

**TERRESTRIAL BIODIVERSITY AND PLANT SPECIES ASSESSMENT
FOR THE DEVELOPMENT OF A DAM AND NEW CULTIVATION
AREAS ON VREDELUST, FARM 800 & 31/319, WORCESTER.**

**Compiled by: Johlene Krige
B.Sc. Biodiversity & Ecology, M.Sc. Botany
Pr. Sci. Nat**

**Applicant: Mr. Nico van Schalkwyk
EAP: Earth Grace Environmental Consultancy**

Date: 19 February 2026

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APPENDIX A – LOCATION OF CONTENT PRESCRIBED BY NEMA FOR SPECIALISTS
REPORTS: PROCEDURES FOR ASSESSMENT AND MINIMUM CRITERIA FOR REPORTING,
GN 320 DATED 20 MARCH 2020.

SPECIALIST DETAILS, EXPERTISE AND DECLARATION

In terms of Chapter 5 of the National Environmental Management Act of 1998, specialists involved in Impact Assessment processes must declare their independence.

I, J. Krige, do hereby declare that I am financially and otherwise independent of the client and their consultants. All opinions expressed in this document are substantially my own.



J. Krige

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Abbreviated CV:

Surname : Krige née Zietsman

First Name : Johlene

Date of birth : 10 September 1982

Contact Details : Tel . 072 1990 500, Email. johlene@breede.co.za, PO Box 573, Ceres, 6835

Qualifications : Stellenbosch University, South Africa: B.Sc. Biodiversity & Ecology, B.Sc.Hons Botany, M.Sc. Botany 2007

Certifications : Pr. Sci. Nat.

Registration number: 118756

Since 2010 I have been working as an Environmental Assessment Practitioner and Botanical & Ecological Specialist at Boland Environmental Consultants in Worcester. I have been involved in various EIA Projects and Environmental Management Programs. In additions I have conducted numerous Botanical & Ecological Impact Assessments in the local area (Breede River Valley). Since 2013 I have been based in Robertson and working at a free-lance basis, trading under my own name, focussing on Specialised Botanical & Ecological Surveys, predominantly within the Breede River Valley. Most of my work relates to new farming development (cultivation areas, construction of dams and agri related infrastructure) or small-scale mining applications in the area. I am currently (since 2017) based in Ceres continuing with Botanical Impact Assessment throughout the Western Cape.

1. INTRODUCTION

This terrestrial biodiversity assessment is for the development of a dam and new cultivation areas on Vredelust Farm 800 & 31/319, Worcester. The property is located approximately 3 km NE of Worcester, in the Breede Valley Municipal Area (Figure 1).

Two alternative sites have been identified for the development of a dam. The total footprint and storage capacity are not yet established but two sites are broadly defined, approximately 1.4 ha each (Figure 2).

- Site 1 is located within the north-western portion of Farm 800.
- Site 2 is located on Farm 31/319 and comprises a current cultivated site.

In addition to the new dam, an area of approximately 17 ha on Farm 800 is targeted for cultivation. The entire site was cultivated in the past but it was more than 10 years ago. This cultivation area will include dam site 1 if the dam is to be developed at site 2 (Figure 2).

A detailed Botanical Assessment was conducted during 2019 but the project has lapsed and only commenced again during 2026. The 2019 botanical report was revised to consider the latest available biodiversity information, tools and maps and to incorporate the NEMA protocol for biodiversity specialist assessments.

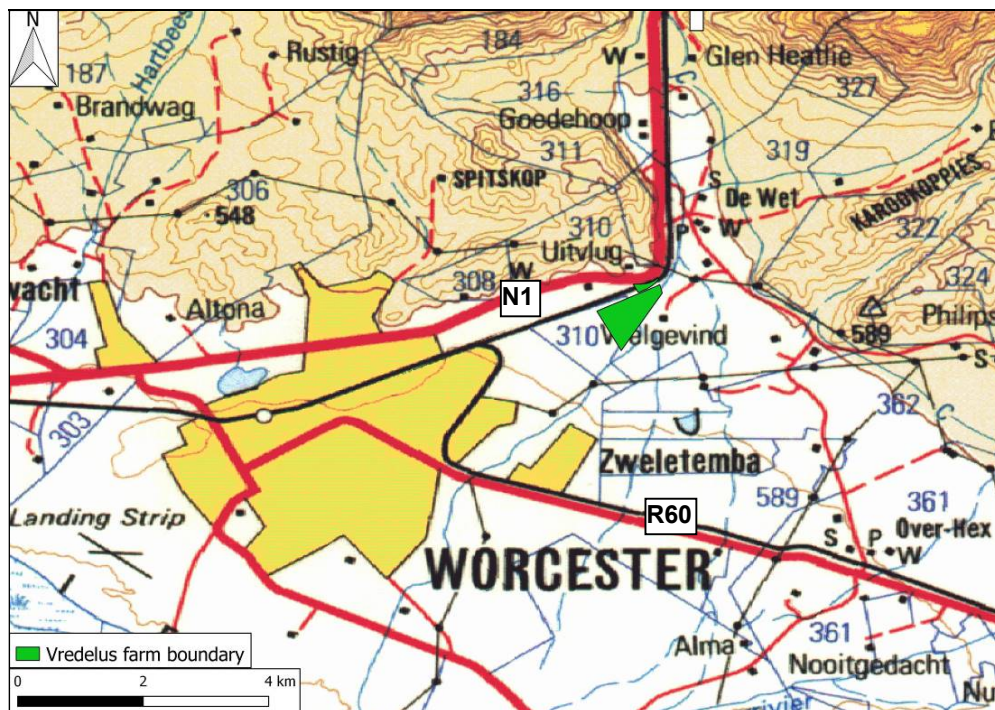


Figure 1. Location of Vredelust Farm (green polygon) north-east of Worcester.



Figure 2. Alternative dam sites (blue) and the proposed cultivation area (red) on Vredelust Farm Portions 31/319 and 800.

2. OUTCOME OF THE ENVIRONMENTAL SCREENING TOOL

The National Web Based Environmental Screening Tool recognised the site as being of Very High terrestrial biodiversity sensitivity and therefore a detailed terrestrial biodiversity impact assessment is required.

The very high sensitivity rating is based on the following sensitivity features:

- CBA: Terrestrial
- CBA2: Terrestrial
- National Protected Area Expansion Strategy (NPAES)
 - The site does however not fall within any NPAES focus areas (refer to Section 6.1.2)
- EN_Breede Alluvium Renosterveld

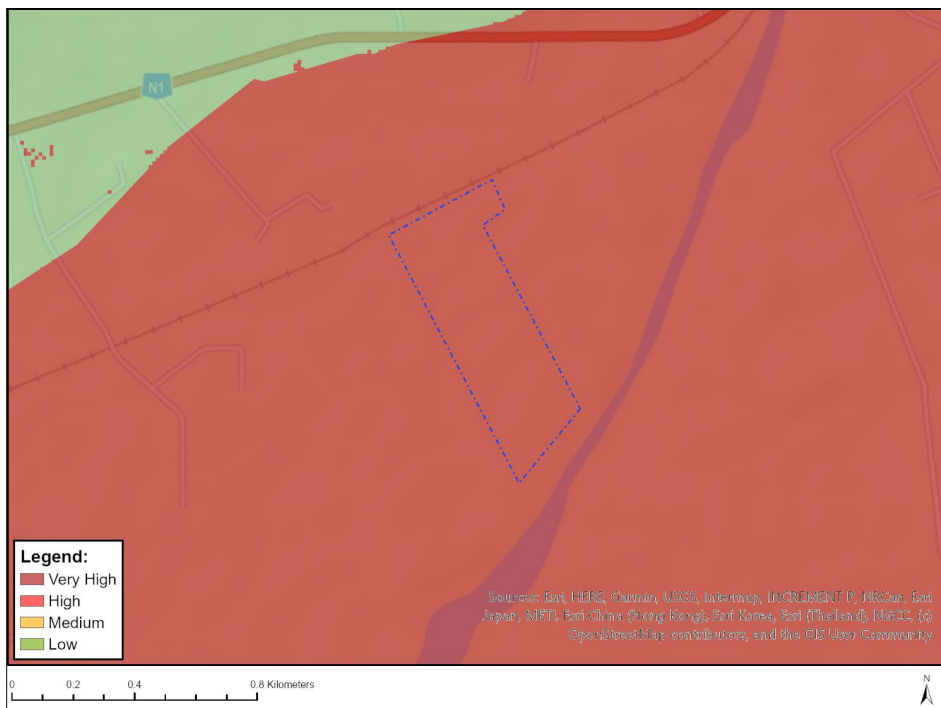


Figure 3. Map of relative Terrestrial Biodiversity Theme Sensitivity for the site.

3. TERMS OF REFERENCE

The basic terms of reference drawn from the Ecosystem Guidelines for Environmental Assessment in the Western Cape (Cadman 2016) were considered in this assessment. In addition the NEMA Protocol for the Specialist Assessment of Environmental Impacts on Terrestrial Biodiversity (GN 320 of 20 March 2020) was followed.

4. METHODOLOGY

An overview of the existing land use, vegetation, ecosystem status and occurrence of sensitive areas on the identified land were obtained through SANBI GIS, The National Vegetation Map (2024 beta update), NEMBA Revised List of Threatened Ecosystems (2022), The 2023 WC Biodiversity Spatial Plan (Cape Nature 2024), National Web Based Environmental Screening Tool, Google Earth Imagery and Cape Farm Mapper. Maps used in this report were configured in Cape Farm Mapper, Google Earth and Quantum GIS.

A field survey was conducted to confirm the vegetation type and to assess the habitat quality and the presence of rare species, whilst recording all evident plant species. The site was walked and various reference points marked using a handheld GPS while aspects such as the condition of the vegetation and levels of disturbance were noted and photographed. The target development area was visited on the 19th of November 2013, the 3rd of September 2019 and the 3rd of February 2026.

5. LIMITATIONS AND ASSUMPTIONS

The latest field work was conducted during summer (February 2026). There were thus seasonal constraints to spring flowering plants and geophytes. The site was, however, surveyed in detail during spring as part of the previous 2019 assessment. The specialist is confident that the 2019 species list will be sufficient in the prediction of the plant species that are likely to be found on site during spring 2026.

Rationale: The site was cultivated in the past (>10 years ago) and some natural plant species established on site as confirmed in the 2019 assessment. It is very unlikely that additional geophyte plants would have established on site since the 2019 assessment, primarily based on the overall lack of improvement over the past few years. This is most likely the result of a deficient seed bank and the lack of nearby source populations. The site is completely bounded by cultivation areas of which most areas are covered by netting.

6. MAIN FINDINGS

6.1 CBAS, ESAS & PROTECTED AREAS

Figure 4 represents Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) identified through the systematic biodiversity planning assessment conducted by the Western Cape Biodiversity Spatial Plan (WC BSP 2023). These areas require safeguarding to ensure the continued existence and functioning of species, ecosystems and ecological processes, including the delivery of ecosystem services, across terrestrial and freshwater realms (CapeNature 2024).

- CBAs are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.
- ESAs play an important role in supporting the functioning of Protected Areas or CBAs, and are often vital for delivering ecosystem services.

6.1.1 CBAs/ESAs on site

- Dam site 1 is recognised as a terrestrial CBA. The site partly overlaps with an existing cultivation area, currently not recognised as any CBA or ESA.
- Dam Site 2 is an existing cultivation area and is also not recognised as any CBA or ESAs.
- The entire area targeted for cultivation is recognised as a terrestrial CBA (Figure 4).
- The target cultivation area borders the Hex River towards the south. The Hex River is recognised as an aquatic CBA, with degraded areas regarded CBA2.

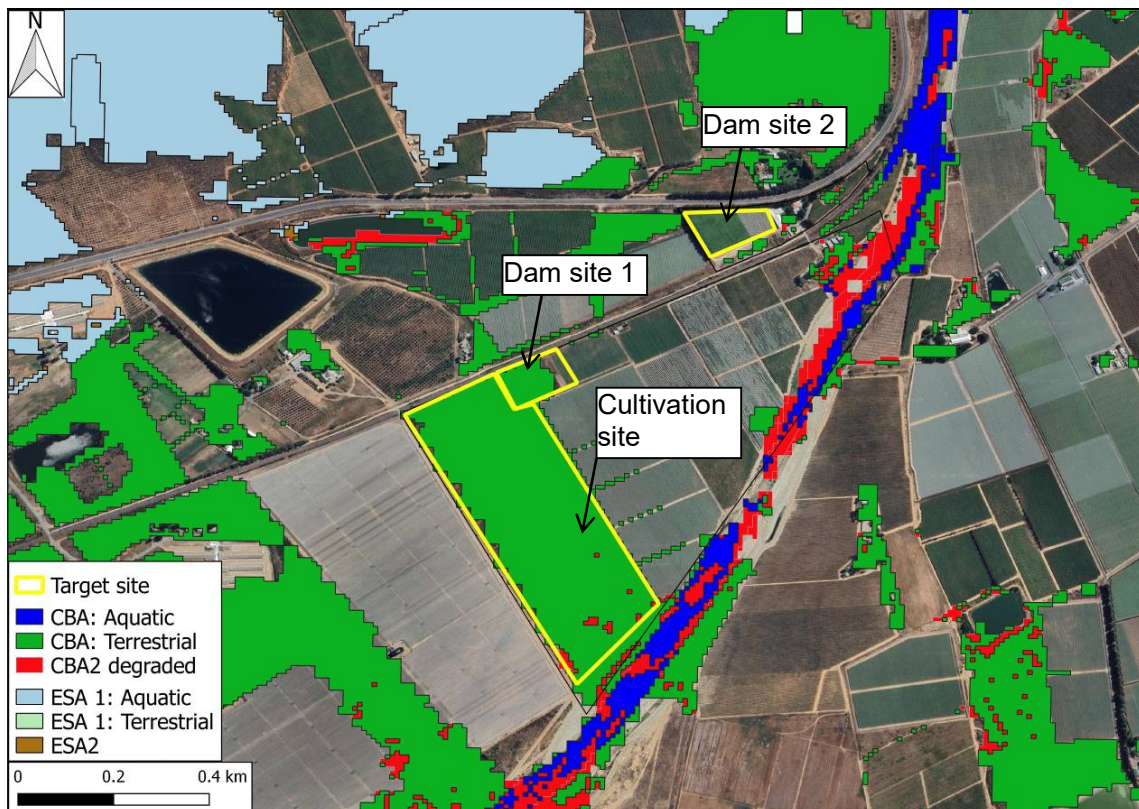


Figure 4. Extract from the WC Biodiversity Spatial Plan (2023) Map showing the extent of CBAs and ESAs in the area.

6.1.2 Protected Areas

The proposed development will not impact on any Protected Areas or on any National Protected Areas Expansion Strategy (NPAES) Focus Areas (Figure 5).

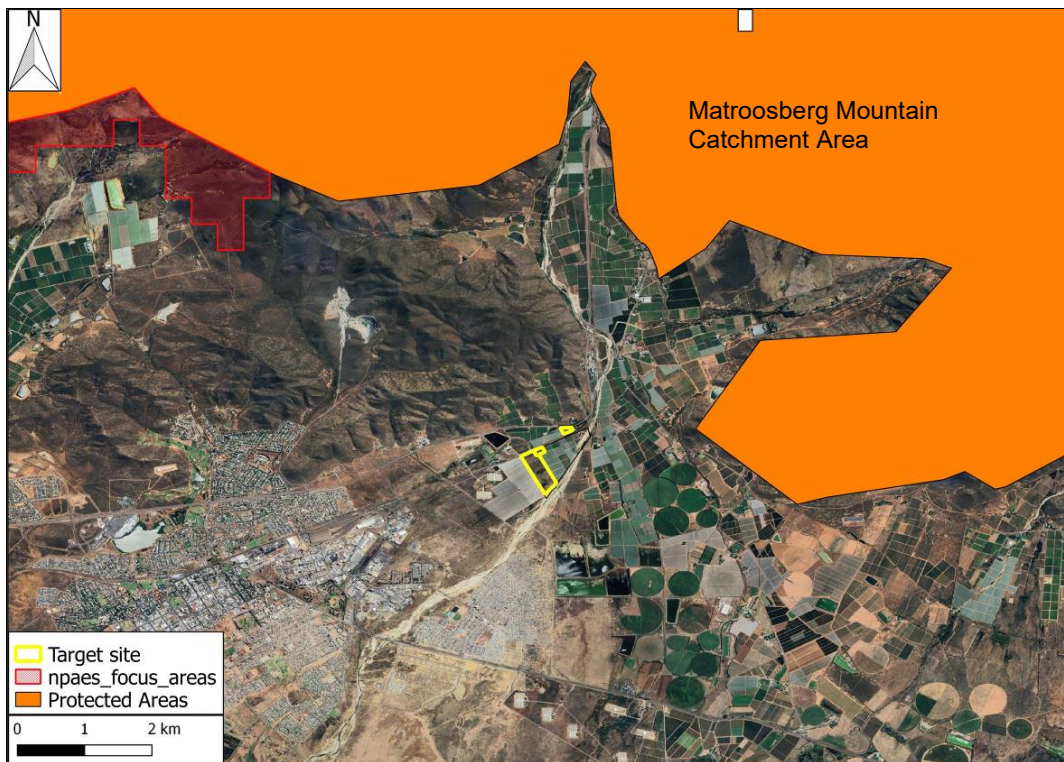


Figure 5. Map showing Protected Areas and NPAES Focus Areas in the broader area.

6.2 CONNECTIVITY AND CORRIDORS

Corridors are important to ensure habitat connectivity for plant and animal migrations and interactions between Protected Areas, CBAs and other landscape features (rivers, mountains etc).

- The target site does not form part of a biodiversity corridor and the development will not impact on local connectivity.
- The site is bounded by cultivation directly towards the north, east and west, of which most areas are covered by netting, with the Hex River towards the south and cultivation further south (Figure 2).

6.3 WETLANDS / AQUATIC FEATURES

There are no NFEPA's, watercourses or wetlands identified within the target cultivation areas or any of the dam sites. The cultivation area is bounded by the Hex River towards the south. The

neighbouring Hex River (excluded from the target site) is recognised as a perennial river and an important NFEPA flat wetland area and river corridor (Figure 6).

Recommendation:

A minimum buffer of 32m should be maintained between cultivation areas and the Hex River floodplain. There is a clear terrace between terrestrial areas on site and the lower lying river floodplain area.

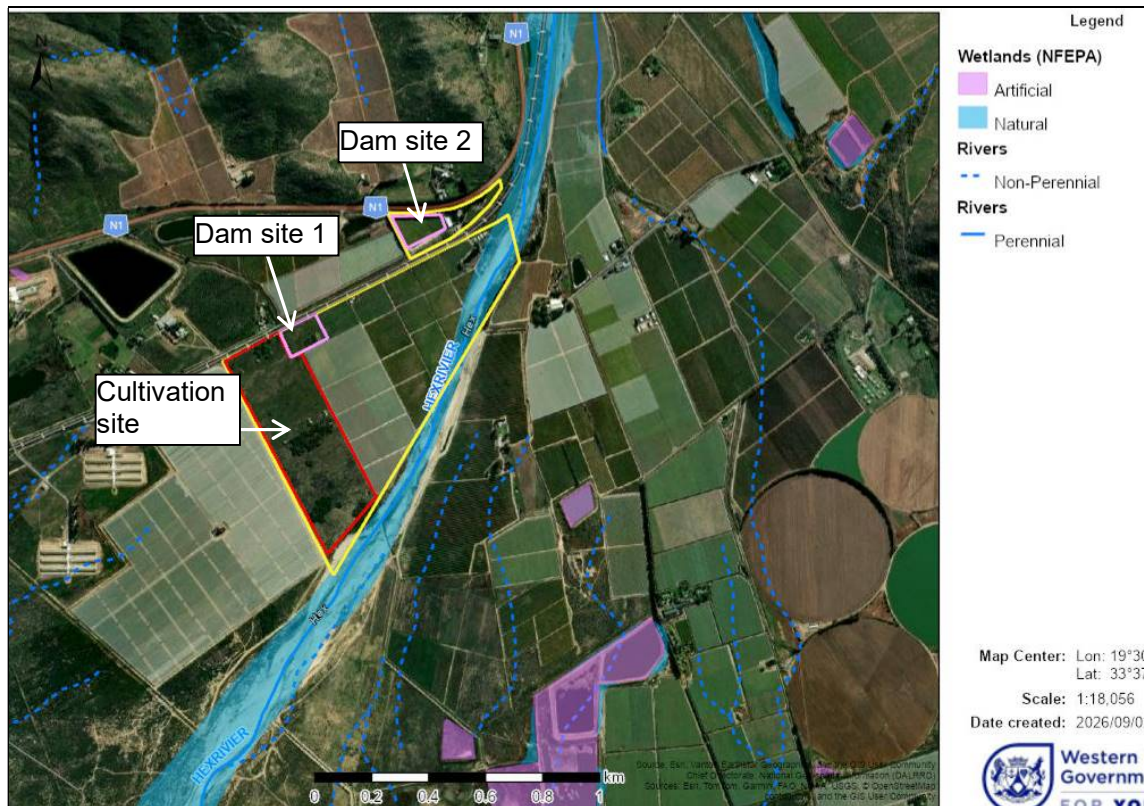


Figure 6. Extract from the Cape Farm Mapper NGI Rivers and NFEPA wetlands layers showing mapped watercourses and wetlands in the area.

6.4 MAPPED VEGETATION TYPES AND ECOSYSTEM THREAT STATUS

According to the SA Vegetation Map (Mucina and Rutherford 2006 & 2024 update) the entire site (cultivation area and both dam sites) comprised Breede Alluvium Renosterveld prior to any disturbances (Figure 7).

- Dam site 2 is however currently cultivated and Dam site 1 and the target cultivation area was cultivated in the past.
- Breede Alluvium Renosterveld is listed as an Endangered ecosystem (DFFE 2022).

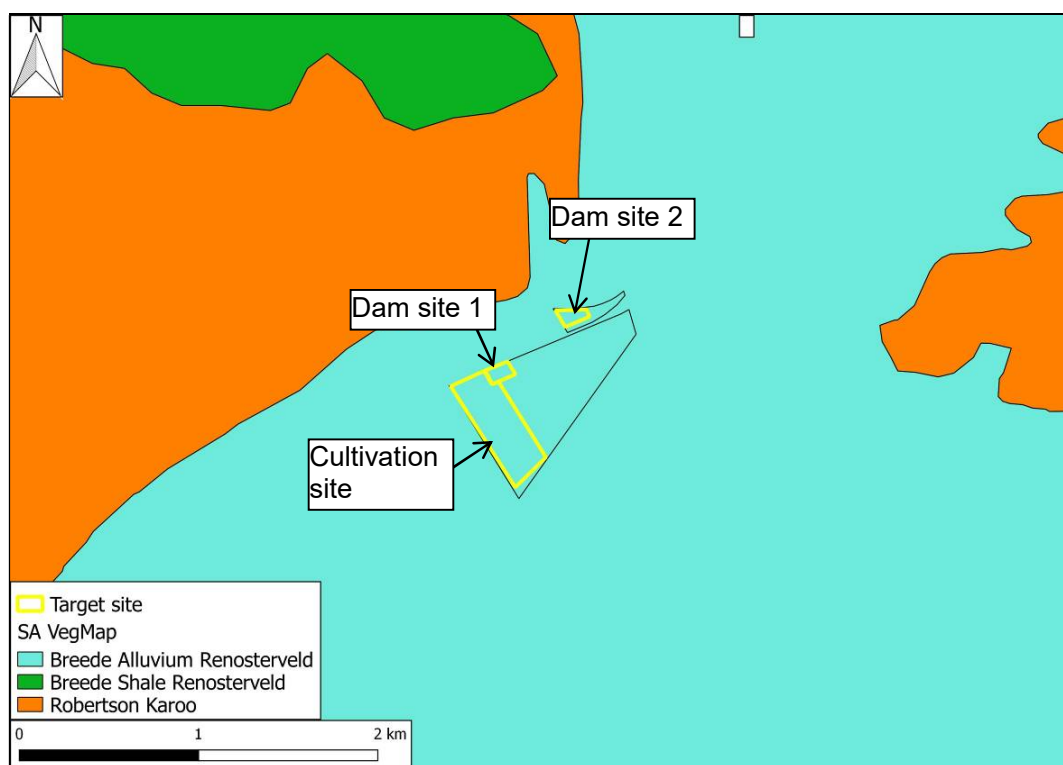


Figure 7. Extract from the National Vegetation Map (2024 update) showing the relevant ecosystems.

Breede Alluvium Renosterveld occurs on flat alluvial fans and valley bottoms supporting short grassy cupressoid-leaved shrubland, usually dominated by renosterbos. The substrate is a mix of sands and clays, with extensive cobbles and pebbles, typical of alluvial fans and river terraces. Often seasonally wet, with a high diversity of bulbs, some of which are threatened. **Important Taxa:** Tall Shrubs: *Montinia caryophyllacea*, *Rhus lucida*. Low Shrubs: *Amphithalea spinosa*, *Aspalathus candicans*, *A. spinosa* subsp. *spinosa*, *Athanasia trifurcata*, *Cliffortia ruscifolia*, *Elytropappus rhinocerotis*, *Diosma passerinoides*, *Helichrysum incarnatum*, *Oedera imbricata*, *O. squarrosa*, *Pentzia incana*. Succulent Shrub: *Ruschia caroli* (d). Herbs: *Corymbium glabrum*, *Senecio erysimoides*. Geophytic Herbs: *Gladiolus permeabilis* subsp. *permeabilis*, *Moraea gawleri*. Succulent Herb: *Crassula expansa* subsp. *expansa*. Graminoids: *Willdenowia incurvata* (d), *Cynodon dactylon*, *Ehrharta longiflora*, *E. villosa* var. *villosa*, *Eragrostis curvula*, *Themeda triandra* (Rebelo et al 2006).

The vegetation within the target cultivation site was classified at a finer scale as Hex River Arid Alluvium Fynbos by the CAPE Fine Scale Mapping Project (Helme, N. A. and Freshwater consulting Group, 2007). The northernmost section, including dam site 1, is classified as Worcester Renosterveld Karoo (previously known as Robertson Karoo which is Least Threatened) (Figure 8).

Hex River Arid Alluvium Fynbos is regarded as Endangered due to cultivation of vines (Helme 2007). This vegetation unit is restricted to the Hex River (De Doorns) valley as far south as Worcester. The habitat is distinguished from Alluvium Renosterveld by the soils, which are sands rather than clays or silts. Sandstone cobbles are frequently common. Typical plant species within the riverine portions include: *Metrosideros angustifolia*, *Rhus angustifolia*, *Calopsis paniculata*, *Diospyros glabra* and *Freylinia lanceolata*, whilst areas away from the rivers support *Anthospermum spathulatum*, *Rhus dissecta*, *Stoebe* sp., *Struthiola ciliata*, *Passerina* sp., *Nylandtia spinosa*, *Willdenowia incurvata*, *Helichrysum moeserianum*, *Montinia caryophyllacea*, *Protea laurifolia*, *Aspalathus rugosa*, *A. acuminata*, *A. biflora*, *Leucadendron barkerae*, *Cliffortia crenata*, *C. ruscifolia*, *Ischyrolepis capensis*, *Euryops tenuissimus*, *Cephalophyllum* sp. and *Antimima* sp. Specials are unknown (Helme 2007).

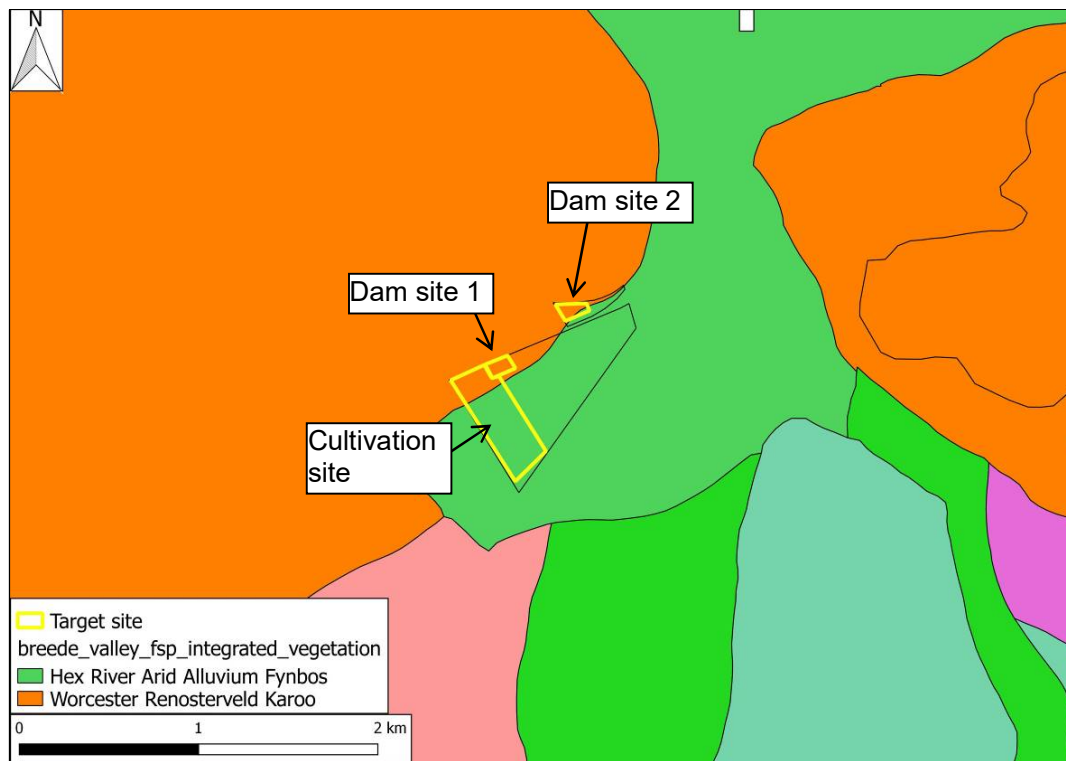


Figure 8. Extract from the CAPE Fine Scale Project: Vegetation Map showing the fine scale plan vegetation units in the area.

6.5 HABITAT CONDITION AND VEGETATION ON SITE

Dam site 1:

The area targeted for dam site 1 is highly degraded with no significant natural vegetation. The site is dominated by *Cynodon dactylon* (kweek), *Carpobrostus edulis* (suurvy) and *Acacia saligna* (port jackson), with scattered individuals of *Athanasia trifurcata* (kouterbos) and the weedy *Senecio burchellii* (geelgifbossie). There is an existing small dam / water abstraction pond which is

completely overgrown by port jackson. There is currently no representation of the original ecosystem, Breede Alluvium Renosterveld, on site.

Dam site 2:

Dam site 2 has no remaining natural vegetation. The site is currently used for cultivation.



Plate 1. Looking north-east towards the proposed dam site 1.



Plate 2. Looking east towards dam site 1 showing a dominant kweek grass cover (*Cynodon dactylon*) with suurv and scattered kouterbos and dense port jackson at the existing abstraction pond.

Proposed cultivation area:

The entire area targeted for cultivation comprises old fields (previous cultivation areas). Remnants of old vineyard and tilling furrows are still evident on site. Subsequent to cultivation the site has been utilised for grazing for many years and the site is currently still utilised for grazing. Previous cultivation occurred more than 10 years ago and some natural vegetation re-established on site.

The site has a history of alien *Acacia saligna* (port jackson) infestation with various attempts to eradicate alien vegetation over the years, followed by recurring port jackson infestations (Refer to Figure 10-12 for earlier satellite imagery).

Currently the vegetation on site is highly degraded and natural plant diversity is very low, making it very difficult to distinguish the relevant ecosystem present on site. Considering the substrate, which is loamy sand and cobble, it is assumed that site would have supported Breede Alluvium Renosterveld as depicted in the SA vegetation map. There is no reference vegetation remaining within the immediate vicinity of the site as it is bounded by cultivation.

The target site is not recognised as a natural remnant of Breede Alluvium Renosterveld in the SANBI Red List of Ecosystems: Remnants layer of June 2021 (Figure 9).



Figure 9. SANBI Red List of Ecosystems: Remnants (June 2021).

The southernmost portion, next to the Hex River is open with sparse cover. The most dominant plant species include *Galenea africana* (kraalbos), *Oncosiphon piluliferum* (stinkkruid) and *Cynodon dactylon* (kweek grass) with isolated individuals of *Aspalatus spinosa*, *Psilocaulon junceum* (loogbossie) and *Tetragonia fruticosa* (kinkelbossie). A dense patch of port jackson is evident along the Hex River with another large, dense patch in the south-western portion of the site.

The central portion of the site is characterised by one patch of natural shrubs dominated by *Metasia densa* (blombos) and *Elytropappus rhinocerotis* (renosterbos) located between 2 large impenetrable stands of port jackson and some open areas. Open areas are dominated by *Cynodon dactylon* (kweek grass), *Eragrostis curvula* (oulandsgras) and *Carpobrotus edulis* (suurvy) with isolated *Galenea africana* (kraalbos), blombos, renosterbos, *Arctotis revoluta* (botterblom) and other species that typically establish within disturbed sites including *Leysera gnaphaloides* (teringteebos), *Oncosiphon piluliferum* (stinkkruid), *Ruschia multiflora* (kraalvygie) and *Senecio burchellii* (geelgifbossie). There is also some remnant vineyard plants and a number of weeds including include *Amaranthus sp.* (misbredie), *Atriplex sp.* (soutbos), *Atriplex semibaccata* (kruipsoutbos), *Chenopodium album* (withondebossie), *Emex australis* (dubbeltjie), *Maireana brevifolia* (kleinblaar bloubos), *Rapistrum rugosum* (wildemosterd) and *Salsola kali* (tolbos) amongst others.

The northern half of the site is fairly open and grassy as this area was used as a grazing paddock for many years. This area is dominated by *Cynodon dactylon* (kweek), *Carpobrotus edulis* (suurvy), *Oncosiphon piluliferum* (stinkkruid) and *Galenea africana* (kraalbos) with isolated individuals of *Athanasia trifurcata* (kouterbos) and *Elytropappus rhinocerotis* (renosterbos). High density port jackson is evident along the northern boundary of the site.



Plate 3. Looking south showing open areas with scattered kraalbos within the southern portion of the site and dense port jackson along the Hex River.



Plate 4. Looking east along the southern portion of the site with dense port jackson along the Hex.



Plate 5. Looking north-west from the southern portion of the site showing a dense stand of port jackson in the south-western portion.

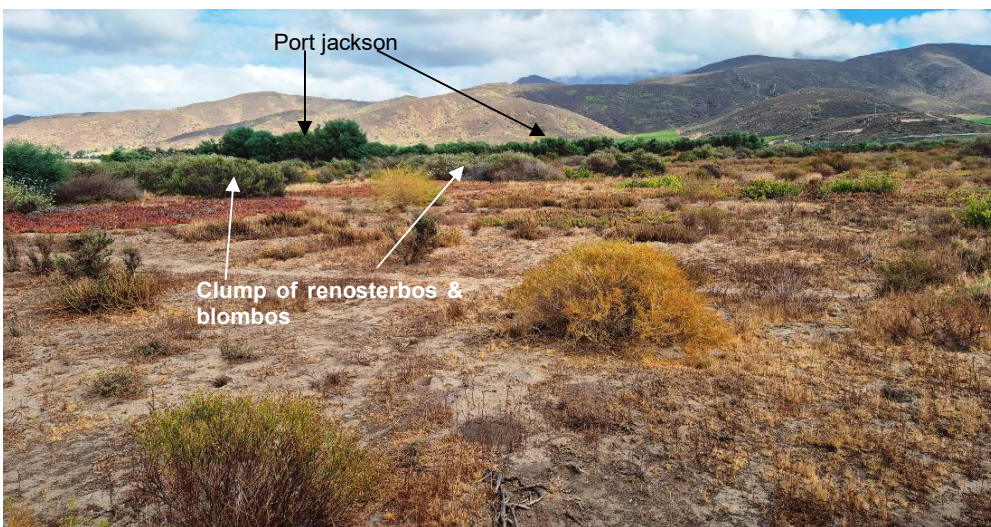


Plate 6. Looking north across the central portion of the site showing open areas with a clump on natural shrubs in the back and dens port jackson further back.



Plate 7. Clump of natural shrubs in the central portion of the site with dominant renosterbos and blombos and dense port jackson in the back.



Plate 8. Looking north-east across open areas within the northern portion of the site showing suurv and kraalbos.



Plate 9. Looking south along the north-western portion of the site showing open, degraded areas.

Previous field surveys:

A botanical survey of the site was conducted during November 2013 to explore the potential for the mining of stone and cobble from the site but this project did not go any further. A detailed survey was conducted a few years later during September 2019 for the potential development of a dam and cultivation areas but the project lapsed and only commenced now during 2016.

- Both these surveys provided a baseline to assess the development of natural habitat over the years on this previously cultivated site.
- Considering both the previous surveys it is confirmed that the habitat on site remained in a poor condition with low natural plant diversity. Refer to Figs. 10-12 for earlier satellite imagery.

During 2013 the site comprised weedy herbaceous plants with a few natural elements that typically establish within disturbed areas, such as old fields. The most prominent indigenous plant species recorded throughout the site included: *Elytropappus rhinocerotis* (renosterbos), *Galenea africana* (kraalbos), *Athanasia trifurcata* (klaaslouwbos), *Metalsia* sp., *Ruschia multiflora* (wit vygie), *Drosanthemum* sp., *Carpobrotus edulis* (suurvry), *Oncosiphon* sp. (stinkkruid), *Tetragonia* sp., *Eragrostis curvula* (oulandsgras) and *Ehrharta calycina* (rooisaadgras). No rare or endangered plant species were recorded on site. Alien plant species were a significant problem throughout the site. Large patches of port jackson was evident within the target site and the river section was severely infested with alien acacia species. The site did not resemble the original ecosystem on site.

Apart from significant alien clearing, the site have not improved much in terms of habitat condition and species diversity from the 2013 to the 2019 survey, most likely as the site is continuously being utilised for grazing and the lack of source populations. During the 2019 survey the site was still dominated by weeds and grasses with a few natural elements that typically establish within disturbed areas, such as old fields. The same natural elements recorded during 2019 were recorded during the 2026 survey, except there was an absence of annuals and geophytes, as the 2026 survey was conducted during summer. The site remained open and degraded but the dominant shrubs (kraalbos, renosterbos and blombos) have now grown taller and significant alien vegetation re-established on site.

- Only 2 geophytes were recorded during September 2019 both typically occurring within disturbed sites namely *Albuca canadensis* (slymstok) and *Oxalis pes-caprae* (geelsuring).
- Annuals included *Dimorphotheca sinuata* (namakwadaisy) and *Osteospermum clandestinum* (trekkertjie).
- Based on the overall lack of improvement in the site, it is highly unlikely that additional annuals and geophytes would currently be present on site, should the area be surveyed during spring.

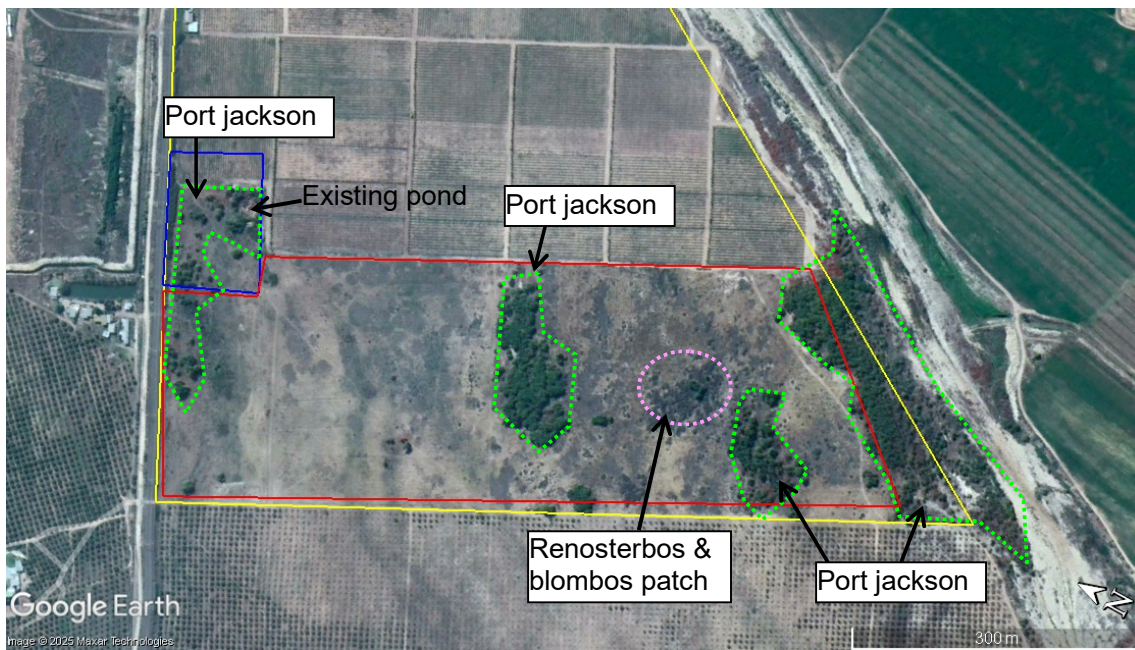


Figure 10. Earlier Google Earth image of September **2017** showing the habitat condition on site.

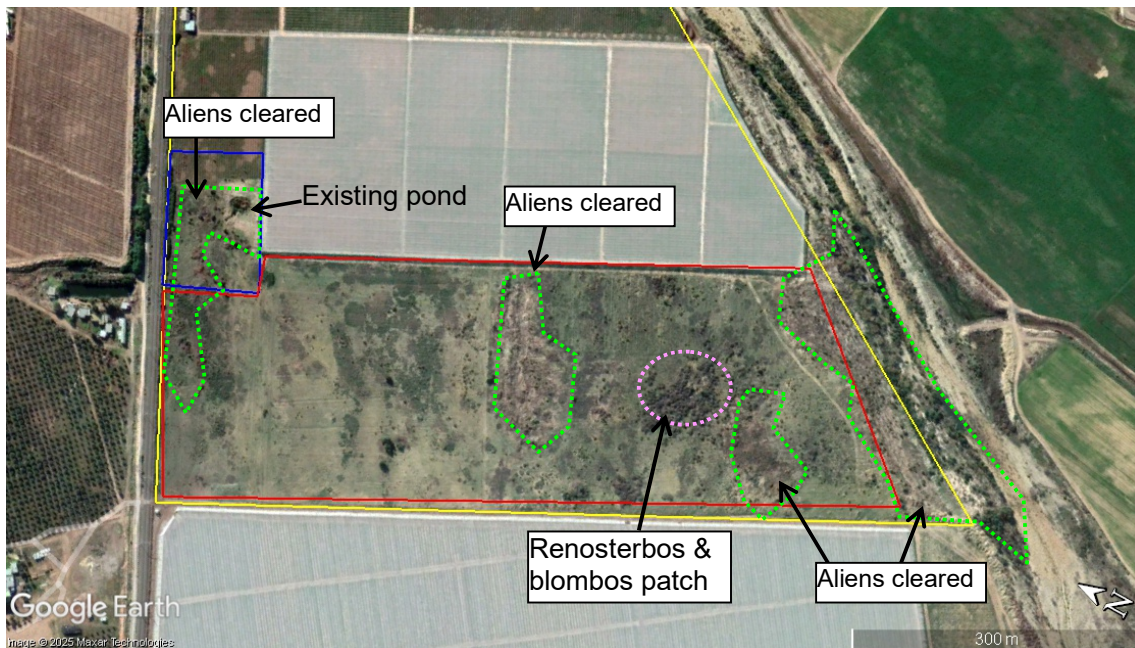


Figure 11. Earlier Google Earth image of June **2019** showing the habitat condition on site.

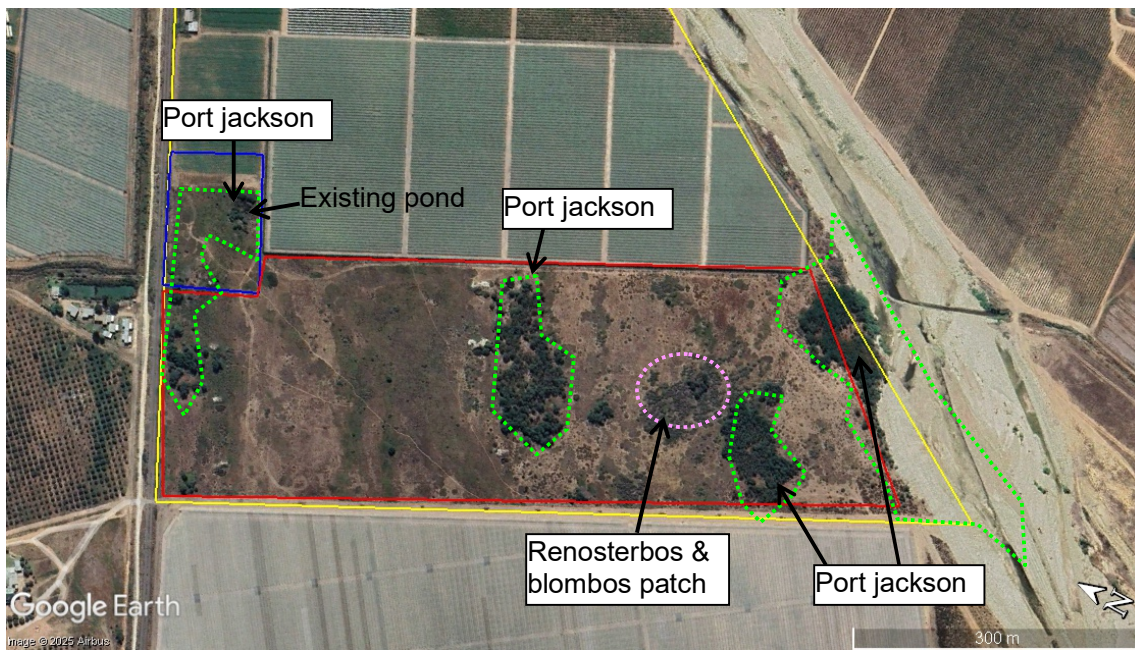


Figure 12. Recent Google Earth image of February **2025** showing the habitat condition on site.

6.6 THREATENED PLANT SPECIES

In terms of plant species, the national web based environmental screening tool recognizes the northern portion of the site to be of low sensitivity. The southern portion is considered to be of medium sensitivity in terms of plant species (Figure 12).

- The Screening Tool has listed 23 sensitive plant species that may potentially occur within the medium sensitive areas, based on their habitat requirements and the mapped ecosystems on site (e.g. species previously recorded in the same habitat type).

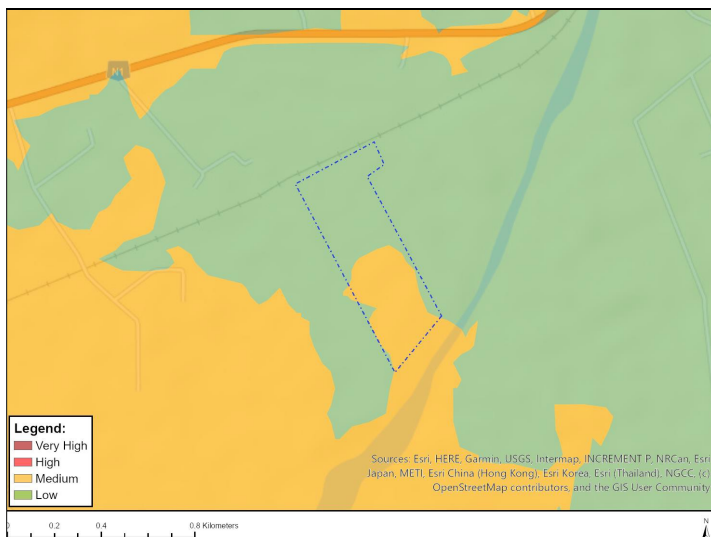


Figure 13. Map of relative Plant Species Theme Sensitivity

The on site assessment confirms that the study area is of “low” sensitivity for terrestrial plant species. None of the Medium Sensitive plant species listed in the Screening Tool nor any other Red Date List plant species were recorded on site. It is highly unlikely that the proposed development will impact on any plant species of conservational concern based on the overall poor habitat condition and low plant diversity.

6.7 ALIEN VEGETATION COVER

The site has a history of alien *Acacia saligna* (port jackson) infestation with various attempts to eradicate alien vegetation over the years, followed by recurring port jackson infestations (Refer to Figure 10-12 for earlier satellite imagery). Cultivation of the site will permanently eradicate alien port jackson from the site but it will remain within the Hex River.

6.8 BIODIVERSITY PROCESSES

There are no apparent biodiversity processes directly associated with the target site. The Hex River, located south of the site is an important biodiversity process area. The riverine area and an adequate buffer should be excluded from the development or any disturbances.

7. SENSITIVE / NO GO AREAS AND RECOMMENDED LAYOUT

The most significant constraints associated with Dam site 1 and the target cultivation site includes the following:

- Original ecosystem on site is Endangered Breede Alluvium Renosterveld
- The entire site is mapped as a terrestrial CBA
- The site is located directly adjacent to the Hex River

The reason for this site being recognised as a CBA is presumably as it is likely to supports a near-natural form of an endangered ecosystem and that the preservation of this site should contribute to the preservation of the remaining extent of endangered Breede Alluvium Renosterveld.

It is however the specialist’s opinion that the site is currently not contributing to the preservation of the original ecosystem on site. It is very unlikely that the site will contribute to the preservation of this ecosystem in future:

- In theory the site should be regarded as natural vegetation as it was cultivated more than 10 years ago and some natural plant species re-established on site, but the site is currently in a poor condition with very low natural plant diversity and high levels of alien infestation. There is very little representation of the original ecosystem evident on site.
- The site is also not recognised as a natural remnant in the SANBI Red List of Ecosystems: Remnants layer of June 2021.

- The site remained in a poor condition over many years and is likely to even further deteriorate due to recurring alien infestation.
- Since the 2019 field survey there was no improvement in species diversity or habitat condition. Most likely the result of a deficient seed bank (long term historic cultivation) and the lack of nearby source populations. The site is completely bounded by cultivation areas of which most areas are covered by netting.

It is therefore recommended that the development of a dam and new cultivation areas be authorised for this site but a minimum buffer of 32m should be maintained between new cultivation areas and the bordering Hex River. There is a clear terrace between terrestrial areas on site and the lower lying river floodplain area.

8. ASSESSMENT OF IMPACTS (TERRESTRIAL BIODIVERSITY)

8.1 CRITERIA FOR ASSESSMENT

Adapted from the DEA&DP Guidelines for involving Biodiversity Specialists in EIA Processes, 2005 and latest Basic Assessment Report template.

Nature of the impact

This is an appraisal of the type of effect (positive or negative) the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected.

Extent of the impact

Extent defines the physical extent or spatial scale of the impact. The impact could:

- **Site specific:** limited to the site.
- **Local:** limited to the site and the immediate surrounding area (1-10km)
- **Regional:** covers an area that includes an entire geographic region or extends beyond one region to another.
- **National:** across national boundaries and may have national implications.

Duration of the impact

- **Short term:** 0-5 years.
- **Medium term:** 5-15 years.
- **Long term:** beyond the operational phase, but not permanently).
- **Permanent:** where mitigation either by natural processes or by human intervention will not occur in such a way or in such time span that the impact can be considered transient.

Consequence of Impact

Indicate how the activity will affect the environment.

Probability of occurrence

- **Improbable/unlikely:** low likelihood of the impact occurring.
- **Probable:** distinct possibility the impact will occur.
- **Highly probable:** most likely that the impact will occur.
- **Definite:** impact will occur regardless of any prevention measures.

Irreplaceable loss of resources

The degree to which resources will be irreplaceably lost due to the proposed activity. It can be **no loss of resources**, **marginal loss**, **significant loss** or **complete loss of resources**.

Reversibility

This refers to the degree to which an impact can be reversed.

- **Fully reversible:** where the impact can be completely reversed.
- **Partly reversible:** where the impact can be partially reversed.
- **Irreversible:** where the impact is permanent.

Indirect impacts

Indirect impacts are secondary impacts and usually occur at a different place or time.

Cumulative impact

An effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development.

The cumulative effect can be:

- **Negligible:** the impact would result in negligible to no cumulative effect.
- **Low:** the impact would result in insignificant cumulative effects.
- **Medium:** the impact would result in minor cumulative effects.
- **High:** the impact would result in significant cumulative effects.

Degree to which impact can be avoided

The degree of avoidance can either be **high** (impact is completely avoidable), **moderate** (avoidable with moderate mitigation), **low** (the impact is difficult to avoid and will require significant mitigation measures) or **unavoidable** (the impact is cannot be avoided even with significant mitigation).

Degree to which impact can be managed

This indicates the degree to which an impact can be managed over time. The degree of management can either be **high** (completely manageable), **moderate** (impact is manageable with moderate mitigation), **low** (the impact is difficult to manage and will require significant mitigation measures) or **unmanageable** (the impact is cannot be managed even with significant mitigation measures).

Degree to which an impact can be mitigated

This indicates the degree to which an impact can be reduced. The degree of mitigation can either be **high** (the impact can be **fully** mitigated), **moderate** (can be **partly mitigated**) or **not mitigated at all**.

Significance

Based on a synthesis of the information contained in the above-described procedure, the significance of the potential impacts can be assessed (prior and post mitigation) in terms of the following significance criteria:

- **No impact.**
- **Low negative:** where it would have negligible effects, and would require little or no mitigation.
- **Medium negative:** the impact will have moderate effects and will require moderate mitigation.
- **High negative:** the impact will have significant effects and will require significant mitigation measures to achieve an accepted level of impact.
- **Very high negative:** the impact will have highly significant effects and are unlikely to be able to be mitigated adequately.

8.2 CONSTRUCTION PHASE

Potential impact and risk:	Terrestrial Biodiversity
Nature of impact:	Physical transformation natural vegetation.
Extent and duration of impact:	Site, Permanent
Consequence of impact or risk:	Loss of ± 18 ha degraded habitat.
Probability of occurrence:	High
Degree to which the impact may cause irreplaceable loss of resources:	Very restricted loss
Degree to which the impact can be reversed:	Irreversible
Indirect impacts:	The development may indirectly impact on the adjacent Hex River floodplain area. The development will result in the permanent eradication of alien vegetation on site which should reduce spread into riverine areas.
Cumulative impact prior to mitigation:	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low
Degree to which the impact can be avoided:	Low
Degree to which the impact can be managed:	Partially
Degree to which the impact can be mitigated:	Partially
Proposed mitigation:	Refer to Section 9
Residual impacts:	None
Cumulative impact post mitigation:	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Very Low

8.3 OPERATIONAL PHASE

The development is not expected to have any impact in terrestrial biodiversity during the operational phase. There are no natural terrestrial areas bordering the site.

No-Go:

- Should the site not be developed, alien infestation will continue throughout the site.
- It is highly unlikely that the site will ever regenerate back to the original ecosystem due to a lack of source populations, continuous disturbances including grazing and alien infestation.

9. PROPOSED MITIGATION

- The development area should be clearly demarcated along the southern portion of the site, adjacent to the Hex River.
- The Hex River floodplain and a 32m buffer area should be excluded from any development or disturbances. The development should be restricted to areas above the paleo-terrace adjacent to the Hex River.

- Rocks and vegetation debris should not be dumped within the Hex River floodplain area.
- Alien vegetation should continuously be managed and controlled within the Hex River using standard DWAF methodology. The Department of Agriculture Landcare should be consulted regarding alien control along the river bank to prevent destabilization of the river bank.

10. CONCLUSION

The proposed development of a dam (either site 1 or 2) and new cultivation within the target site is acceptable from a terrestrial biodiversity and plant species perspective. It is recommended that the development be authorised based on the following:

- The site is highly degraded and was completely transformed in the past.
- There is very little representation of the original ecosystem evident on site. Natural plant diversity is very low.
- The development will not impact on natural connectivity.
- The site is bounded by cultivation and completely isolated from other natural areas.
- It is highly unlikely that the site will ever regenerate back to the original ecosystem due to the overall lack of improvement over the years, a lack of source populations, continuous disturbances including grazing and alien infestation.
- There are no watercourses or wetlands evident on site.
- There are no threatened plant species evident on site.

Development of the site (dam and cultivation) will not significantly compromise biodiversity. Should the site not be developed, alien re-infestation will continue throughout the site.

Overall the impacts on terrestrial biodiversity should be Very Low. Mitigation are proposed to prevent impacts on the bordering Hex River.

11. REFERENCES

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- DFFE 2022. National Environmental Management Biodiversity Act, 2004 (Act no. 10 of 2004): The Revised List of Ecosystems that are Threatened and in need of Protection. *Government Gazette* Vol. 2747: No. 47526 of 18 November 2022. National Printer, Pretoria.
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**APPENDIX A - LOCATION OF CONTENT PRESCRIBED BY NEMA FOR SPECIALIST
REPORTS: PROCEDURES FOR ASSESSMENT AND MINIMUM CRITERIA FOR REPORTING,
GN 320 DATED 20 MARCH 2020**

Table 1: Minimum Requirements for Terrestrial Biodiversity Specialist Assessment as per Protocol for the Specialist Assessment of Environmental Impacts on Terrestrial Biodiversity (GN 320 of 20 March 2020)		
Protocol ref	Terrestrial Biodiversity Specialist Assessment	Section / Page
2.3	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	Section 6
2.3.1	a description of the ecological drivers or processes of the system and how the proposed development will impact these	Section 6.8
2.3.2	ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the preferred site;	Section 6.2, 6.10
2.3.3	the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	Section 6.2
2.3.4	the description of any significant terrestrial landscape features (including rare or important flora- faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments;	Section 6.
2.3.5	a description of terrestrial biodiversity and ecosystems on the preferred site, including: a) main vegetation types; b) threatened ecosystems, including listed ecosystems as well as locally important habitat types identified; c) ecological connectivity, habitat fragmentation, ecological processes and fine - scale habitats; and d) species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified;	Section 6.4-6.7
2.3.6	the assessment must identify any alternative development footprints within the preferred site which would be of a low" sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	Section 7
2.3.7	the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify: 1. terrestrial critical biodiversity areas (CBAs), including: a) the reasons why an area has been identified as a CBA; b) an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation; c) the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to the remaining extent of the ecosystem type(s); d) the impact on ecosystem threat status; e) the impact on explicit subtypes in the vegetation; f) the impact on overall species and ecosystem diversity of the site; and g) the impact on any changes to threat status of populations of species of conservation concern in the CBA; 2. terrestrial ecological support areas (ESAs), including: a) the impact on the ecological processes that operate within or across the site; b) the extent the proposed development will impact on the functionality of the ESA; and c) loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna; 3. protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including- a) an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan; 4. priority areas for protected area expansion, including-	Section 6.1-6.3

	a) the way in which the proposed development will compromise or contribute to the expansion of the protected area network; 5. SWSAs including: a) the impact(s) on the terrestrial habitat of a SWSA; and b) the impacts of the proposed development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses); 6. FEPA sub catchments, including- a) the impacts of the proposed development on habitat condition and species in the FEPA sub catchment; 7. indigenous forests, including: a) impact on the ecological integrity of the forest; and b) percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.	
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Table 2: Minimum Content Requirements for Terrestrial Biodiversity Specialist Reports as per Protocol for the Specialist Assessment of Environmental Impacts on Terrestrial Biodiversity (GN 320 of 20 March 2020)		
Protocol ref	Terrestrial Biodiversity Specialist Report Content requirement	Section / Page
3.1.1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 3
3.1.2.	a signed statement of independence by the specialist;	Page 3
3.1.3.	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 4 & 5
3.1.4.	a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 3, 4 & 8.1
3.1.5.	a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 5
3.1.6.	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 7.
3.1.7.	additional environmental impacts expected from the proposed development;	Section 8.2-8.6
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	
3.1.9.	the degree to which impacts and risks can be mitigated;	
3.1.10.	the degree to which the impacts and risks can be reversed;	
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 9
3.1.13.	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a "low" terrestrial biodiversity sensitivity and that were not considered appropriate;	Section 7
3.1.14.	a substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Section 10
3.1.15.	any conditions to which this statement is subjected.	Section 9 & 10