance**: Contractor to ensure that all temporary structures, materials, water and waste facilities used for construction activities are removed upon completion of the project.	**Contractor and the ECO.**
	• All signs of disturbance and contractor activity must be rehabilitated to a state as on day of site handover.	
	• All toilets must be removed.	
	• All left over stock and bits and pieces of materials must be removed.	
	• All waste bags must be deposited at the waste management facility (site yard).	
	2.Rehabilitation: • All re-seeding activities will be undertaken at the end of the dry season to ensure optimal conditions for germination and rapid vegetation establishment.	
	• When ripping for rehabilitation the contractor will rip to refusal or a minimum of 300 mm.	
	• The rehabilitated and seeded areas must be harrowed after spreading the topsoil and fertiliser uniformly.	
	• All rehabilitated sites must be covered in brush to restrict run-off and prevent erosion.	
	• Inspect rehabilitated area at three monthly intervals during the first and second growing season to determine the efficacy of rehabilitation measures.	

	• Take appropriate remedial action where vegetation establishment has not been successful or erosion is evident.	
	• Only indigenous vegetation commensurate with the Lows Creek Farm landscape is to be used in any landscaping/reseeding which may be undertaken.	
	3. Project Sign Off: The ECO must sign off the works and the site during a Final Audit Assessment. The Final Audit Report will be submitted to DARDLEA for approval and verification.	

PROTECTION OF THE ENVIRONMENT:
DECLARATION OF UNDERSTANDING: CONTRACTOR TO SIGN:

The Contractor will not be given right of access to the Site until this form has been signed.

I / we, _____ {Contractor} record as follows:

I / we, the undersigned, do hereby declare that I / we am / are aware of the increasing requirement by society that construction activities shall be carried out with due regard to their impact on the environment.

In view of this requirement of society and a corresponding requirement by the Employer with regard to this Contract, I / we will, in addition to complying with the letter of the terms of the Contract dealing with protection of the environment, also take into consideration the spirit of such requirements and will, in selecting appropriate employees, plant, materials and methods of construction, in-so-far as I / we have the choice, include in the analysis not only the technical and economic (both financial and with regard to time) aspects but also the impact on the environment of the options.

In this regard, I / we recognise and accept the need to abide by the “precautionary principle” which aims to ensure the protection of the environment by the adoption of the most environmentally sensitive construction approach in the face of uncertainty with regard to the environmental implications of construction.

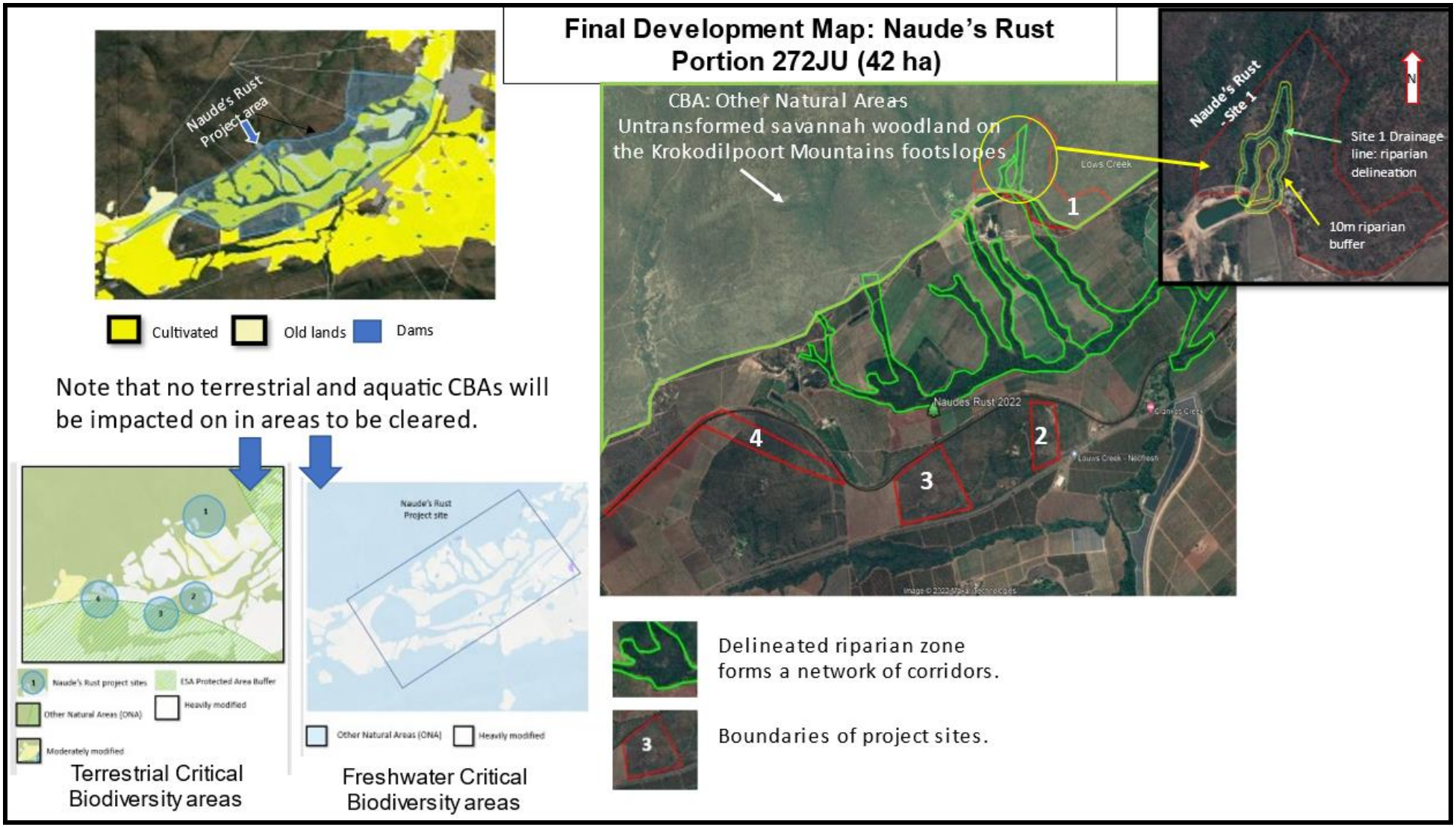
I / we have signed the Declaration of Understanding with respect to the Environmental Management Programme.

I / we acknowledge and accept the right of the Employer to deduct, should they so wish, from any amounts due to me / us, such amounts (hereinafter referred to as fines) as the Construction Manager shall certify as being warranted in view of my / our failure to comply with the terms of the Contract dealing with protection of the environment, subject to the following:

The Project Manager, in determining the amount of such fine, shall take into account inter alia, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance / non-compliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he/she considers it necessary to impose a sanction in order to eliminate / reduce future occurrences.
The Construction Manager shall, with respect to any fine imposed, provide me / us with a written statement giving details of the offence, the facts on which the Construction Manager has based their assessment and the terms of the Contract (by reference to the specific clause) which has been contravened.

Signed _____
Date _____

FINAL DEVELOPMENT MAP



RHENGU ENVIRONMENTAL SERVICES
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ACCEPTANCE OF EMPr:
Naudes Rust Debushing Project:
Project Reference: 1/3/1/16/1E-427

DECLARATION

I/We, the undersigned as the proponent/s/person/s responsible for the above-proposed activity undertake to abide by the above-designated EMP and associated conditions.

Name: _____

Signature: _____

Date: _____

Name: _____

Signature: _____

Date: _____

CHECKED BY ENVIRONMENTAL CONTROL OFFICER

Name: _____

Signature: _____

Date: _____