Eco Route
ENVIRONMENTAL CONSULTANCY
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APPENDIX M: S24G IMPACT ASSESSMENT

Activities carried out and proposed on Farm Portions 420 and 373, Outeniqua Game Farm, Mossel Bay Municipality, Western Cape

Contents

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Section A: Impact Identification and Assessment

A section 24G Environmental Authorisation Process is required for commencement of activities which are listed in terms of the Environmental Impact Assessment (EIA) Regulations published in terms of National Environmental Management Act (Act 107 of 1998) (NEMA) and carried out on Portion 420 and 373, Outeniqua Game Farm, Mossel Bay Municipality

This section presents a description of baseline conditions and the direct, indirect and cumulative impacts that have likely occurred as a result of the activities including impacts relating to the choice of site/activity/technology alternatives.

This section verifies site sensitivities identified in the DFFE screening tool report generated for the site.

Mitigation measures that may eliminate or reduce the identified impacts are recommended.

The Impact Identification and Assessment Methodology is provided in Section B.

The following activities included in Listing Notices (LN) 1, 2 and 3 of the 2014 Environmental Impact Assessment (EIA) Regulations (as amended, 2071) published in terms of National Environmental Management Act (Act 107 of 1998) (NEMA) are assessed:

- Development within / within 32 meters of watercourse (LN1, activity 19)
- Development of facilities or infrastructure for the storage of water, including dams and reservoirs (LN3 activity 2; 14, 23; LN2 activity 16; LN 1, activity 13)
- Clearance of indigenous vegetation (LN3, activity 12; LN 2 activity 15; LN 1 activity 27)
- Development of roads (LN3 activity 4, Ln 2 activity 27)

The main impacts associated with the activities include the following:

- Loss of indigenous vegetation
- Impact on terrestrial ecosystem and associated biodiversity
- Fire risk
- Susceptibility of some areas to erosion
- Impact on land capability (past grazing and current / proposed activities)
- Impact on carrying capacity
- Invasion by exotic and alien invasive species and ongoing removal
- Impact on surface water flows
- Impact on aquatic ecosystem and associated biodiversity
- Impact on socio-economic conditions as a result of employment opportunities
- Impact on socio-economic conditions as a result of agricultural activities

Methodology provided in Section B: Impact Identification and Assessment Methodology

Listing Notice; Activity	Description of Listed activity	Description of development
GN No. R. 327 (Listing Notice 1)		
GN No. R. 327 (Listing Notice 1) **Activity 13**	The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014 (5 meters high / area more than 10ha)	Two road crossings have created dams within the watercourses. The water holding capacity of these is estimated to be 2000 m3 and 4000m3. Reservoirs are in place; GA is in place for 40 000m3 storage on each farm portion. A new dam is proposed which will have a maximum storage capacity of 150 000 cubic meters; the dam wall is planned to be a maximum of 12-meters in height.
GN No. R. 327 (Listing Notice 1) **Activity 19**	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Road crossings; dam within watercourse.
GN No. R. 327 (Listing Notice 1) **Activity 27**	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of indigenous vegetation (not disturbed in previous 10 years) has taken place between 2016 – 2024 for development of structures, dam and roads; Area 1 – 8000m2 – 5 dwellings Area 2 – 9000m2 – dwellings, reservoir Roads – 10000m2 Area 3 – 800m2 - (existing dam) Area 4 – 10000m2 (existing dam and agricultural) Area 5 – 7200m2 - restaurant **Total - 4.5ha** Current agricultural activities in place developed on past used agricultural areas (disturbed within previous 10 years) Ptn 420 – 17.2 ha (irrigated) Ptn 373 – 56.31 ha (irrigated) Existing dryland – 12 ha (pastures) **Total – 85 ha** Proposed: Additional agricultural: 20 ha – Area 4-17 ptn 373 Elephant enclosure (1ha) - Area 5-1&2 Predator enclosure (10ha) - Area 5-4 Proposed 150 000m3 dam (2ha) - Area 3 **Total – 33 ha** Total footprint: 122.5 ha Ln 2; Activity 27 included to authorise all footprints.
GN No. R. 327 (Listing Notice 1) **Activity 28**	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	Activity included in precompliance notice (14/1/1/E3/9/10/3/L1019/19 Occurs outside urban area Zoned as Agriculture 1 Properties were used for cattle farming between 1976 to current. Farmhouse was in place on ptn 420; roads were in place. Crops are currently in place (60 ha) on ptns 373 and 420 Game farm is in place on ptn 420. A restaurant is in place; however, footprint of area is 7200m2. Five new dwellings have been developed on ptn 420, supporting structures and reservoirs are in place in agricultural area. Land currently used mostly for agriculture and game farming with dwellings provided for operational staff. The development on the property is not considered to be residential, mixed, retail, commercial, industrial or institutional.

GN No. R. 325 (Listing Notice 2)		
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or	Clearance of indigenous vegetation (not disturbed in previous 10 years) has taken place between 2016 – 2024 for development of structures, dam and roads; Area 1 – 8000m2 – 5 dwellings Area 2 – 9000m2 – dwellings, reservoir Roads – 10000m2 Area 3 – 800m2 - (existing dam) Area 4 – 10000m2 (existing dam and agricultural) Area 5 – 7200m2 - restaurant Total - 4.5ha Current agricultural activities in place developed on past used agricultural areas (disturbed within previous 10 years) Ptn 420 – 17.2 ha (irrigated) Ptn 373 – 56.31 ha (irrigated) Existing dryland – 12 ha (pastures) Total – 85 ha Proposed: Additional agricultural: 20 ha – Area 4-17 ptn 373 Elephant enclosure (1ha) - Area 5-1&2 Predator enclosure (10ha) - Area 5-4 Proposed 150 000m3 dam (2ha) - Area 3 Total – 33 ha Total footprint: 122.5 ha Ln 2; Activity 15 included to authorise all footprints. LN1 activity 27 and LN 3 activity 12 included in application
GN No. R. 325 (Listing Notice 2) **Activity 16**	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the highwater mark of the dam covers an area of 10 hectares or more.	New dam requires a storage capacity of 150 000 cubic meters. Concept design shows 12-meter-high wall (including 2-meter freeboard)
GN No. R. 325 (Listing Notice 2) **Activity 27**	The development of a road— Excluding a road (b) which is 1 kilometre or shorter; or	Additional roads and tracks developed between 2016 and 2024; Four roads identified which exceed 1km in length; distances are 1km, 1.2km, 1.4km and 2.3km.
GN No. R. 324 (Listing Notice 3)		
GN No. R. 324 (Listing Notice 3) Activity 2	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres. i. Western Cape ii. In areas containing indigenous vegetation; or	Reservoirs in place Storage of water (40 000m3) authorised on ptn 373 Storage of water (40 000m3) authorised on ptn 420
GN No. R. 324 (Listing Notice 3) **Activity 4**	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation;	Small sections of road on very steep terrain exceed 4-meter width
GN No. R. 324 (Listing Notice 3) **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.	Vegetation on the study area is Swellendam Silcrete Fynbos (endangered) and Garden Route Granite Fynbos (critically Endangered) Clearance of indigenous vegetation (not disturbed in previous 10 years) has taken place between 2016 – 2024 for development of structures, dam and roads; Area 1 – 8000m2

	i. Western Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	Area 2 – 9000m2 Roads – 10000m2 Area 3 – 800m2 and proposed 150 000m3 dam (existing dam) Area 4 – 10000m2 (existing dam and agricultural) Area 5 – 7200m2 Total - 45 000 m2 / 4.5ha LN1 activity 27 and LN 2 activity 15 included in application
GN No. R. 324 (Listing Notice 3) **Activity 14**	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; Western Cape Outside urban areas (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	According to the WCBSP for Mossel Bay, the entire length of the Ruiterbos River running through both properties is mapped as an aquatic Critical Biodiversity Area (CBA1); The majority of Portions 420 and 373 are considered first priority Terrestrial Critical Biodiversity Areas (CBA 1). Road crossings Area 3 – 20 000m2 - proposed 150 000m3 dam (existing dam – expanded); Area 4 – 10 000m2 (existing dam and agricultural)
GN No. R. 324 (Listing Notice 3) Activity 23	The expansion of— (i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or (ii) infrastructure or structures where the Physical footprint is expanded by 10 square metres or more; where such expansion occurs— a) within a watercourse; c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; i. Western Cape i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	According to the WCBSP, entire length of the Ruiter Bos River running through both properties is mapped as an aquatic Critical Biodiversity Area (CBA1); The majority of Portions 420 and 373 are Terrestrial CBA1. Dam (OGF1)within watercourse was expanded (2019 / 2020) by 10 m2 or more.

1. Planning

1.1. Overview

High significant impacts are often a result of incorrect planning. The history of activities on this area and review of available information highlights the importance of integrated planning at a strategic level. Numerous permits and authorisations are required to be in place for the activities taking place.

The following approvals are required:

- Environmental Authorisation in terms of National Environmental Management Act (Act 107 of 1998) for listed activities included in this S24 G application
- Water use license in term of the National Water Act (act 36 of 1998) (all water uses must be included in application – DWS to advise)

- Soil permit APPLICATION TO CULTIVATE VIRGIN SOIL (Regulation 2) in terms of CONSERVATION OF AGRICULTURAL RESOURCES ACT, 1983 (ACT 43 OF 1983) (rectification and proposed)
- Permits for disturbance / removal of any protected trees in terms of the National Forestry Act
- Permits for removal of any protected fauna or flora species in terms of the national Environmental Management: Biodiversity Act
- Permits for removal of any species as identified in the Provincial Nature Conservation Ordinance
- Certificate of Adequate Enclosure issued by Cape Nature Conservation. Approved for the breeding, selling of wildlife species as per approved Outeniqua Game Farm Management Plan and Addendums. In place
- National Veld and Forest Fire Act (Act 101 Of 1998) - Development of fire management practices to prevent and combat fires and legal duty and responsibility to ensure that veld fires do not break out on their property, and to take preventative measures to minimize the risk of fires spreading. Due to the fire risk inherent for any fire driven ecosystem (fynbos), it is important that this application be reviewed by the Southern Cape Fire Protection Association (SCFPA) so they can provide comments on management recommendations. It is noted that OGF is a member of the SCFPA. It is important to retain this membership. Assistance with controlled fire blocks on the property is important for the fire-driven ecosystem.

In terms of the NEMA "Development must be socially, environmentally and economically sustainable" (s 2(3)) and requires the consideration of all relevant factors, which are elaborated by eight sub-principles".
These principles include, *inter alia*:
• The polluter pays principle (s 2(4)(p)).
• The public trust doctrine (s2(4)(o)).
• The equitable access to natural resources (s 2(4)(d)).

These three principles are applicable to activities that have taken place since the 1970s.
The environmental authorisation process allows for an assessment of the proposed site and activities in order to determine the feasibility, scale and location of proposed activities. Furthermore, it is indicated in the Fynbos Ecosystem Guidelines, that early appointment of a knowledgeable biodiversity specialist is strongly advised, especially where projects may be under taken in Critically Endangered, Endangered or Vulnerable ecosystems. It must be noted that the Mossel Bay SDF does recognise critical biodiversity areas and the majority of vegetation types occurring within the municipality are critically endangered or endangered. The importance of required approval information provided upon acquiring land is highlighted. It seems to be a common occurrence (based on other projects the EAP has worked on) that landowners are acquiring properties zoned as agricultural however information regarding additional approvals relating to the property don't seem to be provided or known to the landowners. Lack of information therefore seems to be resulting in many new landowners developing without the required, for example, environmental and water use authorisations in place.

Due to the history of the project, the baseline conditions of the site includes past activities, the impacts of past, existing, and proposed activities are assessed, and recommendations are provided. Activities located in areas of medium and higher impacts generally seem to be as a result of no prior assessment carried out. However, these impacts can be addressed with practical interventions.
The impacts of proposed activities (construction of dam, expansion agricultural area, eco village concept, enclosures) are predicted based on the current baseline conditions and assessments carried out.
Commencing without required approvals leads to unnecessary economic costs due to delays in approvals for existing and proposed activities. This results in high economic impacts which are difficult to mitigate. In addition, in terms of the NEMA, commencement without required environmental authorisation can lead to a fine, resulting in a negative economic impact of high significance.

2. Heritage, paleontology, archaeology

2.1 Description of baseline conditions

An old quarry is in place on ptn 420. Structures (dwellings, restaurant etc) are in place. Agricultural areas (past and current) are in place. Roads are in place. The screening tool assessment indicates a low sensitivity for the heritage and palaeontological theme. In terms of Section 38 of the National Heritage Resources Act a Heritage Impact Assessment (HIA) may be requested where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

2.2 Description of impacts

Past quarrying activities may have unearthed resources. Existing activities are expected to have had negligible impact on heritage, archaeological and palaeontological resources. Any further activities in the future (which are carried out with required approvals in place) should put the chance find procedure in place as best practice.

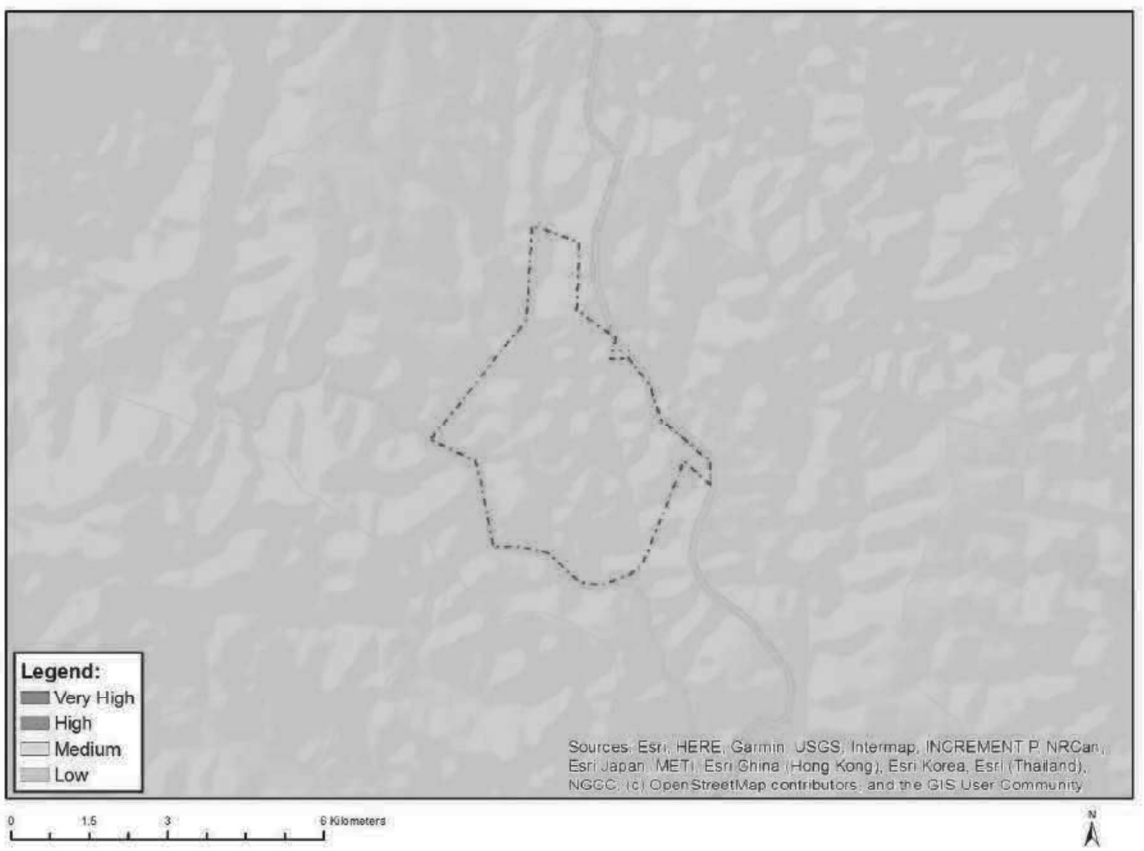


Figure 1: MAP OF RELATIVE ARCHAEOLOGICAL AND CULTURAL HERITAGE THEME SENSITIVITY

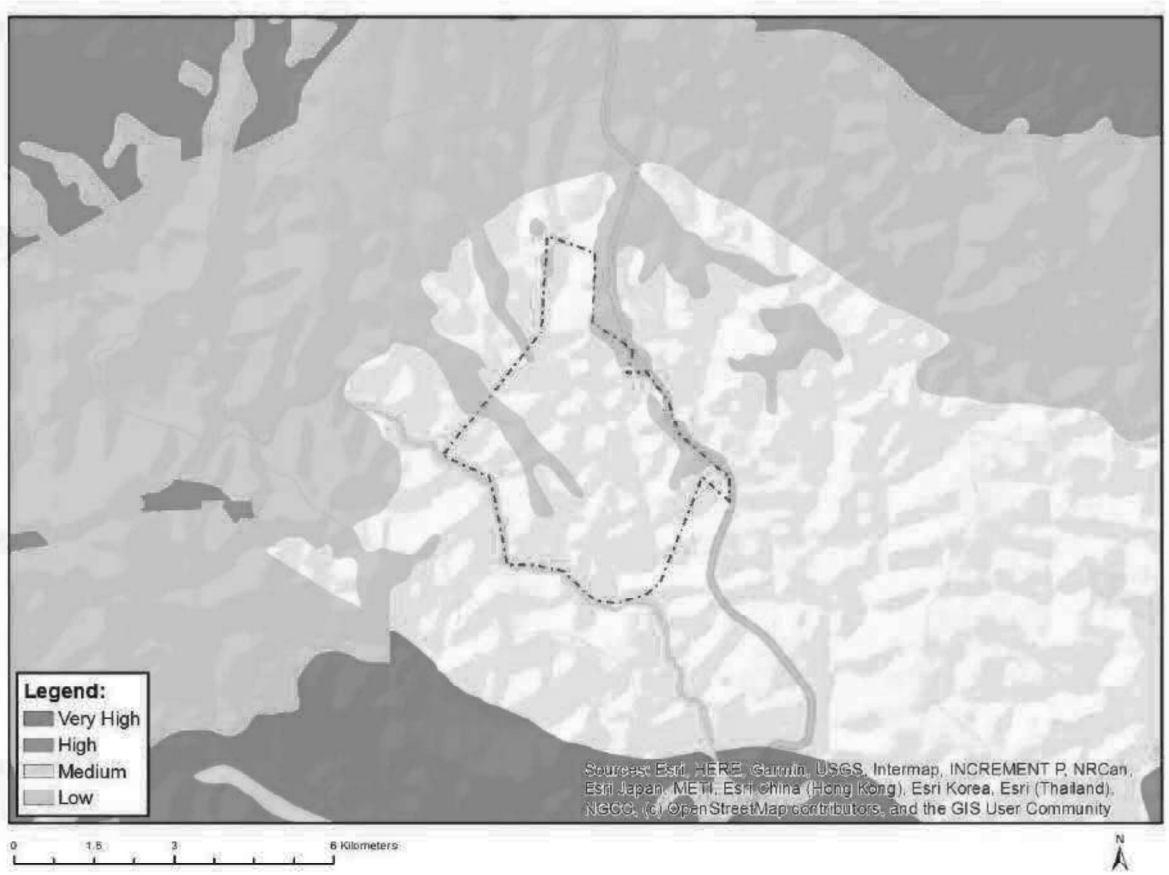


Figure 2: MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY

3.3 Verification

Theme	Environmental Sensitivity in terms of DFFE Screening Tool Report	Verification
ARCHAEOLOGICAL AND CULTURAL Theme	Low	Low
PALEONTOLOGY THEME	Low	Low

2.3 Impact Ratings

Aspect	**All activities in place and proposed activities**			
Phase	**Construction**			
Impact:	**Loss of archaeological / paleontological resources**			
Nature of impact:	**Direct –** disturbance to vegetation and soil can reveal artefacts. Disturbance and loss of resource can occur without mitigation measures in place.			
Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Permanent	6	Very short	1
Frequency	Rare	1	Rare	3
Intensity	High	1	Medium	3
Severity	Negative Medium	8	Negative Low	7
Consequence	Negative Medium	9	Negative Low	8
Probability	Slim	1	Slim	1
Impact Significance	**Low**	**10**	**Low**	**9**
Mitigation	- If archaeological / paleontology sites are unearthed / identified, the find brought to the immediate attention of the developer and all work is to be stopped immediately and reported			

	by the ECO accompanied by photographs and coordinates. This must be sent to a suitable specialist and the WC Heritage as soon as possible to inspect the findings. Any recommendations followed from such an investigation must be carried out. - Any discovered artefacts shall not be removed under any circumstances without consent from the WC Heritage Authority
Confidence	High

3. Terrestrial Biodiversity and Plant species

3.1 Description of Baseline conditions - Terrestrial Biodiversity

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report has identified the **Terrestrial Biodiversity Theme of** Farm Portions 420 (489ha) and 373 (789ha), Outeniqua Game Farm as having **a Very High sensitivity.**

The climate of Outeniqua Game farm is considered Mediterranean with mild cold and wet winters and hotter and drier summers. The average temperature during summer months (November to March) is usually between 20 and 30˚C. Winter temperatures usually remain moderate, usually ranging between 5 and 15˚C. The mean annual precipitation (MAP) of the project area is relatively low (454 mm per annum - Bailey and Pitman, 2016). According to the National vegetation map, critically endangered (CR) Garden Route Granite Fynbos and endangered (EN) Swellendam Silcrete Fynbos is mapped on the Portions 373 and 420. These are grouped as midlands upland fynbos ecosystems in the Fynbos Ecosystem Guidelines. Some of valley vegetation was found to be more representative of thicket, which is most consistent with Gouritz Valley Thicket (CR).

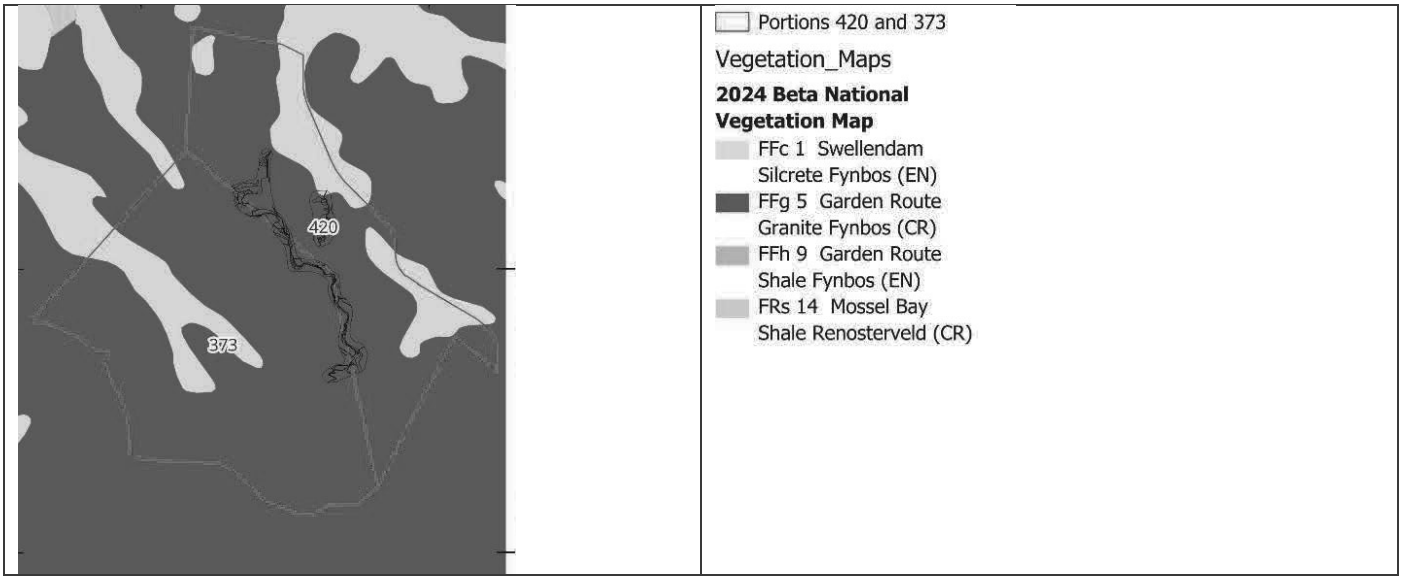


Figure 3: National Vegetation Type and Conservation Status (NBA, 2018).

According to the Vlok vegetation map, Hartenbos River And Flood plain is mapped on the watercourse areas, Leeukloof Fynbos Renoster Thicket is mapped on the majority of the site with Wolwedans Grass Fynbos mapped in the south eastern corner of the site.

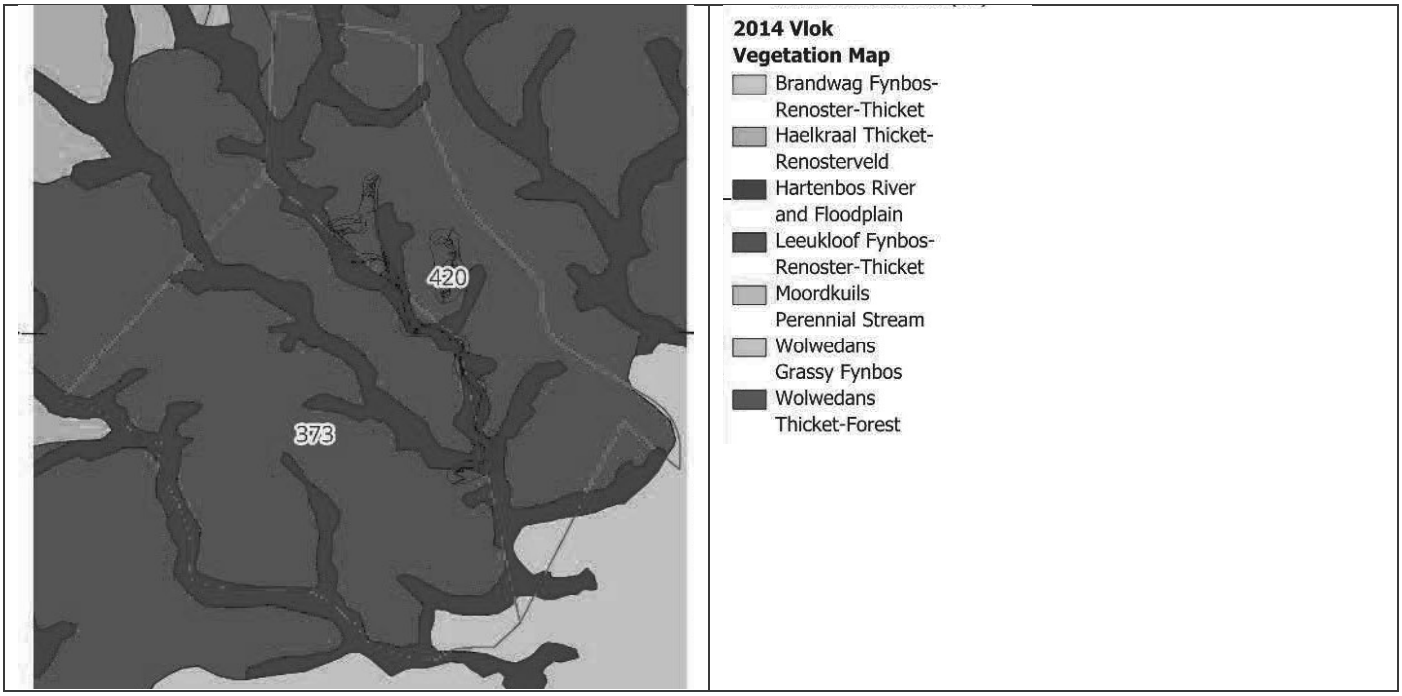


Figure 4: Vlok Vegetation Map

In terms of the Western Cape Biodiversity Spatial Plan, (WC BSP) the entire site is mapped as a Terrestrial critical biodiversity area (CBA) 1 with small sections mapped as a Terrestrial CBA 2.

CBA 1 Objective: Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

CBA2 Objective: Maintain in a functional, natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

The rivers and non-perennial drainage lines are mapped as Rivers and Wetland CBA1 (WCBCP)
The vegetation on Portions 420 and 373 have a high conservation value and are regarded as areas essential to meeting biodiversity targets in the Western Cape.

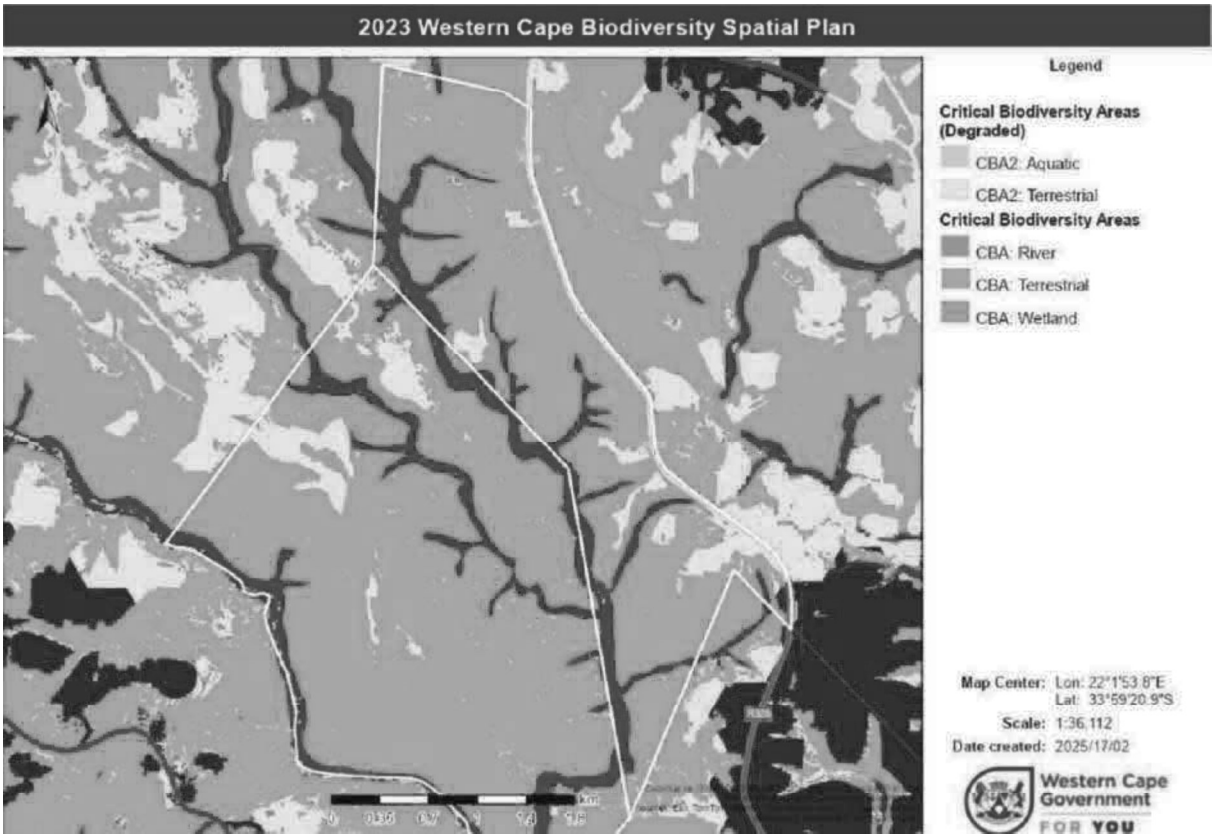


Figure 5: The mapped 2023 Western Cape Biodiversity Spatial Plan (WC BSP) categories for OGF (Portions 420 and 373).

i. Area 1: Construction of five dwellings

Five dwellings were constructed between 2020 and 2022; an accompanying access road was created. Approximately 8000m2 vegetation was cleared in this area. Two dwellings were built on areas of established invaded areas; the majority of the vegetation that was cleared represented Garden Route Granite Fynbos. Stands of invasive plants in this area are visible since 2005 (pink on image below).

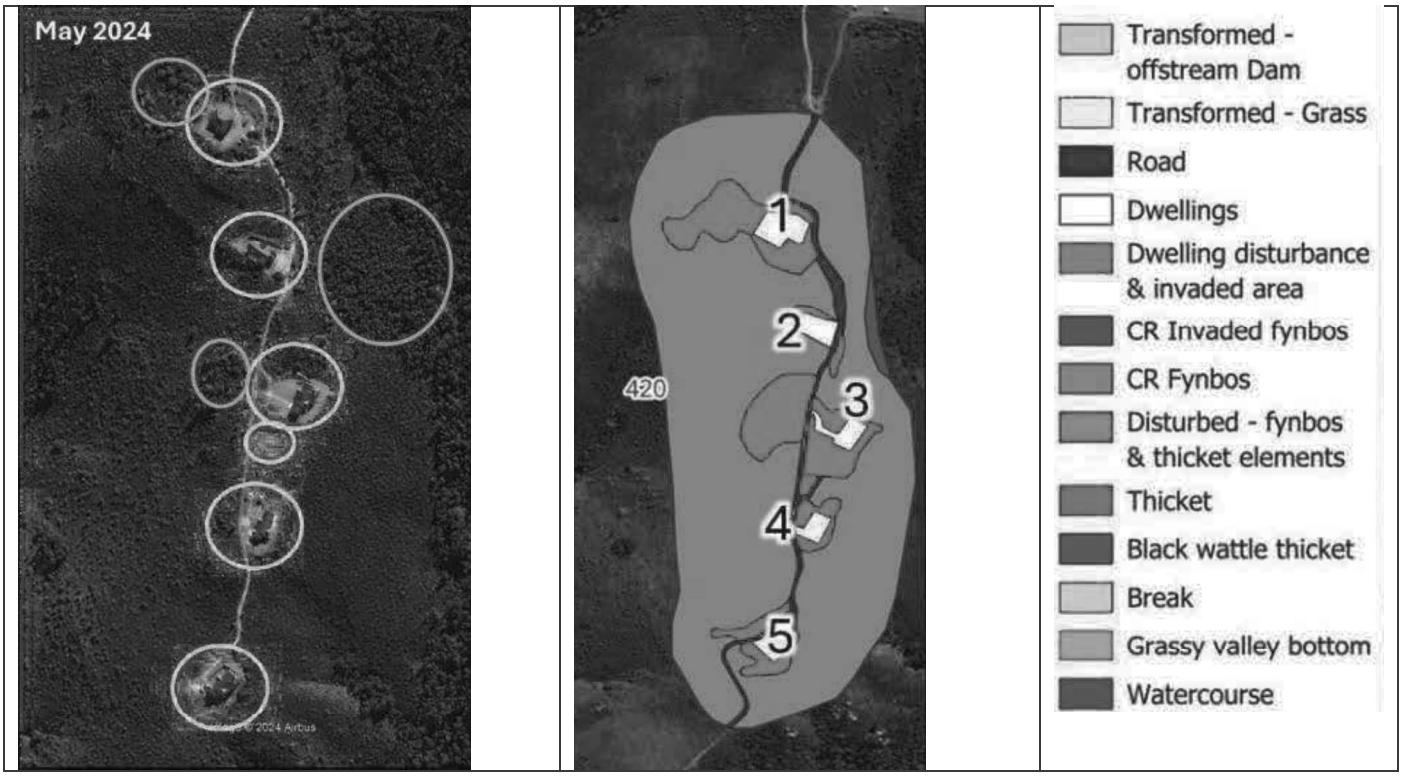
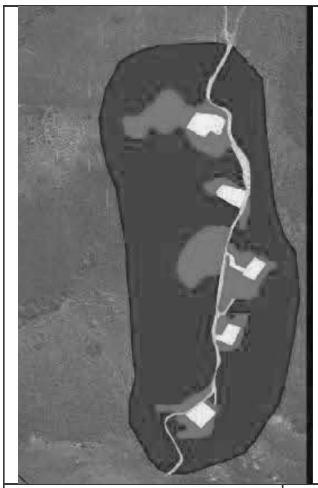


Figure 6: Two dwellings constructed in dense stands AIS; majority of the vegetation cleared represented Garden Route Granite Fynbos.

	1 - The fynbos surrounding the dwelling is in a natural condition, with stands of invasive Rooikrans (*Acacia cyclops*) only becoming dominant nearby the dwelling itself. This stand of invasive Rooikrans has existed prior to the construction of the dwelling. *CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.*
	2 - Rooikrans is also visibly dominant around the dwelling here, with more pristine fynbos further away from the dwelling. A large established invasion exists east of this dwelling, and it is essential that this invasion be monitored to ensure it does not spread into natural fynbos remnants. A large stand of EN *Erica unicolor mutica* is visible just before the Rooikrans. *CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.*
	3 - A large lawn and a mature Rooikrans bush is visible adjacent to this dwelling. The surrounding fynbos is in very good condition, and may require a fire soon. The lawn around this dwelling is too large, especially given that the dwelling is in the middle of a CBA 1 and critically endangered Garden Route Granite Fynbos. *CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.*

	4 - Dwelling four has a large fenced off area around it. This fence should be taken down in order to minimise the area of influence of this dwelling in CR fynbos vegetation. *CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.*
	5 - Pristine fynbos is visible all the way between dwelling 4 and five. The disturbance footprint, as with all four of the other dwellings above, must be minimised around the dwelling. *CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.*

Site Ecological importance of the area surrounding the dwellings is considered High and very high



Land use / Land cover	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) SEI = Biological Importance (BI) + Receptor resilience (RR) Biological Importance (BI) = Conservation Importance (CI) + Habitat functional integrity (FI)
Invaded Fynbos	**Very High** Critically Endangered Garden Route Granite Fynbos with several confirmed and likely to occur SCC	**High** Only minor current negative ecological impacts relating to spreading invasive plant	**Medium** VAST class II: Modified It is easy to transform the original CR fynbos, and here that has happened as the receptor is losing	**Very High** **BI: Very High** **RR: Medium**

		stands. Good rehabilitation potential.	biodiversity via established invasive plants. The habitat will recover slowly, and some species might be lost from these patches forever.	
Garden Route Granite Fynbos	**Very High** Critically Endangered Garden Route Granite Fynbos with several confirmed and likely to occur SCC.	**Very High** > 5 ha of a CR vegetation type. High habitat connectivity serving as functional ecological corridors and minimal past disturbance	**Low** VAST class I: Residual It is easy to transform this CR fynbos. Many species are at risk of being lost forever with various anthropogenic disturbances. This is especially concerning given the high risk of extinction for this vegetation type.	**Very High** **BI: Very High** **RR: Low**
Dwelling disturbance & invaded area	**Medium** > 50% of receptor contains natural habitat with potential to support SCC. It might be very invaded and seem unnatural, however this vegetation could easily be restored.	**High** Good rehabilitation potential with connectivity to pristine fynbos. There are nearby roads between intact habitat patches.	**Low** VAST class II: Modified With alien clearing effort, the current invaded receptor can be restored back to fynbos.	**High** **BI: Medium** **RR: Low**
Dwellings	**Very Low** No natural habitat remaining.	**Very Low** Dwellings do not form part of a connected natural landscape.	**Very High** VAST class VI: Removed The dwellings will remain a built environment.	**Very Low** BI: Very Low RR: Very High

ii. Area 2: Dwellings, structures, transformed field, off stream dam, roads

Dwellings, structures, a water storage area and accompanying roads and tracks have been constructed in this area between 2017 and 2024; the most recent road clearing occurred between May and August 2024. Approximately 4000m2 (structures / dwellings) and 5000m2 (using estimated road width of 2m) of vegetation was cleared in this area. The southern dwelling is located on the edge of fynbos and thicket vegetation, where the fynbos is representative of Garden Route Granite Fynbos (CR) and the thicket representative of Gouritz Valley Thicket (CR).

There is also an area north of area 2 which has been cleared (note – this area was also included in Botanical Assessment, Vlok, 2019).

Figure 7: Vegetation representative of Garden Route Granite Fynbos (CR) and Gouritz Valley Thicket (CR).

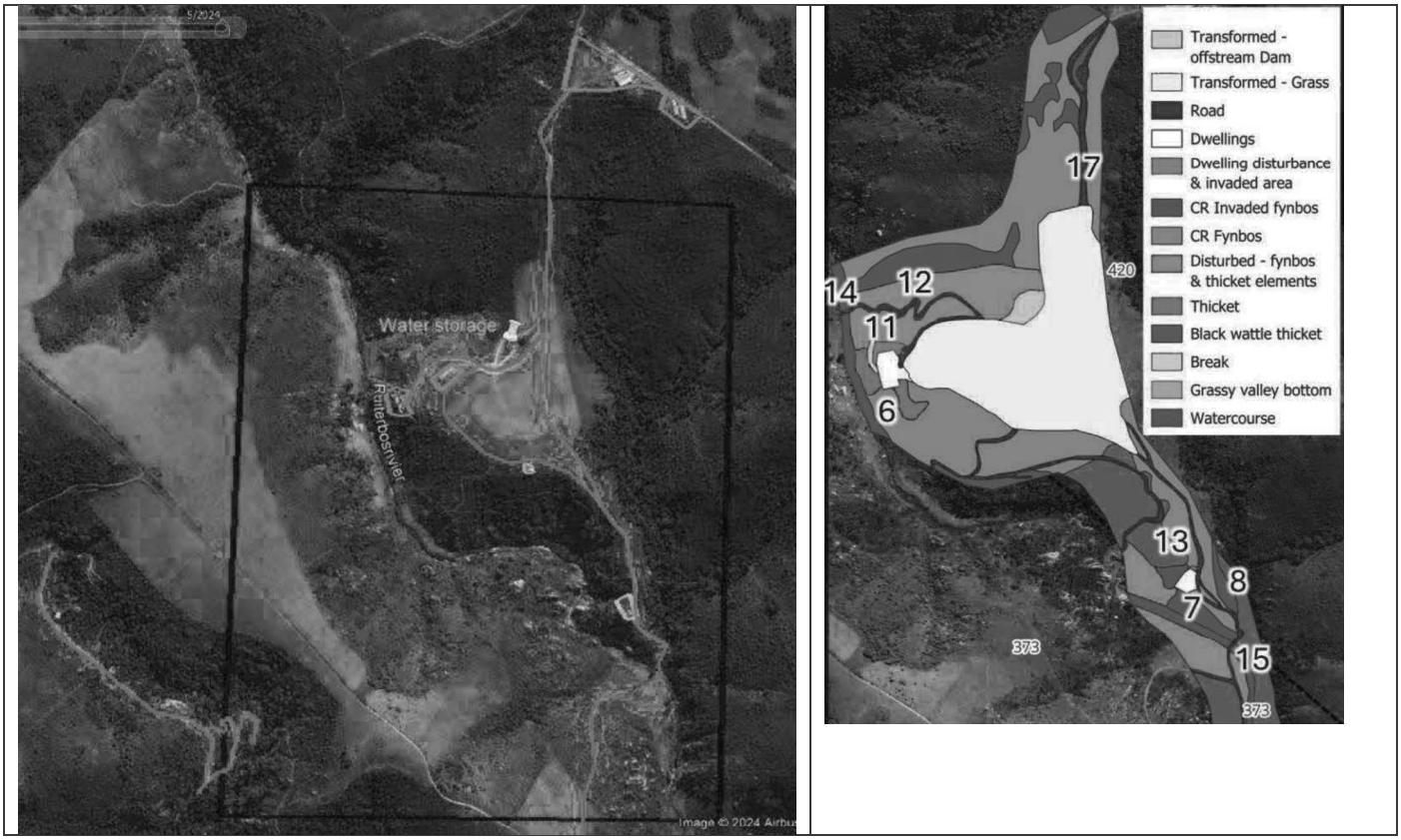


Figure 8: Approximately 4000m2 (structures / dwellings) and 6000m2 (using estimated road width of 2m) vegetation cleared (Area to the north is included in area 5-7)

6 – Northernmost dwelling, Area 2 - A small senescent patch of fynbos is present south of this dwelling.

CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.

7 - Southernmost dwelling, area 2 -
A highly sensitive invaded patch of fynbos is present south of this dwelling. This is also where Sensitive species 142 was observed. The image on the left illustrates *Leucadendron salignum*.

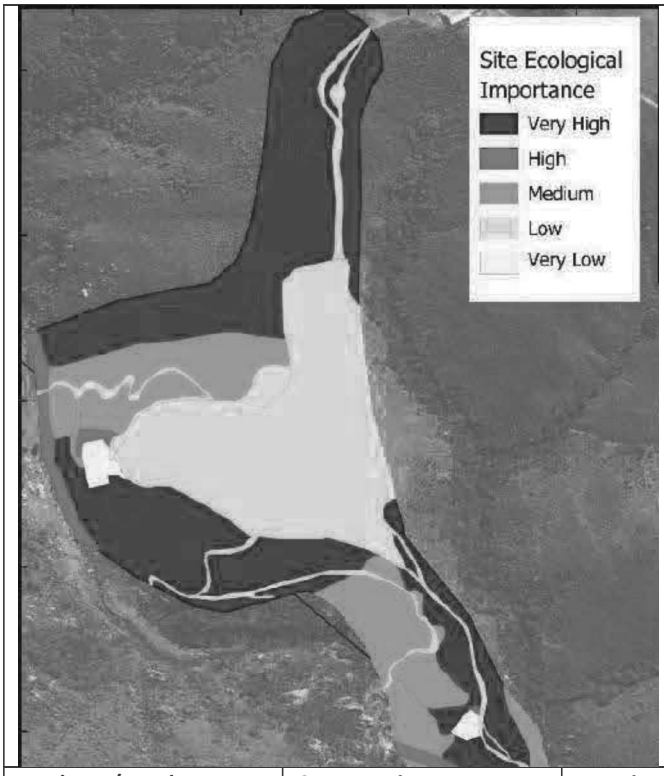
CR Garden Route Granite Fynbos vegetation observed around dwellings and roads on Outeniqua Game Farm.

	8 - Southernmost dwelling, area 2 - small section of the most recently cleared road (May -August 2024) leading towards the valley from the dwelling. South of the excavated road is a Black wattle invasion, and north of the road fynbos if visible. thicket and Black wattle invaded sections
	11 - AREA 2 - Northernmost dwelling The dominance & composition of species here has shifted. The area here is dominated by graminoids, with only a few fynbos and thicket elements persisting north of the dwelling. disturbed vegetation sections that may be approaching a tipping point soon.
	12 - AREA 2 Illegal wide meandering road This road was flagged as part of the 24G process. Eroded sections are present, and the surrounding vegetation is disturbed and modified. Long-term planning should consider the rehabilitation of this road, as it is not a necessary access road. Disturbed vegetation sections that may be approaching a tipping point soon (Vlok, 2019)

	13 - AREA 2 Southernmost dwelling Disturbed vegetation north of the dwelling. Creeping edge effects and new potential invasive plants are visibly spreading from the garden here. Alien clearing is required here as soon as possible, especially given the close proximity of Sensitive species 142. disturbed vegetation sections that may be approaching a tipping point soon.
	14 - AREA 2 - crossing x1 in Aquatic report A road crossing the rocky watercourse. Kikuyu grass is visible adjacent to the River. If the illegal widened road leading to this crossing is rehabilitated, then this crossing can also be rehabilitated. river crossings
	15 - AREA 2 Flagged as crossing x2 in Aquatic report The road crossing leading to the southernmost dwelling in Area 2 defined in this report. The impact of the crossing is minimal, and again kikuyu grass is visible in the riparian zone. river crossings

	17 - AREA 2 Grassy Field & Offstream Dam A view of the transformed field and dam. The road here is a second road that was constructed right next to an older existing road (see bottom left of the image). This may not become standard practice. transformed field in Area 2.

The site Ecological importance of Area 2 is very high for intact thicket and intact and invaded fynbos areas; medium for firebreak and wattle areas, low for the road, dam and grass areas and very low for the dwellings.



Land use / Land cover	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) SEI = Biological Importance (BI) + Receptor resilience (RR) Biological Importance (BI) = Conservation Importance (CI) + Habitat functional integrity (FI)
Thicket	**Very High** Thicket is likely most similar to Gouritz Valley Thicket, which is CR. Confirmed presence of Milkwood (*Sideroxylon inerme inerme*) and Cheesewood (*Pittosporum*	**High** Good habitat connectivity with potentially functional ecological corridors. Good rehabilitation potential, however, thicket patches that are still relatively intact are fragmented.	**Low** VAST class II: Modified The thicket habitat is unlikely to recover fully if it becomes invaded or if any other form of clearing and fragmentation negatively affects these already small fragments.	**Very High** BI: Very High RR: Low

	viridiflorum) protected trees.			
Invaded Fynbos	**Very High** Critically Endangered Garden Route Granite Fynbos with several confirmed and likely to occur SCC	**High** Only minor current negative ecological impacts relating to spreading invasive plant stands. Good rehabilitation potential.	**Medium** VAST class II: Modified It is easy to transform the original CR fynbos, and here that has happened as the receptor is losing biodiversity via established invasive plants. The habitat will recover slowly, and some species might be lost from these patches forever.	**Very High** **BI: Very High** **RR: Medium**
Garden Route Granite Fynbos	**Very High** Critically Endangered Garden Route Granite Fynbos with several confirmed and likely to occur SCC.	**Very High** > 5 ha of a CR vegetation type. High habitat connectivity serving as functional ecological corridors and minimal past disturbance	**Low** VAST class I: Residual It is easy to transform this CR fynbos. Many species are at risk of being lost forever with various anthropogenic disturbances. This is especially concerning given the high risk of extinction for this vegetation type.	**Very High** **BI: Very High** **RR: Low**
Break – cleared maintained & Disturbed – Fynbos & Thicket elements	**Medium** > 50% of the receptor contains natural habitat with potential to support SCC, especially if restored. Confirmed presence of Milkwood (*Sideroxylon inerme inerme*) and Cheesewood (*Pittosporum viridiflorum*) protected trees.	**Medium** Mostly minor current negative ecological impacts with some major impacts relating to vegetation clearance, edge effects, invasions, and a shift in dominant species cover. Moderate rehabilitation potential	**Medium** VAST class III: Transformed This receptor is not completely transformed yet, but the natural species composition has been significantly altered. The vegetation here will, over time, either become more transformed (with ongoing disturbances) or can slowly restore it back to fynbos and thicket.	**Medium** BI: Medium RR: Medium
Transformed – Grass & Transformed – Off stream Dam	**Low** < 50% of receptor contains natural habitat with limited potential to support SCC	**Medium** Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.	**Medium** VAST class V: Replaced - managed The grassy field & off stream dam are likely to remain transformed and will remain areas that no longer represent the natural vegetation unless active restoration takes place. The receptor can therefore be changed to a more natural state, but it will take a long time with invested resources to achieve this.	**Low** BI: Low RR: Medium
Road	**Low** < 50% of the receptor contains natural habitat with limited potential to support SCC	**Low** Several minor and major current negative ecological impacts.	**Medium** VAST class V: Replaced - managed Roads (current receptor) will likely remain roads, however some of the roads that have started to erode may recover, but slowly.	**Low** **BI: Low** **RR: Medium**

Dwellings	**Very Low** No natural habitat remaining.	**Very Low** Dwellings do not form part of a connected natural landscape.	**Very High** VAST class VI: Removed The dwellings will remain a built environment.	**Very Low** BI: Very Low RR: Very High

iii. Roads between Areas 2 and 3

Roads have been created between Areas 2 and 3; this includes estimated 2300-meter road along Albertyn non perennial watercourse; new 1200 meters road on ridge and 1500-meter road along perennial Ruiterbos River and associated jeep tracks (800-meter length).

The valley slopes along either side of the Ruiterbos River and the Albertyn non perennial river have been occupied by established long-term stands of Black wattles (Acacia mearnsii). Most of the vegetation cleared along the watercourses was done for the purposes of clearing dense stands of *A. mearnsii*.

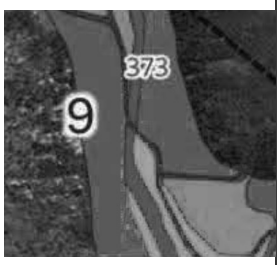
Clearing of vegetation along the valley has resulted in the introduction and naturalisation of invasive kikuyu grass (*Cenchrus clandestinus*).

Some sections of the Ruiterbos river was found to be obstructed by woody slash material leading to erosion along the bank of the river.

A jeep track road crosses the Ruiterbos River in several locations.

The individual jeep track along the river is not impeding the flow of the river.

Several news tracks connecting to the jeep track from the sides of the valley have been found to have caused unnecessary disturbance and erosion.



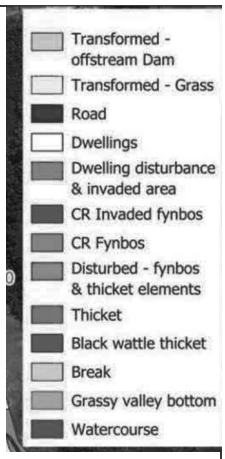


Figure 9: Indication of roads and tracks created between areas 2 and 3

9 - Ruiterbos River between AREAS 2 & 3
A recently cleared section of black wattles. In the background is another stand of Black wattles that mut still be cleared. The cleared slash material will be set alight as it is on the slope. The owners must ensure compliance with the SCFPA and relevant fire regulations.

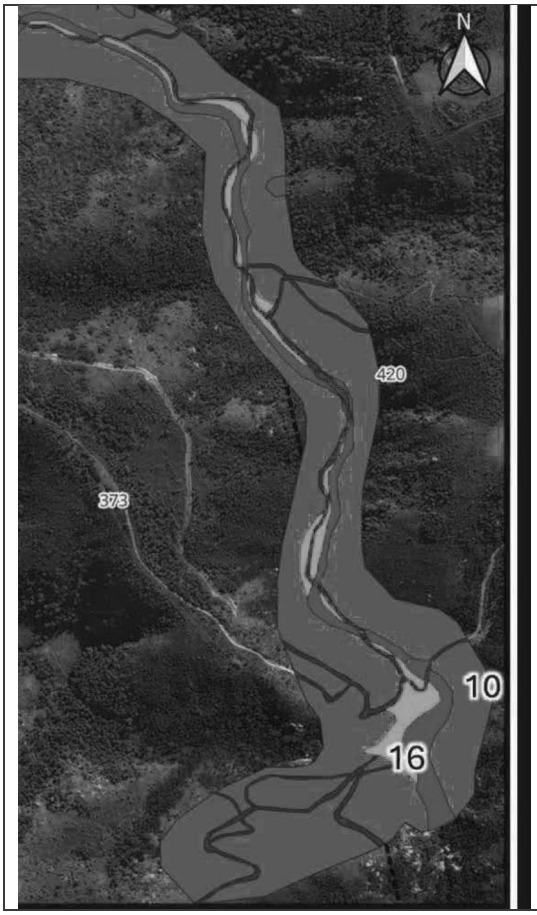
thicket and Black wattle invaded sections

iv. Area 3: Weir and dam

The road crossing the Ruiterbos River at the current dam location has existed since at least 2005.

The current instream dam location is first visible in 2017. One of the roads was also altered between 2016 and 2018. Prior to this, the entire area was heavily invaded with Black wattles (*Acacia mearnsii*) and have been maintained this way. Several new roads were noted to be cleared in this area between 2022 and 2024.

Figure 10: Weir and dam area; existing roads (prior to 2005) show in green providing indication of disturbances in the area (2016 onwards)



- Transformed - offstream Dam
- Transformed - Grass
- Road
- Dwellings
- Dwelling disturbance & invaded area
- CR Invaded fynbos
- CR Fynbos
- Disturbed - fynbos & thicket elements
- Thicket
- Black wattle thicket
- Break
- Grassy valley bottom
- Watercourse

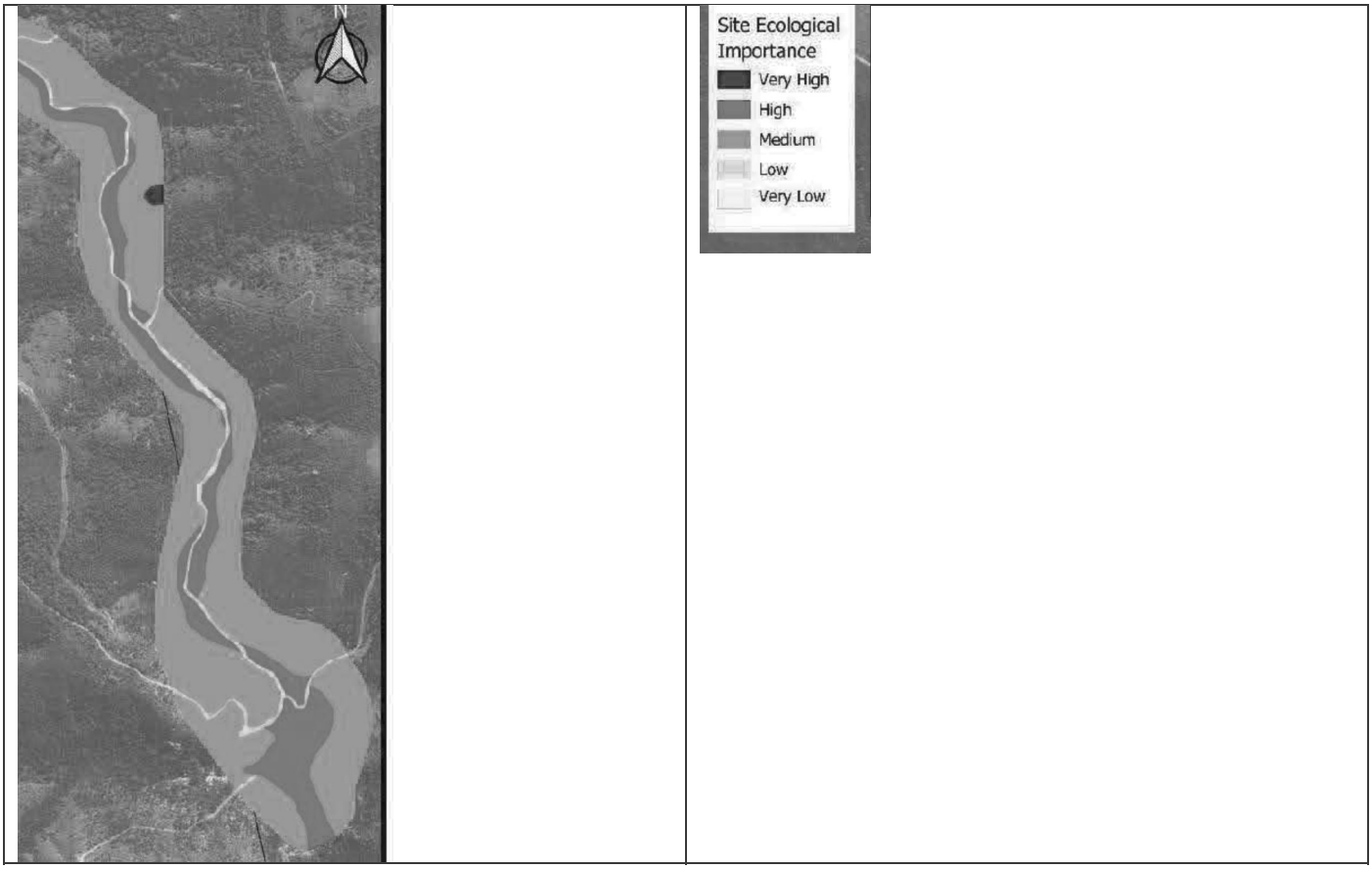
10 - AREA 3 - A slope that has been maintained clear of black wattles for a few years – fynbos is starting to recover due to ongoing clearing effort here.

thicket and Black wattle invaded sections

16 - AREA 3 - Small dam & surrounding area
A view of the valley and small instream dam. Follow the rehabilitation plan outlined in the aquatic specialist report for this area.

river crossings

The Site Ecological Importance of the area between Areas 2 and 3 and weir and dam area is High for the river and medium for the surrounding area invaded with wattle.



Land use / Land cover	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) SEI = Biological Importance (BI) + Receptor resilience (RR) Biological Importance (BI) = Conservation Importance (CI) + Habitat functional integrity (FI)
Ruiterbos River	**High** In a sensitive drainage line surrounded by black wattle invasions. However, the invaded areas are still representative of EN (Swellendam Silcrete Fynbos) and CR (Garden Route Granite Fynbos; Gouritz Valley Thicket) ecosystems. Confirmed presence of Milkwood (*Sideroxylon inerme inerme*) and Cheesewood (*Pittosporum viridiflorum*) protected trees.	**High** Only minor current negative ecological impacts relating to spreading invasive plant stands. Good rehabilitation potential.	**Medium** VAST class III: Transformed The vegetation here will likely remain slightly disturbed and will recover slowly following disturbances	**High** **BI: High** **RR: Medium**

Road	**Low** < 50% of receptor contains natural habitat with limited potential to support SCC	**Low** Several minor and major current negative ecological impacts.	**Medium** VAST class V: Replaced - managed Roads (current receptor) will likely remain roads, however some of the roads that have started to erode may recover, but slowly.	**Low** **BI: Low** **RR: Medium**
Black wattle thicket – active clearing in some places & **Grassy Valley Bottom**	**Medium** Severe and established invasions, however clearing is occurring in some places and there is evidence of the natural fynbos and thicket returning on some places. Therefore, there is still a good likelihood this section could support SCC if alien clearing continues in the long term, however it is uncertain if restoration can be passive only. Some ongoing active restoration will be required. Confirmed presence of Milkwood (*Sideroxylon inerme inerme*) and Cheesewood (*Pittosporum viridiflorum*) protected trees.	**Medium** A semi-intact area for any conservation status. Moderate rehabilitation potential with long-term commitment and funds for alien clearing & restoration.	**Medium** VAST class III: Transformed The black wattle receptor will only be altered with active alien clearing (already started, according to a management plan) that occurs over decades. Therefore the black wattles will recover slowly with concerted effort, but the affected fynbos and thicket will also recover slowly over time, with care.	**Medium** BI: Medium RR: Medium

3.2 Historical and in use agricultural areas and proposed activities

A terrestrial assessment specific to the planned and existing agricultural activities on OGF was carried out.

The agricultural areas on Outeniqua Game Farm (OGF) were initially mapped using census data from Cape Farm Mapper. Following the site assessment conducted in January 2025, these mapped areas were refined to provide a more accurate representation of the land available for irrigation and farming.

The following two key factors were considered during the field assessment:

- **Native or Non-native vegetation cover**: The degree of land modification from natural to non-natural cover was assessed by distinguishing between areas suitable for agriculture (non-native cover areas) and those that remain ecologically intact or require protection.
- **Invasive Species**: Areas with significant invasion, most notably by black wattle (*Acacia mearnsii*) and Rooikrans (*A. cyclops*) were noted, especially those that could be considered for inclusion in the agricultural expansion but are not actively being farmed.

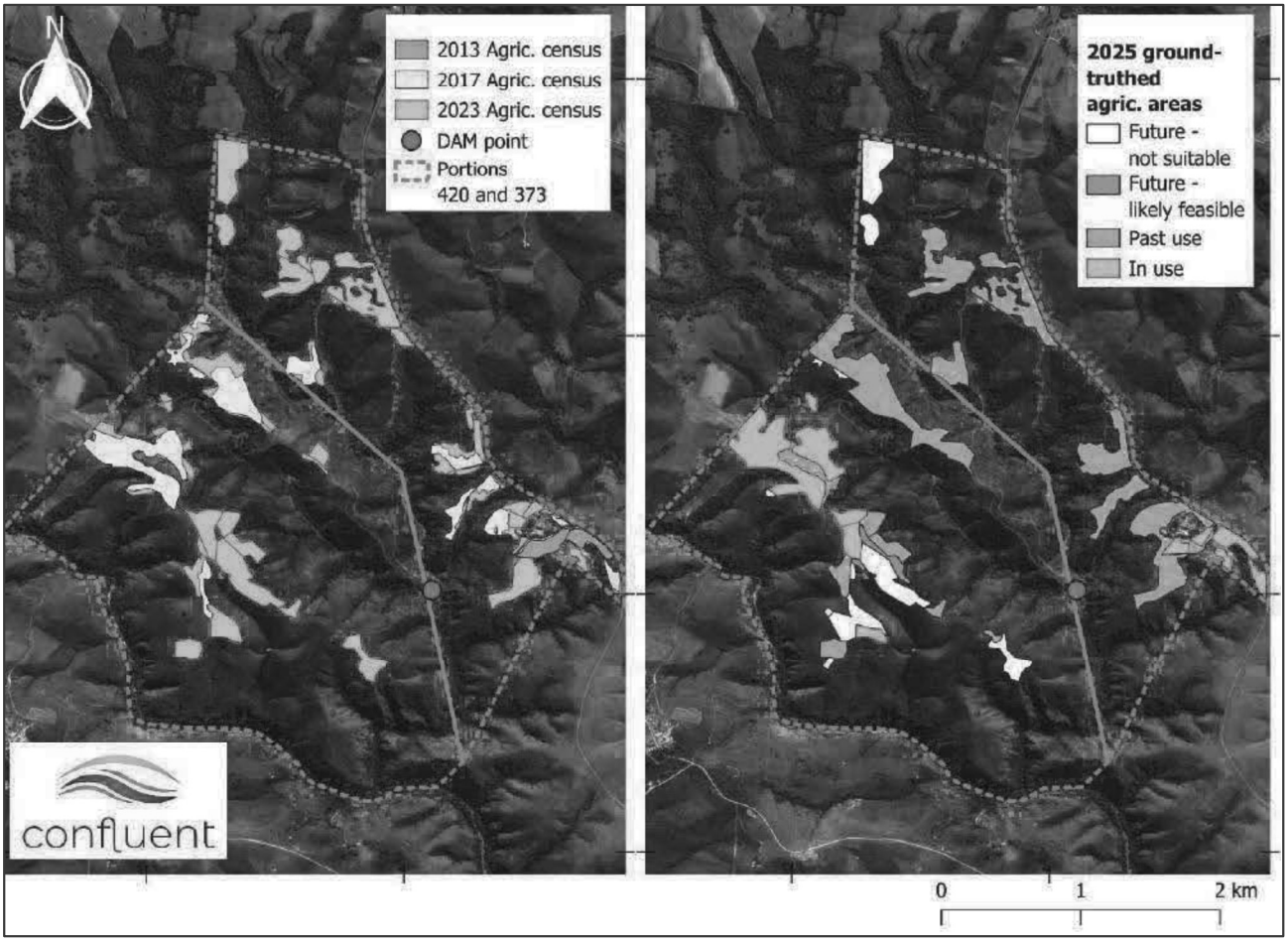


Figure 11: Agricultural areas based on census (left); ground truthed agricultural areas (left)

Historical imagery was used to determine the past agricultural areas. Imagery sources used includes Google Earth and CD NGI Geospatial Portal. (Detailed historical imagery is provided in Appendix 9.2 of the Botanical Report, 2025 - Appendix H2).

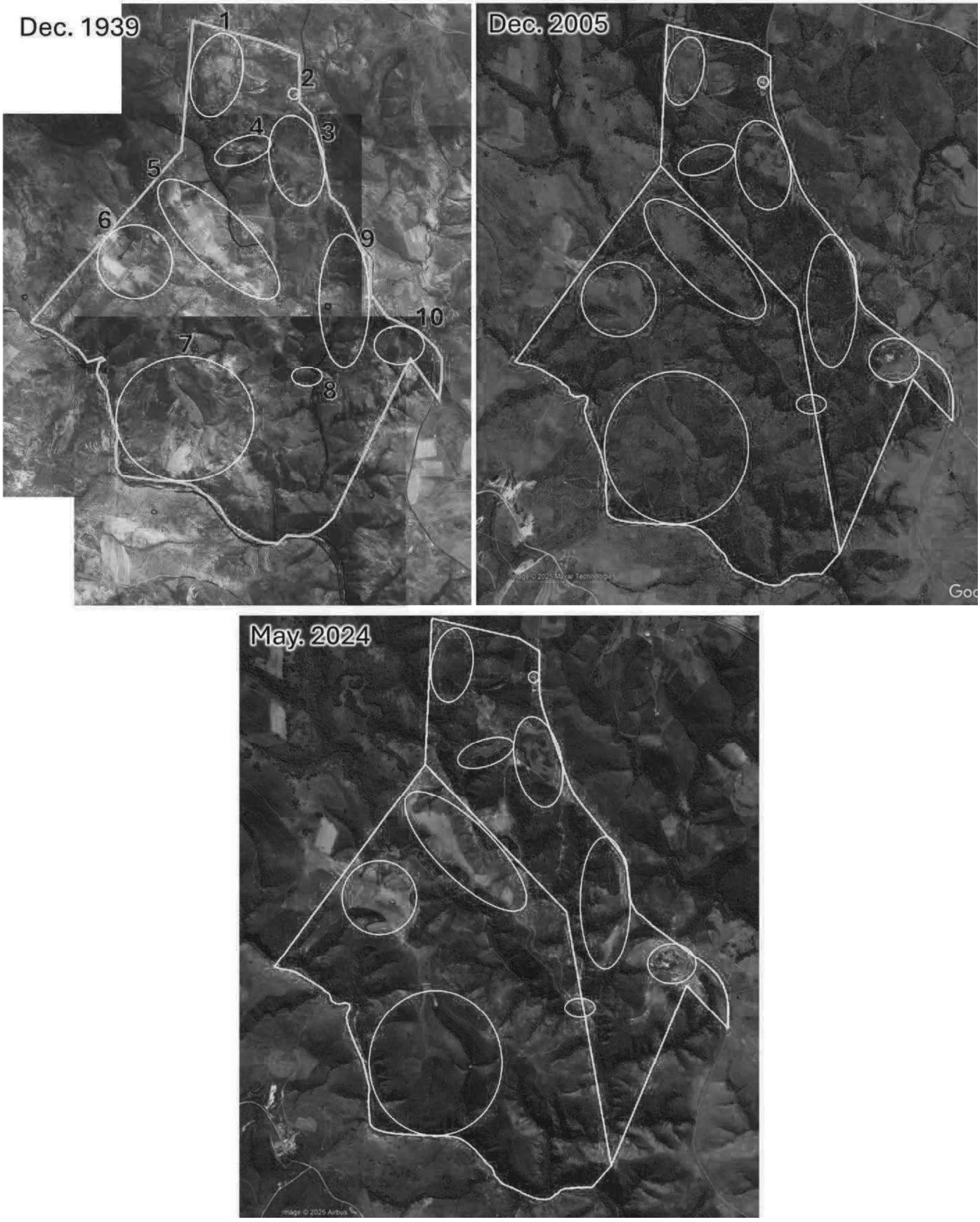
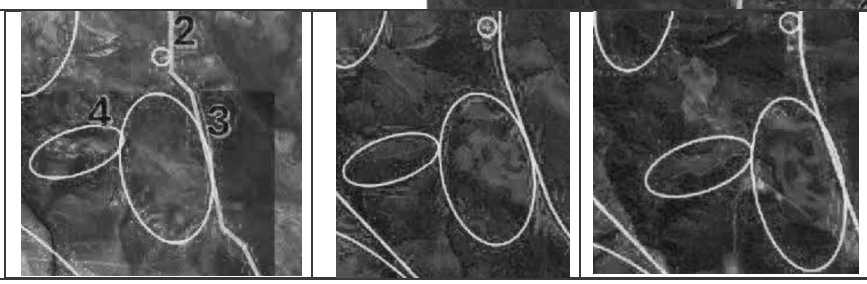
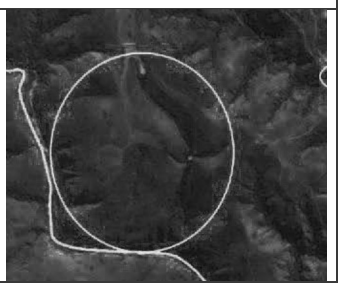
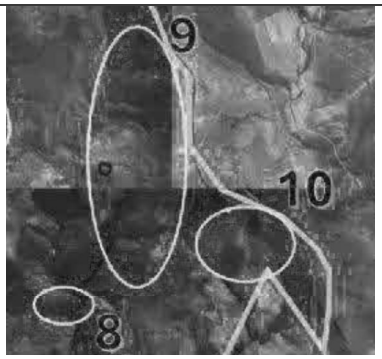


Figure 12: Indication of agricultural activities (1939 – current)

Table 1: Summary of historical areas 1 - 10

1. The north-western corner of OGF seems to have been transformed to some extent in the 1939 imagery and was still transformed as a dryland pasture in 2005. Technically, this area can be identified as a Past-use area, but instead it was classified as an unsuitable area for agricultural expansion as irrigation from the proposed dam is likely not feasible here, and there may be good rehabilitation potential for this land, given the extent of transformation elsewhere on OGF.	
2. Area 2 indicates a quarry area on OGF, which is clearly visible in the 2005 and 2024 imagery. In the 1939 imagery, it is only visible as a small clearing. 3. Area 3 was untransformed in 1939, however over at least the last two decades (i.e., since 2005), this area has been utilised largely as a dryland pasture on Portion 420. 4. Area 4, west of area 3 there is another area which seemed to have some kind of cleared vegetation in the 1939 image. In 2005, the vegetation seems to have recovered, with the beginning of wattle invasion visible in the valley. The 2024 imagery indicates that some vegetation clearing has likely taken place, with additional roads made and a proliferation of invasive wattle. However, the vegetation can likely still recover to fynbos if alien clearing is done here.	

5. Area five has been farmed and maintained as a transformed dryland field since at least 1939. This is likely the largest historical farmed piece of land on OGF, and presents an excellent opportunity for agricultural expansion. This area is currently classified as a Past-use area, as no irrigation or active crop planting is occurring here, and it is a good option for the future given its transformed status (i.e., it does not represent natural fynbos vegetation). Although a lot of this agricultural area is further than 1km away from the proposed dam, it is relatively straightforward to lead water to here compared to other areas that are a similar distance away (because only one "ridge" need be followed, and multiple valleys and hills need not be traversed to get to this area). 6. Area 6 is also an agricultural area that is visible in all the historical images going back to 1939. The majority of this area is active agriculture, with a large portion being planted with maize, and smaller areas planted with avocados. Currently this area is being irrigated from the Palmiet River. It is assumed that irrigation from the proposed dam in the Ruiterbos River might therefore not be required for these lands. Furthermore, although it is a similar distance away from the transformed fields of the area labelled 5, the path water would need to follow to arrive here from the Ruiterbos River seems potentially more convoluted.	
7. An old dam near the Palmiet River (still in use) and some transformed areas are visible since the 1939 imagery in area 7. The transformed areas visible have mostly recovered, apart from two remaining agricultural fields that are still visibly transformed in 2025.	

8. This area is simply highlighted as it is the proposed location of the dam in the Ruiterbos River. 9. Currently this area contains several dryland fields, which are not visible in earlier imagery from 2005 and 1939. These areas are considered transformed Past-use agricultural fields, given that they are transformed, but not irrigated. 10. The last area highlighted in the historical imagery is where the current OGF lodge is located, as well as the surrounding transformed gardens. An increase in the amount of built area and surrounding agricultural fields is visible from 1939 to 2024.			

The main aim of this assessment was to understand which areas of land are transformed due to agriculture, and to help identify any additional agriculturally transformed areas that may contribute towards the existing agricultural areas on OGF. This assessment was also used to determine the preferred areas for the proposed lion / cheetah enclosure and elephant enclosure. The botanical assessment carried out in 2019 was also referred to for this purpose as well as site visits carried out by the EAP.

The area calculation for identified agricultural areas confirms that there is more than 80 ha available for irrigation farming on OGF (including current area of 48.75 ha). Despite this finding, it is important to consider the practicality of pumping water to some of these areas, particularly those situated on steep slopes or located far from the proposed instream dam along the Ruiterbos River. It is generally recognized that pumping water over significant distances and elevation changes requires substantial infrastructure, including high-capacity pumps, energy sources, and potentially reinforced pipelines to manage pressure fluctuations. The feasibility will depend on factors such as elevation gain, energy costs, and water demand. Careful planning and technical consultation would be necessary to determine whether the cost and technical challenges do not outweigh agricultural benefits

Area	Currently in use (ha)	Transformed dryland - past use (ha)	Potential for agriculture - not suitable (ha)	Potential for agriculture - likely feasible (ha)
OGF (Portions 420 & 373)	48.75	119.09	34.71	3.33

v. Area 4: Agricultural area and supporting activities – ptn 373

The ground-truthed agricultural areas that were observed during the 2025 assessment are provided in . The summary of areas 1 – 17 is provided in Table 2.

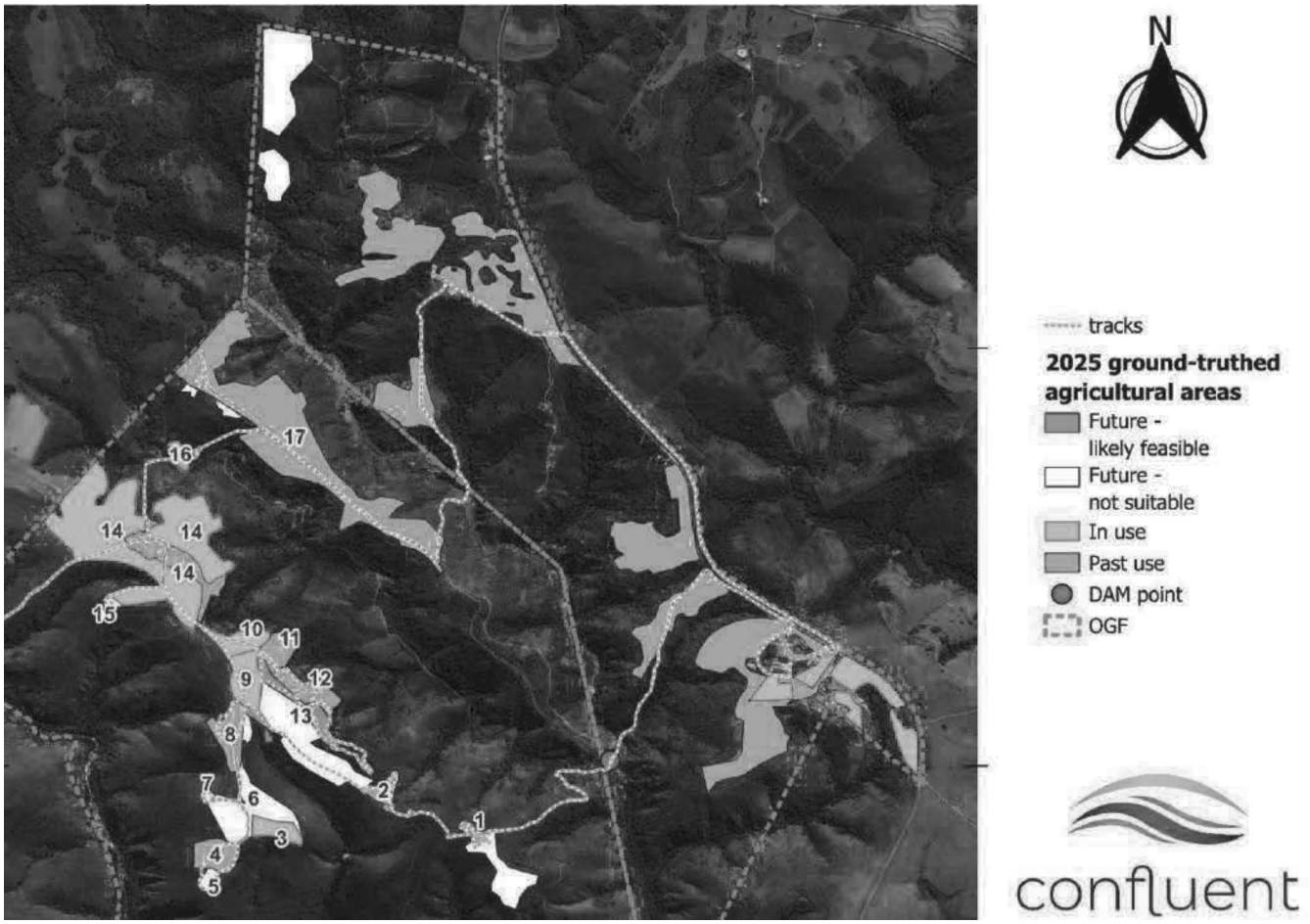
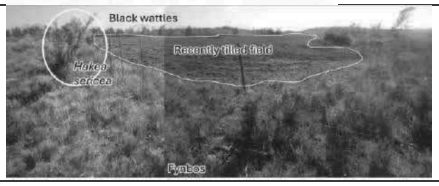
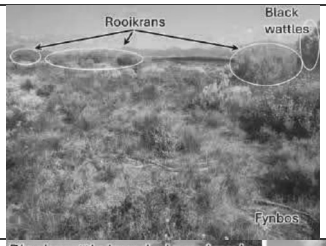
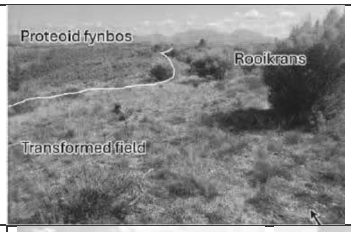


Figure 13: Ground truthed agricultural areas

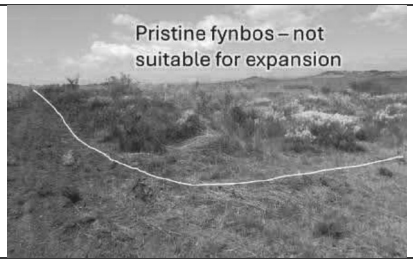
Table 2: Summary of agricultural areas ground truthed (areas 1 to 17) on ptn 373

Area	Size estimate	Description		Soil Potential (Agricultural assessment; Appendix D5)	Land use	Recommendation
1	4,98ha	Small past-use field; still in transformed state. Beyond the small area surveyed, there is a greater area that was flagged as agricultural in the 2023 census map on CFM; however, this section was confirmed to be Garden Route Granite Fynbos during the site assessment and is not suitable for agriculture. The transformed area here accounts for ca. **0.71 ha** of transformed agricultural past-use area. The unsuitable fynbos area here, as mapped in the agricultural map is ca. 4.27 ha.		Medium	Past use / Future use – not feasible	Only dryland in 0.71 ha if required
2	1.55 ha	Transformed agricultural past-use field. Surrounding this dryland field is Rooikrans (*Acacia cyclops*) invaded fynbos.		Medium	Past use	Only dryland grazing
3	2.01 ha	In-use agricultural field observed on OGF Portion 373. This had recently been tilled at the time of the site assessment in January of 2025.		Medium	In use	Preferably not be used; if used, only dryland grazing

4	2.87ha	Past-use field; no signs of irrigation. This field is currently just a dryland pasture and is surrounded by pristine fynbos that contains some stands of invasive wattles in places.		Medium	Past use	Only dryland grazing
5	0.5 ha	Area 5 was pointed out as an area that would be considered favorable for further agricultural expansion. The vegetation in this area is still fynbos, consistent with Garden Route Granite Fynbos. The southernmost point of this proposed future area is defined by a stand of black wattles. However, fynbos persists in this stand of wattles. Dure to the sensitive nature of the fynbos, and the fact that OGF is essentially considered as a CBA 1, this section covering ca. **0.54 ha** may not be transformed for agriculture.		Medium	Future use – not feasible Intact fynbos	Retain as fynbos; removal of dense wattles as per AIS management plan
6	6.79 ha	This section represents another area that seems to have been cleared in the past, but that has been left to recover for long enough for fynbos to recover. This area may also not be transformed for agricultural use.		Medium	Past use Future use – not feasible	Retain as fynbos; removal of dense wattles as per AIS management plan
7	0.34 ha	Small area where some past disturbance noted. Despite being heavily invaded by both Rooikrans and black wattle, this section has excellent rehabilitation potential and may not be transformed for agricultural use.		Medium	Future use – not feasible	Retain as fynbos; removal alien trees as per AIS management plan
8	3.38 ha	Dryland pasture is adjacent to proteoid fynbos. Some rooikrans invasion observed in a section of this Past-use field, and these must be cleared both in the field and in the surrounding fynbos to		Medium to medium high	Past use	Only dryland; removal alien trees in field and adjacent

		prevent biodiversity loss in the adjacent CR Garden Route Granite Fynbos.				area as per AIS management plan
9	3.56 ha	In use agricultural field planted with Maize. This field is surrounded by pristine fynbos that may not be further impacted.		Medium High	In use	No further expansion this area. Manage agricultural area as per mitigation measures.
10	2.5ha	A recently ploughed area adjacent to the fields planted with Maize.		Medium High	In use	Manage agricultural area as per mitigation measures.
11	2.48 ha	Next to the ploughed field there is a transformed dryland Past-use field. This field is bounded along the south by a long stretch of area that is heavily invaded by black wattle (area 12).		Low	Past use - invaded	Dryland grazing Manage as per AIS management plan

12	3.14 ha	The heavily invaded black wattle area represents an area that was transformed historically. Most of the wattle invaded area contains no, or minimal understorey coverage. The edges of the wattle invasion host some fynbos elements		Low	Past use - invaded	Not suitable – low potential soils. Manage as per AIS management plan
13	2.85ha / 9.2 ha	The narrow strip of land between the wattle-invaded area and the maize fields is covered in fynbos (**2.85 ha)**. However, due to its limited width, significant invasion by both Rooikrans and black wattle, and its lack of importance for landscape connectivity, this area is considered a potential site for agricultural expansion. This would only be considered if the currently designated In-use and Past-use agricultural areas do not provide sufficient space for the proposed irrigation zones to be supplied by the planned dam.		Low – 2.85 ha High – remaining area 13 (9.2 ha)	Future - likely feasible (2.85 indicate d in purple) Remainin g area 13 – not feasible (9.2 ha)	Low ecological importance however soil potential is indicated as low for the correspondin g area.
14	35.27 ha	This area represents a large section of transformed land on Portion 373 of OGF. Most of this area is considered as In-use agricultural areas (30ha), with the section containing infrastructure and other materials mapped as a Past-use transformed area (5ha).	 	High and medium High (in use) Medium potential (past use)	In use Past use	Maintain as irrigated agricultural area; use past use area for additional irrigated area and required dwellings, storage.
15	0.33ha	Small section of fynbos was flagged to be included under a pivot irrigation system. Currently the maize pivot irrigation cannot complete a full circle		Medium	Future use – not suitable	Retain as fynbos No agricultural

		of irrigation. Despite the limitation of the pivot, the identified fynbos area for potential agricultural expansion is not appropriate, as it represents pristine CR Garden Route Granite Fynbos.				expansion permitted.
16	0.89ha	A section of transformed lawn / fields exists adjacent to a small dam. While some clearing was also visible adjacent to the dam, this can be rehabilitated; only the lawn areas are included as In-use agricultural areas here (ca. 0.89 ha).		Medium-low	In use	Area surrounding dam should be mulched and planted.
17	30.73 ha	A view looking eastwards over the Past-use dryland pastures. The majority of the Past-use areas mapped on Portion 420 of OGF look very similar to this image.		Medium to Low	Past use	Recommended for irrigated mixed cropped farming. Manage as per agricultural measures.

vi. Area 5: Agricultural area, game farm, tourism, enclosures and supporting activities – ptn 420

A vegetation assessment was carried out for disturbed areas on ptn 373 in 2019 by Jan Vlok. The areas included in the 2019 assessment coincide with the past agricultural areas ground truthed in 2025. The 2019 and 2024 and 2025 assessments were used to complete the summary provided in Table 3.

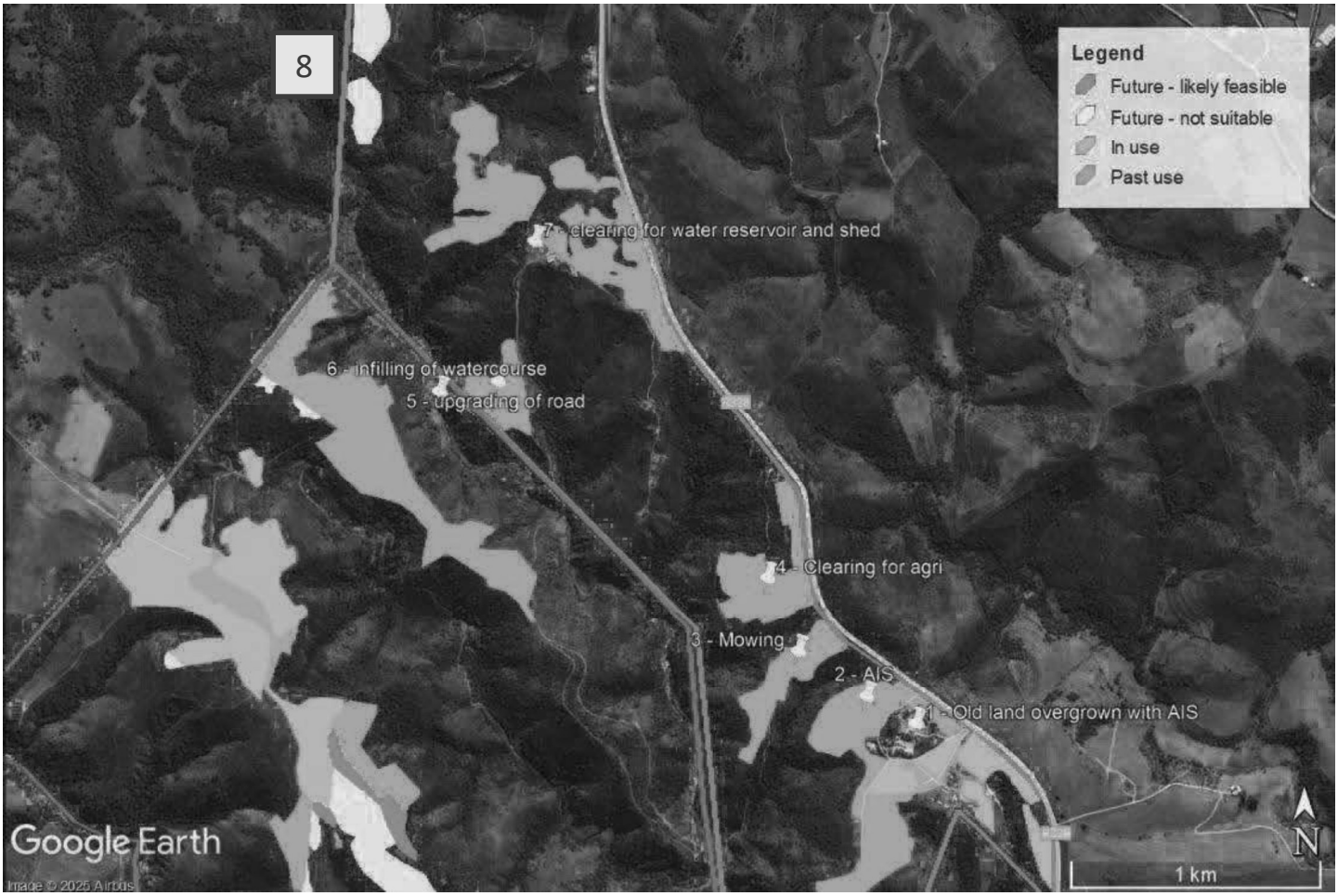
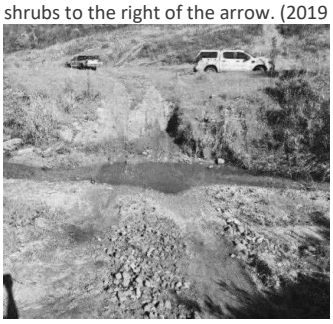


Figure 14: Past use areas on ptn 420 and previous assessments

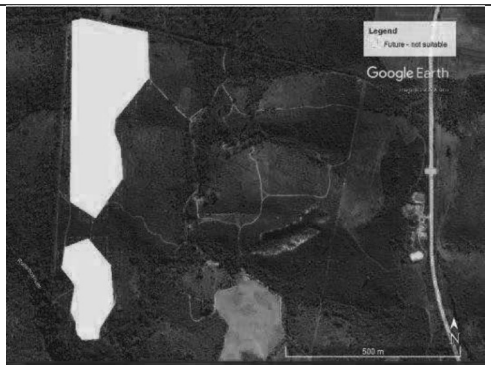
Table 3: Summary of agricultural areas ground truthed (areas 1 to 7) on ptn 420

Area	Size estimate	Description		Land use	Recommendation
1 and 2	30 ha	In use – 9.5 ha Past use -19.3 ha Restaurant, parking area, surrounding transformed gardens – 1.3ha An increase in the amount of built area and surrounding agricultural fields is visible from 1939 to 2024. The 2019 assessment found that the area consisted of an old agricultural land that was overgrown with *Acacia cyclops* and *Acacia mearnsii*. The fact that the area consisted of old agricultural lands is evident from old contour walls. No natural vegetation of any conservation significance was likely disturbed to re-establish the agricultural land.	 Areas 1 and 2 are located on the far slope with the reservoir just visible on the top of the hill. The old contour walls are still visible along the slope (Vlok, 2019)	In use / past use	Maintain infrastructure as required; Small scale agriculutral actvities permitted. Area proposed for elephant holding camp is included in this area. Holding camp for 3x elephants to be 1 ha. Manage as per agriculutral and elephant enclosure management measures.
3	6.5 ha	Currently this area contains several dryland fields that are transformed but not irrigated. The 2019 assessment found that vegetation was slashed to increase the grazing value of the veld and it seems as if this practice has been followed for many years along the crest of this ridge. It is very unlikely that the clearing of the vegetation at this site removed any rare or threatened plant species or that the clearing of the vegetation had a serious		Past use / in use	Dryland – maintain for game farm animals

		negative impact on the ecological functioning of the vegetation.			
4	10.7 ha	This is a past-use dryland field overgrown with *Acacia cyclops* and *Acacia mearnsii*.; no signs of irrigation. Looks similar to area 3.		Past use	Only dryland; lion and cheetah enclosure proposed for this area. Plan shows 17.6 ha and requires clearing of vegetation not mapped as past use. Retain footprint of enclosure to past use area (i.e. 10.7ha) Manage as per cheetah and lion enclosure management plan.
5 and 6	5.9 ha	Corresponds to Area 2 of Terrestrial biodiversity section assessed in 2024. Tracks, reservoir, dwellings, road-crossing, infilling. A 4X4 track was upgraded to access the riverine area where Blackwattle (*Acacia mearnsii*) is being eradicated. In 2019 it was found that most of the upgraded road does not exceed the allowed width of 4 m, but several curves had to be established in the very steep section of this road. In these road bend areas one can argue that the road width exceeds 4 m. The natural vegetation on the north-west facing slope was noted to not be in a healthy ecological condition. The area was clearly subjected to a high burning frequency and severe grazing pressure by domestic stock.	 2024 assessment – Area 2		Past use / in use	Rehabilitate roads in areas as required. Increase biodiversity in this area thorgouhg active re-vegetation. Prioritise for AIS removal. Dryland management only.

			 2019 assessment, the infilling area is marked with a red arrow. Note the cleared Blackwattle area above the arrow. The *Pelargonium cf. capitatum* plants are the three green shrubs to the right of the arrow. (2019 assessment)  Road croasing, 2024 assessment		Manage as per terrestrial biodiversity, AIS and fire management measures provided.

7	28.45 ha (14.6 ha + 12 .7 ha) + (1.15ha)	Past use amounts to 27.3 ha. The 2019 assessment describes an area of about 1 ha was cleared to establish a reservoir, a shed and general work area. Tunnels and a dwelling are also in place on this area. The remnant vegetation on the similarly flat area immediately to the east was described as an old agricultural land that overgrown with Blackwattle with a few grass species (*Cynodon dactylon* and *Eragrostis curvula*) and early pioneer shrubs (*Anthospermum aethiopicum, Athanasia trifurcata* and *Metalasia acuta*). The flat area south of this site was not ploughed earlier and is richer in species, but the species present in this southern area indicate that the vegetation was probably also highly disturbed as only the following species were recorded here: **Trees and large shrubs:** *Agathosma ovata, Athanasia trifurcata, Diospyros dichrophylla, Gymnosporia buxifolia, Leucadendron salignum, Metalasia acuta, Montinia caryophyllacea, Protea neriifolia* and *Searsia lucida*. **Smaller shrubs and herbs:** *Anthospermum aethiopicum, Aspalathus nigra, Berkheya heterophylla, Centella asiatica, Clutia polifolia, Cullumia aculeata, Erica discolor, Eriocephalus africanus, Euryops ericoides, Helichrysum nudicaule, Hermannia flammea, H. saccifera, Hibiscus aethiopica, Lobelia tomentosa, Pelargonium fruticosum, P. suburbanum, Psoralea azuroides, Scabiosa columbaria, Selago corymbosa, Senecio crenatus, S. ilicifolius, Stoebe plumosa* and *Tephrosia capensis*. **Graminoids:** *Aristida diffusa, Brachiaria serrata, Cynodon dactylon, Eragrostis capensis, E. curvula, Lanaria lanata, Melinus repens, Restio triticeus* and *Tribolium hispidum*. **Geophytes:** *Babiana fourcadei*, *Cyanella lutea*, *Oxalis pes-caprae, O. purpurea, Moraea polyanthos* and *Tritoniopsis caffra*.	 2019 assessment, estiamted 1 ha area cleared at Area 7. Note the dense stands of Blackwattle to the left of the road that is probably the best reference site for the cleared vegetation.  **Past use areas and dwelling and reservoir area**	Past use / In use	Maintain dwellings, don't use and rehabilitate unecessary roads. Manage as per AIS management plan and terrestrial biodiversity management measures.

		The only threatened species that was found in this southern area is a few individuals of *Freesia fergusoniae* (status = Endangered).			
8	11.5 ha	Past use agricultural area	 Past use area – not suitable for future use	Past use	Not recommended – rehabilitate unecessary roads.

3.3 Description of Plant Species

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report has identified the **Plant Species Theme of the** area as having **a medium sensitivity.**

The plant species that were listed in the Screening Tool report under the Medium plant species sensitivity were *Agathosma microcarpa, Diosma passerinoides, Elegia squamosa, Erica unicolor subsp. Mutica, Euchaetis albertiniana, Freesia fergusoniae, Lampranthus pauciflorus, Lidbeckia pinnata, Romulea jugicola*, and Sensitive species *268, 500, 516, 633, 700, 800, 980, and 1024*.

Thicket (representative of Gouritz valley thicket) was found to occur in the valley on Portions 420 and 373; the thicket was found to be very disturbed, invaded by Black wattles (*Acacia mearnsii*) with only small sections remaining intact with minimal disturbance. Two species of protected trees (Milkwood (*Sideroxylon inerme inerme*; no. 579) and Cheesewoods (*Pittosporum viridiflorum*; no. 139) were observed along the valleys from Area 2 to Area 3.

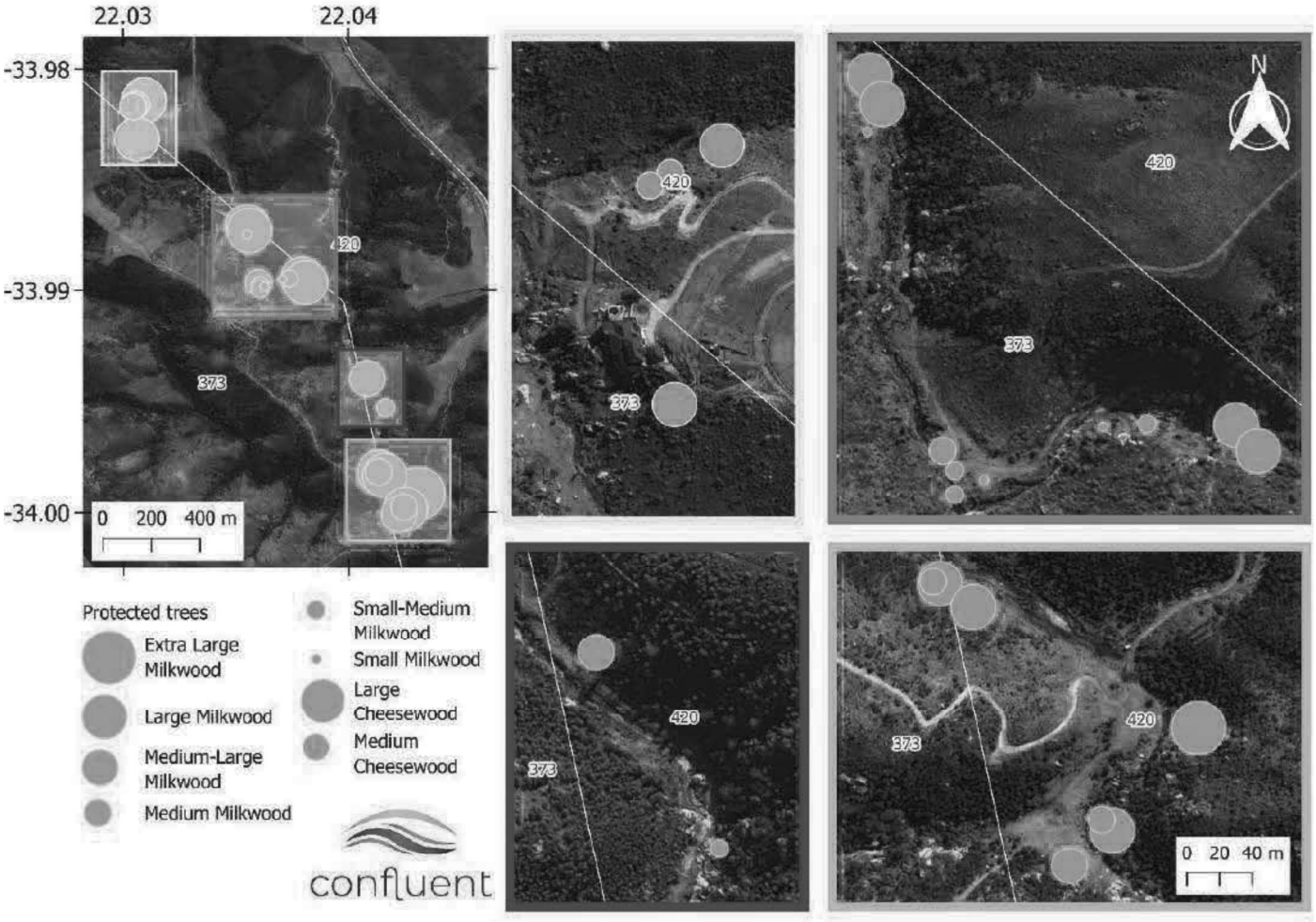


Figure 15: Indication of protected trees (Areas 2 and 3 and road area)

Six species of conservational concern occurring in the fynbos vegetation were confirmed to occur on site:

- One endangered (EN) species - *Erica unicolor mutica*
- Two near threatened (NT) species – *Phylica velutina, Jamesbrittenia calciphila*
- Three vulnerable species - *Hermannia lavandulifolia, Freesia cf. fergusoniae; SS142*; one is protected and targeted by poachers and may not be revealed. Sensitive species 142 occurred in area 2 and populations of this sensitive species are deemed to have been disturbed by construction activities.

The species recorded in this area in 2019 are as follows:

Trees and large shrubs: *Aspalathus kougaensis, Diospyros dichrophylla, Euclea crispa, Gymnosporia buxifolia, Metalasia acuta, Montinia caryophyllacea, Myrsine africana* and *Searsia lucida*.

Smaller shrubs and herbs: *Anthospermum aethiopicum, Argyrolobium argenteum, Aspalathus nigra, Barleria pungens, Chaetacanthus setiger, Erica discolor, E. peltata, Eriocephalus africanus, Euryops ericoides, Helichrysum nudicaule, Hermannia flammea, H. holosericea, H. hyssopifolia, Hibiscus aethiopica, Jamesbrittenia aspalathoides, Lampranthus elegans, Lobelia tomentosa, Pelargonium suburbanum* and *Tephrosia capensis*.
Graminoids: *Aristida diffusa, Brachiaria serrata, Cynodon dactylon, Eragrostis capensis, E. curvula, Eustachys paspaloides, Hyperrhenia hirta, Tribolium hispidum* and *T. uniolae*.
Geophytes: *Drimia capensis, Ledebouria ovalifolia, Oxalis pes-caprae, O. purpurea* and *Moraea polyanthos*.
The only threatened species that was found in this southern area is a few individuals of *Freesia fergusoniae* (status = Endangered).

Species occurring in the aquatic environmental in the Ruiterbos River channel provides habitat to a variety of plant species; Kikuyu grass (*Cenchrus clandestinus*) was present but had not taken over the channel.
SCC that may occur on site were identified using the screening tool report, iNaturalist observations, POSA database, and the site visit by the specialist. The probability of occurrence of these 43 SCC within fynbos, thicket and aquatic vegetation on site is provided below.

Probability of occurrence	Number SCC - Fynbos	Number of SCC – Thicket	Number of SCC - Aquatic
Confirmed	5	2	
Likely confirmed	1		
Very high	3	1	
High	6	2	
Moderate	10	10	
Low	14	7	1
Very Low	4	21	42

Full list is provided in the botanical assessment (Appendix H1)

3.4 Overview of Fauna

The farm portions have historically been used for cattle grazing and quarrying activities and associated dwellings, roads and water supply and had an estimated combine footprint of approximately 197 ha (98 ha on ptn 420; 99 ha on ptn 373).
Ptn 420 currently used as an operational game farm with supporting dwellings, restaurant facilities, tourist facilities and small agricultural / irrigation operations on ptn 420 (combined footprint of approximately 22ha). An elephant enclosure of approximately 1 ha for 4 elephants is proposed; a predator enclosure of approximately 10.4 ha is proposed.
Agricultural operations currently take place on approximately 60 ha of ptn 373 which includes the supporting infrastructure (solar facility, water storage, roads). An additional 20 ha is proposed for agricultural use, with 60 ha under irrigation and 20 ha available for rotation.
A large area of the property consists of intact fynbos representative of Swellendam silcrete fynbos and garden route granite fynbos; Gouritz valley thicket occurs in the valley area with large sections of the slopes invaded with *Acacia mearnsii.*

Swellendam silcrete fynbos is under threat, mostly due to cultivation (pastures) and pine plantations; **Garden Route granite fynbos is under threat due to mostly** cultivation, and some by pine plantations and urban development. Remnants are largely confined to isolated pockets on steeper slopes. Erosion is moderate and high. Very few patches remain in a pristine condition as most of it has been converted to pasture by liming, bush-cutting and frequent burning, and augmented with pasture grasses. Western remnants suggest that proteoid fynbos might have been dominant historically. It is easily converted to graminoid fynbos by regular fires and augmentation with pasture grasses.

A review of historical images shows that the majority of activities (with exception of 5 dwellings and new roads) currently in place have occurred on the areas that were previously disturbed by pastures.
Fynbos ecosystems grow on poor soils and don't support many large mammals. Antiherbivore defence (both structural and chemical) in fynbos is generally absent. In general, there's *low animal biomass* — meaning not a lot of big herbivores, birds, or even insects compared to other ecosystems. But the *variety* of species (especially insects) is high. There is very little seed dispersal by birds in fynbos. Frugivorous birds are generally absent from fynbos, with exception of the red-winged starling (*Onychognathus morio*). However, *nectar-feeding birds* (like sunbirds and sugarbirds) are relatively *common and visible* in fynbos, especially where there are many proteas and ericas. These birds play a key role in pollination. Bird pollination is especially common in fynbos — about 75% of all bird-pollinated plant species in southern Africa are found in fynbos. Fynbos plants often use *ants* for seed dispersal. This is why invasive ant species, like the Argentine ant, are a big threat — they can disrupt pollination and seed dispersal.
In fynbos, some plants are pollinated by small mammals like rodents and shrews, this is mostly seen in Protea (over 20 species) and a few *Leucospermum*, as well as in a few other genera like Erica and Leucadendron. These plants have special traits: their flowers are near the ground, dull in colour, and have a yeasty smell to attract mammals.
Pollination by rodents and shrews is most common in proteoid and asteraceous fynbos, and it's more likely to occur in dry areas where birds are less active, because the nectar doesn't need to be diluted with water. Rodents mainly feed on nectar during their breeding season, and some shrews visit flowers not for nectar, but to hunt insects like ants. Studies show that rodents can be responsible for about half **of seed production** in these plants. However, insects like bees and beetles also contribute significantly, even in flowers that seem adapted for birds or mammals.
Based on the flora identified on site and the site condition, insect pollinations seems to dominate on site:

- Bees and beetles (for Hermannia, Pelargonium, Aspalathus, Erica)
- Moths or rodents (possible in Freesia and geophytes)
- Occasional bird pollination for tubular-flowered species (e.g. some Erica)

Fauna commonly associated with Garden Route Granite Fynbos & Swellendam:

- Cape Sugarbird, Orange-breasted Sunbird, and Cape Grysbok, are known fynbos endemics or specialists.
- Striped Mouse, Cape Spiny Mouse, and Small Grey Mongoose are generalist but frequently occur in these fynbos types.
- Several reptiles like the Southern Rock Agama and Cape Dwarf Chameleon are known to inhabit fynbos landscapes and edges.

The screening tool report indicates a very high sensitivity for the majority of the area with medium sensitivity areas corresponding to old grazing areas. As indicated, the majority of current activities are taking place on the old grazing lands. An overview of fauna SCC identified in Screening tool report is provided in Table 4 with an indication of likelihood of occurrence in the project area. The expected fauna to occur naturally on site based on local species records and habitat characteristics is provided in Table 5. The mammals that have been introduced onto the ptn 420 are provided in Table 6.

The site supports habitat representative of Garden Route Granite Fynbos and Swellendam Silcrete Fynbos, both of which are known to host a diverse assemblage of faunal species, including several of conservation concern. While no targeted faunal surveys were undertaken, the habitat characteristics, Screening Tool outputs, and local species records indicate that a number of threatened or sensitive species could potentially occur on site, including the Black Harrier (*Circus maurus*), Parrot-beaked Tortoise (*Homopus areolatus*), and Sensitive Species flagged in the Screening Tool. In addition, the giraffe and bontebok occur on site, both with a conservation status of vulnerable.
The ecological integrity of areas such as Area 2 is of particular importance, as some species appear to have already been impacted by construction-related disturbance. To maintain faunal diversity and support conservation objectives, it is recommended that remaining natural areas be protected from further transformation, grazing be carefully managed, and alien invasive species be removed with appropriate restoration of indigenous vegetation and measures

to prevent disruption to fauna be put in place. With these measures in place, the site has the potential to continue supporting both common and conservation-significant fauna.

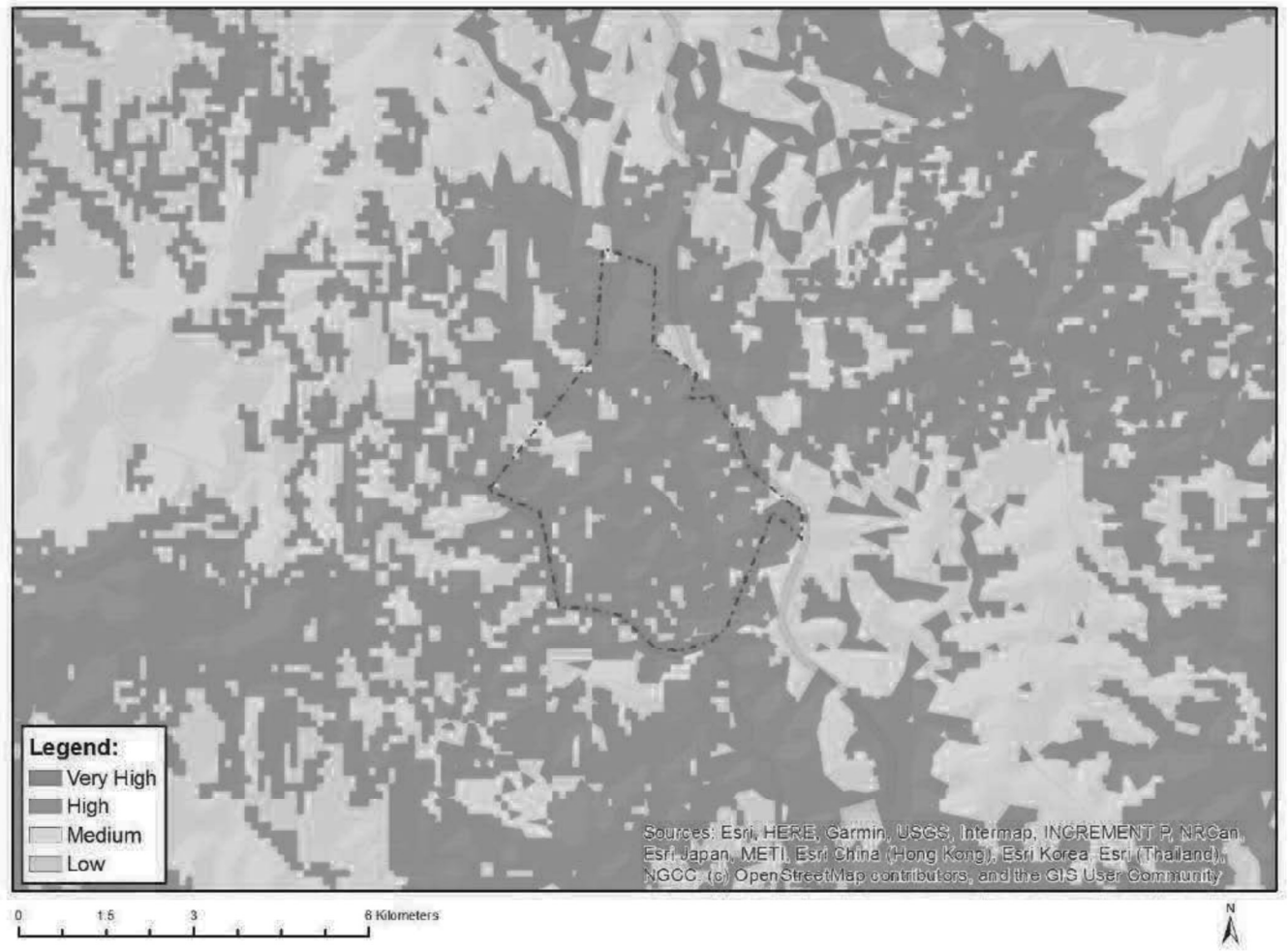


Figure 16: MAP OF fauna THEME SENSITIVITY

Table 4: Overview of fauna SCC identified in Screening tool report

Aves	Status	Overview
Crowned Eagle (*Stephanoaetus coronatus)*	VU	Occurs in forested valleys and mosaic landscapes near fynbos—possibly present if forest edges nearby. Rare in open fynbos. **Unlikely to breed on-site** but may pass through if forest edges are present nearby.
Forest Grassbird (*Bradypterus sylvaticus)*	VU	Rare and highly habitat-specific (dense reedbeds/wetlands). May be unlikely unless well-developed wetlands exist.
Black Harrier (*Circus maurus*)	EN	High likelihood of occurrence. Highly relevant. A flagship species of fynbos. Globally Endangered. Often forages in low shrubland/fynbos and grassland—appropriate for both vegetation types.
Martial Eagle *(Polemaetus bellicosus)*	EN	Large-range predator may occur occasionally in more open or mosaic landscapes with prey. Not fynbos specific.
African Marsh Harrier (*Circus ranivorus)*	NT	Wetland specialist—relevance depends on quality of wetlands. Could pass through or forage in wet areas.
Mountain Silverleaf (*Aneuryphymus montanus)*	VU	A fynbos-endemic grasshopper. Potentially present. This species prefers mountainous areas and collected in tough-leaved fynbos-like vegetation in rocky foothills. Threatened by overgrazing and habitat degradation.
Sensitive Species 5	VU	Predator. Does not occur naturally on site.

Sensitive Species 8	VU	Low – medium likelihood. Difficult to confirm. Browser and opportunistic feeding on eggs and insects; habitat includes forest, coastal scrub, farmlands, Prefers coastal forest thicket areas. Low water requirements; well camouflaged.

Table 5: Expected fauna for Garden Route Granite Fynbos and Swellendam Silcrete Fynbos

Common Name	**Scientific Name**	**Conservation Status**	**Notes**
Cape Grysbok	*Raphicerus melanotis*	Least Concern (LC)	Fynbos endemic, shy browser
Small Grey Mongoose	*Galerella pulverulenta*	LC	Widespread in fynbos & coastal scrub
Cape Porcupine	*Hystrix africaeaustralis*	LC	Mostly nocturnal
Striped Mouse	*Rhabdomys pumilio*	LC	Important fynbos pollinator
Cape Spiny Mouse	*Acomys subspinosus*	Near Threatened (NT)	Habitat specialist
Southern Aardwolf	*Proteles cristatus*	LC	Observed on site
Cape Genet	*Genetta tigrina*	LC	Nocturnal, observed on site
Cape Golden Mole	*Chrysochloris asiatica*	Near Threatened (NT)	Endemic, fossorial insectivore
Reptiles			
Parrot-beaked Tortoise	*Homopus areolatus*	Near Threatened (NT)	Coastal and fynbos endemic
Cape Cobra	*Naja nivea*	LC	Observed
Boomslang	*Dispholidus typus*	LC	Arboreal
Southern Rock Agama	*Agama atra*	LC	Common in rocky fynbos
Cape Skink	*Trachylepis capensis*	LC	Widespread
Cape Dwarf Chameleon	*Bradypodion pumilum*	Vulnerable (VU)	Threatened by habitat loss
Birds			
Cape Sugarbird	*Promerops cafer*	LC (but range-restricted)	Fynbos endemic, protea specialist
Orange-breasted Sunbird	*Anthobaphes violacea*	LC (but fynbos-restricted)	Strong fynbos indicator
Malachite Sunbird	*Nectarinia famosa*	LC	Nectar feeder
Amethyst Sunbird	*Chalcomitra amethystina*	LC	Observed on site
Lesser Honeyguide	*Indicator minor (ssp. minor)*	LC	Observed on site
Cape Batis	*Batis capensis*	LC	Forest edge/strandveld
Southern Boubou	*Laniarius ferrugineus*	LC	Common in thicket/fynbos fringe
Cape Robin-Chat	*Cossypha caffra*	LC	Widespread
Lanner Falcon	*Falco biarmicus*	LC	Observed on site
Invertebrates			Invertebrates
Group	*Example Species*		
Pollen Beetles	*e.g. Heterochelus spp., Melyridae*		Fynbos endemics, pollinators
Solitary Bees	*Various native genera*		Vital for endemic shrub pollination
Ants	*e.g. Camponotus, Lepisiota spp.*		Myrmecochory (seed dispersal)
Grasshoppers	*Infraorder Acrididea*		Observed
Butterflies	*Charaxes pelias, Chrysoritis spp.*		Some rare fynbos endemics

Table 6: Introduced Game Species (Current Land Use)

Common Name	Scientific Name	Feeding Type	Conservation status	Conservation / Occurrence Notes
Burchell's Zebra	*Equus quagga*	Grazer	Lc	More suited to grassland and savannah
Sable	*Hippotragus niger*	Grazer	LC	Not naturally occurring in this region
Waterbuck	*Kobus ellipsiprymnus*	Grazer	LC	Associated with wetter savannas and grasslands
Bontebok	*Damaliscus pygargus*	Grazer	VU	Endemic to southern coastal fynbos/renosterveld
Kudu	*Tragelaphus strepsiceros*	Browser	LC	Occurs in thicket-fynbos ecotones
Giraffe	*Giraffa camelopardalis*	Browser	VU	Not naturally occurring in fynbos
Nyala	*Tragelaphus angasii*	Browser	LC	Naturally occurs in more subtropical regions
Eland	*Taurotragus oryx*	Mixed Feeder	LC	Naturally occurring in montane fynbos and Karoo
Impala	*Aepyceros melampus*	Mixed Feeder	LC	Native to savanna regions, not fynbos
Springbok	*Antidorcas marsupialis*	Mixed Feeder	LC	Native to drier Karroo and, savannah and grasslands

3.4.1 Carrying capacity – livestock and game farm

a. Portion 420 of Outeniqua Game Farm

Portion 420 of Outeniqua Game Farm is approximately 489 ha.
Land use:
~16.5 ha for restaurant, dwellings, irrigated crops
~10.4 ha proposed predator enclosure
~1 ha elephant night holding
~5 ha for additional dwellings/agricultural use

Current (agricultural, restaurant, dwellings) and proposed (enclosures) will have a footprint of approximately 33 ha. This leaves approximately 456 ha of natural veld available for free-ranging game.
A Large stock unit is the equivalent of an ox weighing 450kg which gains 500 gram per day on grass pastures. In very dry areas, the stocking rate could be as light as one large stock unit (1 LSU) per 30ha, which means that you could run one head of cattle weighing 450kg on 30ha of the farm's grazing.

The following game numbers were provided; the corresponding LSU are included:

Animal	Count	Feeding Type	LSU/animal	Total LSU
Zebra	8	Grazer	0.75	6.0
Sable	15	Grazer	0.75	11.25
Waterbuck	19	Grazer	0.8	15.2
Bontebok	14	Grazer	0.3	4.2
Kudu	14	Browser	0.6	8.4
Giraffe	3	Browser	1.25	3.75
Nyala	28	Browser	0.5	14.0

Eland	23	Mixed Feeder	1.0	23.0
Impala	26	Mixed Feeder	0.2	5.2
Springbok	9	Mixed Feeder	0.15	1.35
Total LSU				92.35

It is proposed to include four elephants that will free roam during the day, with provision made for a 1 ha night-time holding enclosure. Based on SANParks (2008) and DAFF (2009) guidelines, one elephant is equivalent to approximately 5 LSU, contributing an additional 20 LSU to the estimated game pressure. However, the elephants will be in captivity and fed daily. These elephants will free-roam during the day under guided walks and be returned to a 1-hectare night shelter enclosure. Importantly, the elephants will not rely on the natural veld for foraging — daily supplementary feeding will be provided, primarily using lucerne grown and cut wattle (*Acacia* species) cleared from the infested valley areas. While this reduces pressure on the veld, it is still expected that some interaction with natural vegetation will occur, particularly as elephants are taken through alien-infested areas during guided walks. This is being considered a low impact clearing strategy, as elephants have the potential to physically disturb and remove woody alien invasive species (AIS), particularly *Acacia* spp. Although elephants are classified as high-impact feeders with a conversion rate of 5 LSU per individual, their limited foraging and managed movement reduce the long-term impact on carrying capacity. Nonetheless, their presence must be carefully monitored to prevent localized trampling or damage to recovering fynbos and thicket, especially in post-fire or erosion-prone zones.

Tainton, N.M. (1999) suggests stocking rates between 1 LSU per 5–10 ha for well-managed fynbos/thicket, reducing to 1 LSU per 12–15 ha for degraded or infested land. The Guidelines for Grazing Capacity Determination (DAFF, 2009) recommends 1 LSU/10–15 ha in low rainfall zones (<600 mm) and veld dominated by low-carrying capacity species.
Based on prevailing conditions — including low average rainfall (~450 mm/year), dominance of calcrete and silcrete fynbos with thicket valleys, and the presence of alien invasive species — a conservative carrying capacity of 1 LSU per 12 ha would yield a sustainable capacity of approximately 38 LSU; an optimistic carrying capacity would be 1LSU / 10 ha which would be 45 LSU.
However, considering that game are being supplemented daily with lucerne bales (cultivated on-site) and wattle biomass from ongoing AIS clearing, pressure is partially alleviated. Several of the species on the property — including eland, giraffe, nyala, and kudu — are primarily or partially browsers and have been observed utilizing invasive wattle species (*Acacia mearnsii*, *A. cyclops*) present in the valley thickets. While these species are not a preferred or high-quality forage source, limited consumption of wattle foliage, bark, and pods can supplement diets, particularly in winter and post-fire recovery periods.
This natural browsing behaviour, combined with active wattle clearing and mechanical thinning, can contribute to:

- Reduced pressure on indigenous thicket species,
- Biomass reduction of alien invasive species, and
- Partial supplementation of browsers, particularly eland and kudu, which are known to make use of wattle as fallback forage.

When combined with lucerne supplementation for grazers and elephants, the use of wattle by browsers supports a marginal increase in estimated carrying capacity; 1 LSU per 7 hectares may be cautiously applied, bringing the potential sustainable capacity to approximately 65 LSU, provided this is carefully monitored to avoid over-browsing of recovering thicket and indigenous regrowth.

Potential Extra-Limital Species for Fynbos/Thicket Areas:

- Gemsbok (*Oryx gazella*)
  Gemsbok are native to the arid, semi-desert regions of Southern Africa and are typically found in open, grassland habitats. They prefer grasslands and deserts and are not ideal for fynbos or thicket areas. Their strict grazing habits also make them less suited to the mixed vegetation of fynbos and thicket.
- Zebra (*Equus quagga*)

Like the gemsbok, zebra are typically found in grasslands and savanna ecosystems, with an affinity for open spaces and grazing. While they can adapt to some scrubby areas, they are not ideally suited to the thicket or fynbos vegetation, which are more suited for browsers.

The most suitable animals for the area include:

- Kudu (*Tragelaphus strepsiceros*)
  Suitable: Kudu are browsers and are well-adapted to fynbos and thicket habitats. They prefer areas with dense cover, which makes them a good fit for this type of environment.
- Nyala (*Tragelaphus angasii*)
  Suitable: Nyala are browsers that thrive in thicket and bush environments, feeding on shrubs and woody plants. They are well-suited to fynbos and thicket areas.
- Springbok (*Antidorcas marsupialis*)
  Suitable: Although primarily grazers, springbok are highly adaptable and can also browse in times of scarcity. They are found in semi-arid and drier habitats and can tolerate the fynbos areas if managed well.
- Impala (*Aepyceros melampus)*
  Suitable: Impala are mixed feeders, meaning they can both graze and browse, which allows them to adapt to a variety of habitats, including fynbos and thicket areas.
- Eland (*Taurotragus oryx*)
  Suitable, but needs careful management: Eland are mixed feeders (grazers and browsers), so they can adapt to fynbos and thicket areas, though they are large and need more space to graze. They can be considered appropriate for your area but would require careful stocking and management.

It must be noted that, research and similar management plans in the area, indicate that animals such and bontebok and zebra will not feed on fynbos. For the current area, based on reviewed information, a more suitable LSU would be between 45 and 65 LSU. Alternatively, 300 ha on the southern section of portion 373 could be considered to be incorporated into the game farm area to increase the area from 456 to 756 ha with a subsequent increase of carrying capacity (using 1:7ha) from 75 to 108, meaning the current game numbers would be comfortably within the carrying capacity of the area. This would however entail lowering the livestock on portion 373 and putting in required game fencing.

b. Portion 373

Portion 373 is approximately 789 ha in extent. Agricultural activities (crops) on ptn 373 is estimated to be 60 ha and an additional 20 ha to be used for rotational purposes. The number of livestock is livestock are in place (100 cattle; 50 sheep).

Livestock	LSU/animal	Total Animals	Total LSU
Cattle	1.0	80	80.0
Sheep	0.15	180	27
Total		150	107.5 LSU

Land use practices supporting higher carrying capacity:

- Lucerne is actively grown and used as supplementary feed, reducing veld pressure.
- Rotational grazing is applied across parts of the grazing area
- Dryland cultivation on a portion of the farm further reduces reliance
- Alien clearing activities continue, improving vegetation condition over time.

Summary of carrying capacity:

- Using 1 LSU per 12 ha the carrying capacity of ptn 373 is estimated at 60.75 LSU.
- Using 1 LSU per 10 ha the carrying capacity of ptn 373 is estimated at 72.9 LSU.
- Using 1 LSU per 7 ha the carrying capacity of ptn 373 is estimated at 104.19 LSU.

In many areas of South Africa, the rangeland condition and grazing capacity have deteriorated as a result of environmental conditions, but the biggest contributing factor has been the overutilization of the resource. (Mokolobate et al, 2015). Overutilization results mainly because the grazing capacity is over-estimated, resulting in high stocking rates, or simply because of a lack of knowledge by the farmer, which is sometimes aggravated by poor advice (Meissner et al. 2013 as cited in Mokolobate et al, 2015), The maximum capacity of livestock on the available area is considered to be at full capacity.

3.5 Verification of Terrestrial Biodiversity and Plant and Animal Species

Theme	Environmental Sensitivity in terms of DFFE Screening Tool Report	Site Verification
Terrestrial Biodiversity	Very High	Very high – fynbos and thicket
		Medium sensitivity – previous disturbed agricultural areas no longer in use (fynbos invaded with wattle)
		Low Sensitivity –watercourses / in use disturbed agricultural areas
Plant Species	Medium	High Sensitivity – Fynbos and Thicket
		Medium sensitivity – previous disturbed agricultural areas no longer in use (fynbos invaded with wattle)
		Low Sensitivity –watercourses / in use disturbed agricultural areas
Animal Species Theme	High	High

3.6 Impacts and Significance Rating – Terrestrial Biodiversity (including flora and fauna)

Past activities

Aspect	**Past agricultural activities (Area 4-1-15 and 17; Area 5)**
Phase	**Construction / Operations**
Baseline	**Historical vegetation on the property is** critically endangered (CR) Garden Route Granite Fynbos, endangered (EN) Swellendam Silcrete Fynbos (midlands upland fynbos ecosystems, FEG) with valley vegetation representative of Gouritz Valley Thicket (CR).
Impact:	**Habitat Loss and Fragmentation and loss of SCC**
Nature of impact:	**Direct**

Description

Historical agricultural activities (dryland cattle grazing) have modified identified areas on the property (little natural vegetation remaining, soil disturbance and AIS). Certain previously disturbed areas on the site show signs of fynbos regeneration and these areas are not recommended for further agricultural expansion / disturbance (22.98 ha). Most of the identified areas will require AIS management.

Area	Size estimate	Past land use	Current Land use	Recommendation
4-1	4,98ha	0.71 ha used in past	Roads and tracks	Not recommended Future use – not feasible
4-5	0.5 ha	Used in past	Not in use	Retain as fynbos;
4-6	6.79 ha	Used in past	Not in use	Retain as fynbos;
4-7	0.34 ha	Used in past	Not in use	Retain as fynbos Future use – not feasible
4-12	3.14 ha	Used in past	Not in use - invaded	Not suitable – low potential soils.

5-8	11.5 ha (agricultural)	Past use. Not in use / some tracks	Not recommended – rehabilitate unecessary tracks	Future use – not feasible

Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Without mitigation		With mitigation (AIS clearing and no disturbance to previously disturbed fynbos area)	
Spatial	Site	2	Site	2
Duration	Medium	4	Short to Medium	3
Frequency	Seldom	3	Infrequent	2
Intensity	Medium	3	Low	1
Severity	Medium High	10	Low	6
Consequence	Medium High	12	Low	8
Probability	Probable	4	Slight	2
Impact Significance	**Medium High**	**16**	Low	10
Mitigation / Reversibility	Ongoing removal of the AIS using a combination of fire, clearing and biological measures as per the recommended fire management and AIS management measures, can considerably improve the condition of the site. Certain previously disturbed areas on the site show signs of fynbos regeneration and these areas are not recommended for further agricultural expansion / disturbance (22.98 ha). The ongoing clearing of AIS and implementation of management measures could improve the functioning of terrestrial and aquatic ecosystems on OGF. Unnecessary roads and tracks must be rehabilitated as per rehabilitation plan provided in the EMPr.			
Confidence	High			

Construction - Existing activities

Aspect	**Clearing of vegetation for roads, dwellings (Areas 1, 2, 3)**			
Phase	**Planning / Construction**			
Baseline	**Intact fynbos / thicket with some AIS in dwelling areas; roads along watercourses heavily infested with AIS**			
Impact:	**Habitat Loss and Fragmentation**			
Nature of impact:	**Direct**			
Description of impact	Construction activities led to habitat loss and fragmentation. Disruption of plant communities; altered ecological processes. Roads should have been planned in order to avoid multiple redundant roads.			
Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2		
Duration	Life of operation	5		
Frequency	Medium	4		
Intensity	High	5		
Severity	High	14		
Consequence	Medium High	16		
Probability	Expected	5		
Impact Significance	**Negative High**	**21**		
Mitigation / Reversibility	Not possible – activity has already occurred			
Confidence	High			

Aspect	**Clearing of vegetation for roads, dwellings (Areas 1,2,3)**
Phase	**Planning / Construction**
Baseline	**Intact fynbos / thicket with some AIS in dwelling areas; roads along watercourses heavily infested with AIS**
Impact:	**Loss of indigenous vegetation and flora and fauna SCC**
Nature of impact:	**Direct**
Description	
Clearing of thicket and fynbos vegetation took place. A search and rescue of geophytes and succulents and fauna could have occurred. Habitat disturbance due to development and construction in Area 2 may have affected a population of a Sensitive Species (S142).	

Revegetation of bare soil following construction is an essential part of concluding the construction phase of the project. The plants that could have been rescued could have been used for this purpose both in the 2m disturbance footprint, as well as in areas where alien clearing could have taken place. Clearance of vegetation may have displaced small mammals, reptiles, and ground-nesting birds, especially within sensitive fynbos and wetland-edge habitats.
Unnecessary harm to fauna (particularly reptiles and burrowing mammals) could have been prevented.

Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1		
Duration	Long term / permanent	6		
Frequency	Rarely	1		
Intensity	Medium to high	5		
Severity	Negative Medium High	12		
Consequence	Negative Medium High	13		
Probability	Anticipated	6		
Impact Significance	**Negative Medium High**	**19**		
Mitigation / Reversibility	Not possible – activity has already occurred			
Confidence	High			

Aspect	**Clearing of vegetation for agricultural activities, enclosures and restaurant facility and supporting structures (reservoirs, solar, roads) (Area 4-15, 17, 9, 10,3 Area 5)**
Phase	**Planning / Construction**
Baseline	**Previously disturbed areas**
Impact:	**Habitat Loss and Fragmentation**
Nature of impact:	**Direct**

Description
These activities were developed on old agricultural lands. No further habitat fragmentation deemed to occur as a result of these activities.

Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1		
Duration	Medium - long	5		
Frequency	Rarely	1		
Intensity	Low	1		
Severity	Negative Medium High	7		
Consequence	Negative Medium High	8		
Probability	Slight	2		
Impact Significance	**Negative Low**	**10**		
Mitigation / Reversibility	Not possible – activity has already occurred			
Confidence	High			

Aspect	**Clearing of vegetation for agricultural activities, enclosures and restaurant facility and supporting structures (reservoirs, solar, roads) (Area 4-15, 17, 9, 10,3 Area 5)**
Phase	**Planning / Construction**
Baseline	**Previously disturbed areas**
Impact:	**Loss of indigenous vegetation and SCC**
Nature of impact:	**Direct**

Description
Clearing of vegetation took place. No search and rescue was carried out and therefore loss of some SCC may have occurred based on the natural vegetation and seed bank of the area. However, the probability, based on the current and previous vegetation assessments of this occurring on these areas is considered to be low as these areas had already been transformed upon purchasing of the land by OGF. Operational management must take place as per the operational mitigation measures.

Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1		
Duration	Medium - long	5		

Frequency	Rarely	1		
Intensity	Low	1		
Severity	Negative Medium High	7		
Consequence	Negative Medium High	8		
Probability	Slight	2		
Impact Significance	**Negative Low**	**10**		
Mitigation / Reversibility	Not possible – activity has already occurred			
Confidence	High			

Aspect	**Clearing of vegetation for agricultural activities at area 4-16 and associated crossing and dam area**
Phase	**Planning / Construction**
Baseline	**Intact area and falls within identified drainage line and mapped as a NFEPA valley bottom wetland**
Impact:	**Disruption of ecosystem services**
Nature of impact:	**Direct**

Description

Clearing of vegetation took place in a thicket area which was likely disturbed by AIS. The road was already in place in 2005 however no dammed area is visible. The mapped drainage line (DWS) seems to be thicket vegetation infested with AIS. This area is mapped as a NFEPA wetland. (Eastern Fynbos-Renosterveld Granite Fynbos_Channelled valley-bottom wetland).

A section of transformed lawn / fields exists adjacent to a small dam. While some clearing was also visible adjacent to the dam, this can be rehabilitated; only the lawn areas are included as In-use agricultural areas here (ca. 0.89 ha).

Figure 17: 2005 - Area 4-16

Figure 18: Current - Area 4-16 – showing dammed area, farming area and NFEPA channelled valley bottom wetland.

This area (0.89ha) is in a valley area and is recommended to be rehabilitated with thicket / riverine/ wetland vegetation. The dammed area needs to be modified to allow for drainage. The watercourse crossing will require a small culvert to be installed to ensure drainage during rainfall conditions. The operational management measures need to be implemented to ensure ongoing removal of AIS within the drainage line areas on the property. These measures should in the long term, increase the amount of water that can be captured by the proposed OGF2 dam during storm events. Buffers (32 meters) of intact riverine / thicket vegetation should be maintained along all drainage lines and should not be used for any activities (including agricultural activities) with exception of authorised activities – road crossings, dwelling within 32 meters and instream dam)

Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Life of operations	5	Life of operations	5
Frequency	Seldom	3	Seldom	1
Intensity	Medium	3	Low	1
Severity	Negative Medium	10	Low	7
Consequence	Negative Medium	12	Low	8
Probability	Possible	4	Slight	2
Impact Significance	**Medium**	**16**	Low	10
Mitigation / Reversibility	Possible – recommend modifications to allow drainage from this area; agricultural area should be rehabilitated back to thicket /riverine /wetland vegetation • This area (0.89ha) is recommended to be rehabilitated with thicket / riverine/ wetland vegetation. Modify dammed area to allow for drainage. • Culvert recommended at crossing to ensure drainage during rainfall conditions. • ongoing removal of AIS within drainage line areas on the property • Buffers (10 meters) of indigenous vegetation (as per rehabilitation plan) should be maintained along all drainage lines and should not be used for any activities (including agricultural activities) with exception of authorised activities – road crossings, dwelling within 32 meters, AIS clearing and instream dam)			
Confidence	High			

Construction and operations- Proposed and existing activities

Aspect	**Construction of Proposed dam – 150 000 m3 capacity**
Phase	**Construction and operations**
Impact:	***Loss of Riparian and Thicket Habitat and SCC***
Nature of impact:	**Direct**
Description Construction of a larger dam could have impacts on protected trees and other flora in the vicinity. The creation of an instream dam modifies the natural river environment by impounding water, which changes the flow regime and water levels upstream and downstream. This affects the ecological balance of the riparian zone and can lead to the submersion of previously existing habitats. Plants, invertebrates, fish, and other organisms that rely on specific riverine conditions may be adversely affected or displaced.	

Impact Status	Negative Impact		Negative Impact	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Local	3	Site	2
Duration	Very short	1	Very short	1
Frequency	Rarely	1	Rarely	1
Intensity	High	5	Medium	3
Severity	Negative Medium	7	Negative Low	5
Consequence	Negative Medium	10	Negative Low	7
Probability	Anticipated	6	Anticipated	6
Impact Significance	**Negative Medium High**	**16**	**Negative Medium**	13
Mitigation	Difficult / Possible - Protected trees must be avoided - All protected trees identified must be demarcated prior to the commencement of the construction of the dam. - If it is anticipated that protected trees will be affected by the construction of the dam, then the appropriate forestry licence must be obtained first. - Construction of the dam must occur during the dry season (i.e. December to January / June to July) - The disturbance footprint must be clearly defined and demarcated - Preferably one road should be used for access (entry and exit). - The access road may not be the Jeep track that extends between Areas 2 and 3 along the Ruiterbos River. - Should large muddy areas be created, these areas must be rehabilitated and stabilised to avoid unnecessary further reaching impacts.			
Confidence	High			

Aspect	**Agricultural activities, enclosures**
Phase	**Planning, construction, operations**
Impact:	***Loss of fynbos / thicket vegetation and habitats and disruption to fauna***
Nature of impact:	**Direct**

Description

Agricultural activities are in place on Area 4-15 and recommended to be managed as per EMPr; Suitable areas for expansion include area 4-17 and a small section is also identified on Area 4-13 (2.58 ha). Area 5-4 is considered an acceptable site for the predator enclosure and may not exceed the 10.4 ha previously disturbed footprint. Area 5 1&2 is considered acceptable for the development of the 1ha elephant enclosure. Disturbance of indigenous vegetation and associated fauna in these areas is deemed to be negative low with mitigation measures in place.

Impact Status	Negative Impact		Negative Impact	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Long term	6	Long term	6
Frequency	Infrequent	2	Rarely	1
Intensity	Medium	3	Low	1
Severity	Negative Medium	11	Negative Low	8
Consequence	Negative Medium	13	Negative Low	9
Probability	Anticipated	5	Slim	1
Impact Significance	**Negative Medium High**	**18**	**Negative Low**	10
Mitigation	Difficult / Possible - No further expansion of agricultural areas or development of structures other than those identified in this assessment should take place. - No agricultural activities to take place within 32 meters of drainage lines / river lines. Only authorised activities included in the S24G assessment are permitted within 32 meters of drainage lines / river lines – dam, watercourse crossings, single dwelling. - Carry out search and rescue for indigenous fauna and flora / protected trees within the agricultural footprint / enclosure footprints prior to disturbance of the area; - Rescue identified fauna / flora and place in similar area on property outside of agricultural / enclosure footprints (as necessary). - Permits required for fauna search and rescue (i.e., tortoises) must be obtained before any construction commences. Some animal species that potentially occur, in addition to potential flora and fauna SCC, are protected under CITES and the PNCO. A permit will be required for their removal where appropriate. For example, tortoises are listed on Schedule 2 of the PNCO and will, therefore, require permits for their removal during the construction phase of the project.			

	- A permit is required for activities that disturb protected bird species, particularly during the breeding season. Sites with eggs or chicks are considered to be protected sites. - Threatened species should be removed to similar habitat within proximity of the project area by a suitably qualified person where appropriate. Reptiles such as lizards are less mobile compared to mammals, and some mortalities could arise. - Record of permits for removal / transplanting of sensitive species of conservational concern / protected trees to be kept on record in EM file for audit purposes. - Ensure all required permits are in place from CapeNature for the predator and elephant enclosures. - Gathering of firewood / plants /fauna in adjacent areas is not permitted outside of search and rescue operations, AIS clearing operations. Staff and visitors should be informed of such. - Fines must be imposed for illegal collection of plants / animals on the property and reported if required (i.e. poaching suspected) - Movement of workers must be limited to areas under construction. Access to surrounding areas is not permitted; these must be designated as no-go areas during construction. - It is important that clearing activities are kept to the minimum and take place in a phased manner; this allows any smaller animal species to move into safe areas and prevents wind and water erosion of the cleared areas. - At any point (during construction), if an animal with limited mobility is observed on site, this should be reported to the ECO and construction temporarily halted. - No animals are to be harmed or killed during the course of operations - All open excavations must be securely fenced or barricaded. Excavations / dams / reservoirs must be checked daily for trapped fauna; floating devices should be placed in these for any trapped fauna to use. Trapped animals are to be rescued and released. - Establish strict speeding regulations. All personnel and visitors to abide to speeding regulations. Signs should be put up along the roads to remind people of speed limits, as well as warnings to look out for small animals on the roads. - For any assistance with snake removals/relocations, identifications, or bite treatment contact the African Snakebite Institute. - No insect zappers should be allowed on site, nor the general application of insecticides around infrastructure. Ecofriendly repellents are readily available (i.e. citronella oil/lotions) and should be used instead. - Speedbumps or other speed reducing techniques can be incorporated into the road design to assist in keeping speeds to a minimum. - No feeding of wildlife is permitted, and no disposal/discarding of any food waste (bones, scraps, fruit pips/cores) within the surrounding environment is allowed. - Ensure scavenger proof bins and waste management areas are in place to prevent access of wildlife to food waste
Confidence	High

Aspect	**Roads and tracks**			
Phase	**Post construction / operations**			
Impact:	**Habitat Loss and Fragmentation and unnecessary loss of SCC**			
Nature of impact:	**Direct**			
Description Creation of unnecessary roads and tracks leading to unnecessary loss of vegetation and habitat loss and fragmentation. Multiple, intersecting roads and the close proximity of new roads to existing ones perpetuate habitat fragmentation. The presence of new roads and dwellings has also created negative edge effects that affect ecological dynamics. These influence plant growth, species interactions, pollinators, and biodiversity.				
Impact Status	Negative Impact		Negative Impact	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Medium	4	Medium	4
Frequency	Infrequent	2	Rarely	1
Intensity	Medium	3	Low	1
Severity	Negative Medium high	9	Negative Medium	6
Consequence	Negative Medium	11	Negative Medium	8
Probability	Anticipated	6	Slight	2
Impact Significance	**Negative Medium High**	**17**	**Negative Low**	10
Mitigation / Reversibility	Difficult / Possible - No new road may be constructed directly adjacent to an eroding existing road, especially when no erosion control measures are in place. - Determine which roads are needed for game drives, agricultural activities and management activities and rehabilitate roads not needed / not feasible to drive- mulch and revegetate			

	- No more new roads are to be made along the valley slopes that lead to the Ruiterbos River. - Where feasible, utilize existing roads instead of constructing new ones. Upgrading and expanding current roadways can be more environmentally beneficial than creating new routes. - Some of the existing roads are redundant, and one path must be chosen and used. Design and implement shared access routes where possible, combining multiple access points into single, multi-use roads. This approach minimizes the total length of roads required and reduces habitat fragmentation. - Plan road layouts to minimize impact on sensitive areas, such as wetlands, riparian zones, and critical habitats. Ensure that the road network is as compact and direct as possible to reduce land disturbance and fragmentation. - Where roads are along steep inclines, ensure that the road meanders down as opposed to cutting straight down. This will minimise erosion. - The new road that was excavated between May and August 2024 must be rehabilitated with fynbos species only, as the old road is still functional and can be upgraded to reduce the likelihood that it will become eroded. - The illegal wide road assessed north of the northernmost dwelling in Area 2 should preferably be rehabilitated and the associated river crossing should be removed. - The road at Area 4-16 should be equipped with a culvert and the dammed area modified to ensure drainage from the area; the surrounding 0.89 ha to be seeded with vegetation as per rehabilitation plan. A well-maintained road between Areas 4-15 and 4-17 is important as these will be the main agricultural areas on the site.
Confidence	High

Aspect	**Dwellings, facilities and structures**			
Phase	**Operations**			
Impact:	**Habitat Loss, SCC Loss and Fragmentation**			
Nature of impact:	**Direct**			
Description of impact	The presence of dwellings, supporting structures and facilities has created negative edge effects that affect ecological dynamics. These influence plant growth, species interactions, pollinators, and biodiversity.			
Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Life of operation	5	Life of operation	5
Frequency	Seldom	3	Rarely	1
Intensity	Low to medium	2	Low	1
Severity	Medium High	10	Medium	7
Consequence	Medium High	12	Medium	8
Probability	Plausible	3	Slight	2
Impact Significance	**Negative Medium**	**15**	**Low**	**10**
Mitigation / Reversibility	Possible – - Gardens to be redesigned to be water wise and avoid erosion and friendly to wildlife and the greater natural habitat. - Plan gardens to capture rainfall & slow water loss. - Create a grey-water wetland if there is a need for water filtration & absorption of extra nutrients. - No garden waste is to be dumped in any remaining natural area and must be disposed of in a responsible manner. Select an existing level site within an existing disturbed footprint for a composting area. - No NEMBA invasive plants permitted in landscaping - Plant local indigenous vegetation; thicket around dwellings are recommended as fire mitigation measures; grey water wetlands can also be planned to serve as a firebreak for the dwellings. - Avoid plants that are hybrids and cultivars - Plant during the rainy season (early winter May/June) and add a 10cm thick layer of wood chip to keep in moisture. - Reduce or replace lawns with water-wise groundcovers or enlarging shrub beds. - Add local edible and aromatic plants - Avoid water & nutrient intensive vegetable gardens - Ensure soft landscaping (natural vegetation) is used as opposed to hard landscaping (avoid impermeable surfaces) - Clearly delineate maintenance zones and employ low-impact maintenance techniques - Schedule major maintenance activities to avoid critical periods such as flowering, seed dispersal, and pollination periods (for most species this is during spring between September to November).			

	- Gathering of firewood / plants /fauna in adjacent areas is not permitted outside of search and rescue operations, AIS clearing operations. Staff and visitors should be informed of such. - Establish strict speeding regulations. All personnel and visitors to abide to speeding regulations. Signs should be put up along the roads to remind people of speed limits, as well as warnings to look out for small animals on the roads. - For any assistance with snake removals/relocations, identifications, or bite treatment contact the African Snakebite Institute. - No insect zappers should be allowed on site, nor the general application of insecticides around infrastructure. Ecofriendly repellents are readily available (i.e. citronella oil/lotions) and should be used instead. - Speedbumps or other speed reducing techniques can be incorporated into the road design to assist in keeping speeds to a minimum. - No feeding of wildlife is permitted, and no disposal/discarding of any food waste (bones, scraps, fruit pips/cores) within the surrounding environment is allowed. - Ensure scavenger proof bins and waste management areas are in place to prevent access of wildlife to food waste – refer to waste management. Rehabilitation plan to include: - Rehabilitate cleared areas with native fynbos / thicket / riparian vegetation. This will stabilize the soil, reduce erosion, and create a natural barrier to prevent debris from reaching the river. - Initial graminoid ground covers that could be considered include members of the families Restionaceae, Cyperaceae, and Poaceae. Examples of species that could be planted includes *Aristida diffusa, Aristida junciformis, Cynodon dactylon, Ehrharta erecta, Elegia tectorum, Eragrostis capensis, Eragrostis curvula, Ficinia truncata (near the watercourse), Ischyrolepis subverticillata, Pentameris macrantha, Pentameris pallida, Restio festuciformis, Restio quadratus, Schoenoxiphium lanceum (riparian zone), Stipa dregeana, Tetraria bromoides, Thamnochortus insignis, and Themeda triandra.* - No kikuyu grass may be planted. This is a listed and recognised invasive species. - Dwelling disturbance and invaded areas between the dwellings should be rehabilitated and ongoing alien clearing effort should be prioritised in these areas. - Active restoration will need to take place at the rehabilitated road and associated river crossing in order to minimise further erosion and sediment transport. Introduce hardy, fast-growing native ground cover plants that are well-adapted to local conditions. Grasses that can be considered include Themeda triandra, Eragrostis capensis, Eragrostis curvula, and Stenotaphrum secundatum. - *Osteospermum moniliferum (Bietou), Diospyros dichrophylla, Searsia glauca, Pterocelastrus tricuspidatus (Candlewood), Grewia occidentalis (Crossberry), Carissa bispinosa, and Euclea racemosa (Gwarrie)* are also appropriate for this illegal road section. - Develop a long-term monitoring plan for the kikuyu grass at the jeep track along the Ruiterbos River to ensure that it doesn't invade into the Ruiterbos River drainage line. - Protected trees may not be impacted on by clearing and rehabilitation activities
Confidence	High

Aspect	**Game farming and stock farming**
Phase	**Operations**
Impact:	Exceeding carrying capacity and poaching treat
Nature of impact:	**Cumulative**

Description

Grazers , browsers and mixed feeders are kept on OGF. Habitats and foraging areas include fynbos, thicket, ravines and old grazing lands. Note that animals such as bontebok and zebra are selective grazers and will not feed on the fynbos.

The carrying capacity of ptn 420 is estimated at between 45 and 65 LSU; the existing LSU is 92 LSU.

The carrying capacity of ptn 373 is estimated at between 60 and 104 LSU; the existing LSU of 107 is considered to be at maximum land capacity.

The current ratio of feeders is estimated at:

- Browsers: ~28.5%
- Grazers: ~39.5%
- Mixed Feeders: ~32%

Recommended ratio:

- Browsers: 40–60% Browsers
  Grazers: 30–50% Grazers
  Mixed Feeders 10–20%

Over stocking of animals can result in overgrazing and / over browsing and degrade sensitive fynbos vegetation and reduce habitat for small mammals, birds, and invertebrates and alter vegetation structure and species composition over time. High numbers of extra-limital species (e.g., Waterbuck, Nyala, Giraffe) may outcompete native species or alter plant communities. Lack of natural predators and artificial feeding may affect ecological dynamics.

High grazer pressure (currently 39.3% of total LSU) can reduce grass cover, leading to erosion and invasive plant proliferation; an underrepresentation of native browsers can lead to imbalance in shrub management, potentially affecting small specialist herbivores and plant pollinators.

Maintaining a suitable grazer/ browsing / mixed feed ratio can assist to prevent overgrazing and soil loss and mimic the natural diversity of feeding behaviours. The current ratio shows that browsers are slightly underrepresented for a fynbos landscape, where shrubs and ericoid vegetation dominate. It is recommended to decrease the number of selective grazers (i.e., zebra and waterbuck).

Ongoing monitoring of the 4 elephants will be required to determine their natural foraging in the area during walks.

Ongoing AIS clearing and rehabilitation and careful management can increase the carrying capacity of the land. Ensure anti-poaching measures are in place to prevent harm to the fauna on site.

Impact Status	**Negative Impact**		**Negative / Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Medium – long term	4	Medium	3
Frequency	Seldom	3	Infrequent	2
Intensity	Medium	3	Low	1
Severity	Negative Medium High	10	Negative Low	6
Consequence	Negative Medium High	12	Negative Low	8
Probability	Expected	5	Slight	2
Impact Significance	Medium High	18	Low	10

Mitigation

- Reassess stocking rates and the browser: grazer ratio relative to carrying capacity
- Monitor sensitive species and implement exclusion zones or buffer areas in regions with confirmed SCC or high conservation value.
- Put in place AIS, fire management and rehabilitation plan
- Consider removal of extra-limital selective grazers (zebra, waterbuck) are not typical of this vegetation type – their presence should be justified by low numbers and active management.
- Encourage coexistence of native fauna and managed game by:
  - Maintaining connectivity between natural patches
  - Avoiding fencing that blocks small animal movement
- Ongoing monitoring of the 4 elephants will be required to determine their natural foraging in the area during walks. Record of plants utilized naturally should be kept and note if any AIS is preferred.
- Incorporate these measures into a comprehensive game farm management plan
- Ensure all SCC permits, enclosure permits, and game farming permits are in place and kept up to date and relevant requirements are adhered to
- Ensure anti-poaching measures are in place:
- Regular patrols by trained personnel to identify snares and traps, recent human activity (cut fences, spoor etc), injured / snared animals. Follow up reporting (CapeNature, SAPs as required).
- Installation of surveillance equipment in key areas

Confidence	High

4. Alien Invasive Vegetation

4.1 Description of baseline conditions

Landowners are under legal obligation to control alien plants occurring on their properties. Alien Invasive Plants require removal according to the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act (10 of 2004; NEMBA): Alien and Invasive Species Lists (GN R598 and GN R599 of 2014).

AIS infestation is a common problem facing many farmers and the AIS infestation is generally common along the drainage lines. The extent of AIS on the property has been estimated as an area of approximately 200ha occurring mostly within the drainage line on the site.

The valley areas along the drainage lines is heavily infested with *acacia mearnsii*.

The following AIS were found in thicket and valley areas:

Black wattles (*Acacia mearnsii*)
Plume Albizia (*Paraserianthes lophantha*)
Inkweed (*Phytolacca octandra*)
Jimson weed (*Datura stramonium*)
Purpletop vervain (*Verbena bonariensis*)

The following AIS were found in fynbos and valley areas:

- Kikuyu Grass (*Cenchrus clandestinus*)
- Bull Thistle *(Cirsium vulgare)*
- Indian fig opuntia *(Opuntia ficus-indica)*
- Western coastal wattle *(Acacia cyclops)*
- Bushy needlebush *(Hakea sericea)*
- Bugweed *(Solanum mauritianum)*

Kikuyu grass (*Cenchrus clandestinus*) was found to be present in the aquatic environmental in the Ruiterbos River channel but had not taken over the channel.

Ongoing removal of the AIS using a combination of fire, clearing and biological measures as per the recommended fire management and AIS management measures, can considerably improve the condition of the site. The ongoing clearing of AIS and implementation of management measures could improve the overall functioning of terrestrial and aquatic ecosystems on OGF.

Extracted from AN EXPERIMENTAL STUDY OF THE EFFECT OF ACACIA MEARNSII (BLACK WATTLE TREES) ON STREAMFLOW IN THE SAND RIVER, ZWARTKOPS RIVER CATCHMENT, EASTERN CAPE, Rowntree, Beyers, 1999:

Pristine fynbos catchments are known as reliable sources of large quantities of high-quality water, but with the invasion of alien trees this reliability is being threatened (Le Maitre et al., 1996). The mountain catchments of the Fynbos Biome yield large amounts of water - essential for the social and economic development of the region (Cowling, 1995). Fynbos shrubs provide a stable ground cover inhibiting sheet erosion and encouraging infiltration, as opposed to stands of Acacia mearnsii which develop bare soil under the canopy (Macdonald, 1987). The indigenous plants also require less water to survive than the high biomass stands of A. mearnsii, resulting in more water reaching the streams and rivers (Cowling, 1995; Le Maitre et al., 1996).

Figure 19: Estimated AIS areas on property falling mostly within drainage line areas

4.1 Impacts and Significance Rating – Alien Invasive vegetation

Aspect	**Construction activities**			
Phase	**Construction of**			
Impact:	**Increase in AIS / displacement indigenous vegetation**			
Nature of impact:	**Direct**			
Description of impact Construction activities (dam, clearing for agricultural activities) can lead to introduction of AIS and lead to seeding of AIS on disturbed areas. AIS must be hand removed immediately on construction areas to prevent further invasion of AIS on the farm.				
Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Medium	4	Very short	1
Frequency	Regular	4	Infrequent	2
Intensity	Low	1	Low	1
Severity	Negative Medium	9	Negative Medium	4
Consequence	Negative Medium	11	Negative Medium	5
Probability	Plausible	3	Plausible	3
Impact Significance	**Negative Medium**	**14**	**Negative Low**	**8**
Mitigation / Reversibility	Possible - Materials used during construction must be sourced and transported responsibly to minimise the risk new invasive plants - Adequately clean construction equipment and machinery to prevent the transfer of invasive seeds / plant material between sites.			

	- Train all staff to identify common AIS (black wattle) and hand remove as soon as detected - Dispose small plants; large plants are addressed for operational phase - Native plant species collected during site clearing activities to be used for site restoration and revegetation to outcompete invasive plants and restore ecological balance
Confidence	High

Aspect	**Alien Invasive Management**			
Phase	**Operations**			
Impact:	**Increase in AIS / displacement indigenous vegetation** **Poor management can lead to disruption to ecosystem services / correct management can be beneficial for terrestrial and aquatic ecosystems**			
Nature of impact:	**Direct**			
Description of impact The established invasives further alter plant community structures and reduce the resilience of the native flora, maintaining an ongoing challenge for ecological recovery. Incorrect management of removed AIS; material placed in watercourse at several locations disrupting the flow of the Ruiterbos river impacting on its health and ecosystem services; ensuring no slash material is dumped into the watercourse can reverse this to a negligible impact.				
Impact Status	**Negative Impact**		**Negligible Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Medium	4	Short	1
Frequency	Seldom	3	Rare	1
Intensity	Low to medium	2	Low	1
Severity	Medium	9	negligible	3
Consequence	Medium	10	negligible	4
Probability	Plausible	3	Plausible	1
Impact Significance	**Medium**	**13**	negligible	**5**
Impact:	**Correct management can be beneficial for terrestrial and aquatic ecosystems**			
Nature of impact:	**Cumulative**			
Description of impact Ongoing removal of the AIS using a combination of fire, clearing and biological measures as per the recommended fire management and AIS management measures, can considerably improve the condition of the site. The ongoing clearing of AIS and implementation of management measures could improve the overall functioning of terrestrial and aquatic ecosystems on OGF.				
Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Medium	4	Medium	4
Frequency	Seldom	3	Seldom	3
Intensity	Low to medium	2	Low to medium	2
Severity	Medium	9	Medium	9
Consequence	Medium	10	Medium	10
Probability	Plausible	3	Plausible	3
Impact Significance	**Medium**	**13**	**Medium**	**13**
Mitigation / Reversibility	Possible Alien invasive species management plan to include: - Disturbed areas around dwellings must be cleared of invasives with the aim of rehabilitating the fynbos / thicket vegetation. - When chemical treatments are necessary for the treatment of invasive plants, use targeted applications that minimize exposure to non-target species. - Areas with new / small infestations should be targeted for alien clearing first, gradually moving to areas with denser & more established invasions. - Target hilltops and upstream areas first for clearing. - Native plant species should be used for site restoration and revegetation to outcompete invasive plants and restore ecological balance. - New invasions to be promptly cleared on ongoing basis			

	- Set up collection areas for removed AIS materials – areas should be level and outside floodline - Do not stockpile removed AIS materials / debris in watercourses within floodline of the river - No burning of AIS is preferred; if AIS material is to be burnt it must not be burnt in watercourses / within floodline of the river - Clear smaller areas at a time; - Shred / chip cleared material on site to create mulch to prevent erosion and suppress wattle regrowth and / or create windrows (long, narrow piles) of AIS material away from the river and position these on contour lines to reduce erosion and allow for natural decomposition - Cut prior to seed formation or implement biological control measures to prevent seed formation (seed-feeding weevils and gall-forming flies and wasps which prevent seed production by inducing the formation of galls instead of seed pods). This will increase the prospects for effective control through the combination of mechanical felling, fire, and seed reduction. o Acacia mearnsii (Black Wattle) typically flowers in spring to early summer (August–November), and seeds mature by late summer/autumn. o Acacia cyclops (Rooikrans) flowers mostly in late winter to spring (July–October), with seed pods developing by summer. o Best Time to Cut: Late autumn to early winter (May–June) - - Combine mechanical felling, chemical control, and biological control. This measure is in place for Black wattle infestations along the valley edges where the Ruiterbos River meanders. - Plant indigenous vegetation (provided in rehabilitation plan) on cleared sloped areas to encourage regrowth as per rehabilitation measures. - Fire management should also include blocks of dense AIS areas – where burning of wattle occurs prior to seed bearing stage of wattle and during seeds formation of fynbos (i.e. winter months) - New invasions to be promptly cleared on ongoing basis - Protected trees may not be impacted on by clearing activities - Research shows that elephants have preference to *Acacia mearnsii* to fynbos vegetation; plan walks through areas with newly emerging A. mearnsii in attempt to allow elephants to remove these naturally. *A. mearnsii* which is cut on the property can also be used as feed for the elephants in combination with lucerne.
Confidence	High

5. Fire Management

5.1 Description of baseline conditions

Vegetation on site is representative of critically endangered (CR) Garden Route Granite Fynbos and endangered (EN) Swellendam Silcrete Fynbos; these are grouped as midlands upland fynbos ecosystems in the Fynbos Ecosystem Guidelines. Fynbos is a fire driven ecosystem. A fire scar assessment was carried out (SANSA, 2017) following a fire in the area on 23 December 2016. Fire risk is confirmed to be high. The fire risk on the property (and surrounding areas) is exacerbated by the alien invasive species.

The enhanced biomass that results from dense stands of woody aliens increases the intensity and temperature of fires which, in turn, can destroy indigenous seed banks and change the physical structure and composition of soil. Fynbos is particularly prone to the spread of alien species after physical disturbance and unseasonal and too-frequent fires. Black wattle Acacia mearnsii can spread virulently in mountain streams. Altered fire regimes can also be a major problem in fynbos ecosystems with veld either burnt too frequently or fire is actively suppressed. Reduced fire frequency associated with development means that many patches convert to thicket or forest. (Fynbos Ecosystem Guidelines).

It is a legal duty and responsibility to ensure that veld fires do not break, and to take preventative measures to minimize the risk of fires spreading. Property owners are required to prepare and maintain firebreaks on the boundary of their property to prevent the spread of fires to neighbouring lands. Fire management practices are required to prevent and combat fires.

Controlled burns, fire breaks and fire proof hedges are required to be implemented. Fire management must take place in conjunction with alien invasive management and must taking grazing requirements into consideration. Fire frequency depends in part on degree and type of grazing applied. It is important that this application be reviewed by the Southern Cape Fire Protection Association (SCFPA) so they can provide comments on the management recommendations from a fire risk reduction perspective. It is noted that OGF is a member of the SCFPA.

The natural fire season is during the hot dry season (i.e. summer or early autumn). In Granite Fynbos, Ferricrete, Conglomerate and Silcrete Fynbos (i.e. fynbos on the property), hot burns are required to prevent over-dominance of weedy elements such as renosterbos *Elytropappus rhinocerotis* and *Cliffortia* spp. Hot-burning fires also allow recovery of large-seeded species, early seral species, prominent in these communities. Pioneer (early seral) plant species take 4-8 years to disappear and be replaced by typical fynbos.

Too frequent burns to promote grasses for grazing can impact fynbos ecosystems. However, reduced frequency can result in transition of fynbos to thicket. The recommended burning interval for this area is 10-15 years. To retain species richness, appropriate grazer-browser ratios and certain fire regimes must be retained.

5.2 Impacts and Significance Rating – Fire management

Aspect	**Fire regimes and planning**			
Phase	**Construction and operations**			
Impact:	**Fire risk and hazard**			
Nature of impact:	**Direct**			
Description of impact: The dwellings positions should have been selected in order to maintain the ability of fynbos to burn in the future. the Dwellings in Area 1 should not have been built on a hilltop and should have been planned for more flat areas (Esler et al., 2014). However, measures can be put in place to reduce fire risk of this area. With the occurrence of the high number of alien vegetation on the site and natural fynbos, the site is considered to have a high fire risk; measures must be put in place to prevent unplanned fires and control planned fires. With no management of the Fynbos, it will start to present a fire risk and will result in long-term biodiversity loss. It recommended that the OGF remain a member of the SCFPA. Fire-proof hedges (Esler et al., 2014) can be made with indigenous species to reduce fire risk around the built environment. With recommendations implemented the risk of uncontrolled burns can be prevented / reduced.				
Impact Status	Negative Impact		Negative Impact	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Local	3	Site	2
Duration	Very short	1	Very short	1
Frequency	Rarely	1	Rare	1
Intensity	High	5	Low-medium	2
Severity	Negative Medium	7	Low	4
Consequence	Negative Medium	10	Low	6
Probability	Anticipated	6	Possible	4
Impact Significance	**Negative Medium High**	**16**	**Negative Low**	10
Impact:	**Fire driven ecosystem**			
Nature of impact:	**Direct**			
Description of impact: The correct hot fires at correct timing and intervals, combined with ongoing AIS and rehabilitation should result in a long-term positive impact for the fynbos vegetation.				
Impact Status	Negative Impact		Positive Impact	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Local	3	Site	2
Duration	Very short	1	Medium to long	4
Frequency	Rarely	1	Rare	1
Intensity	High	5	Low	1
Severity	Negative Medium	7	Negative Low	6
Consequence	Negative Medium	10	Negative Low	8
Probability	Anticipated	6	Plausible	3
Impact Significance	Negative Medium High	**16**	Positive medium	11
Mitigation				

- Fire management must comply with the National Veld and Forest Fire Act No. 101 of 1998, which mandates a 5m fire break where natural veld adjoins agricultural land or alien areas. - All landholders must implement a fire management plan. A permit is required from the Fire Protection Association (FPA) to conduct controlled burns. - Controlled burns must be planned with local fire authorities - Recommended fire frequency: Every **10 to 15 years** for mature calcrete and silcrete fynbos types as these fynbos types typically regenerate more slowly than sandstone fynbos. Too frequent fires could reduce seeds banks. Last fire occurred December 2016; controlled burns will be required between 2026 and 2031. Recommended burning Strategy: - Patch burns (mosaic burning): Recommended over blanket burns to reduce fire intensity, maintain habitat heterogeneity, and allow wildlife and livestock to move between burned and unburned areas. - Target areas: Prioritize areas with dense alien growth or moribund vegetation for burning. Burning should occur before seed-set of alien species like Acacia mearnsii or Acacia cyclops. - Post-burn recovery: Exclude livestock for 1 season post-burn using temporary fencing to allow vegetation recovery. Follow up with manual clearing to prevent alien species resurgence. - Conduct burns **late summer to early autumn** (March–April) under mild conditions to reduce fire risk and align with the natural fire season, allowing early winter rains to stimulate regrowth. Ongoing Management and Safety: - AIS control: Ongoing clearing of alien invasive species (AIS) must be part of the fire management strategy. - Fire safety: Designate areas for fire, ban open fires outside these zones, and install fire-proof hedges using indigenous species to reduce fire risk around built environments. - Emergency measures: Ensure adequate fire-fighting measures, emergency water supply, and visible emergency numbers at all times. Key staff should have access to emergency contact information. - Training: Provide job-specific fire management training for all individuals responsible for managing fires.	
Confidence	High

6. Aquatic ecosystem and biodiversity

6.1 Description of baseline conditions

OGF is located in quaternary catchment K10D of the Kromme Primary Catchment. OGF covers a combined area of 1277 ha in extent and are located in the foothills of the Outeniqua Mountains within the Southern Coastal Belt ecoregion which is located between 0 and 500 masl and is characterized by undulating plains and low hills of moderate relief. The mean annual precipitation (MAP) is relatively low (454 mm per annum - Bailey and Pitman, 2016), with distinct peaks in the transition between summer and autumn (March to April) and winter and spring (August to November)

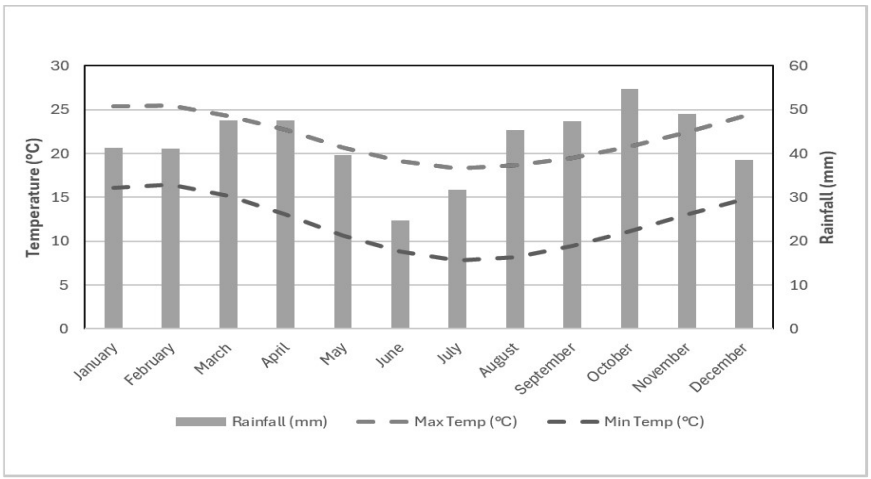


Figure 20: Mean monthly rainfall and temperature for quaternary K10D (Van Heerden and Walker, 2016)

The Ruiterbos River originates from the mountains and runs north to south along the boundary of the two properties and joins the Palmiet River to form the Brandwag River which terminates at the Great Brak Estuary. Numerous, small instream farm dams are located in the upper most reaches of the river and its catchment, where a mixture of dryland and irrigated pastures are farmed (mostly dryland, with small areas of macadamias and avocado).

The Ruiterbos River is mapped as a non-perennial river associated with a channelled valley-bottom wetland. The river runs along the steeply confined valley and fed by several non-perennial rivers draining from the east and west. In terms of the Biodiversity Spatial Plan for the Western Cape (WC BSP), the watercourses on the properties are mapped as River and Wetland CBA1.

Table 7: WCBSP categories and associated management objectives.

Category	Description	Management Objectives
CBA1	Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.

Terrain throughout the properties consists of flat to gentle sloping plains at higher altitudes, interspersed with very steep valleys along the Ruiterbos River and its tributaries.

Hydrological assessment

A hydrological assessment was carried out to gain a better understanding of the yield of the catchment area of the proposed dam, the impacts of the proposed dam on downstream users, and the amount of water available for farm portions for the existing and proposed activities.

The mean annual runoff of K10D catchment is 17.9Mm3.
Reserve requirements are as follows:

- **Ecological Water Requirement (EWR):** 9 % of MAR (or 1.77 Mm3)
- **Basic Human Need (BHN):** 0.06 % of MAR (or 0.01 Mm3).

Mean annual runoff for the Ruiterbos catchment upstream of the dam was estimated using downscaled estimates of flow simulated by the Water Resources System Model / Pitman Model (WRSM/2000) for K10D. The percentage area of the OGF Dam catchment that falls within K10D catchment area upstream of K1H004 was calculated at 51 %. This was used to downscale WRSM K10D simulations for K1H004 in order to estimate flows into the dam from Ruiterbos River catchment.

Peak high flow periods are from spring to early summer (i.e. August to November) and critical low flow periods are during peak summer (January and February). They hydrology assessment shows that the Ruiterbos River does periodically cease flowing 25 % of the time during the summer months (October to March). Simulated mean annual flows from the OGF U/S catchment area are 1.24 Mm3, which represents approximately 9.5 % of the mean annual flows measured at K1H0004 (13.07 Mm3).
The catchment modelling exercise indicates that the mean annual runoff from the catchment area of the dam is approximately 1.24 Mm3, which is sufficient to meet the irrigation demands of crops.

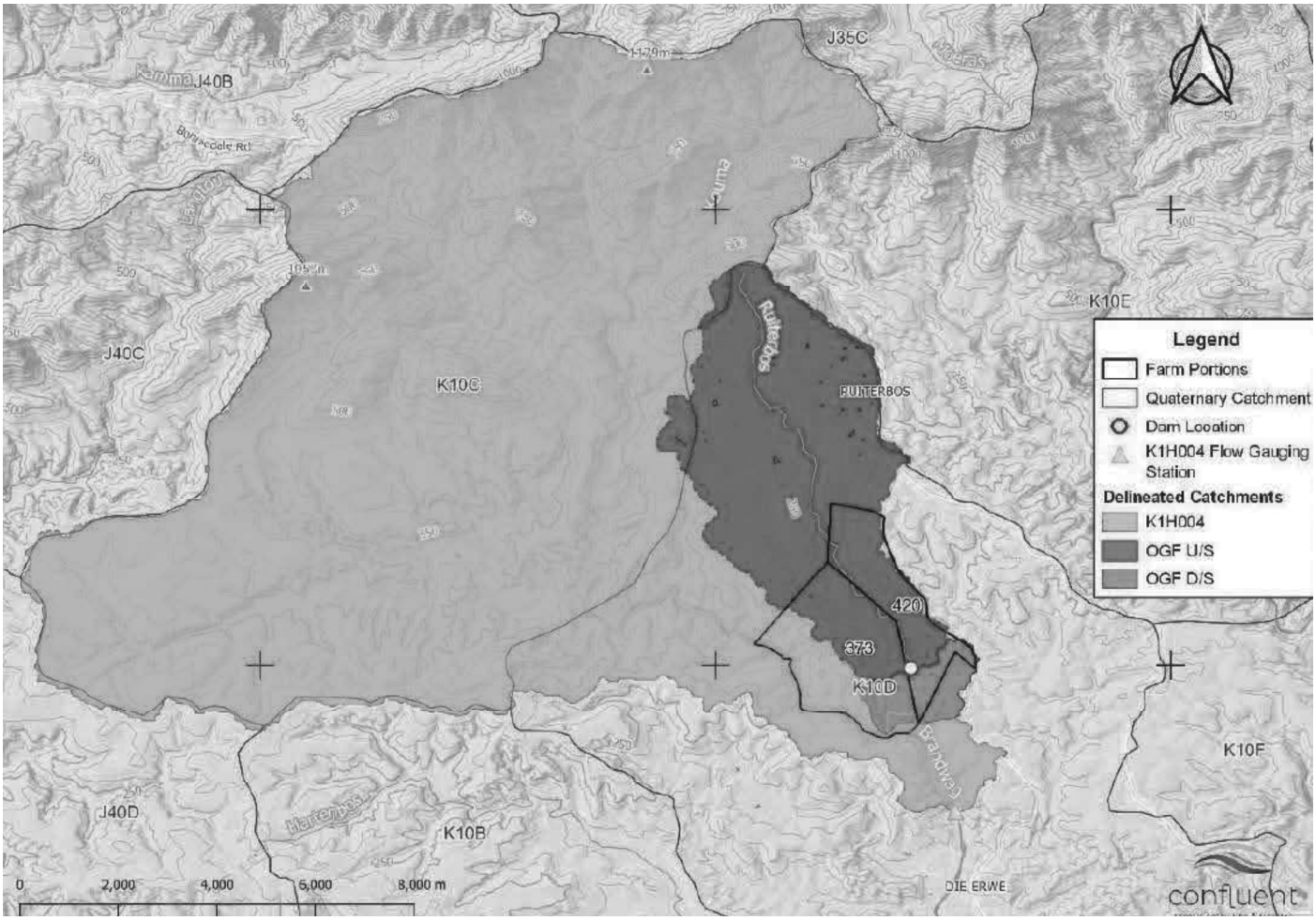


Figure 21: Delineated catchments

Existing Lawful Use (ELU)

Registered (lawful) rights are in place to abstract water from the Palmiet and Ruiterbos rivers (Table 8). According to the applicant, the quality of water abstracted from boreholes is not adequate for irrigation or domestic use purposes. The applicant will therefore surrender the rights to these water sources in favour of increased abstraction from the Ruiterbos River.

Table 8 : Registered lawful water uses for Farm 373 and Farm 420.

Property	Water Use	Volume (m3/annum)
RE/373	21 (a): Taking of groundwater from a borehole for irrigation	117 819
	21 (a): Taking of surface water from the Palmiet River for irrigation	**80 000**
RE/420	21 (a): Taking of groundwater from a borehole for irrigation	73 425
	21 (a): Taking of surface water from the Ruiterbos River for irrigation	**80 000**

The Outeniqua Game Farm receives an average annual rainfall of approximately 450 mm, which equates to 4,500 m³ of water per hectare per year. However, not all rainfall contributes directly to plant-available water due to factors such as evaporation, transpiration, and surface runoff. Assuming an average effective rainfall rate of 60%, the actual water available for crop use is estimated at 2,700 m³/ha/year. General water use requirements are shown in Table 9 below and include olive trees which are not currently grown.

Table 9: Water requirements of commercial crops

Crop	Water Requirement (m^3/ha/year)	Rainfall Contribution (m^3/ha/year)	Irrigation Needed (m^3/ha/year)
Avocados	3000–5000	2700	300–2300
Maize	4500–6000	2700	1800–3300
Lucerne	~1200	2700	0 (surplus)
Citrus	3000–5000	2700	300–2300
Vegetables	3000–5000	2700	300–2300
Olive Trees	600–800	2700	0 (surplus)

The SAPWAT 4.0 model was used to estimate irrigation requirements for crops and associated areas specified in Table 10 (59 ha in total).

Table 10: Crops and associated areas

Avocado	RE/420	10 ha
Broccoli	RE/420	3 ha
Maize	RE/373	23 ha
Lucerne	RE/373	23 ha

Water Requirements Analysis

RE/373 has an authorised abstraction of 80 000 m3 from the Palmiet River. This allocation will be used for irrigation of 10 ha of avocado (RE/420) and 8 ha of maize (18ha). Water from the Ruiterbos River will be used for irrigation of 15 hectares of maize and 23 ha of lucerne on RE/373 and 3 hectares of broccoli on RE/420 (41 ha).

Average irrigation demand per annum is approximately 180 000 m3 per annum, with maximum demand (90th percentile) increasing up to 214 770 m3 during below average rainfall periods.

Considering an existing water entitlement of 80 000 m3 from the Ruiterbos River, a Water Use License (WUL) would be required to abstract and additional 100 000 m3 to 135 000 m3. The applicant will therefore need to apply for additional abstraction of between 100 000 m3 and 135 000 m3 in order to meet irrigation demands with a 90 % assurance of supply. Average monthly flows meet average monthly irrigation requirements.

Dam Size	**No. of Deficit Months**	**No. of Deficit Months (% of total)**	**Average Monthly Deficit (% of irrigation demand)**	**Maximum Monthly Deficit (% of irrigation demand)**
100 000	44	7.6	72	100
150 000	15	2.6	68	100
200 000	6	1.0	88	100

Median irrigation requirements exceed median monthly flows during the drier summer months and demonstrates the need for a dam to store water during high flow periods such that irrigation demands can be met during low flow periods.

Based on a detailed monthly water balance based on weather data covering a 50-year period, a dam size of 150 000 m3 is expected to provide at least a 95 % assurance of supply.

Based on the 50-year simulation assuming a 150 000 m3 dam and abstraction for meeting irrigation requirements, mean annual flow simulated at K1H004 would reduce from 11.08 Mm3 to 10.87 Mm3 (or 2 %).

Present Ecological State (PES)

The PES assessment of the river considered the entire length of the Ruiterbos River running from its source and through the Outeniqua Game Farm. As described previously, the upper most reaches of the Ruiterbos River are

dominated by agriculture which is associated with numerous small instream farm dams and abstraction of water for irrigation. Base flows running through the properties have therefore been reduced. The channel banks are incised and eroded in places, most likely due to historical invasion by *A. mearnsii*. Water quality measurements indicate relatively high conductivity, which is likely due to upstream agricultural activities. Apart from these modifications, instream habitat is in a relatively good ecological state. The most significant impacts are associated with riparian habitat. The entire length of the river reach had historically been heavily invaded by mainly *Acacia mearnsii.* Clearing of invasives has taken place right up to the banks of the river and vegetation has been replaced by kikuyu (*Cenchrus clandestinus*). The lack of a functional riparian zone has compromised the protection of the channel against peak flood flows and will most likely contribute to the erosion and incision of the channel banks. The PES of the River is **D – Largely Modified (Refer to aquatic assessment, Appendix D2)**.

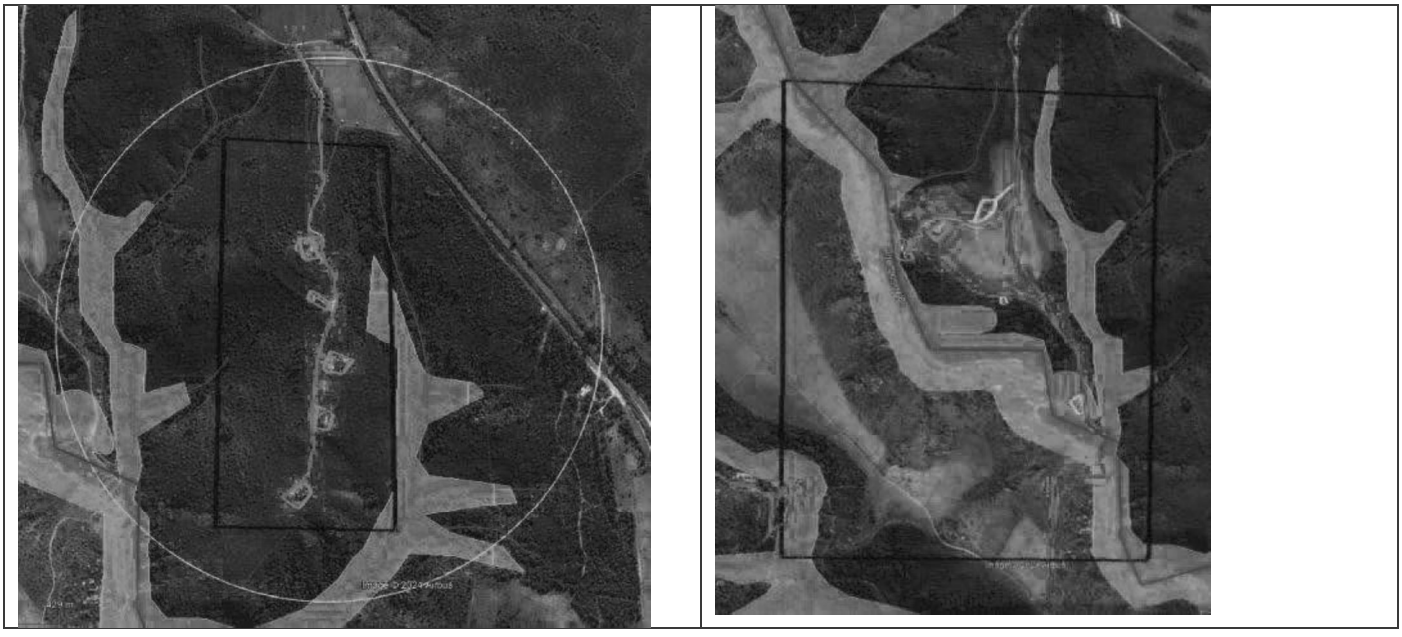
Ecological Importance & Sensitivity (EIS)

The Ruiterbos River is a relatively small non-perennial river characterised by seasonal flows. It provides important diversity of habitat at a local scale, but given its flow characteristics, offers low potential for hosting endangered or unique biota. Considering its size and geomorphological zonation, the river is relatively sensitive to changes in flow and water quality.

In terms of conservation importance, the river is an aquatic CBA and is regarded as important for meeting biodiversity targets at a provincial scale. Overall, the river is considered as important at a local scale. The EIS score is 2 (**Moderate)**

The availability of the water in the area has been determined at 150 000m3 available for storage and use. Planning on the property is therefore advised to keep within these water availability limits. A review of the IDP, SDF and past conditions from the Department of Agriculture highlights that integrated farming, permanent soil cover and water wise irrigation (in the form of drip irrigation) are preferred management methods.

i. **Area 1** and Area 2**: Dwellings are located within 500 meters of a Channelled valley-bottom wetland.**



Aquatic impacts are negligible in this area, however relevant activities must be included in the water use license application for the dwellings and infrastructure (roads, dam and crossings) located within 100 m of watercourse / 500 m wetland and will require an accompanying risk assessment matrix completed by an aquatic SANASP registered specialist.

The location of the septic tanks (outside of the riparian area and floodline) and the volumes discharged daily (<50 m3 per day), do not trigger the need to register them as water uses.

Best practice measures to prevent soil erosion and impact on drainage lines must be put in place (refer to EMPr)

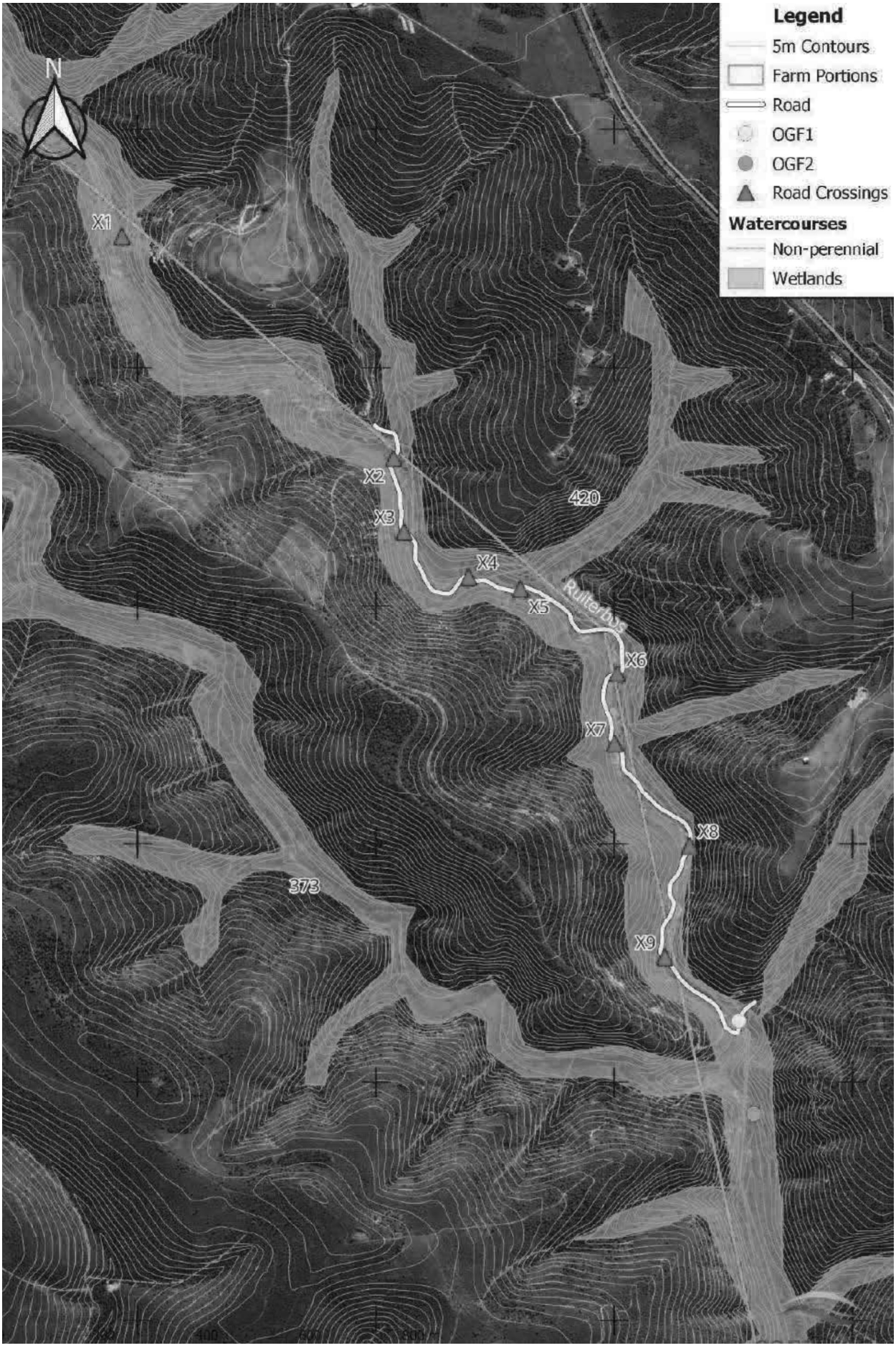


Figure 22: Map showing watercourses affected by historical and proposed activities on the Ruiterbos River running through the Outeniqua Game Farm, with indication of road crossings (X1-9), and existing dam OGF 1 and proposed location of dam OGF2

ii. Roads along watercourses

OGF Game Farm constructed a road that crosses the Ruiterbos River at multiple locations. The western most road is located within 100 meters of a non-perennial watercourse and within 500 meters of a Channelled valley-bottom wetland. The eastern most road is located within 500 meters of the Ruiterbos river and associated channelled valley-bottom wetland (X1-9).

Vegetation was cleared to create a road along the Ruiterbos River in 2019 in order to for clearance operations of dense stands of Black Wattle (*Acacia mearnsii*) to take place, which appear to have invaded the entire length of the river channel. Evidence of *A. mearnsii* invasion along the steeper slopes adjacent to the river is apparent and clearance of the invasion is ongoing. Kikuyu (*Cenchrus clandestinus*) grass was noted along the banks of the river and revegetated the entire length of the road, to the extent that the road is now defined by a single jeep-track running along the length of the river.

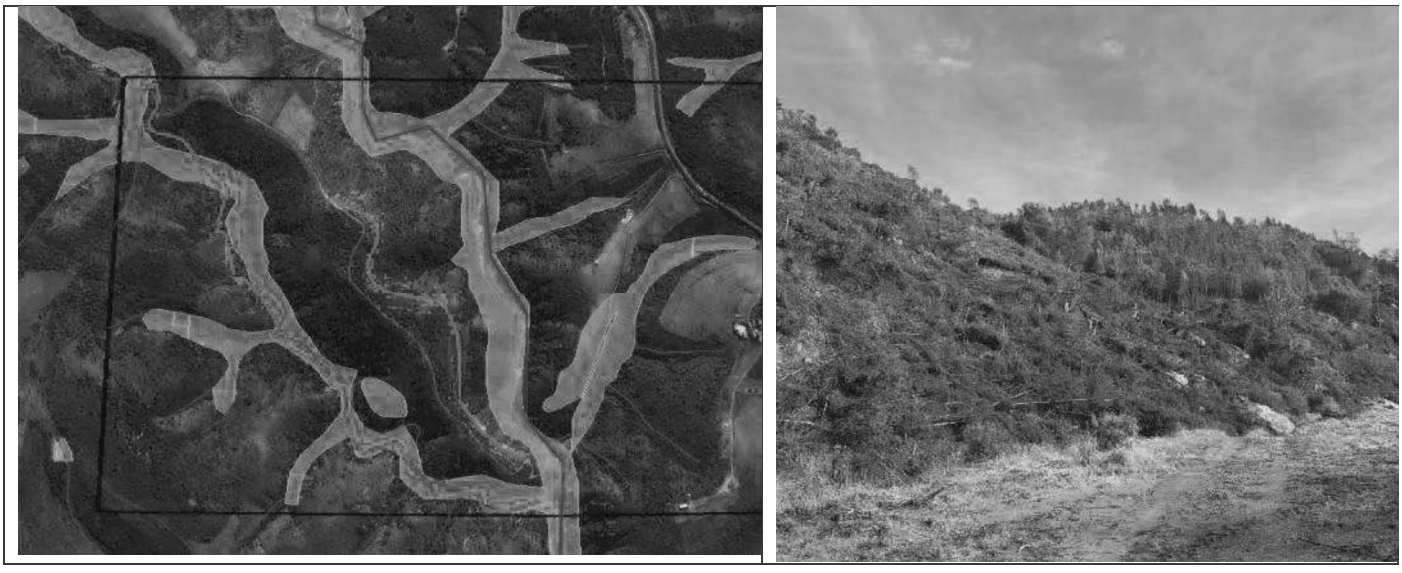
The road crosses the river at several location along the river. The crossings are unprotected drifts directly across the riverbed (most often on bedrock substrate, but also occasionally over cobble substrate)

Observations at crossings to be addressed:

X1 – cement tracks have been constructed down each bank leading down to the river. Road crossings have not resulted in any impedance or diversion of flow

X3 - accumulation of woody debris from AIS clearing; obstruction of eastern bank and resultant erosion on opposite side

X7 and X9- multiple entry/exit points to/from the river have resulted in unnecessary additional disturbance to the riverbank. No signs of erosion were observed at road crossing points.



iii. Area 3: Road crossing and existing dam (OGF1) and proposed dam (OFG2)

a. Existing dam – OGF1

OGF2 is proposed to be located a short distance downstream from the existing dam. The length of the Ruiterbos River stretching from road crossing X1 down to the proposed location for OGF2 was assessed.

An existing road crossing was upgraded that resulted in the creation of a small instream dam (OGF1) on the Ruiterbos River .The road crossing the Ruiterbos River at the current dam location (OGF1) has existed since at least 2005.

The current instream dam location is first visible in 2017. One of the roads was also altered between 2016 and 2018. Historical imagery indicated the presence of a road crossing the Ruiterbos River at the dam location from at least 2005. The river crossing and current instream dam location is first visible in 2017, when clearing of vegetation occurred (most likely *A. mearnsii*). In 2017 it appears as if a low-level concrete crossing was present. Over time the road has been maintained along its existing alignment and footprint, maintaining an inundated area upstream of the road. The river

experiences significant flooding and over time it appears as if the crossing may have been damaged and replaced by a low-level dirt crossing, a section of which would become inundated during higher flow periods (e.g. 2020). A notable change occurred in 2024, when the road crossing was visibly upgraded and the inundated area upstream of the road was enlarged. The site visit confirmed the presence of a road supported by gabion baskets which essentially acts as small dam/weir. The gabion baskets are porous and together with pipes through the road, water does pass through the road, maintaining flow below the road. The gabion baskets had experienced damage during recent flood events and will require maintenance in the near future. Sediment excavated from upstream of the road (to enlarge the dam basin) had been deposited in the river downstream of the road. General disturbance to the bed and banks and widening of the channel immediately downstream of the road was visible.




b. OGF2 site assessment

The river is confined to a well-defined channel with clearly discernible bed and banks (relatively incised in places). Occasional narrow stretches of channelled valley bottom wetland habitat were observed along sand banks but were not continuous along the entire length of the river channel. A variety of wetland plant species were observed. In terms of classification, the river reach is considered to be primarily a river dominated by granite bedrock, with narrow, intermittent patches of channelled valley-bottom wetland habitat where sand banks have formed along gentler gradients. Substrate was dominated by bedrock and coarse sand to fine gravel.

Water quality

Water quality measurements taken at the proposed dam OGF2 location, showed that water was clear (high clarity) with very low turbidity. The flow can be best described as trickle base flow, the water was well oxygenated, indicating a low organic load, as would be expected of a stream close to its mountain source.

Parameter	Measurement
Temperature	21.2 ºC
Dissolve Oxygen	9.95 mg/L
pH	7.16

Conductivity	88.3 mS/m
Clarity	80 cm

Note: The conductivity measurement indicates elevated concentrations of salts (most likely from upstream agricultural activities) which can also account for the increase in pH (in case of elevated base cations such as calcium and sodium).

Aquatic biodiversity

Macroinvertebrates

Instream biotopes were relatively limited. The main biotope present was shallow, very slow flowing pools, ranging from 5 to 40 cm in depth.

Cobble riffle (stone in current) habitat was very poorly represented and runs were generally very shallow chutes over bedrock connecting pools. Instream vegetation was very limited to small patches *Persecaria sp.* and marginal vegetation was sparse. Overall instream habitat is fairly limited in terms of diversity as is reflected in the biotope score (53 %). In total 21 taxa were observed, which included a relatively high proportion of air breathing taxa (i.e. Hemipterans and Gyrinidae beetles). These taxa are typically abundant in pools where slow-moving currents do no not favour rapid respiration across gill surfaces typically required by other aquatic macroinvertebrate taxa. Gomphid dragonfly larvae and Naucorid bugs were abundant in gravel habitat. Families favouring high flow conditions (e.g. Ephemerotera, Plecoptera and Trichoptera) comprised a low proportion of taxa. The total SASS score was 92 with an Average Score per Taxon of 4.4 which is a relatively low score. (Refer to aquatic assessment, Appendix D2)

Table 11: WCBSP categories and associated management objectives.

Parameter	Score
SASS Score	92
Number of Taxa	21
Average Score per Taxon	4.4
Biotope score	24 (53%)

Elevated conductivity levels (together with other contaminants such as pesticides and fertilisers used in agriculture) are likely to partly explain this score, however, the limited habitat diversity and seasonal flow regime is also a contributing factor.

The SASS results provide a baseline against which to monitor future downstream impacts of the proposed OGF2 dam.

Fish

An approximate 200 m stretch of river habitat was sampled in the vicinity of the OGF2 dam site. Habitat for fish is very limited and is restricted to deeper pools (~ 40 cm depth) where cover (in the form of rock overhangs and marginal aquatic vegetation) was available. No fast-flowing run or riffle habitat was present. Only one fish species was collected – *Tilapia sparmanii.* This species is tolerant of a wide range of habitats but has a preference for slow flowing pools or standing water. The species was relatively abundant in such pools and adults and juveniles were observed. The natural distribution of this species is from the Orange River and southern KwaZulu-Natal northwards (Skelton, 2004). The species has been introduced to the Western Cape Distribution in the Western Cape where it is considered extralimital (i.e. occurs outside of its natural distribution).

Given the seasonal nature of river flows, rheophilic species favouring fast flowing water are unlikely to occur along the river reach. Marginal, lentic habitat availability during the dry season will only be likely to be suitable for hardy species such as *T. sparmanii.* No other records of any fish species have been recorded for the Ruiterbos River and given the FEPA status for the catchment area, is unlikely to be an important river reach for conservation of fish species.

iv. Area 4 – Agricultural areas and road crossings

All agricultural areas are outside of the aquatic systems with exception of Areas 4-1 and 4-16 which are not recommended. The road crossing and dammed area at 4-16 needs to be addressed. This area (0.89ha) is in a valley area and is recommended to be rehabilitated with thicket / riverine/ wetland vegetation. The existing road crossing was already in place by 2005; however, no dammed area is visible in historical imagery from that period. At the road crossing, no culvert, bridge, or formal channel is visible to facilitate hydrological flow, and the obstruction of natural drainage has the potential to contribute to ecological degradation. This location intersects a mapped non-perennial drainage line (DWS) and falls within a NFEPA-designated channelled valley-bottom wetland system. A proper hydrological flow path (e.g. culvert or low water crossing) must be installed at the road crossing. This road is anticipated to be retained long-term due to its role in accessing recommended agricultural areas 4-15 and 4-17. The operational management measures need to be implemented to ensure ongoing removal of AIS within the drainage line areas on the property. These measures should in the long term, increase the amount of water that can be captured by the proposed OGF2 dam during storm events.

Figure 23: Area 4 showing drainage lines (light blue), Ruiterbos and Palmiet Rivers and channelled valley bottom wetland mapped in terms of the NFEPA

v. Area 5 – Agricultural, tourism, game farm, road crossings

All agricultural areas (5-1 to 5-8) are outside of the aquatic systems. Some roads in areas 5-7 and 5-8 which are unnecessary and cross drainage lines should not be used.

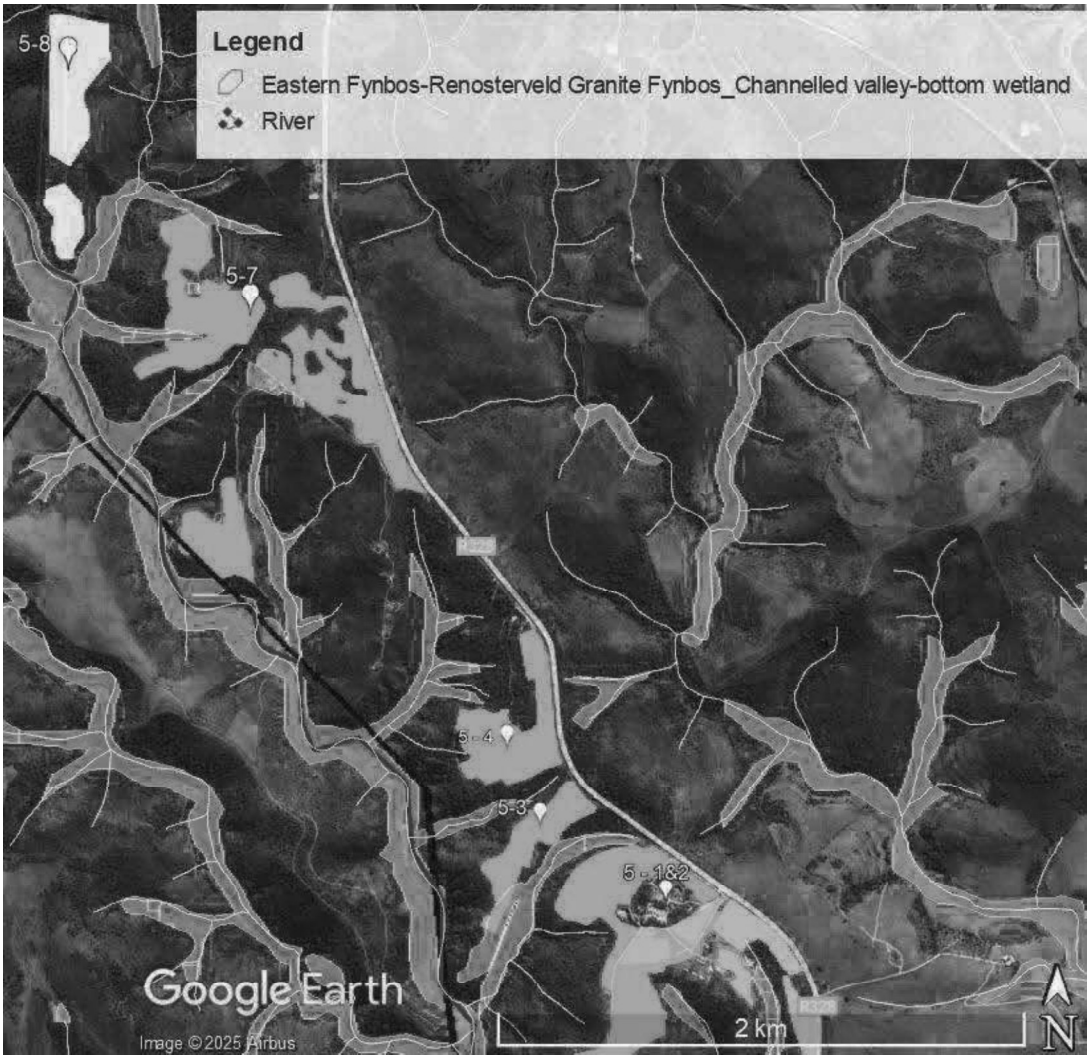


Figure 24: area 5 showing Ruiterbos River and drainage lines (light blue) - no agricultural activities are occurring within drainage lines / wetland areas; enclosures will be located within 32 meters of drainage lines

6.2 Verification of aquatic biodiversity

Theme	Environmental Sensitivity in terms of DFFE Screening Tool Report	Verification
Aquatic Biodiversity	Very high	Very high

6.3 Impacts and Significance Rating – Aquatic biodiversity

Existing activities - Construction and operation

Aspect	**Construction within watercourses – road crossings between area 2 and 3**			
Phase	**Construction and operation**			
Impact:	Disturbance of bed and banks caused by construction of road along the Ruiterbos River			
Nature of impact:	Direct			
Structures are limited to short sections of concrete track on the bank of the river at crossing X1. Multiple entry/exit points to/from the river at X7 and X9 have resulted in unnecessary additional disturbance to the riverbank, however none of the crossings that were assessed have resulted in any impedance of flow and have not resulted in any erosion of the bank.1				
Impact Status	**Negative Impact**		**Negligible**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Seldom	3	Rare	1
Intensity	Low	1	Low	1

Severity	Negative Low	5	Negligible	3
Consequence	Negative Low	6	Negligible	4
Probability	Slim	2	Slim	1
Impact Significance	Low	8	Negligible	5
Impact	Removal of riparian habitat			
Nature of impact:	Direct			

Description

Based on the site assessment and historical imagery, it appears as if the riparian zone was dominated by *A. mearnsii*, although it is uncertain whether any indigenous species may have been present in amongst the invasion. Dense, woody invasions of *A. mearnsii* typically degrade channel habitat by constraining flood events to the river channel which contributes to increased bank erosion. Dense canopies also shade out stabilising understorey vegetation which also contributes to erosion of the channel. It is therefore most likely that current bank incision observed along the river is largely related to the historical invasion along the river. Currently the riparian zone is dominated by *C. clandestinus,* and trees and shrubs are largely absent from the riparian zone. Shallow rooted riparian species do not stabilise banks well and the channel will most likely be susceptible to continued erosion in the future. Impacts associated with historic and current condition of the riparian zone are similar and, assuming the riparian zone was historically dominated by *A. mearnsii*, the transformation to a grass dominated riparian zone represents a relatively low impact. It is however likely that some indigenous species were cleared, which, if left in-situ, would have contributed to a more rapid regeneration of the riparian zone.

Impact Status	**Negative Impact**		**Negligible**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Seldom	2	Rare	1
Intensity	Medium	3	Low	1
Severity	Negative Low	6	Negligible	3
Consequence	Negative Low	7	Negligible	4
Probability	Slim	2	Slim	1
Impact Significance	Low	9	Negligible	5

Mitigation Measures

- Entry/exit points at each crossing must be restricted to a single track to limit disturbance to the bank and the potential for erosion to occur; and
- Road crossings must be routinely inspected. Any bank sections which have become exposed and appear vulnerable to erosion should be immediately protected in an appropriate manner so as to prevent or arrest the erosive process before further damage to the channel can occur;
- Alien invasive species must continue to be controlled along the river. Felled trees must be removed from the banks and must not be dumped in the active channel of the river.
- Passive regeneration together with active planting of the riparian zone must be encouraged. Passive regeneration allows indigenous species to naturally re-seed and re-establish along the banks. This process must be encouraged wherever possible and vehicle access must be restricted to use of the road only so as to avoid disturbance to new seedlings. Recommended plant species for active planting provided in rehabilitation measures (also provided in Aquatic assessment, appendix D1 and EMPr)

Reversibility	High
Irreplaceability	Low
Confidence	High

Aspect	**Construction within watercourses –** gabion road structure crossing the Ruiterbos River / existing OFG1 dam			
Phase	**Construction and operation**			
Impact:	Impendence of flow caused by the gabion road structure crossing the Ruiterbos River			
Nature of impact:	Direct			

Description

Construction of the gabion road crossing, together with excavation of sediment from the channel upstream of the road has impeded flow in the Ruiterbos River and created a small instream dam, allowing the landowner to abstract water from the river. The gabion wall does however allow water to flow through the wall and base flows below the crossing were maintained at the time of the site visit. It is however unknown whether this base flow would be maintained when the water in the dam drops below a certain level.

Impact Status	**Negative Impact**		**Negligible**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1

Duration	Medium - Long	5	Very short	1
Frequency	Often	5	Rare	1
Intensity	Low	1	Low	1
Severity	Medium High	11	Negligible	3
Consequence	Medium	12	Negligible	4
Probability	Expected	6	slim	1
Impact Significance	Medium high	18	Negligible	5
Impact:	Impact of OGF1 dam on river habitat			
Nature of impact:	Direct			

Description

Excavation of sediment from upstream of the dam wall has created a small dam basin in the river, converting habitat from a natural lotic (flowing) system to a lentic (stagnant) system. This represents a very small section of habitat relative to the length of the entire river reach.

Impact Status	**Negative Impact**		**Negligible**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Very short	1
Frequency	Rare	1	Rare	1
Intensity	Low	1	Low	1
Severity	Negligible	11	Negligible	11
Consequence	Negligible	12	Negligible	12
Probability	Slim	1	Slim	1
Impact Significance	Negligible	5	Negligible	5
Aspect	**Construction within watercourses**			
Phase	Construction			
Impact:	Impact of dumping excavated sediment in the Ruiterbos River			
Nature of impact:	Direct			

Description

Excavated sediment has been dumped in the watercourse downstream of the gabion wall which has smothered aquatic habitat. Future flood flows could potentially be diverted into the opposite bank (causing erosion of the bank) or could disperse the dumped sediment over a larger area, smothering a greater area of habitat.

Impact Status	**Negative Impact**		**Negligible**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Very short	1	Negligible	-
Frequency	Rare	1	Rare	1
Intensity	Low	1	Low	1
Severity	Negligible	4	Negligible	3
Consequence	Negligible	4	Negligible	4
Probability	Anticipated / occurred	6	Slim - Plausible	1 - 3
Impact Significance	Low	10	Negligible to low	5 – 7

Mitigation

- The existing dam must be rehabilitated as a condition of approval for the new larger dam

Rehabilitation Plan:

Removal of Sediment Previously Excavated from the Riverbed

- An excavator may be used to remove sediment from river;
- The sediment must be removed from the watercourse as soon as possible and stockpiled well outside of the floodline for use in rehabilitation of the river channel once the dam wall has been removed. The stockpile must be covered and protected from rainfall and erosion to prevent loss of material;
- Care must be taken not to widen or deepen the channel during the removal of the dumped material. The depth of the bed and width of the channel must be continuous with the channel further downstream.

Removal of Dam Wall

- An excavator may be used to remove the dam wall;
- Dam removal must take place during the dry season (generally June to July or December to January) so as to minimise the potential of flooding whilst working in the watercourse. Weather forecasts must be consulted with aim of the ensuring a minimum 3-day window of low (< 10 %) percent likelihood of rainfall.

- The water level must be drawn down as much as possible prior to removal of the dam wall. A single opening must be made in the wall to allow water to drain out in a controlled manner.
- Once the water level has receded, the gabion wall can be removed using common excavation methods and earth-moving equipment. The wall must be removed in a systematic fashion, with the excavator operating from the surface of the existing road crossing, moving backwards along the road as material is removed from the watercourse.
- All gabion and road materials, including rock, wire baskets and concrete/cement structures MUST be removed from the site and disposed of at an appropriate waste disposal facility. No road materials or gabion baskets may be dumped in the watercourse or stockpiled adjacent to the watercourse.
- Removal of the dam wall must be overseen by and appropriately qualified Environmental Control Officer (ECO) or an aquatic ecologist.

Replacement and Stabilisation of Soil

- The channel must be reshaped such that the embankment slopes gently towards the channel and is consistent with the natural channel of the river.
- Stockpiled sediment can be used to reshape the banks
- Precautions
- Construction vehicle parking and equipment stores must be located at least 100 m from the demarcated area to prevent fuel and material spills from entering the watercourse;
- Access by vehicles must be in and out on one road only to reduce the area of disturbance;
- The wetland areas upstream of the dam must be demarcated as 'No-go Areas' for people and vehicles.
- The banks must be reshaped and sloped to the natural site contours, avoiding the creation of ditches and cuts which channel water flow and cause erosion. The shape/contours/dimensions of the banks must be continuous with the undisturbed section of wetland upstream of the dam.
- Reshaping of the channel must take place during the dry season (generally June to July or December to January) so as to minimise the potential of flooding whilst working in the watercourse. Weather forecasts must be consulted with aim of the ensuring a minimum 3-day window of low (< 10 %) percent likelihood of rainfall
- The final reshaped channel must be independently assessed by an ECO or aquatic ecologist and signed off as complete.

Revegetation

- Seed the slopes and stream bed with an indigenous fynbos grass mix and cover with a light mulch;
- Nail in overlapping soil saver matting to protect the soil (see Appendix 5);
- Revegetated slopes must be actively monitored to ensure a dense cover of > 80% of grass. Gaps should be actively re-seeded;
- A combination of active and passive revegetation must take place in the 10 m buffer zone: Active = planting recommended indigenous species, and Passive = not disturbing indigenous plants that naturally germinate (See Table 12 for suitable plant species);
- Alien vegetation must be actively removed before it becomes established when it can either be hand-pulled or removed with a tree popper. NO heavy machinery can be used for the purpose of alien removal;
- Revegetation of the buffer and previously excavated area must be monitored 6-monthly by an ECO or Aquatic Ecologist until such time that revegetation of the banks is considered satisfactory;
- Monitoring should also take place by the landowner following heavy rainfall to identify and proactively address erosion before it can progress too severely;
- Eroded areas of the steep banks must be refilled with topsoil, reseeded with grass mix, covered with a light mulch and protected with soil saver mats; and
- Monitoring of the site is recommended to ensure that rehabilitation efforts are successful and that problematic areas are attended to effectively and pro-actively. Monitoring is provided in EMPr)

Table 12: Flora species identified for active rehabilitation of disturbed / cleared areas

Species Name	Common Name	Planting density guide / 75 m2
Trees		
Ekebergia capensis	Cape Ash	1
Halleria lucida	Tree fuchsia	3
Osteospermum moniliferum	Bitou	3
Searsia undulata	Kuni-bush	1
Protea neriifolia	Pink ice	1
Buddleja salviifolia	Sagewood	1
Tarchonanthus littoralis	Coastal camphorbush	2
Virgilia oroboides	Keurboom	1
Shrubs		Per 75m2
Agathosma recurvifolia	Boegoe	2
Cyclopia subternata	Vleitee	5
Helichrysum petiolare	Licorice plant	5

Phylica ericoides	Hardeblaar	2
Psoralea axillaris	Violet-flash fountainbush	1
Watsonia angusta	Narrow watsonia	2
Watsonia fourcadei	Forked watsonia	2
Watsonia pillansii	Orange watsonia	2
Selago corymbosa	Stiff bitterbush	2
Otholobium acuminatum	Longsepal dottypea	1
Pelargonium cordifolium	Heartleaf storksbill	3
Grass		Per m2
Themeda triandra	Red grass	2
Eragrostis capensis	Heart-seed love grass	2
Eragrostis curvula	Weeping love grass	2
Pennisetum macrourum	Riverbed grass	2

Reversibility	High
Irreplaceability	Low
Confidence	High

Aspect	**Agricultural activities at area 4-16 and associated crossing and dam area**
Phase	**Construction / Operations**
Impact:	Disruption of ecosystem services - Area and falls within drainage line and associated NFEPA valley bottom wetland
Nature of impact:	Cumulative

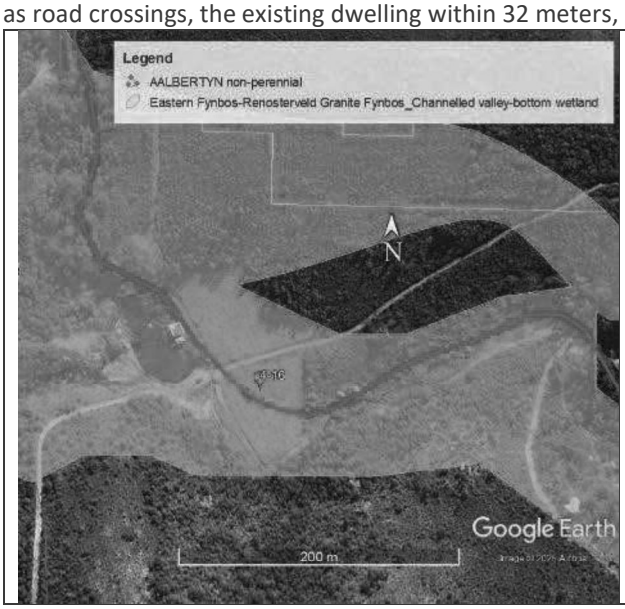
Description

The existing road crossing was already in place by 2005; however, no dammed area is visible in historical imagery from that period. A section of transformed lawn or fields is present adjacent to the current small dam. At the road crossing, no culvert, bridge, or formal channel is visible to facilitate hydrological flow, and the obstruction of natural drainage has the potential to contribute to ecological degradation.

This location intersects a mapped non-perennial drainage line (DWS) and falls within a NFEPA-designated channelled valley-bottom wetland system. It is recommended that a proper hydrological flow path—such as a culvert or low-water causeway—be installed to restore connectivity and preserve wetland function.

In line with the broader rehabilitation strategy, alien invasive species (AIS) clearing and passive vegetation regeneration must be implemented in this area. Long-term AIS control has the added benefit of improving catchment hydrology and may enhance stormwater capture into the proposed OGF2 dam.

A minimum buffer of 32 meters of intact riverine or thicket vegetation must be maintained along all drainage lines. These buffer zones should remain free from disturbance, including agricultural use, with the exception of authorised activities such as road crossings, the existing dwelling within 32 meters, and the in-stream dam.



Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Medium	4	Life of operations	5

Frequency	Seldom	3	Seldom	1
Intensity	Medium High	4	Low	1
Severity	Negative Medium High	11	Low	7
Consequence	Negative Medium High	13	Low	8
Probability	Possible	4	Slight	2
Impact Significance	**Medium High**	**17**	Low	10
Mitigation / Reversibility	Possible			

Mitigation

- Rehabilitation: The disturbed area should be rehabilitated to restore thicket, riverine, or wetland vegetation, in accordance with the rehabilitation plan.
- Hydrological Connectivity: A proper hydrological flow path (e.g. culvert or low water crossing) must be installed at the road crossing. This road is anticipated to be retained long-term due to its role in accessing recommended agricultural areas 4-15 and 4-17.
- Alien Invasive Species Management: Ongoing removal of alien invasive species (AIS) must be implemented within all drainage line areas across the property.
- Buffer Zones: A minimum buffer of 10 meters of intact riverine or thicket vegetation must be maintained along all drainage lines. These buffer zones must remain undisturbed and may not be used for any activities, including agriculture, except for:
    - Authorised road crossings
    - The existing dwelling located within 32 meters
    - AIS clearing activities
    - The in-stream dam

Confidence	High

Planning, construction and operations - Proposed activities

Aspect	**Construction activities within watercourses**
Phase	**Construction**
Impact:	Disturbance and pollution of aquatic habitat caused by construction of the activities
Nature of impact:	Direct

Description

Construction of an instream dam wall and rehabilitation / modification of road crossings will require that construction vehicles and machinery will need to access the river which can result in:

• Physical disturbance of aquatic habitat (beyond the footprint of the dam) and

• Pollution through leaks and spills of hydrocarbons (i.e. fuel and oil from construction vehicles and machinery) and other construction materials (e.g. cement, paint etc.) and

• Mobilisation of sediment due excavation of the bed and banks and operation of construction vehicles in the watercourse

Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Short (3 months – 1 year)	2	Short (3 months – 1 year)	2
Frequency	Rare	1	Rare	1
Intensity	Medium / high	4	Medium	3
Severity	Medium high	7	Medium high	6
Consequence	Medium high	8	Medium high	7
Probability	Expected	5	Plausible	3
Impact Significance	Medium	13	Low	10
Reversibility	High			
Irreplaceability	Low			

Mitigation

- Construction of the dam must occur during the dry season (i.e. December to January or June to July);
- Working areas must be clearly demarcated and no vehicle access or disturbance must take place outside of demarcated areas;
- Rehabilitate and naturalise areas beyond the development footprint, which have been affected by the construction activities, using indigenous grass species;
- Vehicles must be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities;
- Restrict vehicle access to the river to single points that are clearly demarcated;

- Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work in the river;
- No fuel storage, refuelling, vehicle maintenance or vehicle depots to be allowed within 30 m of the edge of the river;
- Ensure that all stockpiles are well managed and have measures such as berms and hessian sheets implemented to prevent erosion and sedimentation. Stockpiles must be located more than 30 m from the edge of the river;
- Contractors used for the project should have spill kits available to ensure that any fuel or oil spills are cleaned and disposed correctly;
- Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation) and must be routinely serviced; and
- No dumping of construction or waste material is permitted. All construction and waste materials must be removed from the river valley and correctly disposed.

Confidence	High

Aspect	**New instream dam**
Phase	**Planning and operations**
Impact:	Impact of reduced instream flows on instream habitat and aquatic biota.
Nature of impact:	Direct / Cumulative

Description

Instream aquatic biota are adapted to specific temporal variations in flow volumes. Dams disrupt the volume of flows and timing of flood events, which in turn influences downstream habitat quality and availability. Construction of a dam will impound flows and alter the natural flow regime of the river downstream of the dam. Base flows are most likely to be affected, and the volume and duration of base flow events is expected to be significantly reduced. Given that the river flows are seasonal, reduction in base flows can have a significant impact on downstream biota. Flow conditions downstream of the dam are likely to become highly intermittent, with low potential for maintenance of aquatic macroinvertebrate and fish communities over longer periods. It is likely that pools along the river (which are currently sustained by prolonged periods of base flow) would dry up and only opportunistic macroinvertebrate species (with rapid life cycles) would be able to tolerate such flow conditions. Downstream flows will generally be restricted to high and peak flood events when the dam periodically reaches the full supply level and overflows. Overall, an approximately 2 km stretch of the Ruiterbos River will be affected by the dam.

Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Local	3	Site	2
Duration	Long term	5	Long term	5
Frequency	Rare	1	Rare	1
Intensity	High	5	Medium	3
Severity	Medium high	11	Medium	9
Consequence	Medium high	14	Medium	11
Probability	Anticipated / certain	6	Expected	5
Impact Significance	High	20	Medium high	16

Mitigation

- Ecological Water Requirement (EWR): The EWR for the Ruiterbos River is recommended to be determined. While the simulated MAR for the dam catchment is estimated at approximately 1.24 Mm^3/year (representing 51% of the upstream catchment area at gauging station K1H004), no specific EWR has yet been quantified for this river reach.
- The dam design must incorporate operational release infrastructure capable of releasing environmental flows, either through a pipe-and-valve outlet system or via a bypass mechanism (e.g., weir and pipeline), in accordance with the outcomes of the EWR.
- All irrigation and operational water demands must be clearly quantified to ensure abstraction and meets the water demand for the farm and remains within permissible limits. The catchment MAR (1.24 Mm^3) is sufficient to meet the proposed irrigation demands, provided this is managed efficiently.
- A comprehensive water balance must be developed, integrating inflows (from hydrological modelling), irrigation needs, and environmental flow releases. The dam must not be designed to store volumes exceeding the actual water demand
- Final design of dam to consider ecological water requirements and incorporate release flow infrastructure, either through a pipe-and-valve outlet system or via a bypass mechanism (e.g., weir and pipeline),
- Pumps used to abstract water from the dam must be fitted with calibrated flow meters with the purpose of ensuring that annual lawful water allocations are not exceeded, and abstraction volumes must be submitted to BOCMA bi-annually to ensure lawful water use.

- Biomonitoring Plan: An aquatic biomonitoring programme, including at minimum SASS and IHI (Index of Habitat Integrity) assessments, must be implemented. This plan should monitor whether the dam's environmental flow releases are maintaining downstream aquatic ecosystem integrity at the Recommended Ecological Category (REC). The specific frequency, timing, and monitoring indicators must be informed by the EWR determination.
- Water Rights Alignment: Any additional abstraction from the Ruiterbos River must be subject to the formal surrender of existing borehole water use rights on RE/420 and RE/373 to ensure overall compliance with the lawful water allocation.

Interim Release flow requirements (for comment from DWS)
Mean Annual Runoff (MAR): 1.24 million m^3/year
Proposed Dam Capacity: 150,000 m^3
Interim Environmental Water Requirement (EWR): ~9.5% of MAR ≈ 118,000 m^3/year

• A formal Reserve Determination has not yet been undertaken. However, based on the hydrological assessment of the dam catchment (MAR estimated at 1.24 million m^3/year) and considering the planned cessation of existing borehole abstractions on RE/420 and RE/373, it is reasonable to apply a precautionary approach and implement an interim EWR.

• A release allocation of approximately 118,000 m^3/year (9.5% of MAR) is proposed to simulate continuous environmental baseflows downstream of the dam. This estimate aligns with standard EWR ratios applied within the K10D catchment for similar river systems.

Dam Operation Requirements

• The dam must be operated to:
o Maintain continuous baseflow release throughout the year,
o Provide increased outflows during storm events or peak rainfall, and
o Allow for adaptive management until a formal EWR is determined.

• A pipe-and-valve outlet system, preferred by the landowner, is recommended to accommodate controlled and adjustable releases. This infrastructure will enable:
o A year-round trickle flow to maintain ecological connectivity downstream,
o Temporary flow increases during and after rainfall events to mimic natural runoff patterns.

• This approach reflects the regional rainfall regime (~450 mm/year), with peak rainfall typically occurring during spring (September–November) and autumn (March–May), and dry conditions prevailing from December to February.

Reversibility	High
Irreplaceability	Low
Confidence	High

Aspect	**New instream dam**			
Phase	**Operations**			
Impact:	Inundation of river habitat caused by construction of a new instream dam			
Nature of impact:	Direct			
Description Construction of a new instream dam will result in a larger area of inundation, permanently transforming a section of river habitat from a lentic to a lotic system. Macroinvertebrate communities along the river reach will be altered. In terms of fish species only T. sparmanii was collected during sampling. These fish favour slow flowing pools and are unlikely to be negatively affected by the inundation of the river. The extent of inundation represents a small percentage of the entire length of the river and the spatial extent the impact is therefore very limited				
Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1		
Duration	Long term	6		
Frequency	Rare	1		
Intensity	High	5		
Severity	Medium high	12		
Consequence	Medium high	13		
Probability	Anticipated / occurred	6		
Impact Significance	Medium high	19		
Mitigation	- Cannot be mitigated; will be permanent impact			
Reversibility	High			
Irreplaceability	Low			
Confidence	High			

Impact:	Impact of reduced sediment transport on instream habitat and aquatic biota.
Nature of impact:	Direct

Description

Substrate along the riverbed is dominated by bedrock and coarse sediment (coarse sand and fine gravel). Dams act as a barrier to sediment transport and trap sediment which will likely lead to a reduction in sediment supply and a modification to the quality and diversity of instream habitat downstream of the dam. Shortage of sediment supply downstream of the dam can also lead to accelerated erosion of the bed and banks of downstream watercourses, which ultimately leads to degradation of habitat quality over time.

Impact Status	**Negative Impact**			
Impact Criteria	Without mitigation		With mitigation	
Spatial	Local	3		
Duration	Long term	5		
Frequency	Rare	1		
Intensity	High	5		
Severity	Medium high	11		
Consequence	Medium high	14		
Probability	Expected	5		
Impact Significance	High	190		
Mitigation	Cannot be mitigated.			
Reversibility	High			
Irreplaceability	Low			
Confidence	High			

Impact:	Fragmentation of aquatic habitat caused by construction of OGF2
Nature of impact:	Direct

Description:

The dam creates a barrier preventing movement of biota upstream and downstream of the wall. This most significantly affects fish species. *T. sparmanii* are not migratory and are adapted to living in slow flowing lentic systems and are therefore unlikely to be affected. The longfin eel (*Anguilla mossambica*) was not collected during sampling on the river but is common along rivers throughout the Southern Cape. This species is catamadromous and breed at sea but spend most of their adult life in freshwater systems. They therefore migrate from the sea to rivers and vice versa and dams pose significant barriers to migration routes. There are no major impoundments downstream of the proposed dam site and it is possible that this species may migrate upstream and inhabit pools along the length of the river. While dam walls do pose significant barriers to migration, this species is known to navigate up high barriers

A fish ladder can be incorporated into the design of the dam wall which is designed to allow fish eels to migrate over dam walls. This option is however likely to add expense to the dam design and construction and would need to be designed by a suitably qualified specialist. Given that the river reach is not considered to be important for fish diversity and the fact that *A. mossambica* is not threatened, can navigate up significant obstacles and is not confirmed to be present in the river, the construction of a fish ladder is not considered to be a justifiable mitigation measure.

Impact Status	**Negative Impact**			
Impact Criteria	Without mitigation		With mitigation	
Spatial	Local	3		
Duration	Long term	5		
Frequency	Regular	4		
Intensity	High	5		
Severity	Medium high	14		
Consequence	Medium high	17		
Probability	Probable	4		
Impact Significance	High	21		
Mitigation	- Cannot be mitigated.			
Reversibility	High			
Irreplaceability	Lo			
Confidence	High			

Aspect	Construction of dam within watercourse (Ruiterbos)
Phase	Operations
Impact:	Impact of dam on downstream users
Nature of impact:	Direct

Description

Ruiterbos River - There are no additional water users on the Ruiterbos River downstream of the proposed dam and increased abstraction will therefore not affect any users that abstract water from the Ruiterbos River. The most important impact is on the ecological flows in the river and on base flows in particular. Currently dry river conditions (with minimal base flow or zero flow) occur approximately 40 % of the time (Ruiterbos-Pre). For all dam sizes, modelled flows (Ruiterbos-Post) indicate that that these low flow conditions will increase to approximately 60 % of the time. (Refer to ecological impact assessed)

Brandwag River - According to the 50-year simulation period, MAR at K1H004 is expected to reduce from to 11.08 Mm3 to 10.87 Mm3 which is considered minimal. According to the WARMS database, water users downstream of the applicant are registered to abstract a total of 3.54 Mm3 per annum. The reduction in MAR caused by the storage and increased abstraction from the Ruiterbos River is therefore unlikely to have any significant impact on downstream users.

Based on a volume of 7.82 Mm3 that remains unallocated, the additional abstraction of 100 000 m3 to 135 000 m3 per annum will ensure that sufficient water remains in the system to meet reserve requirements of 1.78 Mm3 per annum.

Impact Status	Negligible
Mitigation	- Flow meters must be installed on pumps and records of abstraction volumes must be submitted to BOCMA bi-annually. - The EWR for the Ruiterbos River must be determined and an outlet works must be incorporated into the dam design to ensure that the EWR is met. Alternatively, a weir and pipeline must be constructed at the dam inlet to divert baseflows around the dam and into the Ruiterbos River below the dam. - Authorisation of additional taking of water from the Ruiterbos River must be subject to the surrender of abstraction rights from boreholes on RE/420 and RE/373. **Interim Release flow requirements (or comment form DWS)** Mean Annual Runoff (MAR): 1.24 million m³/year Proposed Dam Capacity: 150,000 m³ Interim Environmental Water Requirement (EWR): ~9.5% of MAR ≈ 118,000 m³/year • A formal Reserve Determination has not yet been undertaken. However, based on the hydrological assessment of the dam catchment (MAR estimated at 1.24 million m³/year) and considering the planned cessation of existing borehole abstractions on RE/420 and RE/373, it is reasonable to apply a precautionary approach and implement an interim EWR. • A release allocation of approximately 118,000 m³/year (9.5% of MAR) is proposed to simulate continuous environmental baseflows downstream of the dam. This estimate aligns with standard EWR ratios applied within the K10D catchment for similar river systems. Dam Operation Requirements • The dam must be operated to: o Maintain continuous baseflow release throughout the year, o Provide increased outflows during storm events or peak rainfall, and o Allow for adaptive management until a formal EWR is determined. • A pipe-and-valve outlet system, preferred by the landowner, is recommended to accommodate controlled and adjustable releases. This infrastructure will enable:

	○ A year-round trickle flow to maintain ecological connectivity downstream, ○ Temporary flow increases during and after rainfall events to mimic natural runoff patterns. • This approach reflects the regional rainfall regime (~450 mm/year), with peak rainfall typically occurring during spring (September–November) and autumn (March–May), and dry conditions prevailing from December to February. Compliance and Monitoring • All pumps abstracting water from the dam must be equipped with calibrated flow meters to monitor water usage and ensure compliance with lawful allocations. • Additional abstraction from the Ruiterbos River must be conditional upon the formal surrender of borehole water use rights on RE/420 and RE/373 to ensure that cumulative abstraction remains lawful.
Reversibility	High
Irreplaceability	Low
Confidence	High

7. Soil and land capability

7.1 Description of baseline conditions

The area comprises a steeply rolling incised landscape with gently sloping upper and top slopes, classified as a steeply dissected coastal plateau (Schafer, 1992). Altitudes range from approximately 100 to 276 masl.
Historical images and data indicates that the existing agricultural areas have been farmed since 1976 (grazing areas for cattle). The estimated past use area identified is approximately 197 ha.

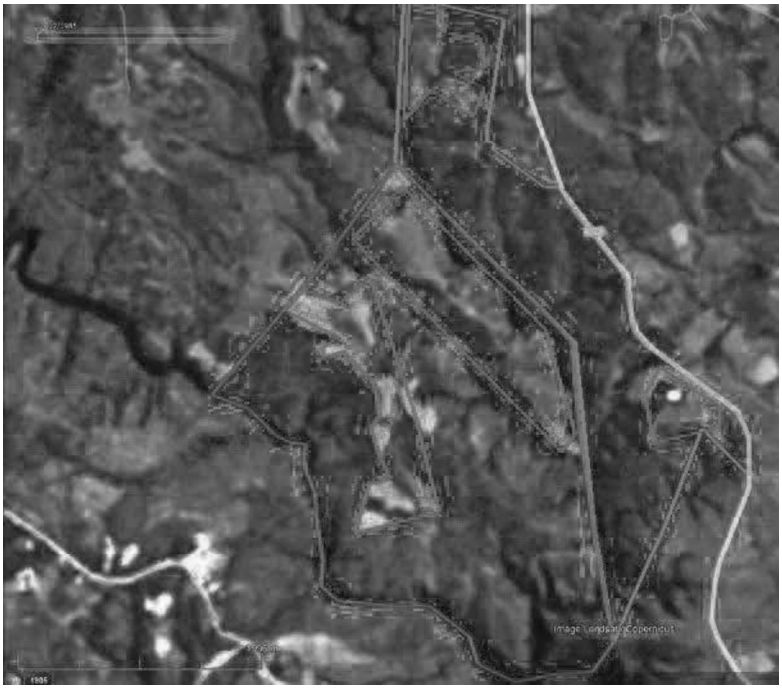


Figure 25: 1985 grazing / modified areas indicated in red; an estimated 197 ha were modified due to previous cattle farming

Figure 26: 2006 grazing areas indicated in red; quarry on NE section of ptn 420 is visible

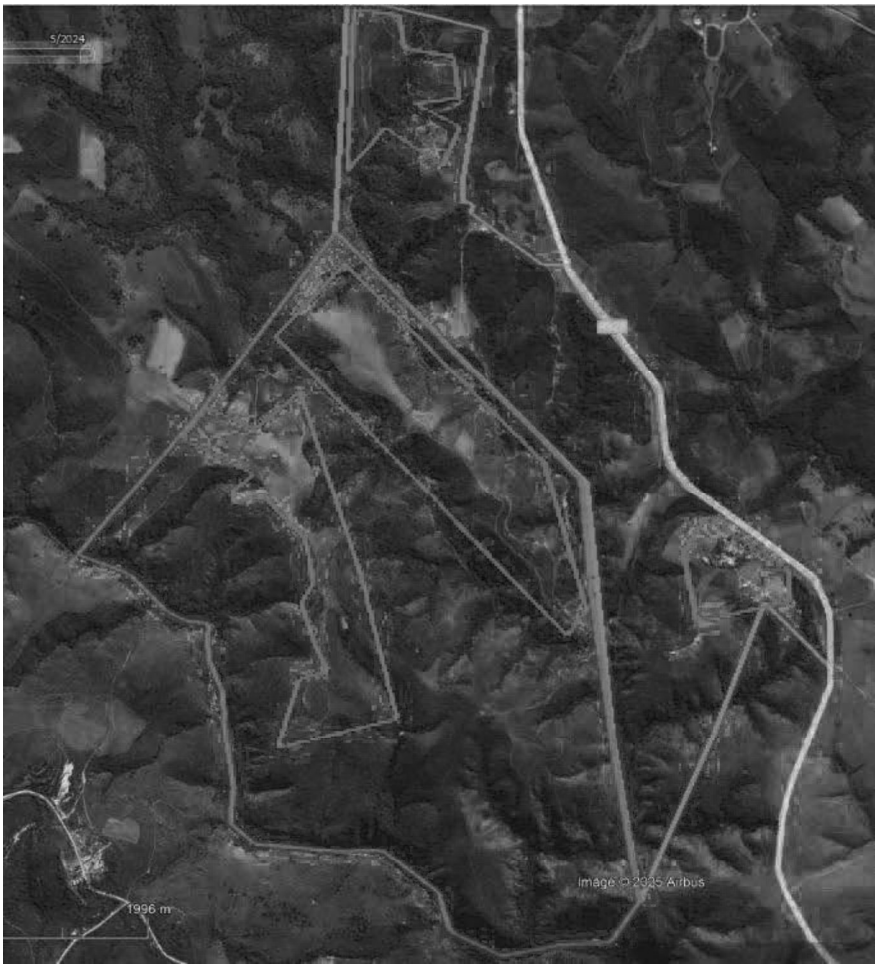


Figure 27: 2024 agricultural areas clearly visible – mostly takes place on old grazing areas indicated in red; Clearing for additional dwellings took place outside previously modified areas; areas surrounding dwellings are recommended to be revegetated, including thicket vegetation to offer fire protection.

Ptn 373 is approximately 789 ha in extent; measurement tools used provide an estimated 60 ha are currently used for agricultural purposes on ptn 373. Ptn 420 is an estimated 489 ha in extent; an estimated 22 ha is currently used on ptn

420 for mixed uses (dwellings, restaurant, tourist facilities) and irrigated areas with the remaining area used for free-ranging game. The proposed predator and elephant enclosure would require a further 11.5 ha.
A maximum of 95 ha is currently in use for activities on the properties. This is approximately half that which was in use in 1979 for cattle grazing.

The land class map developed by the DFFE is provided below.

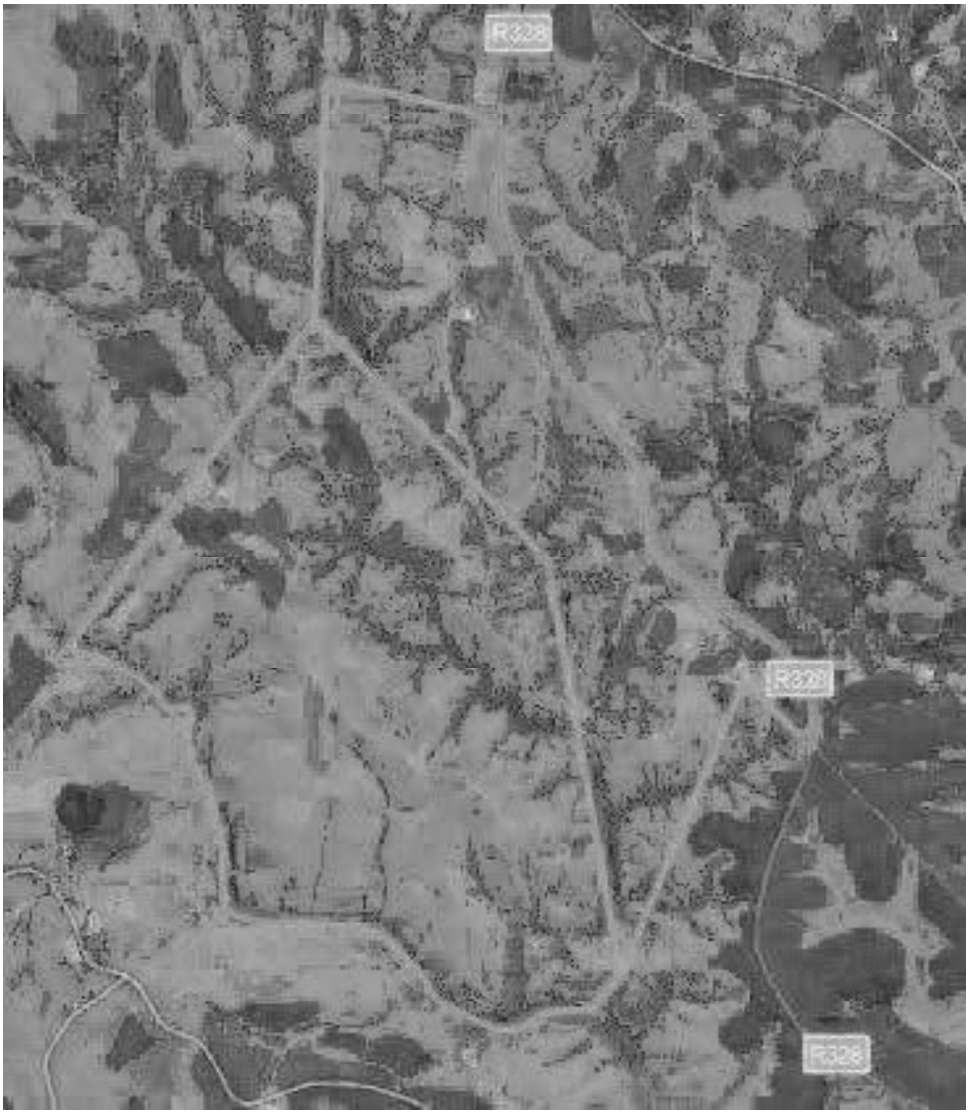


Figure 28: DFFE land class map (DFFE, 2022)

Brown areas on map indicate:
Land Cover 73-class (DFFE, 2022)

Class:	commercial annual crops rain-fed / dryland
Classification Level 1:	Cultivated
Classification Level 2:	Temporary Crops

These brown areas correspond to the areas requiring verification in terms of threated ecosystem layers, 2022. The vegetation assessment confirmed that these areas are past use / in-use agricultural areas.
The light green areas represent the fynbos grassland area; the vegetation assessment shows that the majority of fynbos is intact on the property with light to moderate AIS invasion in some areas; the dark green provides an indication of valley vegetation (forest / thicket) which is currently invaded.

Figure 29: 20 meters contour lines showing mountainous nature of ptns 373 and 420; the agricultural activities are taking place on flat ridge areas. The dwellings and other infrastructure have also been developed on the flatter areas of the property.

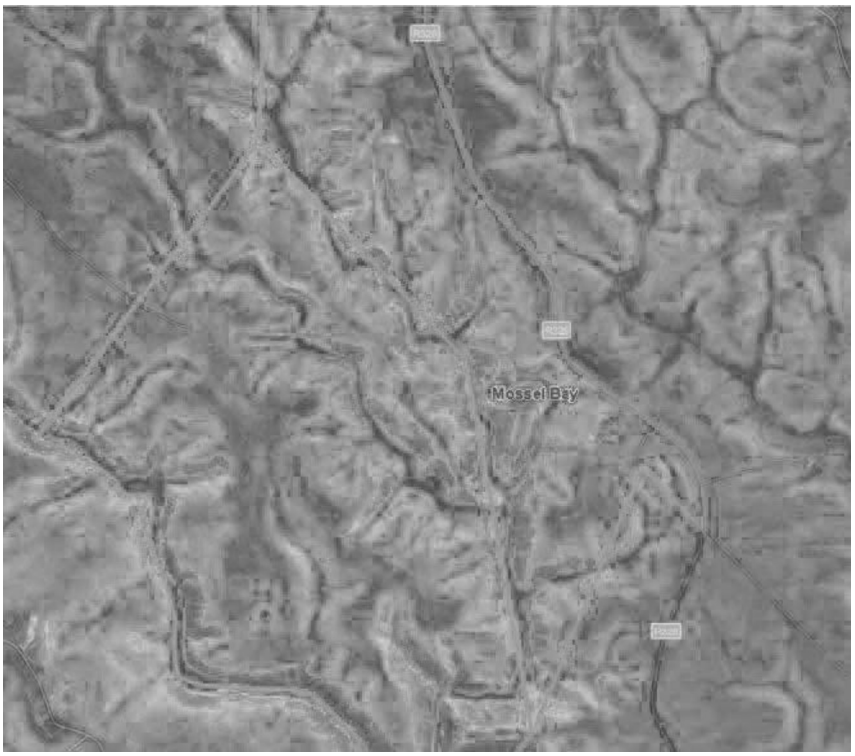


Figure 30: Slope classification – blue: gentle (2% slope); red: steepest (67% slope)

7.1.1 Overview of soil assessment

A soil assessment was carried out to determine the suitability of soil on site to crop farming.

Approximately 158.8 ha of ptn 373 was surveyed and assessed for agricultural potential - irrigated crops and pastures as well as dryland pastures. Potentials were rated from high to moderately low for 143.9 ha of arable land. Soils were described and classified using the South African soil classification (Soil Classification Working Group, 2018).

The soils were found to vary considerably over short distances with regards to soil depth, texture and classification and therefore delineated soil units may have some variation but for practical reasons they are grouped into management units. The geology of the assessment area is predominantly granite with some ridge crests capped with silcrete remnants (consistent Garden Route Granite Fynbos and Swellendam silcrete vegetation).

a. Soils derived from the silcretes occurred on the top and upper slopes of the area.

These soils are generally podzolized *(Houwhoek* or *Groenkop* soil forms) with very high gravel contents. Plate 1 illustrates a *Houwhoek* soil form from within the Hh 1 soil unit. Podzols essentially form in light textured soils. Of fundamental importance to the genesis of these soils is the formation of fulvic acid which is capable of breaking down clay minerals into compound elements. Iron and aluminium are then leached out of the upper horizons of the soil profile into the lower B horizons (Brink, 1985). A hard-pan or ortstein B horizon layer generally occurs below 60 cm. This is largely impervious and limits vertical water movement.

Vilafontes soil form (Vf 1 soil unit; plate 3) was also identified where a moderately developed E horizon or leached soil layer overlies a darker coloured, gravelly layer often with higher clay (25-35% clay).

b. Soils derived from the Granites on Upper to lower mid slopes

These granites comprise very coarse-grained particles, are well-drained sandy clay loams and have weathered to mainly dark reddish-brown soils or dark brown quartz rich sandy clays.

Tubatse, Vilafontes and *Glenrosa* are common soil forms that have formed in the granite material. Textures range from sandy loam to sandy clay loam in the topsoils and generally sandy clay loam (25 to 35%) in the subsoils. The *Tubatse* soils are red apedal and friable and contain some loose stone or rock in the lower subsoil while the *Vilafontes* have an E horizon that has developed over the gravel rich subsoil. These soils are quite variable due mainly to the variable nature of the terrain: steep to very steep, both convex and concave slopes and frequent rock outcrops. They are however of moderate to high potential despite the very steep slope gradients for the most part. The boundaries of this unit were photo interpreted as the very steep slopes and dense vegetation made it difficult to excavate any soil pits.

c. Concave lower slopes and drainage lines

Organic rich, apedal, loamy sands and sandy loams overlie a clay rich lower subsoil at below 100 to 130 cm depth (Tu 1 unit). These soils are well drained, acid but have a high agricultural potential. An added advantage for crop production, particularly fruit tree crops, is that these sites are well protected from wind. A small area of hydromorphic soils viz. *Kroonstad* was described on a level lower slope (unit Kd 1), These soils have a moderate potential for dryland pastures.

d. Soils developed from sandstone - Upper and upper mid slopes

These soils are moderately deep to deep sandy loam to sandy clay loams (Be 1 soil unit). They are apedal, friable and well drained with little stone or rock in the upper subsoil horizons. Topsoil clay percentages range between 16 and 18% and subsoil between 24 and 35 %. Effective soil depths are between 70 and 100 cm. and they are underlain by hard or fractured rock. These soils which support a Protea/Erica vegetation are likely to be more acid than other soils.

7.1.2 Overview of soil potential

The soil units mapped by the specialist provides an indication the suitability rating for improved dryland pastures as well as irrigated lands and an indication of clay percentage and limitations of the soil unit.

The international land capability classification (LCC) classes indicate the most intensive tillage that can be practiced safely with permanent maintenance of the soil (McRae and Burnham, 1981). There are 8 classes where classes I-IV are suitable for agriculture. The soils have been rated from high to low.

The soil units have been plotted on google earth to provide an indication of soil potential of the study area. Detailed soil maps are provided in the specialist report. Soil potential is determined by physical characteristics of the soils such as depth to limiting layers, texture and structure, which all affect soil water holding capacity and drainage. Soil potential was assessed for irrigated orchards, pastures and dryland pastures. The majority of The general crop potential areas is provided below in Table 13. A concise summary of the soil potential for areas 4 (1-17) is provided in **Error! Reference source not found.** and includes the corresponding recommendations identified from site visits and s pecialist input.

Table 13: Summary of general crop potential areas (ha)

Potential class	Area in hectares
High	56.6
Medium high	44.6
Medium	34.3
Medium low	5.9
Low	17.4

Soil amelioration

Most of the soils will be acidic and require liming especially on upper slopes and ridge crests, where podzols were identified and protea fynbos vegetation is common or where no lime was added previously. Deep ripping to depths of at least 60cm and ridging to a height of 40 cm is recommended on most sites for the establishment of Citrus, Avocado Pears or Olives. Ridges should follow the contours to prevent soil erosion and aid in trapping water.

Crop Suitability

The major limitation for fruit tree crops is the low water holding capacity of the soils in general, due to the high gravel and stone contents and restricted depth despite moderate-high clay contents in some of the subsoils (commonly 20-35%). The only crops that have been recommended for dryland cropping are pastures. This would include lucerne and various suitable perennial grasses.

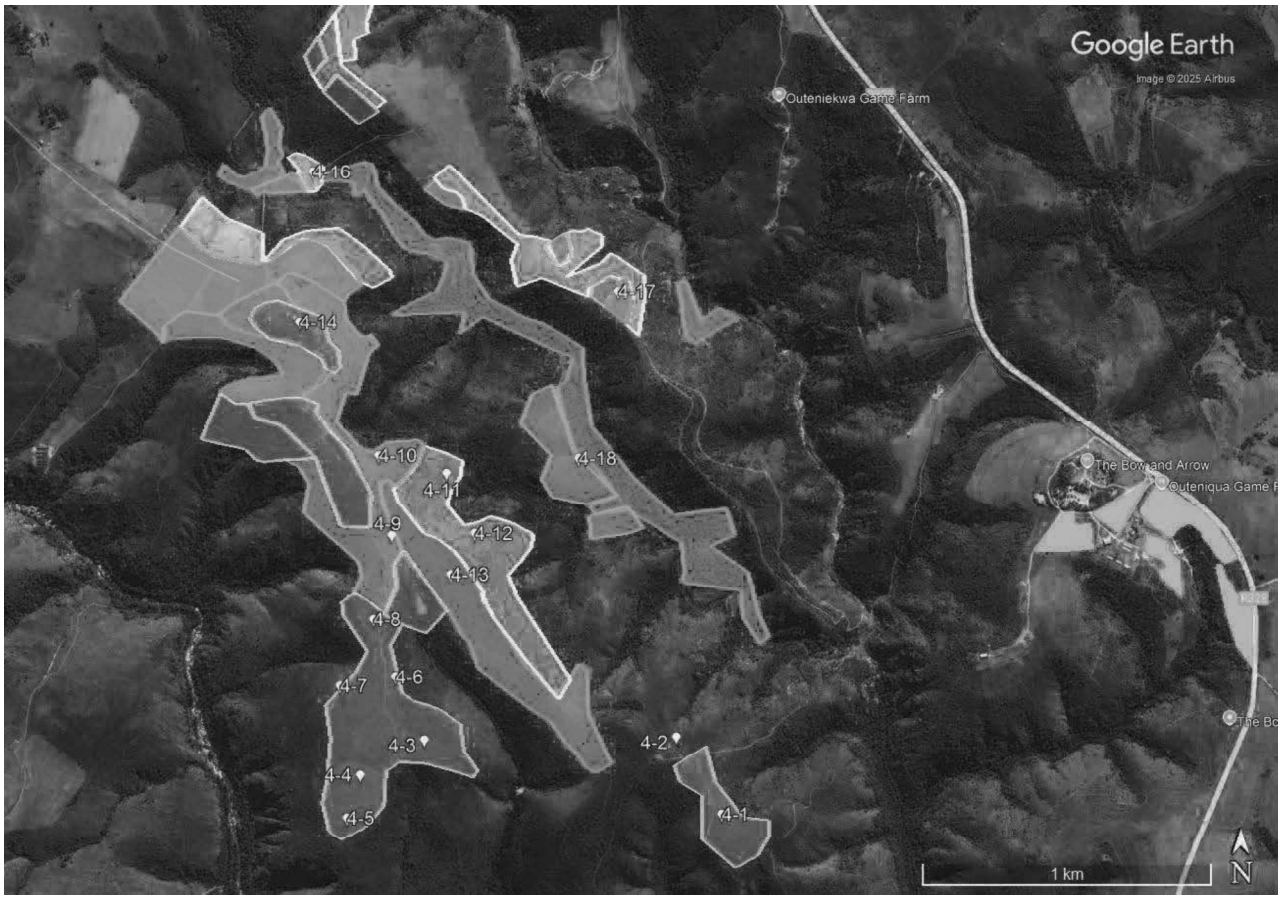


Figure 31: Generalised soil potential of the study area (yellow: Low; medium: Orange; medium-high / high: green); agricultural area on area 4-1,2 on ptn 420 indicated in east

Table 14: Summary of soil potential areas (areas 1 to 17) on ptn 373

Area	Size estimate	Soil unit	Limitations	Generalised Soil Potential	Dryland	Irrigated					Land use	Recommendation
					Pastures	Pastures	Avocado	Citrus	Maize	Olives		
1	4,98ha	Nk1	Gravel; restricted depth; low Water holding capacity	Medium	Medium						Past use /	Only dryland in 0.71 ha if required / Future use – not feasible
2	1.55 ha	Be 1	Stone; saprolite	High	Medium High	High	High	High	High	High	Past use	Only dryland grazing
3	2.01 ha	Hh1	Gravel; restricted depth; low Water holding capacity	Medium	ML	M	-	-	-	-	In use	Preferably not be used; if used, only dryland grazing
4	2.87ha	Hh1	Gravel; restricted depth; low Water holding capacity	Medium	ML	M	-	-	-	-	Past use	Only dryland grazing
5	0.5 ha	Hh1	Gravel; restricted depth; low Water holding capacity1	Medium	ML	M	-	-	-	-	Future use – not feasible Intact fynbos	Retain as fynbos; removal of dense wattles as per AIS management plan
6	6.79 ha	Hh1	Gravel; restricted depth; low Water holding capacity	Medium	ML	M	-	-	-	-	Past use Future use – not feasible	Retain as fynbos; removal of dense wattles as per AIS management plan
7	0.34 ha	Hh1	Gravel; restricted depth; low Water holding capacity	Medium	ML	M	-	-	-	-	Future use – not feasible	Retain as fynbos; removal alien trees as per AIS management plan
8	3.38 ha	Hh1	Gravel; restricted depth; low Water holding capacity	Medium	ML	M	-	-	-	-	Past use	Only dryland; removal alien trees in field and adjacent area as per AIS management plan
		Vf 1	Gravel; restricted depth; low Water holding capacity	medium high	Medium High	High	-	Medium	Medium	Medium		
9	3.56 ha	Vf 1		medium high	Medium High	High		Medium	Medium	Medium	In use	No further expansion this

Area	Size estimate	Soil unit	Limitations	Generalised Soil Potential	Dryland	Irrigated					Land use	Recommendation
					Pastures	Pastures	Avocado	Citrus	Maize	Olives		
			Gravel; restricted depth; low Water holding capacity									area. Manage agricultural area as per mitigation measures.
10	2.5ha	Vf 1									In use	Manage agricultural area as per mitigation measures.
11	2.48 ha	GS1	Stone and rock; restricted depth; low WHC	Low	Medium Low						Past use - invaded	Dryland grazing Manage as per AIS management plan
12	3.14 ha										Past use - invaded	Not suitable – Manage as per AIS management plan
13	2.85ha										Future - likely feasible (2.85)	Low ecological importance however soil potential is indicated as low for the corresponding area. Possible dryland
13	9.2ha	Be1	Stone;saprolite	High	Medium High	High	High	High	High	High	Remaining area 13 – not feasible	High ecological importance
14	3.6 ha	GK2	This section on Area 4-14 is where supporting infrastrucutre and dwellings are in place. Area is recommended for supporting strucutrures, storage	High and medium High (in use) Medium potential (past use)	M	M	-	-	M	-	In use Past use	Maintain as irrigated agricultural area; use past use area for additional irrigated area and required dwellings, storage.

Area	Size estimate	Soil unit	Limitations	Generalised Soil Potential	Dryland	Irrigated					Land use	Recommendation
					Pastures	Pastures	Avocado	Citrus	Maize	Olives		
			faiclities and compost areas.									
14	30 ha	GK1	Gravel; sub-optimal WHC	MH	M	MH	-	-	MH	-		Existing agricultural area suitable for combination of maize, olives, avocados and citrus.
		Be2	Gravel & stone;	MH	M	H	M	M	H	MH		
		Be3	Gravel; dense lower subsoil	H	M	H	MH	H	H	H		
		Vf1	Restricted depth; low WHC	MH	MH	H	-	M	M	M		
	6.6ha	Gs1	Stone and rock; restricted depth; low WHC	L	**L**	ML	-	-	-	-		No agricultural expansion in this area
		GS2		L	L	-	-	-	-	L		
15	0.33ha	HH1	Gravel; restricted depth; low WHC	Medium	ML	M	-	-	-	-	Future use – not suitable	Retain as fynbos No agricultural expansion permitted.
16	0.89ha	Kd1	Poor drainage	Medium	M	MH	-	-	-	-	In use	Area surrounding dam should be mulched and planted.
17	30.73 ha	Be2	Gravel & stone;	Medium high	M	H	M	M	H	MH	Past use	Recommended for irrigated mixed cropped farming. Manage as per agricultural measures.
		CV1	Gravel; restricted depth	medium	MH	M	-	-	M	-		
		Tu1	Variable soils; drainage areas	High	H	H	H	H	H	H		
		Tu2	Restricted depth	Medium	M	M	-	-	-	-		
		Se1	Dense structured clay subsoil; soil wetness	Medium low	M	M	-	-	-	-		
		Gs1	Stone and rock; restricted depth, low WHC	Low	**L**	ML	-	-	-	-		
		GS2		Low	**L**	L	-	-	-	-		
18	5ha	Tb1	Steep slopes; variable soils	Medium high	MH	H	M-H	M	-	MH	Fynbos with high AIS	No formal crop farming is recommended to

Area	Size estimate	Soil unit	Limitations	Generalised Soil Potential	Dryland	Irrigated					Land use	Recommendation
					Pastures	Pastures	Avocado	Citrus	Maize	Olives		
	15.5ha	TU1	Variable soils; drainage areas	High	H	H	H	H	H	H	Thicket / riverine with high AIS	take place in this area. The area, as well as the majority of drainage line areas on the property which (estimated of 200 ha) requires ongoing AIS clearing combined with rehabilitation. A 10-15 m buffer areas of drainage lines / rivers are to be rehabilitated with plants as provided in rehabilitation plan and maintained. Sustainable harvesting of *Agathosma recurvifolia* and *Cyclopia subternata should* be considered once rehabilitation has been underway for 5 years.

7.2 Verification of soil and land capability

Theme	Environmental Sensitivity in terms of DFFE Screening Tool Report	Verification
Agricultural Theme	Very High	Very High – identified areas Low – identified areas based on low soil potential and high ecological importance.

7.3 Impacts and Significance Rating – Soil and land capability

Aspect	**Excavation Activities and roads and crossings**			
Phase	**Construction / Operations**			
Impact:	**Soil erosion and ability of vegetation to recover**			
Nature of impact:	**Direct**			
Description of impact:	Excavation activities associated with the construction of dwellings, structures, roads etc have increased soil erosion and sediment runoff, which slows down and compromises the ability of the natural vegetation to recover in eroded areas. Measures are to be put in place to remediate eroded areas and prevent further erosion			
Impact Status	Negative Impact		Negative Impact	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Short to medium	3	Very short	1
Frequency	Seldom	3	Seldom	3
Intensity	Low to medium	2	Low	1
Severity	Negative Medium	8	Negative Low	5
Consequence	Negative Medium	9	Negative Low	6
Probability	Expected	5	Possible	4
Impact Significance	**Negative Medium**	**14**	**Negative Low**	10
Mitigation / Reversibility	Possible – - Revegetate area as per rehabilitation plan for dwellings, roads, dams as applicable - Mulch bare areas – chip AIS material (without seed) for mulch material and place in windrows - Put in place stone spillways where necessary - Put in place anti-erosion berms in roads where necessary - Minimize soil disturbance and compaction, such as using hand tools instead of heavy machinery. Use specialized equipment designed to reduce environmental footprint, like lightweight mowers or trimmers. - Stabilize disturbed soils promptly with native vegetation or erosion control materials. - Construction and land-clearing activities to be scheduled to avoid periods of heavy rainfall to reduce the risk of debris and sediment runoff.			
Confidence	High			

Aspect	**Agricultural activities**
Phase	**Operational**
Impact:	**Soil potential and land capability**
Nature of impact:	**Direct**
Description Annual crops - Following harvesting, and before planting, large areas on the farm may be exposed at a single time, and susceptible to wind and water erosion. Sediment may be eroded, transported and deposited in the surrounding area. Using a combination of mulch and maintaining a permanent organic cover on the worked areas will assist in preventing soil erosion / loss and reducing generation of dust. Besides aiding in reducing water evaporation the use of a straw mulch can result in vastly improved crop yields. Perennial crops – While perennial crops such as avocados, citrus, and olives generally maintain canopy cover and root structures that help stabilize the soil, the areas between trees are often left bare, especially during	

early growth stages or in intensively managed orchards. These exposed inter-row zones are also vulnerable to wind and water erosion, particularly on sloped terrain. To address this, it is recommended that these areas be permanently mulched and / or managed with a low-growing organic ground cover. This not only minimizes erosion and dust but also helps regulate soil temperature, reduces water evaporation, suppresses weeds, and can contribute to improved soil fertility over time. An example of an indigenous ground cover is *Helichrysum cymosum which is a drought tolerant which can assist with weed suppression, improved soil condition and natural pest deterrent.*

Are 4-18 – No formal crop farming is recommended to take place in this area.
This area, as well as the majority of drainage line areas on the property which (estimated of 200 ha) requires ongoing AIS clearing combined with active and passive rehabilitation. A 10-15 m buffer areas of drainage lines / rivers are to be rehabilitated with wetland plants and maintained; the remaining areas to be rehabilitated as per the rehabilitation plan and accompanying list of flora species.
Sustainable harvesting of *Agathosma recurvifolia* and *Cyclopia subternata* could be considered once rehabilitation is complete.
With the implementation of mitigation measures — including the use of permanent organic mulch, erosion control strategies, and the establishment of indigenous ground covers — the current risks associated with soil exposure can be significantly reduced. A positive impact may result in the medium term, through improved soil health, enhanced biodiversity, increased water retention, and more resilient agricultural systems.

Impact Status	**Negative Impact**		**Negative / positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Short – medium term	3	Very short	1
Frequency	Infrequent	2	Infrequent	2
Intensity	Low – medium	3	Low	1
Severity	Negative Low	8	Low	4
Consequence	Negative Low	10	Low	5
Probability	Plausible	3	Slight	2
Impact Significance	Negative Medium	13	Low	7

Mitigation
General Agricultural Practices

- Recommended agricultural areas are provided in Table 15, Table 16 and Table 14
- Consider olive trees due to the lower water requirements.
- No planting on slopes steeper than 1:5 (20%) to prevent erosion
- Liming will be required, particularly on upper slopes and ridge crests, based on soil pH levels and crop requirements (especially for lucerne and fruit trees).
- Deep ripping to depths of at least 60 cm should be undertaken only where compacted soils are present, and not in sensitive areas such as fynbos zones or slopes prone to erosion.
- Ridging to a height of 40 cm is recommended on most sites for the establishment of citrus, avocado, or olive trees.
- Ridges should follow natural contours to reduce the risk of erosion and to assist with water retention.
- Apply organic mulch to all open areas between and around crops to:
    - Reduce water evaporation
    - Suppress weed growth
    - Improve soil structure and crop yields
- Cleared Alien Invasive Species (AIS) biomass (seed-free) may be used as mulch
- Maintain permanent organic ground cover on worked areas to prevent wind and water erosion and reduce dust emissions.
- Exposed areas between fruit trees should be permanently mulched and/or interplanted with low-growing, water-wise indigenous ground covers such as:
    - *Helichrysum cymosum*
    - *Pelargonium capitatum*
    - *Carpobrotus edulis*
- Where appropriate, interplant perennial indigenous crops for sustainable harvesting, such as:
    - *Artemisia afra* (African Wormwood)
    - *Origanum vulgare* (Wild/Berg Oregano)
    - *Salvia africana-lutea* (Wild Sage)
- Land clearing activities should be scheduled to avoid periods of heavy rainfall to minimize erosion risk.
- Avoid working with wet soils, as this will damage soil structure and compromise productivity.

- Access is limited to existing tracks or clearly demarcated low-impact routes; No off-track driving is allowed.
- Regular monitoring of tracks must be undertaken to assess signs of degradation.

Area 4–18 and drainage lines and AIS areas:

- Rehabilitation (active and passive) of AIS-cleared areas in accordance with alien invasive management plan and rehabilitation plan.
- Maintain a 10–15 m buffer from the drainage line, to be rehabilitated with locally indigenous riverine vegetation.
- No fertilisers, pesticide, herbicides, fencing, or irrigation is permitted in this area (unless for target clearing of AIS).
- No heavy machinery is permitted within these areas
- *Agathosma recurvifolia* (Least concern) and *Cyclopia subternata* (near threatened) are included in the list of plants to use for rehabilitation. Sustainable harvesting of these could take place once the area is rehabilitated with the plants included in the rehabilitation plan. Access to this area to be primarily by foot, with wheelbarrows or hand-pulled carts for harvest transport. sustainably harvested (not uprooted), allowing natural regeneration to continue supporting erosion control, habitat provision, and water quality. Sustainable harvesting includes. No commercial varieties of *Agathosma recurvifolia* and *Cyclopia subternata permitted due to interference with surrounding species. Permits will be required for Cyclopia subternata*
- Annual audit recommended to determine level of rehabilitation, extent of AIS and population levels of *Agathosma recurvifolia* and *Cyclopia subternata to inform sustainable harvesting.*
- The following guidelines for sustainable harvesting guidelines are provided:
- *Cyclopia subternata (*Honeybush Vleitee)
- Harvesting of Vleitee should be seen as pruning; Choose tall, healthy plants with many branches for harvesting; select and cut only some of the branches on a plant to avoid killing the plant; Cut older side branches; Leave young branches to regrow; Only prune 50% of the branches; Always leave the main trunk uncut.

Confidence	High

Aspect	**Farming Operations – fertilizers, pesticides**
Phase	**Operations**
Impact:	**Soil and groundwater quality and surrounding indigenous vegetation and fauna**
Nature of impact:	**Cumulative**

Description

Excessive fertilizer use, and use of pesticides, can impact soil quality, groundwater and surface waters

Impact Status	**Negative Impact**		**Negative Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Short	2	Very short	1
Frequency	Seldom	3	Infrequent	2
Intensity	Medium	3	Low	1
Severity	Negative Medium	8	Negative Medium	4
Consequence	Negative Medium	10	Negative Medium	5
Probability	Expected	5	Probable	4
Impact Significance	Medium	15	Low	9

Mitigation

- No fertilizers or pesticides permitted in natural surrounding areas / drainage lines.
- Potassium based (not sodium based) fertilizers recommended to prevent saline runoff form farming areas.
- Avoid over-application of fertilizers and apply the correct amount
- Rotate annual crops from different botanical families to reduce the risk of soil-borne diseases and pest build-up; example - Lucerne - Maize - Lucerne - Maize: Rotate between these two crops to allow for nitrogen fixation by lucerne to support maize growth. Lucerne will improve soil health, especially in terms of nitrogen content, benefiting maize crops.
- Avoid overuse of synthetic fertilizers. After growing a leguminous crop like lucerne, the soil will have increased nitrogen, reducing the need for nitrogen-based fertilizers in subsequent crops.
- Between crop rotations, consider using organic amendments such as compost or cover crops to build soil organic matter, improve microbial activity, and reduce the need for synthetic fertilizers and herbicides
- Use minimum tillage or no-till practices between crop rotations to protect soil structure, prevent erosion, and promote water infiltration. This also helps maintain beneficial soil organism
- Apply organic mulch after crop harvests to preserve soil moisture, prevent erosion, and reduce weed growth between rotations.
- Apply pesticides when absolutely necessary and follow application guidelines to minimize environmental impact.
- Use Integrated Pest Management techniques where practical, such as monitoring pest populations, introducing beneficial insects, and applying organic or low-toxicity treatments.

- Apply fertilizers and pesticides with the utmost caution. - Investigate use of alternative fertilizers - manure, cakes of plant origin, vermicompost, microbial bio-fertilizers - Keep all fertilizers and pesticides well labelled and locked away in a secure store room. If pesticides are to be used: - Make use of target-specific pesticides only. - Avoid persistent pesticides, rather using biodegradable types. - Understand how each pesticide works, and when its effects should become evident. - Ensure selection of the correct pesticide, and best method of application and dose. - Avoid indiscriminate aerial spraying at all times, and aerial spraying on windy days. - No spraying of pesticides if bees are present - The use of pesticides are regulated by the Department of Agriculture, Fisheries and Forestry. Ensure compliance with applicable legislation: Legislation applicable to pesticides and fertilizers includes: o Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) o Agricultural Pest Act, 1983 (Act No 36 of 1983) o Section 24 of the Constitution of the Republic of South Africa, (Act No. 108 of 1996) o Medicines and Related Substances Control Act, 1965 (Act 101 of 1965) o Hazardous Substances Act, 1973 (Act 15 of 1973) o The Foodstuffs, Cosmetics and Disinfectants Act (FCDA), 1972 (Act No. 54 of 1972) o The Occupational Health and Safety Act (OHSA), 1993 (Act No. 85 of 1993) o Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) - Ensure correct training in proper pesticide use is provided to workers. - Ensure the correct Personal Protective Equipment (PPE) is provided and used during pesticide applications. - Paraquat is not to be used due to its extreme toxicity to animals and humans.	
Confidence	High

8. Land use

8.1Overview of past and current landuses.

Historically, land use on the property included cattle grazing and small-scale quarrying, which contributed to the disturbance of approximately 197 ha of fynbos. In recent years, additional land uses have taken place on the property and includes the development of a game farm, a restaurant, and expanded agricultural activities.

Current land use activities are largely concentrated within previously disturbed areas, with the exception of the new dwellings and associated structures and reservoir, restaurant facilities, small agricultural area and some internal roads. The estimated combined footprint of activities in previously undisturbed areas is estimated at 6.5 ha.

Dryland pastures have an approximate footprint of 12 ha. The combined footprint of current irrigated agricultural activities is approximately 60ha; An additional 20 ha on ptn 373 has been identified as suitable; however, this expansion is to maintain 60 ha under irrigation with 20 ha available for crop rotation.

Area 4: Agricultural area and supporting activities – ptn 373 (789ha)

- Past use areas (prior to 2005): 95,77ha
- Past use agricultural areas currently in use: 43 ha
- Dryland (all past use): 12 ha
- Past undisturbed agricultural area currently in use: 1 ha (Site 4-16) (must be rehabilitated)
- Current and additional agricultural area (20 ha) on past use / disturbed area: 33ha
- Total (proposed and current) irrigated – 77 ha
- Total (current and proposed) irrigated and dryland: 89 ha

Area 1,2,3 and 5: Agricultural area, game farm, tourism, game enclosures, supporting activities - ptn 420 (489ha)

- Past use areas (prior to 2005) : 97.05 ha

- Past use agricultural areas currently in use: 17.2 ha; Restaurant adjacent to old quarry - 7200m2
- Past undisturbed area currently in use: 2.7 ha
  - Five dwellings and road - 8000m2
  - Two dwellings, structures, water storage, roads, tracks on ptn 420 - 9000m2
  - Roads between Area 2 and 3 on ptn 420 – 10 000 m2
  - Dam area – 800m2
- Proposed activities on previously disturbed areas: 13.4 ha
  - Elephant night enclosure to accommodate a maximum of four (4) African elephants: 1 ha within previously disturbed area (Area 5-1&2)
  - Proposed – predator enclosure: 10,4 ha (maximum) within previously disturbed area (Area 5-4)
  - Proposed 150 000m3 dam (2ha) - Area 3

Extent of areas with alien invasive species (AIS): 200ha

The areas along the drainage line areas considered to have high soil potential; these areas are also identified as being heavily infested with AIS, particularly A. mearnsii. This area is estimated at approximately 200 ha and requires ongoing AIS clearing combined with rehabilitation. The landowner estimates that 200 ha AIS area has already been cleared.
It is noted that *Agathosma recurvifolia* and *Cyclopia subternata* are included in the list of plants to use for rehabilitation along drainage lines. Sustainable harvesting of these could take place once the area is rehabilitated. This will need to be informed by monitoring of the AIS clearing and rehabilitation.

The combined footprint of all activities (existing and proposed) would be an estimated 122.5 ha, which is a reduction of 75 ha compared to past use activities. The property currently has a diversity of land uses that are considered to complement each other. Additional low impact activities recommended to be integrated into agricultural activities includes bee-farming; it is further recommended to consider olive trees (i.e. instead of more maize or avocado) due to the lower water requirements. Owl box are recommended in remaining natural areas to assist with rodent control.

A summary of land use areas on ptn 373 and 420 is provided below with indication of crop suitability.

Table 15: overview of land use areas on portion 373

Area	Extent (ha)	Recommendation
1, 2, 3, 4, 8, 11, 13 (2.8ha)	11.4ha	dryland grazing
14, 9, 10	36ha	irrigated farming (mixed crops)
17	30 ha	mixed dryland / irrigated as per soil condition (mixed crops)
5,6,7,11,12,13 (9.2ha), 15, 16	21.19 ha	retain / rehabilitate as fynbos / riverine as required
18		Identified as having high agricultural potential; however, no formal crop farming is recommended to take place in this area. This area (approximately 21 ha) is identified along the non-perennial drainage line. The area, as well as the majority of drainage line areas on the property which (estimated of 200 ha) requires ongoing AIS clearing combined with rehabilitation. i.e. cut aliens prior to seeding, use as mulch placed in windrows to prevent soil erosion, plant as per the rehabilitation plan. Note that the 10-15 m buffer areas of drainage lines / rivers are to be rehabilitated with wetland plants. It is noted that *Agathosma recurvifolia* and *Cyclopia subternata.*are included in the list of plants to use for rehabilitation. Sustainable harvesting of these could take place once the area is rehabilitated.

Total natural remaining area (proposed / preferred)	789 – (89)	700 ha
Total natural remaining area – past use	789 – (99 ha)	690 ha

Table 16: overview of land use areas on portion 420

Area	Extent (ha)	Recommendation
Area 1 / 5.5+6	2 ha	Additional dwellings and roads Past use (6ha);
Area 2	3 ha	5 dwellings (Past use – none)
Area 3	2 ha	New dam
5 - 1, 2	10 ha	Mixed irrigated / dryland grazing (Past use – 30 ha)
	5.5 ha	restaurant, old quarry, structures
	1 ha	Elephant enclosure
5-3	-	Past use - 6.5 ha
5.-4	10.4 ha	Predator enclosure (Past use – 10.4 ha)
Area 7	1 ha	Past use (26 ha); structures (current) 1 ha
Area 8	-	Past use (11 ha)
Total natural remaining (proposed / preferred)	489 ha – (33)	456 ha
Total natural remaining area – past use	489 ha – (78.9)	410 ha

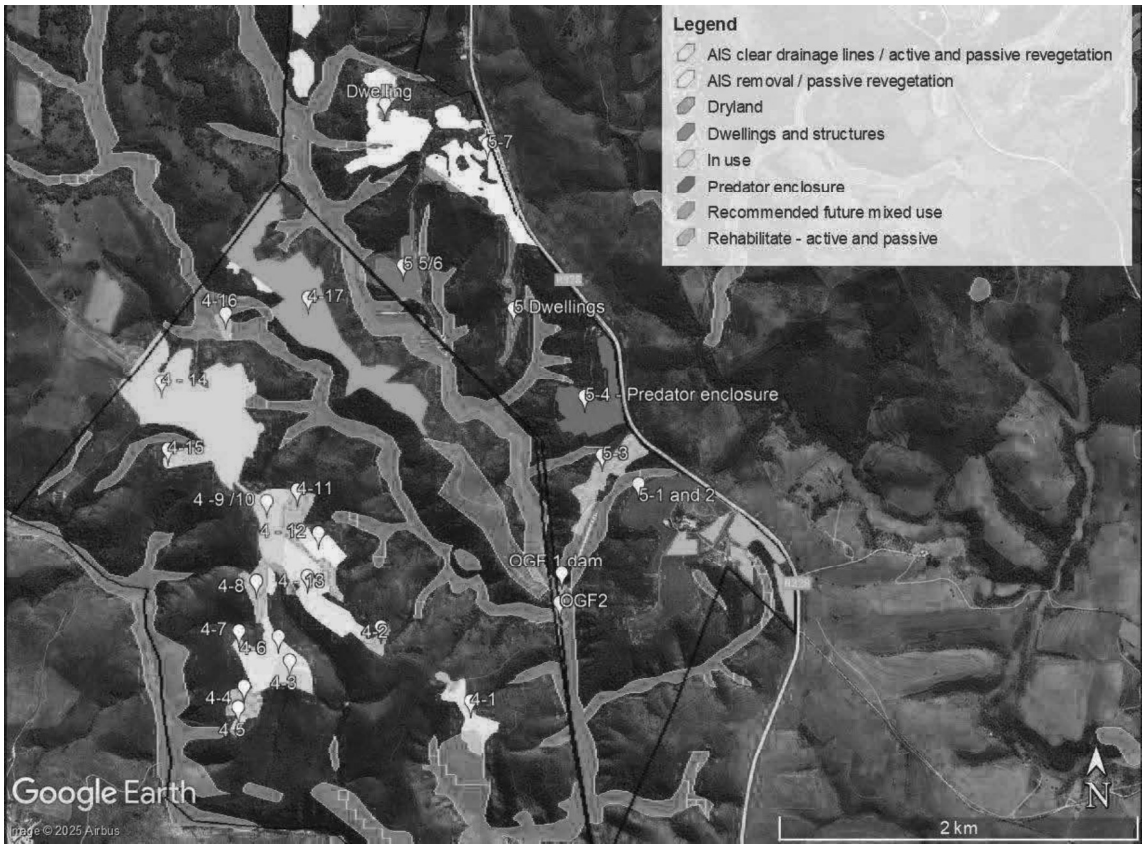


Figure 32: Recommended land uses

8.2 Impacts and Significance Rating – Land use

Aspect	**Land use change – past, current, proposed**
Phase	**Construction and Operations**
Impact:	**Change of land use from cattle farming to mixed use including crops, grazing, game farm, enclosures and restaurant.**
Nature of impact:	Cumulative / direct

Description

Current land use activities are largely concentrated within previously disturbed areas, with the exception of the proposed dam footprint and new dwellings and some internal roads.

It is recommended that approximately 21 ha of historically disturbed land on Portion 373 and 17.5 ha on Portion 420 be left to regenerate naturally as part of broader ecological restoration efforts.

Alien Invasive Species (AIS) currently affect an estimated 200 ha of the property. Ongoing AIS clearing is being implemented and should continue in conjunction with rehabilitation activities in line with the Environmental Management Programme (EMPr).

Suitable areas for irrigated and dryland agriculture have been identified using a combination of factors, including soil potential, slope gradient, ecological sensitivity, rehabilitation potential, and water availability.

The shift from cattle grazing and quarrying to a more diversified and managed land use approach—including wildlife tourism, crop production —combined with implementation of the EMPr (AIS control, landscaping, rehabilitation, and agricultural management), can reduce further habitat fragmentation and support long-term biodiversity conservation. Restoration of unnecessarily disturbed areas, including redundant roads, is encouraged to further improve ecological integrity. If the activities are well managed the impact is considered a low positive impact for overall land use on the area.

Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Medium – long	4	Medium – long	2
Frequency	Seldom	3	Seldom	3
Intensity	Medium low	2	Low	1
Severity	Negative Medium High	9	Negative Low	7
Consequence	Negative Medium High	11	Negative Low	6
Probability	Probable	4	Slight	1
Impact Significance	**Negative Medium**	**15**	**Positive Low**	**7**
Mitigation	- Avoid additional clearing activities that will result in fragmentation of habitats. Patch connectivity must be maintained and maximised to allow for movement of pollinators - Low impact agricultural activities such as beekeeping / honey production can be integrated into crop areas. Beekeeping supports the pollination of crops such as avocados, citrus, and other fruit trees, improving yields and supporting ecosystem health. - Care should be taken to ensure that beehives are placed in areas that do not disturb sensitive ecosystems or wildlife habitats. - Consider olive trees due to lower water requirements - Consider sustainable harvesting once AIS clearing combined with rehabilitation is underway - Owl boxes are recommended for natural rodent control, supporting ecological balance. - Seek advice of land planner to determine what zoning the activities require – a different zoning may be required for the restaurant facilities on Area 5-1 &2.			
Confidence	High			

Aspect	**Energy management**
Phase	**Operational**
Impact:	**Reliance on non-renewable energy sources**
Nature of impact:	**Direct / cumulative**

No municipal services (electricity, water, or sewage) are available on the property. As such, all energy requirements are met through off-grid systems, primarily solar power and gas. Solar installations provide electricity for dwellings, agricultural activities, restaurant facilities, and water pumping infrastructure. The use of renewable energy aligns with sustainable land use practices and reduces long-term operational costs.

Impact Status	Positive Impact		Positive Impact	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Activity	1	Activity	1
Duration	Short to medium	3	Short to medium	3
Frequency	often	5	often	5
Intensity	Low	1	Low	1
Severity	Negative Medium	8	Negative Medium	8
Consequence	Negative Medium	9	Negative Medium	9
Probability	Slight	1	Slight	1
Impact Significance	**Low**	**10**	**Low**	**9**
Mitigation	- Use of solar-powered pumps for irrigation and domestic water supply. - Energy-efficient lighting and appliances in all new dwellings and hospitality facilities. - Limited night lighting to reduce disturbance to wildlife and minimize energy demand.			
Confidence	High			

9. Socio-economic impacts

9.1 Description of baseline environment

Past activities allowed for one tenant to occupy the area, and the area was used for cattle farming up until 2016. No authorisations are on record for this activity. Agricultural imagery shows the agricultural areas used for farming dating back to the 1970s on the farm portions. Quarrying activities are also visible. Employment opportunities and income generation would have been provided by these activities.

Current activities allow for staff to be accommodated in the existing agricultural dwellings, and the 7 dwellings on ptn 420. A game farm and restaurant has also been established as well as 60 ha of cropland. The landowner reportedly encourages proposals from the existing staff members (agricultural and game farming activities) which will add value to the land.

9.2 Description of impacts

The existing restaurant and accompanying tourist activities are situated on ptn 420 alongside the R328. Ptn 420 is used as a game farming area (with small sections of agricultural areas that can be seen in the google earth 1985 imagery). Ptn 373 is used for the majority of agricultural activities.

The agricultural activities provides avocados, maize and vegetables to the market and the small-scale vegetables are also made available for staff use.

The agricultural activities and restaurant, game farm and tourist activities provide employment. The game farm area and proposed enclosures provides for the environmental awareness of species of conservational concern

The majority of dwellings are located on ptn 420 and allow for accommodation to be provided for the staff. Energy costs are dramatically reduced as the staff members live within walking distance of their workplace.

The persons currently in operational management are qualified personnel with previous experience in the relevant proposed activities and the property therefore provides unique employment opportunities.

Water is a resource which is required to be shared by all persons and all persons have the right to water.

In order for any activity to take place, water is a pre-requisite. The borehole water on the site is not suitable for domestic or irrigation purposes. The impact of not being able to source water for the activities currently in place will have significant high economic and social impacts. In terms of the NEMA, activities are encouraged to be sustainable and therefore, the activity must offer social, economic and environmental benefits.

Any further development on the portions (excluding that presented in this assessment) will require all approvals to be in place, to ensure correct planning has taken place and that the proposed activity is most suitable with regards to the

prevailing conditions of the property. Further clearance of vegetation on this property, and further farming, without approval could result in a significant high impact on water resources and critical biodiversity due the fact that water supply is scarce in the area and that the vegetation which occurs on this property is endemic and only occurs in a very small area (i.e. the Mossel bay municipality). This would then deem the project unstainable due to high environmental impacts.

It is critical that the management team view themselves as custodians of this endemic vegetation and incorporate the pristine fynbos on the property into all planning and management and focus on proposals that are low impact and suited to the vegetation and soil and water capacity on the site. For example, incorporating bee farming, consideration of low water use crops such as olives, and sustainable harvesting, which could also be incorporated in the environmental awareness activities (e.g. provision of local honey and tea to tourists)

9.3 Impact Ratings

Aspect	**Dwellings**			
Impact:	**Accommodation**			
Phase	**Operational**			
Nature of impact:	**Direct – social benefits**			
Dwellings allow for accommodation to be provided for the staff.				
Impact Status	**Positive Impact**		**Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Short	2	Short	2
Frequency	Rarely	1	Rarely	1
Intensity	Low	1	Low	1
Degree	Positive low	4	Positive low	4
Consequence	Positive Low	6	Positive Low	6
Probability	Plausible	3	Plausible	3
Impact Significance	**Positive Low**	**9**	**Positive Low**	**9**
Mitigation	Possible - Rehabilitate areas around dwellings and structures as per EMPr - Pit in place a fire management plan as per EMPr			
Confidence	High			

Aspect	**Water requirements**			
Impact	**Food production, economic, social**			
Phase	**Operational**			
Nature of impact:	**Indirect**			
Proposed activities may only resume once approvals, and relevant conditions are in place; low water supply will negatively impact the operations of the farm until such time that a more reliable source or suitable water is in place.				
Impact Status	**Negative Impact**		**Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Site	2	Site	2
Duration	Short to medium	3	Life of operations	5
Frequency	Seldom	3	Regular	4
Intensity	Medium	3	Low to medium	2
Severity	Negative medium	9	Medium high	11
Consequence	Negative medium	11	Medium high	14
Probability	Anticipated	6	Anticipated	6
Impact Significance	**Negative Medium high**	**17**	**Positive medium high**	**20**
Mitigation	Possible - Final design of dam to consider ecological water requirements and incorporate release flow infrastructure, either through a pipe-and-valve outlet system or via a bypass mechanism (e.g., weir and pipeline),			

	- Pumps used to abstract water from the dam must be fitted with calibrated flow meters with the purpose of ensuring that annual lawful water allocations are not exceeded, and abstraction volumes, with bi-annual volume reporting to BOCMA. - Any leaks noted to be immediately repaired. - Install rainwater tanks at all roofed structures to assist with catchment of water during high rainfall Water use license application to include: Section 21(a): Taking water from a water resource - Any additional abstraction from the Ruiterbos River must be subject to the formal surrender of existing borehole water use rights on RE/420 and RE/373 to ensure overall compliance with the lawful water allocation. - Dam – irrigation, domestic, animal use, restaurant use Section 21(b): Storing water - Dam and existing reservoirs on site Section 21(c): Impeding or diverting the flow of water in a watercourse. - for infrastructure near or within mapped wetlands and drainage lines, including dwellings and roads. Section 21(i): Altering the bed, banks, course, or characteristics of a watercourse. - construction within or adjacent to a wetland or drainage line, dwellings, roads, dam, rehabilitation and AIS clearing - A Risk Assessment Matrix compiled by an SACNASP Professional (aquatic) must accompany the WULA to identify and evaluate the magnitude, likelihood, and consequences of each water use activity and its potential impact on the water resource.

Aspect	**Agricultural, restaurant, game farm, enclosures and construction of dam**			
Impact:	**Economic opportunities and employment creation**			
Phase	**Operational**			
Nature of impact:	**Direct – employment creation**			
The agricultural operations provide employment opportunities in both cultivation and harvesting. The restaurant, game farm management, enclosures and related tourism activities further contribute to local job creation.				
Impact Status	**Positive Impact**		**Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Local	3	Local	3
Duration	Short	2	Short to medium	3
Frequency	Rarely	1	Rarely	1
Intensity	Low	1	Low to medium	2
Degree	Low	5	low	6
Consequence	Low	8	Low	9
Probability	Anticipated	6	Plausible	6
Impact Significance	**Positive Medium**	**14**	**Positive Medium**	**15**
Mitigation	Possible - Encourage employment of local persons - Use local suppliers for required materials and services (e.g. transport, recycling, solar requirements) - Put in place a fire management plan as per EMPr - Ensure all operational managers have read the EMPr and communicate measures to the staff through training - Work specific training must be provided to those dealing directly with AIS removal and revegetation of areas. This will include familiarising themselves with all alien invasives identified on the property as well as all the plants listed in the rehabilitation plan. - Work specific management must be provided to those working in game farm area with regards to natural SCC deemed likely to occur on the property as well as identification of snares etc.			
Confidence	High			

Aspect	**Agricultural, restaurant, game farm, enclosures**
Impact:	**Environmental awareness**
Phase	**Operational**
Nature of impact:	**Direct**
The existing game farm and proposed enclosures play a significant role in promoting environmental awareness, particularly in relation to species of conservation concern. These activities create an opportunity for tourists and	

staff to learn about indigenous fauna, conservation challenges, and the importance of habitat protection. The presence of SCC and the emphasis on their protection fosters a greater appreciation for biodiversity among visitors.				
Impact Status	**Positive Impact**		**Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	International	6	International	6
Duration	Very short	1	Very short	1
Frequency	Regular	4	Regular	4
Intensity	Low	1	Low	1
Degree	Positive low	6	Positive low	6
Consequence	Positive medium	12	Positive medium	12
Probability	Plausible	3	Plausible	3
Impact Significance	**Positive medium**	**15**	**Positive medium**	**15**
Mitigation	Possible - Put in place EMPr – carrying capacity, AIS, rehabilitation, agricultural areas - Consider incorporation of sustainable agricultural products into tourism - Consider incorporation of agricultural produce into restaurant			
Confidence	High			

10.Waste management

Due to the absence of municipal sewage and waste removal services, the property is reliant on on-site waste management systems. Current systems include:

- Septic tanks or French drains for domestic wastewater.
- Restaurant wastewater is treated using grease traps and septic tanks.
- General waste is taken to registered landfill site
- Some burning of AIS

10.1 Impacts and Significance Rating – Waste management

Aspect	**Waste management**			
Phase	**Operational**			
Impact:	**Incorrect waste management can result in localised pollution and disturbance to flora and fauna and overall ecosystem functioning**			
Nature of impact:	**Direct**			
Incorrect waste management can result in localised pollution and disturbance to flora and fauna and overall ecosystem functioning. Careful waste management is required to prevent the introduction and spread of Argentine ants. Correct waste management practices should result in negligible impacts and could result in positive impacts through reuse and recycling of the various waste streams.				
Impact Status	**Negative Impact**		**Negative / Positive Impact**	
Impact Criteria	Impact significance			
	Without mitigation		With mitigation	
Spatial	Site	2	Activity	1
Duration	Short to medium	3	Very short	1
Frequency	Regular	4	Seldom	3
Intensity	Low to medium	2	Low	1
Severity	Negative Medium	9	Negative Low	5
Consequence	Negative Medium	11	Negative Low	6
Probability	Plausible	3	Plausible	3
Impact Significance	**Negative Medium**	**14**	**Negative / positive Low**	**9**
Mitigation	Waste Stream Identification - All waste streams must be identified and documented (e.g., organic waste, AIS biomass, recyclables, e-waste, hazardous waste). - Note that Argentine ants (*Linepithema humile*) are known to be invasive in fynbos ecosystems and can disrupt balance by outcompeting native ant species. Careful waste management is required to prevent the introduction and spread of Argentine ants AIS material - Cleared AIS material (no seed) not chipped on site, must be stockpiled and processed as mulch at designated areas: Area 4-15, 4-17, 5-1. Waste separation - Provide facilities for the separation and temporary storage of recyclable waste items: o plastic, glass, metal, paper o e-waste (batteries, small electronics o food scraps - Waste facilities must be equipped with sealable lids and labelled - These facilities will likely be required at the operational farm area on ptn 373 and at the restaurant area on ptn 420 - Food waste should not be mixed with recyclables to avoid contamination of the waste streams - Train staff in waste sorting and ensure adequate signage and infrastructure. - Identify and partner with a registered recycling facility for regular off-site removal. - Any waste that cannot be reused or recycled must be disposed of at a licensed, registered waste disposal site. General - No dumping or burial of waste to take place - General Waste receptacles should be emptied on a regular basis. - No littering; ensure good housekeeping of the site (i.e. no litter) at all times. - Service machines and vehicles regularly to prevent unnecessary fumes and leaks.			

	Food scraps Recommended management system - Food scraps is recommended to be managed using a combination of bokashi (microorganisms) and red wriggler composting worms. - The first step is a 30-day fermentation in sealed container under anaerobic conditions. This takes place in sealed containers and will prevent attraction to Argentine ants. - The second step is further 30-day process in aerobic conditions using a worm farm. The worm bin must be covered with lid or cover / shade cloth. The worm farm must be equipped with drainage and catchment of the worm tea (e.g an old bath / container can be used) - All food scraps can be thrown into fermentation container; once full it is sealed for 30 days. The fermented waste is then buried in the worm farm. The composting process will take a further 30 days and can then be used. - Each dwelling can be provided with 2x25liter bokashi digesters (one for active use; one for 30-day fermentation) - Restaurant and agricultural area can be provided with 2x250 liter digesters (one for active use; one for 30-day fermentation) - Dwellings worm farm – recommended 1 kg initial input of Eisenia foetida, thereafter the red wrigglers will sustain themselves as per fermented waste input - Restaurant and agricultural area – recommended 10 kg, thereafter the red wrigglers will sustain themselves as per fermented waste input *Note:* ***Bokashi tea*** *is the liquid that drains from the sealed fermentation process in the bokashi container, rich in microorganisms.* ***Worm tea*** *is the liquid produced by the worms during the composting process, which is rich in nutrients.* The fermented tea, at a 1: 10 ratio can be added to all drains and toilets on a monthly basis to assist with overall sewage management. The worm tea can be used as a natural fertilizer The compost can be used in soft landscaping at dwellings / agricultural areas Required Bokashi and digesters and red wrigglers and are available from local suppliers. Hazardous Waste & Fuel Management - All generators must be fitted with drip trays to catch fuel or oil leaks. - Spill kits must be accessible near all machinery and generator areas. - A designated hazardous waste bin must be provided for the safe containment of any contaminated materials (e.g., fuel-soaked rags, used oil). Concrete, cement, plastering, and painting: - Mixing areas be clearly defined on the site and must be surrounded by an impermeable material (i.e. create a temporary coffer dam with sandbags and thick plastic sheeting) to prevent any runoff and absorption into the surrounding soils. - The designated mixing areas should be limited to areas that will become future hard surfaces on the site. No concrete and cement mixing is allowed in areas outside of the proposed hardened surfaces of the camping block. - Cleaning of cement, plastering & paint equipment must be done into a designated, bunded, & lined slurry sump or container to avoid contaminating the environment. Sewage - Ensure tanks are properly sealed and maintained to prevent leakage or groundwater contamination. - Conservancy tanks are preferred over septic tanks and soakaways as these can be pumped out and desludged (every 2–5 years depending on use). - Consider adding microbes (bokashi tea diluted 1 part to 10 parts water) to sewage systems to accelerate the breakdown process. - Use water-saving fixtures in buildings to reduce load on the system. - Consider reuse of grey water (e.g. sinks, showers, laundry water) where feasible (e.g. for irrigation). - Consider composting toilets or biogas digesters. Local suppliers (e.g.Biogas SA) provide affordable solutions for domestic and community-based biogas systems. - Avoid future installations on steep slopes or highly permeable soils near watercourses; ; tanks should be located downslope and outside of any 1:100 floodline, at the maximum feasible distance from wetlands and watercourse.
Confidence	High

Section B: Impact Identification and Assessment Methodology

The purpose of impact assessment is to assign a qualified significance to impacts which are predicted to occur as a result of the various aspects of an activity.

The following definitions apply:

- Activity: A distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.
- Environmental aspect: An element of an organisation's activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact.
- Environmental impacts: The consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality.
- Receptors: Comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and paleontology.

Aspects

Aspects associated with the proposed project are differentiated into construction and operation phases of the project. The nature of the impact is described. Once this has been undertaken the significance of the impact is determined.

Identifying significant environmental impacts

The significant environmental impacts are identified using three sources of information:

- The nature of the receiving environment (the environment includes the social, cultural and biophysical environment)
- A review and understanding of the aspects associated with the proposed project.
- All comments received from interested and affected parties during the public participation process. The issues raised will be described giving consideration to the associated activity and the aspect of that activity that is likely to result in an impact.

Nature of the impact

Impacts on the environment can lead to changes in existing conditions; the nature of the impact can be direct, indirect or cumulative.

- Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. The direct impact is caused by the action and occurs at the same time and place.
- Indirect (Secondary) impacts result from cause-effect consequences of interactions between the environment and direct impacts. The indirect impact is caused by the action and occurs later in time or is further removed in distance.
- Cumulative impacts refer to the combined effect of changes to the environment caused by multiple human activities over space and time. Cumulative impact is the sum of existing conditions and the direct / indirect impacts resulting from the project. Example: A single cut in the forest is unlikely to have a detectable change, however increasing multiple cuts in the forest caused by a number of human activities is likely to decrease fauna and flora and increase soil erosion. Cumulative effects can thus be additive or synergistic. A synergistic effect refers to when the combined effect is greater than the sum of individual effects.

Method for assessing the overall significance of impacts

The overall significance of the impact is critical for defining mitigation and monitoring strategies. The qualified significance of predicted impacts assists to determine the manner in which aspects should be managed in order to avoid or minimise the predicted impacts.

Overall significance of the impacts is determined through systematically rating the following criteria of the impacts:

- The status of the impact
- The spatial extent of the impact
- The severity of negativity or degree of positivity of the impact
  - The duration of the impact
  - The frequency of the impact
  - The intensity of the impact
- The consequence of the impact

- The probability of the impact occurring

Impact Status
A qualitative rating of positive or negative is assigned to impact status. Refer to Table 17 (methodology).

Spatial Extent
The spatial extent for each aspect, receptor and impact is defined. The geographical coverage (spatial extent) description will take account of the following factors:

- The physical extent / distribution of the aspect
- The physical extent / distribution of the receptor
- The proposed impact as a result of the aspect
- The nature of the baseline environment within the area of impact

For example, the impacts of noise are likely to be confined to a smaller geographical area than the impacts of atmospheric emissions, which may be experienced at some distance. The significance of impacts also varies spatially; noise may be significant in the immediate vicinity. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating. Refer to Table 17 (methodology).

Duration
The duration refers to the length of time that an aspect of a proposed project may cause change on the receiving environment. The receiving environment could refer to either the social or cultural or biophysical environment. The change caused may be a positive or negative change. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Frequency
The frequency of the impact occurring refers to how often the aspect results in a given impact on the receiving environment. The receiving environment could refer to either the social or cultural or biophysical environment. The impact may be positive or negative. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Intensity
The intensity refers to the magnitude of the impact experienced by the receiving environment. The environment could refer to either the social or cultural or biophysical environment. The impact experienced may be a positive or negative impact. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Severity / Degree
The severity is the sum of the intensity, duration and frequency of the impact and therefore a quantitative value ranging from 3 – 18 is assigned to the rating. If the impact is positive, the degree of positivity is determined. A qualitative description is assigned to the rating.

Consequence
A qualitative description is assigned to the rating. The consequence is the sum of the Severity (Intensity + Duration + Frequency) and Spatial Extent. Therefore, a quantitative value ranging from 4 – 24 is assigned to the rating.

Probability
In order to determine the significance of the impact, the probability of the impact occurring must first be rated. The probability refers to the likelihood that an impact will result from the aspect in question. A qualitative description is assigned to the rating. A quantitative value ranging from 1 – 6 is assigned to the rating.

Overall Significance
A definition of a "significant impact" for the purposes of the study is: "An impact which, either in isolation or in combination with others, could, in the opinion of the specialist, have a material influence on the decision-making process, including the specification of mitigating measures."

A qualitative description is assigned to the rating. The significance is the sum of the Consequence and Probability. Therefore, a quantitative value ranging from 5 - 30 is assigned to the rating. A value of 5, 6 or 7 represents a low significance and described as "not harmful". A value of 30 presents a Very High Significance and is described as an "environmental disaster".

Mitigation

The Mitigation ratings are described qualitatively according to the success and feasibility of the mitigation option in question. The impacts are further rated before and after mitigation / management options. Negative impacts are assessed with mitigation measures in place in order to give an overall significance rating with mitigation in place. Positive impacts are assessed with management measures in place in order to give an overall significance rating with management in place.

Confidence

The confidence of the EAP is assigned a qualitative value.

Table 17: Impact Assessment Rating methodology

Impact Status						
Rating	**Negative**			**Positive**		
Description	An impact is rated negative if any degree of negative change will occur in the receiving environment as a result of any aspect of the proposed project. The environment refers to the social environment or the cultural environment or the biophysical environment. Negative impacts are to be avoided, minimised, or mitigated.			An impact is rated positive if any degree of positive change will occur in the receiving environment as a result of any aspect of the proposed project. The environment refers to the social environment or the cultural environment or the biophysical environment. Positive impacts are to be enhanced.		
Scale (Spatial Extent) Referring to the spatial area the aspect will impact on the environment. The impact may be positive or negative.						
Rating	**Activity specific**	**Site specific**	**Local area Specific**	**Municipal**	**Provincial / National**	**International**
Description	Impact only experienced on area where activity is located	Impact extends to the entire site of the project	Impact extends beyond site into surrounding areas	Impact extends beyond local area into municipal areas	Impact extends beyond municipal area into provincial and may extend nationally	Impact extends beyond national area
Value	1	2	3	4	5	6
Duration Refers to the length of time that the aspect may cause a change on the environment. The change may be positive or negative.						
Rating	**Very Short term**	**Short term**	**Short - Medium term**	**Medium term**	**Medium - Long term**	**Long term**
Description	1 day to 3 months	3 months to one year	One year to three years	Three years to ten years	Life of operation	Extends beyond post closure
Value	1	2	3	4	5	6
Frequency Refers to how often the aspect may impact on the environment. The impact may be positive or negative.						
Rating	**Rarely**	**Infrequent**	**Seldom**	**Regular**	**Often**	**Continuously**
Description	Could occur annually	Could occur within 6 months	Monthly	Weekly	Daily	Nonstop
Value	1	2	3	4	5	6
Intensity (Magnitude / Size) Refers to the intensity of the impact experienced by the receiving environment. The impact may be positive or negative.						
Rating	**Low**	**Low to medium**	**Medium**	**Medium to High**	**High**	**Very High**
Description	Low intensity experienced only	Low – medium intensity on	Medium intensity on receiving	Medium to high intensity on	High intensity on receiving	Very high intensity on receiving

	by receiving environment and / or occurs within 100 metres of activity	receiving environment and / or occurs 100 – 500 metres of activity	environment and / or occurs 500 – 1000 metres of activity	receiving environment and / or occurs within 1000 – 5000 metres of activity	environment and / or occurs within 5000 – 10 000 metres of activity	environment and / or within 10 000 metres or beyond of the activity
Value	1	2	3	4	5	6
Severity of negative impact Severity (Intensity + Duration + Frequency) The severity of an environmental aspect is determined by the degree of change to the baseline environment, and considers the following: The reversibility of the negative impact, The sensitivity of the receptor to the stressor, The impact duration, its permanency and whether it increases or decreases with time.						
Rating	**Negligible**	**Low Negative**	**Medium Negative**	**Medium - High Negative**	**High Negative**	**Very High Negative**
Description	There will be negligible impact as a result of the aspect	There will be a minor impact as a result of the aspect. This is easily reversible.	The aspect will result in a moderate impact. Reversibility of the impact easy but costly.	The aspect will result in a high impact. Reversibility of the impact possible but costly.	The aspect will result in a high impact. Reversibility of the impact difficult and costly.	The aspect will result in a severe impact. Reversibility of the impact not likely.
Value	3	4-6	7-9	10-12	13-15	16-18
Degree of positive impact Degree (Intensity + Duration + Frequency) The severity of an environmental aspect is determined by the degree of change to the baseline environment, and considers the following: The enhancement of the positive impact, The sensitivity of the receptor to the opportunity, The impact duration, its permanency and whether it increases or decreases with time.						
Rating	**Negligible**	**Low Positive**	**Medium Positive**	**Medium High Positive**	**High Positive**	**Very High Positive**
Description	There will be negligible impact as a result of the aspect	There will be a minor impact as a result of the aspect.	The aspect will result in a moderate impact.	The aspect will result in a high impact.	The aspect will result in a high impact.	The aspect will result in a very high positive impact.
Value	3	4-6	7-9	10-12	13-15	16-18
Negative Consequence Consequence = (Severity + Spatial extent)						
Rating	**Negligible**	**Negative low**	**Negative Medium**	**Negative Medium High**	**Negative High**	**Negative Very High**
Description	Impact has insignificant consequences on receiving environment. Requires little or no mitigation.	Impact requires in situ mitigation and receptor mitigation.	Impact requires in situ mitigation and receptor mitigation	Impact requires in situ mitigation, receptor mitigation and repair or restoration.	Impact requires in situ mitigation, receptor mitigation and repair or restoration and possible compensation.	Impact is to be avoided
Value	4	5-8	9-12	13-16	17-20	20-24
Positive Consequence Consequence = (Degree + Spatial extent)						
Rating	**Negligible**	**Positive low**	**Positive Medium**	**Positive Medium High**	**Positive High**	**Positive Very High**
Description	Impact has insignificant consequence on receiving environment.	Impact has a positive consequence; management	Impact has a positive consequence; management required to	Impact has a positive consequence; management required to	Impact has a positive consequence; management required to	Widespread / substantial beneficial effect. No alternative ways to achieve same benefits.

		required to enhance positive outcomes.	enhance positive outcomes.	enhance positive outcomes.	maintain positive outcomes.	Management required to maintain positive outcomes.
Value	4	5-8	9-12	13-16	17-20	20-24
Probability Refers to the likelihood that an impact will result from the aspect in question. The impact may be positive or negative.						
Rating	**Slim**	**Slight**	**Plausible**	**Probable**	**Expected**	**Anticipated**
Description	0 - 9% likelihood	10 – 25 % likelihood	26 - 50% likelihood	51 - 75% likelihood	76 - 90% likelihood	91 - 100 % likelihood
Value	1	2	3	4	5	6
Negative Significance (Consequence + Probability)						
Rating	**Negligible**	**Low**	**Medium**	**Medium High**	**High**	**Very High**
Description	Not harmful	Slightly harmful	Harmful	Very Harmful	Considerably Harmful	Disaster
Value	5	6-10	11-15	16-20	21-25	26-30
Positive Significance (Consequence + Probability)						
Rating	**Negligible**	**Low**	**Medium**	**Medium High**	**High**	**Very High**
Description	Insignificant	Slightly positive	Positive	Positive but not substantial.	Substantial positive impact.	Necessity
Value	5	6-10	11-15	16-20	21-25	26-30
Mitigation of negative impact						
Rating	**None**	**Likely**	**Possible**	**Difficult**	**Unlikely**	**Not possible**
Description	Mitigation not required. Impact remains the same.	Impact can be avoided with mitigation which has proven results.	Impact can be minimised and managed with mitigation	Difficult or costly to mitigate.	Difficult and costly to mitigate	Impact cannot be mitigated
Management of positive impact						
Rating	**None**	**Likely**	**Possible**	**Difficult**	**Unlikely**	**Not possible**
Description	Management not required. Impact remains the same.	Impact can be easily enhanced with management which has proven results.	Impact can be enhanced with management	Difficult or costly to enhance but possible	Difficult and costly to enhance	Impact cannot be enhanced
Confidence Refers to the confidence level the EAP has in predicting the impact.						
Rating	**Low**	**Medium low**	**Medium**	**Medium High**	**High**	**Very High**

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