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ALIEN AND ECOLOGICAL CORRIDOR MANAGEMENT PROGRAMME

FOR THE

REMAINDER OF PORTION 5 OF THE FARM ZANDHOOGTE 139,
TERGNIET WESTERN CAPE PROVINCE.

PREPARED FOR: 3MP Sales and Education Services

DATE: 3 March 2026

DEADP REF NO: 16/3/3/1/D6/35/0008/26

Submitted to: **Stiaan Kotze**

-
- Environmental Impact Assessments • Basic Assessments • Environmental Management Planning
 - Environmental Control & Monitoring • Water Use License Applications • Aquatic Assessments



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DOCUMENT DETAILS

Project Ref. No:	16/3/3/1/D6/35/0008/26
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Sharples Environmental Services cc (SES) has been actively engaged since 1998 in the fields of environmental planning, assessment and management. Clients include private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. The consultants have over 40+ years of combined experience and operate in the Southern, Eastern and Western Cape regions.

MICHAEL BENNETT (**Director, Report Writer**):

Michael studied at the University of Cape Town completing a Bachelor of Science degree majoring in Environmental and Geographic Science and Ocean and Atmospheric Science. Michael joined SES in 2014 and has extensive experience in assessments and monitoring and has worked on a variety of technical projects. See Appendix C for his curriculum vitae. Michael is registered with EAPASA as a certified Environmental Practitioner (EAPASA # 2021/3163).

Onela Mhobo (**Candidate Environmental Practitioner**)

Onela graduated from the University of South Africa completing her BSc honors degree in Environmental Management and also holds a BSc in Botany and Geography from the Nelson Mandela University. She is well versed in the technicalities associated with Monitoring.



1. Introduction

Sharples Environmental Services cc (SES) has been appointed *the MP3 SALES AND EDUCATION SERVICES*, to facilitate an Invasive Alien Plant Control Plan (ACP) in terms of the National Environmental Management: Biodiversity Act (NEM:BA, Act 10 of 2014) for the property.

2. About this Alien and Ecological Corridor Management Programme

A recommendation from the Terrestrial Biodiversity Assessment was to compile an Alien Invasive Plant Management Plan as part of the final Environmental Management Plan (EMPr). The objective of this plan is to include mitigation measures to prevent the infestation of Alien Invasive Plant Species (AIPS) in the project area and ensure that continuous monitoring and removal of AIPS is undertaken.

This report presents the site-specific Alien Invasive Plant Management Plan for the construction of a mixed- use development on ERF 998 and Portion 5 of the farm Zandhoogte No. 139 (Portion of RE.139), Tergniet, Mossel Bay , Western Cape (hereafter referred to as 'the project') and has been compiled in accordance with the National Environmental Management: Biodiversity Act 2004 (Act No. 10 of 2004): Alien and Invasive Species Regulations (2014 and subsequent 2020 amendments). The layout of the report is based on the Guidelines for Monitoring, Control and Eradication Plans (DEA, 2015).

3. Background and Location of the activity

3.1 Background and description

The property is situated on Erf 998, Tergniet, approximately 22 km's north-east of the Mossel Bay town. It has the proposed project footprint around 10.6 hectares in size and situated between the town of Groot Brakrivier and coastal village, Tergniet. The site is bordered by the provincial road R102, the N2 National Highway and a municipal road, Old Mossel Bay Road (Figures 1 and 2). The R102, which immediately borders and runs parallel to the site's southern fenceline, is a major regional road connecting various coastal towns. Old Mossel Bay Road runs immediately adjacent and parallel to the site's eastern border and is one of the major access roads between Groot Brakrivier and Tergniet and connects the rural communities further inland to the town and coastal villages. The N2 runs adjacent and parallel to the site's northern border.

The site is located in a semi transformed strandveld environment in the southern Cape coastal region. The 2018 Vegetation Map of South Africa classifies the vegetation type found here as Hartenbos Dune Thicket. The latter is currently listed as Endangered¹. It is described as "a mosaic of low (1-3 m) thicket, occurring in small bush clumps dominated by small trees and woody shrubs, in a mosaic of low (1-2 m) asteraceous fynbos. Thicket clumps are best developed in fire-protected dune slacks, and the fynbos shrubland occurs on upper dune slopes and crests". The northern-western part of the site harbours thick stands of alien and invasive plants.



Figure 1: Locality Map

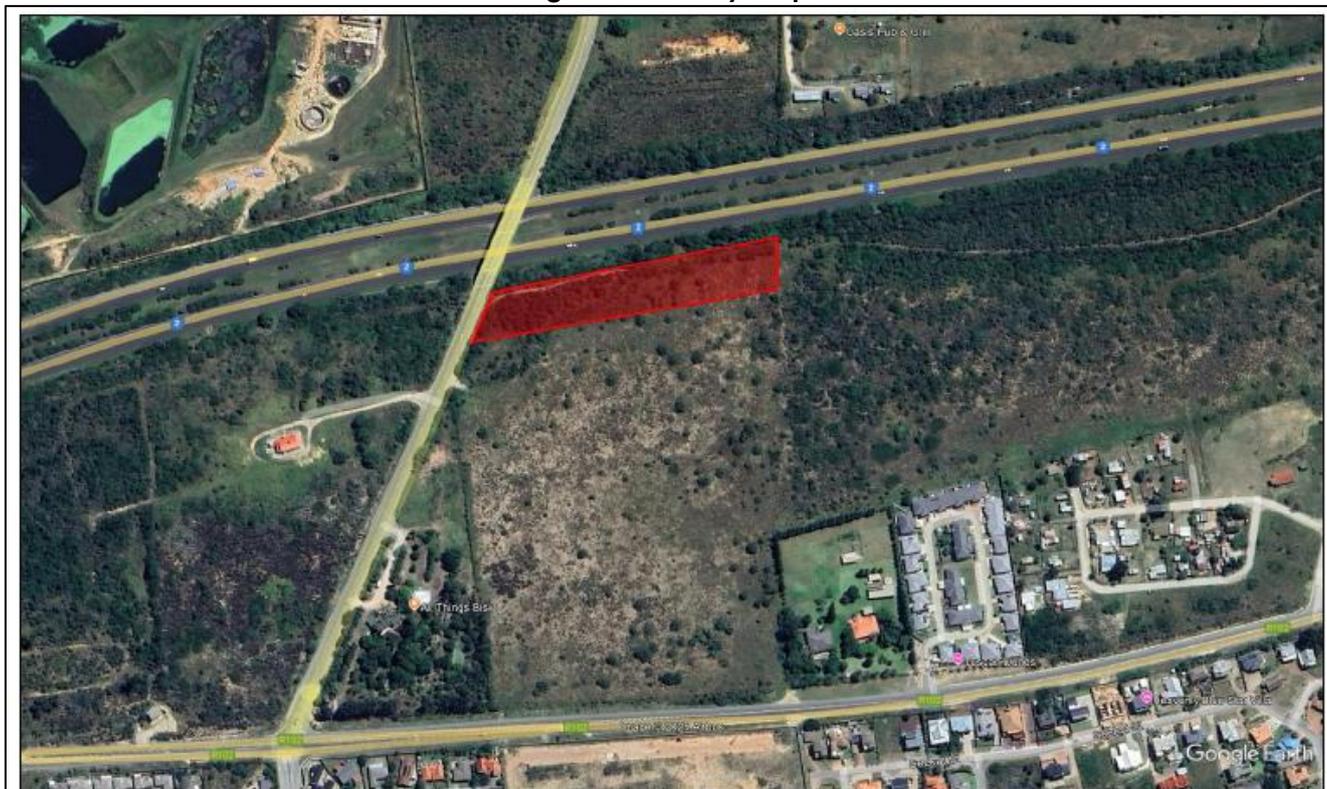


Figure 2: Site to be managed.

This control plan will assist in the long-term managing of alien vegetation and subsequent re-growth on the property.

4. Legal Framework

The management of invasive alien plant species within the proposed development area is governed by the following key legislation and policy instruments:

- National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA), in particular Section 76, which requires organs of state and landowners to control and eradicate listed invasive species.
- Alien and Invasive Species Regulations (2014, as amended), which prescribe control obligations based on species category.
- Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983), where applicable to listed weed and invader species.
- The constitution of South Africa

THE CONSTITUTION OF SOUTH AFRICA:

Section 4 of the Constitution guarantees everyone the right to an environment that is not harmful to their health or well-being. The constitution also mandates that the environment be protected for present and future generations through reasonable legislative and other measures, which includes preventing pollution and degradation. It promotes sustainable development and, where appropriate, the sustainable use of natural resources to ensure “ecologically sustainable development”.

In South Africa, there are two main laws governing the control, eradication, purchasing and trading of Alien Invasive Plant (AIP) species, namely the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) and the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004). All landowners have a responsibility and legal liability to control AIPs on their land.

THE CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT NO. 43 OF 1983)

The Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983) was promulgated in 1984 and amended in 1985 and again in 2001. The Act intends to provide for control over the utilization of the natural agricultural resources of the Republic, to promote the conservation of the soil, the water sources, and the vegetation, and the combating of weeds and invader plants. CARA includes a list of 198 species which are classified as weeds or invader plants according to three categories:

- Category 1: Invader plants must be removed & destroyed immediately. No trade in these plants.
- Category 2: Invader plants may be grown under controlled conditions in permitted zones. No trade in these plants.
- Category 3: Invader plants may no longer be propagated or sold. Existing plants do not need to be removed.

THE NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (ACT NO. 10 OF 2004):

In terms of Section 73 of the National Environmental Management: Biodiversity Act (NEMBA), the landowner or person in control of land has a legal duty of care to take reasonable steps to prevent the spread of listed invasive species occurring on the property and to control or eradicate such species in accordance with the Alien and Invasive Species Regulations. Failure to comply with this obligation may result in enforcement action by the competent authority.

The Alien and Invasive Species Lists (2020) published under the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 of 2004) includes a list of 383 plant species which are assigned to one of four categories:

- Category 1a: Invasive Species that must be combatted or eradicated. A person in control of land with a Category 1a Listed Invasive Species must:
 - Immediately take steps to combat or eradicate listed invasive species.
 - Allow authorised officials to inspect the property to monitor, assist with or implement the combatting or eradication of the listed invasive species.
 - If an Invasive Species Management Programme has been developed, a person must combat or eradicate the listed invasive species in accordance with such a programme.
- Category 1b: Invasive Species must be controlled.
 - If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such a programme.
 - A property owner must allow an authorised official to inspect a property to monitor, assist with or implement the control of listed invasive species or compliance with the Invasive Species Management Programme.
- The Minister may require any person to develop a Category 1b Control Plan for one or more Category 1b species, which plan must be submitted to the Minister for approval, and such Control Plan must include the following:
 - a) species identification;
 - b) extent of invasion;
 - c) control measures to be used;
 - d) an action plan or schedule including time-frames for the clearing of each species;
 - e) whether or not any species can be utilised as biomass; and
 - f) any other information which the Minister may require
- Category 2: Invasive Species require a permit to carry out a restricted activity within a specified area.
 - No person may carry out a restricted activity in respect of Category 2 Invasive Species without a permit.
 - A person in Control of a Category 2 Listed Invasive Species, or a person in possession of a permit, must ensure that the specimens of the species do not spread outside of the land or the area specified in the permit.
 - Any species listed as Category 2 that occurs outside of an area specified in a permit must be considered to be a Category 1b Listed Invasive Species and must be managed as such.
 - Any person or organ of state must ensure that Category 2 Listed Invasive Species do not spread outside of the land over which they have control or the specified area on such land where any restricted activity is authorised in respect of any Listed Invasive Plant Species.
- Category 3: Category 3 listed invasive species are subject to certain exemptions in terms of section 70 (1)(a) of the NEMBA Act, which applies to the listing of alien invasive species.

- o Any plant species identified as Category 3 Listed Invasive Species that occurs in riparian areas must be considered to be a Category 1b Listed Invasive Species and must be managed as such.

5. ECOLOGICAL CONTEXT AND IMPORTANCE OF THE SITE

Dr Visser was appointed to compile the terrestrial biodiversity report or the project as part of the Basic Assessment Report process being undertaken by Sharples Environmental Services cc. The specialist has determined the following regarding the different habitat types within the study area:

Location	Habitat	Photo 1	Photo 2
<p>A</p> <p>-34.06333, 22.18899</p> <p>B</p> <p>34.06439, 22.18978</p>	<p>This habitat comprises the larger part of the site and consists of deep sandy soil with remnant patches of vegetation, common grass species and a number of alien and invasive trees.</p>	<p>A</p> 	<p>B</p> 
<p>C</p> <p>-34.06235, 22.1888</p> <p>D</p> <p>-34.06176, 22.18984</p>	<p>This habitat encompasses a small section along the northern margin of the site and comprises thick an impenetrable stand of alien and invasive trees such as Port Jackson and Black Wattle. A small artificial dam is also located in the north-western part of the site (C).</p>	<p>C</p> 	<p>D</p> 

The Terrestrial Biodiversity Assessment Report confirms that although the northern margin of the site is mapped as a mix of terrestrial CBA 1 and CBA 2, the study area therefore fails to meet the criteria of these categories defined as:

CBA 1: "Areas in a natural condition that are required to meet biodiversity targets for species, ecosystems, or ecological processes and infrastructure."

CBA 2: "Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure."

According to the Botanical Comment compiled by Mark Berry the following management of the area is recommended:

From a biodiversity network perspective, the northern side of the site encroaches on a terrestrial critical biodiversity area (CBA) and a degraded critical biodiversity area (CBA2). CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure². Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended. The site forms part of an ecological link between the Groot Brak and Klein Brak Estuaries. However, the link may have been compromised by development approvals further away to the west between the R102 and the N2. There is also an unrehabilitated or active sand mine 500 m away to the west that also impacts on the link, The areas to the north and south of the site have been transform for agricultural and residential purposes. Other (probably lesser) links run along the railway line, the N2 road reserve and primary dune above the beach.

The most important management or maintenance task for the corridor would be to keep it clear of aliens. Ideally, all exotic species should be removed from the corridor. A simple alien clearing plan should suffice. It is important to note that the aliens must be cleared on an annual basis. To improve biodiversity inside the corridor, it is recommended that topsoil containing seeds of indigenous species and salvageable plants, such as *Carpobrotus spp* and *Aloe arborescens*, be collected from the development areas and deposited or planted inside the corridor.



Figure 3: Spatial locations of Critical Biodiversity Areas (CBAs) overlapping with the study area.

6. ALIEN INVASIVE PLANTS WITHIN THE PROJECT AREA OF INFLUENCE

6.1 Identification of alien species

Table 1 below identifies the alien invasive plant species recorded in the Terrestrial Biodiversity Assessment Report (2024).

Table 1: Alien invasive plant species recorded on site

Scientific Name	Common Name	NEM:BA Category
<i>Acacia mearnsii</i>	Black Wattle	Category 2
<i>Acacia saligna</i>	Port Jackson	Category 1b
<i>Acacia melanoxylon,</i>	Australian blackwood	Category 2
<i>Cestrum laevigatum</i>	Ink Berry	Category 1b
<i>psidium guajava</i>	(Common guava)	Category 2
<i>Schinus terebinthifolia</i>	(Brazilian peppertree)	Category 1b

Table 2: Eradication methods

Species name	Common name	Common methods	Source of control methodology
<i>Acacia mearnsii</i>	Black Wattle	Sprouting tree Seedling <ul style="list-style-type: none"> • Hand pull • Foliar spray Young <ul style="list-style-type: none"> • Lopping / pruning with herbicide application • Removal with tree-popper Adult	Working for Water Programme. Strategic Plans and Operational Guidelines

Environmental Management Programme

		<ul style="list-style-type: none"> • Bark strip with herbicide application • Cut stump/frill with herbicide application 	
<i>Acacia saligna</i>	Port Jackson	<p>Seedling and coppice: hand-pull or foliar spray</p> <p>Young: lopping/pruning and herbicide application</p> <p>Adult: cut stump and herbicide application</p>	<p>DFFE "Best Practice Guidelines for the Control of Invasive Alien Plants"</p> <p>WfW Contractor Operational Manuals</p>
<i>Acacia melanoxylon</i>	blackwood	<p>Sprouting tree</p> <p>Seedling</p> <ul style="list-style-type: none"> • Hand pull • Foliar spray <p>Young</p> <ul style="list-style-type: none"> • Lopping / pruning with herbicide application <p>Adult</p> <ul style="list-style-type: none"> • Bark strip with herbicide application • Cut stump/frill with herbicide application 	<p>Working for Water Programme. Strategic Plans and Operational Guidelines</p>
<i>Cestrum laevigatum</i>	Inkberry	<p>Seedling</p> <p>Hand-pull</p> <p>Adult.</p> <p>Cut and spray</p>	<p>Working for Water Programme. Strategic Plans and Operational Guidelines</p>
<i>Schinus terebinthifolius</i>	Brazilian Pepper Tree	<p>Cut Stump</p> <p>Foliar spray</p>	<p>Working for Water Programme. Strategic Plans and Operational Guidelines. DFFE.</p>

		Basal bark application	
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7. MANAGEMENT OBJECTIVES

OBJECTIVE 1: ERADICATE CATEGORY 1B SPECIES:	
Category 1b species identified on site must be controlled and eradicated in terms of the Alien and Invasive Species Regulations.	
Management Actions:	
1. Baseline Survey	<ul style="list-style-type: none"> • Conduct a site walk-through prior to vegetation clearing. • Identify and map all Category 1b species. • Record density and extent (GPS and photo record).
2. Control Methods	<ul style="list-style-type: none"> • Control methods must adhere to Section 7 of this Alien Management Plan. • Chemical treatment (registered herbicides only) applied to cut stumps where required. It is important to note that Chemical treatment (pesticides and herbicides) must adhere to the DFFE Pesticide Policy attached as Appendix C to this Alien Management Plan.
3. Timing of Clearing	<ul style="list-style-type: none"> • Prioritise removal before seed set. • Avoid clearing during heavy rainfall periods to prevent soil erosion.
4. Disposal	<p>All plant material must be:</p> <ul style="list-style-type: none"> • Removed from site, or • Stacked and dried in a demarcated area (if safe), or • Disposed of at a registered waste facility where necessary. • No dumping in natural areas or watercourses.
5. Monitoring	<ul style="list-style-type: none"> • Clearing activities to be supervised by the ECO. • Monthly monitoring during construction. • Biannual monitoring post-construction (recommended for 3 years).
OBJECTIVE 2: PREVENT REGROWTH	
Regrowth is common due to seed banks and stump resprouting.	
Management Actions:	
1. Follow-Up Clearing:	<ul style="list-style-type: none"> • First follow-up within 6–8 weeks of initial clearing.

	<ul style="list-style-type: none"> • Subsequent follow-ups every 3–6 months during first year. • Thereafter annually for at least 3 years.
2. Stump Treatment:	<ul style="list-style-type: none"> • Immediate application of systemic herbicide to cut surfaces. • Ensure no untreated stumps remain.
3. Seed Bank Management	<ul style="list-style-type: none"> • Disturbed soil areas must be stabilised quickly. • Avoid unnecessary soil disturbance.
4. Record Keeping:	<ul style="list-style-type: none"> • Maintain register of cleared areas. • Record regrowth hotspots and treatment dates.
OBJECTIVE 3: PREVENT SPREAD TO ADJACENT NATURAL VEGETATION	
Special care must be taken to protect surrounding indigenous vegetation and aquatic buffers.	
Management Actions:	
1. Demarcation:	<ul style="list-style-type: none"> • Clearly demarcate approved development footprint. • No clearing outside approved areas.
2. Vehicle & Equipment Hygiene:	<ul style="list-style-type: none"> • Construction vehicles must arrive free of soil and plant material. • No storage of contaminated soil near natural vegetation
3. Stockpile Management:	<ul style="list-style-type: none"> • No stockpiling within 10–20 m of watercourses or buffers. • Prevent wind or water dispersal of seeds.
4. Stormwater Control	<ul style="list-style-type: none"> • Install erosion control measures. • Prevent runoff transporting invasive seeds.
5. Immediate Removal	<ul style="list-style-type: none"> • Any new alien growth in buffer areas must be removed immediately.
OBJECTIVE 4: RESTORE INDIGENOUS VEGETATION	
Rehabilitation reduces invasion risk and promotes ecological stability.	
Management Actions:	
1. Topsoil Management:	<ul style="list-style-type: none"> • Strip and stockpile topsoil separately. • Replace topsoil during rehabilitation phase.
2. Revegetation:	<ul style="list-style-type: none"> • Encourage natural regeneration where feasible. • Supplement with locally indigenous species if required. • Avoid planting invasive or ornamental species.
3. Erosion Control:	<ul style="list-style-type: none"> • Use brush packing where appropriate. • Install silt fencing and berms where necessary.
4. Rehabilitation Monitoring:	<ul style="list-style-type: none"> • Assess vegetation cover percentage. • Ensure no new alien dominance.
5. Success Criteria:	<ul style="list-style-type: none"> • No Category 1b regrowth. • Indigenous vegetation cover stabilised. • No active erosion.

OBJECTIVE 5: ENSURE COMPLIANCE WITH DFFE CONDITIONS	
The Alien Management Plan forms part of the EMPr and must comply with DFFE requirements.	
Management Actions:	
1. Integration into EMPr:	<ul style="list-style-type: none"> This Alien Management Plan forms part of the approved EMPr. Binding on the Applicant and all contractors.
2. ECO Monitoring:	<ul style="list-style-type: none"> Monthly monitoring during construction. Post-construction monitoring every 6 months for 3 years (recommended).
3. Reporting:	<ul style="list-style-type: none"> Alien clearing activities to be included in ECO reports. Non-compliance to be recorded and corrective action implemented immediately.
4. Training:	<ul style="list-style-type: none"> Contractors and workers must receive environmental induction. Awareness of listed invasive species and legal obligations.
5. Legal Compliance:	<ul style="list-style-type: none"> Compliance with: <ul style="list-style-type: none"> NEMBA (Act 10 of 2004) Alien & Invasive Species Regulations NEMA Duty of Care (Section 28)
6. Responsibility:	<ul style="list-style-type: none"> The Applicant remains legally responsible for ongoing control of invasive species.

8. GENERIC ALIEN MANAGMENT PLAN

The management approach will follow an adaptive control model comprising initial clearing, follow-up treatment, rehabilitation, and long-term monitoring.

All vegetation clearance must be undertaken with utmost care to ensure that only that vegetation, which needs to be removed, is removed.

Eradication of alien plants must be completed in such a manner that indigenous vegetation is not damaged.

It is important to remove both young plants (saplings) and old trees that are seed bearing. Different strategies can be employed to remove different species, but all methods will involve manual labour as mechanical means other than chain saws and brush cutters, should be used where necessary. It is important to tackle the smaller, more dispersed plants first, and then the larger stands of alien vegetation.

To ease the removal of the alien plants, present on the site, it is recommended that all alien plants be removed during the initial site clearing activities at the start of the construction process rather than during the operational phase of the development.

8.1 Clearing of small alien plants

The best method of clearing small plants is by hand pulling them. They must then be stacked for removal to a recognized waste site, or alternatively mulched on site. Mulched material can be used as a ground cover where necessary.

8.2. Clearing of alien trees

Alien trees must be cut down with chain saws and then chopped into smaller portions. Some species of alien plants like Black Wattle trees are coppicing species and will re-grow from roots and stumps. This means that a chemical such as Roundup or Garlon will need to be used to prevent the trees from re-sprouting. These chemicals can either be sprayed onto the stump with a knapsack sprayer or painted on with a paintbrush. Another alternative to prevent re-growth is to strip the bark from the remaining part of the stump.

8.3. Methods for controlling alien vegetation

Biological control, chemical control, mechanical clearing, and burning have all been used with varying results. Each method has been successful but nearly all require follow-up control. The most successful clearing projects have included an integrated approach to account for initial clearing and continued management.

8.3.1 Mechanical control:

- Mature non-coppicing trees must be cut as low as possible and no herbicide treatment is needed on the cut stumps.
- Debris may be removed immediately from site to be burned in a safe area, mulched or used as firewood.
- Large branches should be used as firewood.
- Smaller branches should be mulched.
- Alien material containing seed must be removed from the site and burned.
- Should debris be left on site:
 - In sparser areas, where felled debris will not hinder follow-up operations, plants can be felled and left in situ.
 - In dense areas, stack debris in rows five meters apart parallel to the contours to facilitate follow-up operations.
 - Low density seedling regeneration must be hand pulled.
 - Hand pulling around pockets of indigenous vegetation (1m swathe around clumps) is important so as to not damage indigenous vegetation pockets.

8.3.2 Chemical control

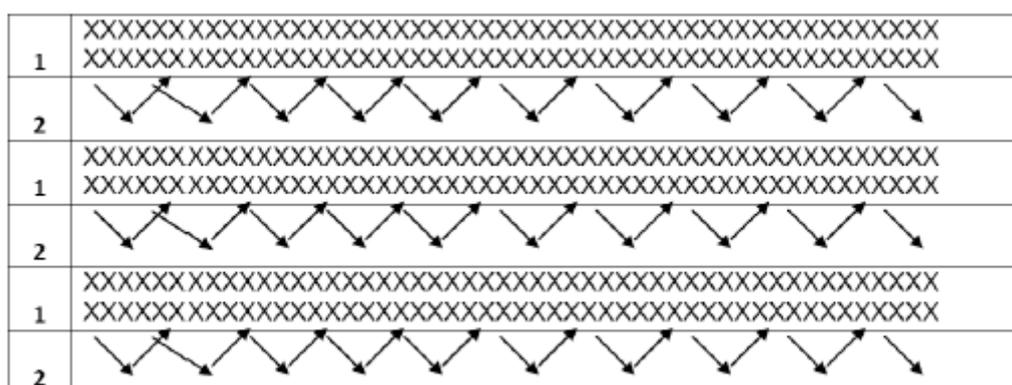
- Follow-up visitation no later than three months after initial operation.
- Follow-up control will be needed because soil stored seed may stay dormant in soil for up to 50 years.
- Follow-up control will involve a combination of hand pulling and foliar spraying.
- Seedlings, saplings and coppice can be foliar sprayed.
- Follow-up spray operation when sufficient regeneration has taken place.
- Blanket or foliar spray.

8.3.3 Tools

- Loppers, bow saws and chainsaws
- 12 –15 litre back pack spray units
- Flat fan nozzles or solid cone and 1 bar constant flow valves.

8.3.4 Team composition

- 6 persons, each being equipped with a lopping shear, bow saw and herbicide applicator, must first sweep through the area in individual lanes 5 meters apart. These persons target all plants less than 8 cm in basal diameter, felling, stacking and applying herbicide. De-branching should only be used to facilitate stacking of larger branches.
- 2 chainsaw operators thereafter follow through these lanes felling all plants more than 8 cm in basal diameter. Two assistants are responsible for stacking and herbicide application.
- For the denser areas, methodology must follow the illustration below. All rows are five meters wide. Swathes labelled 1 must be cut first and the debris placed back into these swathes. Thereafter debris generated in swathes labelled 2, must be placed into swathes labelled 1.



8.3.5 Follow up

Once the source of the problem has been removed, namely the seed-bearing trees, it is important to follow up on any seedlings and saplings that may have grown in the interim. If this is not done the effort of the removal of the adult trees will have been wasted, as the alien vegetation problem will intensify.

9. Monitoring, Reporting and compliance

The landowner retains responsibility for invasive species control in terms of NEMBA. The appointed Environmental Control Officer (ECO) for the duration of the construction phase (and if appointment is extended to the operational phase) will monitor alien clearing during regular ECO site inspections. Progress can be measured against the alien clearing Any contravention must be reported to the Competent authority (DFFE: Biosecurity).

Phase	Activity	Timeframe	Responsibility
Construction Phase	Initial clearing	Construction duration - ongoing	Contractor (Implement) ECO (Audit)
Post Construction Rehabilitation Phase	Follow up clearing and rehabilitation	3 months post construction	Contractor (Implement) ECO (Audit)

Monitoring Phase	Annual monitoring	1-3 years post construction	Contractor
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9. Responsibilities

Applicant – MP3 SALES AND EDUCATION SERVICES

Mp3 Sales and Education Services, as the Applicant and landowner (or authority responsible for the project), shall:

- Ensure implementation of this Alien and Invasive Species Management Plan;
- Allocate adequate financial and human resources for clearing and follow-up activities;
- Appoint a suitably qualified contractor to undertake alien clearing;
- Appoint an independent Environmental Control Officer (ECO) to monitor compliance;
- Ensure that clearing operations comply with the approved EMP, NEMBA, and AIS Regulations;
- Ensure post-construction monitoring is undertaken for a minimum period of three (3) years;
- Ensure corrective action is taken where non-compliance or regrowth is identified.

Contractor

The appointed Contractor shall:

- Implement clearing strictly in accordance with this Management Plan;
- Ensure workers are informed of alien species identification and control methods;
- Apply herbicides in accordance with manufacturer specifications and legal requirements;
- Prevent the spread of seeds or vegetative material during clearing;
- Dispose of cleared biomass responsibly;
- Undertake follow-up clearing where instructed;
- Maintain records of clearing activities for submission to the ECO.

Environmental Control Officer (ECO)

The appointed ECO shall:

- Monitor implementation of this Plan during monthly construction site visits;
- Verify that clearing methods are appropriate and legally compliant;
- Record areas cleared and any regrowth observed;
- Include compliance findings in monthly ECO reports;
- Conduct post-construction monitoring at least once every six (6) months for three (3) years;
- Provide recommendations for corrective action where necessary.

Environmental Assessment Practitioner (EAP)

The EAP shall:

- Ensure this Plan forms part of the approved EMP;
- Provide guidance where amendments are required;
- Assist the Applicant in ensuring compliance with regulatory requirements where necessary.

CURRICULUM VITAE

MICHAEL JON BENNETT

PERSONAL

Profession: Principle Environmental Assessment Practitioner and Senior Environmental Control Officer, Sharples Environmental Services cc, George

Nationality: South African

Date of Birth: 22 October 1985

Languages: English (read, write and speak) & Afrikaans (read, write and speak)

Marital Status: Single

Drivers License: Code B

Health: Excellent

EAPASA Reg: 2021/3163

IAIASA Membership: 7334

WORK EXPERIENCE

2014 – Present: Sharples Environmental Services cc, George, WC
Environmental Assessment Practitioner

I have gained extensive experience in assessments and monitoring and have worked on a variety of multidisciplinary projects and am proficient in:

- Basic Assessments Reports
- Water Use Authorisation Applications
- Environmental Monitoring and Reporting
- Environmental Management Programmes
- Environmental Control Officer Training
- Conducting Outeniqua Sensitive Coastal Area licensing applications

2016 – 2017: Sharples Environmental Services cc, Cape Town, WC
Intrim Office Manager, Environmental Assessment Practitioner

2011 – 2014: Peninsula Permits & NCC Group, Cape Town, WC
Environmental Control Officer

- Environmental Monitoring

TERTIARY EDUCATION

2010 University of Cape Town

- I hold a Bachelor of Science Degree specialising in Environmental and Geographic Science & Ocean and Atmospheric Science

PROJECTS

- 2023** George Urban Country Estate (Pty) Ltd
- Basic Assessment Report for the proposed residential development on erf 19374 (remainder erf 6182, erven 6179 and 6156), George, Western Cape
- 2023** George George Municipality
- Basic Assessment Report for the Upgrading of the Eden Pumpstation, George, Western Cape
- 2023** Mossel Bay Paprenax Trading 6 cc
- Amendment of Environmental Authorisation (Part 2, Substantive amendment) for the proposed establishment of a filling station and associated business infrastructure on a portion of erf 13996, Kwanonqaba, Mossel Bay, Western Cape
- 2023** George George Municipality
- Basic Assessment Report for proposed upgrade of the Schaapkop Pumpstation rising main on remainder of erf 464 and erf 13486, George, Western Cape
- 2023** George Garden Route Gateway Plaza
- Basic Assessment Report for proposed mixed-use development on portions 278 and 282 of farm Kraaibosch no. 195, George, Western Cape
- 2023** George George Municipality
- Basic Assessment Report for proposed development of a Photovoltaic Solar Plant on erf 2819, George, Western Cape
- 2023** George EARP Construction
- Basic Assessment Report for the proposed commercial development on portion 49 of Farm Hansmoeskraal 202, George, Western Cape
- 2022** George Pieterkoen Trust
- Basic Assessment Report for the proposed residential development on Portion 21 of the Farm Kraaibosch No. 195 (Pieter Koen), George, Western Cape
- 2022** Mossel Bay Dalmar
- Amendment of Environmental Authorisation (Part 2, Substantive amendment) for the Proposed Residential Development On A Portion Of The Farm Vaale Valley 219, Mossel Bay (Hartenbos Landgoed II), Western Cape

- 2022** George Dalmar
- Amendment of Environmental Authorisation Proposed Development of Herold's Bay Country Estate on A Portion of Portion 7 of The Farm Buffelsfontein No. 204, Herold's Bay, Western Cape
- 2022** George Pieterkoen Trust
- Basic Assessment Report for the proposed residential development on Portion 21 of the Farm Kraaibosch No. 195 (Pieter Koen), George, Western Cape
- 2022** Still Bay W. Nel & Irma Oosthuizen Trust IT 1596/2008
- Basic Assessment Report for the development of 5 residential units on erven 4139, 4140, 4141, 4142, 4143, 4144, 4145 (Erf 3997), Still Bay West, Western Cape
- 2022** George Octo Trading 377 cc
- Section 24 G Retrospective Environmental Authorisation for the alleged unlawful construction of a road clearance of vegetation to establish a house on remainder of Farm Holle Kloof 91 and Portion 1 of the Farm Plattekloof 131, Waboomskraal, George, Western Cape
- 2022** Knysna CapeNature
- Basic Assessment Report for the Proposed development on Portions 38 and 39 of Farm 205 and Remainder of Farm 211, Goukamma Nature Reserve, Knysna, Western Cape
- 2021** Prince Albert Jurie Klue
- Section 24 G Retrospective Environmental Authorisation for the alleged unlawful clearance of vegetation on Farm Angliers Bosch (Fernkloof), Remainder of Farm 157, Klarstroom, Prince Albert, Western Cape
- 2021** Mossel Bay Mossel Bay Municipality
- Basic Assessment Report for the proposed Dana Bay Emergency Access Road on Remainder of Portion 7 of the Farm 225, Dana Bay, Mossel Bay, Western Cape
- 2021** Willowmore LEZMIN 2087cc
- Basic Assessment Report for the proposed development of Portion 1 of the Farm Matjiesfontein No. 206, Baviaanskloof, Division Willowmore, Eastern Cape
- 2020** Sedgefield Knysna Municipality
- Basic Assessment Report for the proposed housing development on erven 3861, 3865, 3866, 3917, 3918 and 5010 in Sedgefield, Knysna, Western Cape

- 2020** Mossel Bay Paprenax Trading 6 cc
- Basic Assessment Report for the proposed establishment of a filling station and associated business infrastructure on a portion of erf 13996, Kwanonqaba, Mossel Bay, Western Cape
- 2020** Ladismith Department of Transport and Public Works
- Maintenance Management Plan for the periodic maintenance of Trunk Road 31, section 4, km 30.8 to km 76.06, Barrydale to Ladismith, Western Cape
- 2020** Knysna Knysna Municipality
- Maintenance Management Plan for the Maintenance of the potable water pipeline system on Erven 4197, RE/1352, RE/1351, RE/1146 and 1316 in Knysna, Western Cape
- 2020** Humansdorp Kouga Municipality
- Environmental Control Officer for the Phase 1A of New municipal 66kV double circuit overhead line between the Melkhout substation at Humansdorp and the main intake substation at Jefferys Bay, Eastern Cape
- 2020** Humansdorp Kouga Municipality
- Environmental Control Officer for the Construction of a new 22kv overhead powerline between Melkhout substation and Allison Street, Humansdorp, Eastern Cape
- 2020** Knysna Knysna Municipality
- Environmental Control Officer for the Charlesford raw water pumping scheme: Upgrade and refurbishment of pumpstation: Mechanical and electrical, Knysna, Western Cape
- 2020** Seweweekspoort, Department of Transport & Public Works
- Amendment of Environmental Authorisation (Part 2, Substantive amendment) for the flood damage repairs to road structures on MR309 in Seweweekspoort, Western Cape
- 2019 – 2021** Seweweekspoort, Department of Transport & Public Works
- Environmental Control Officer for the flood damage repairs to road structures on MR309 in Seweweekspoort, Western Cape
- 2019** George George Municipality
- Environmental Control Officer for the Raising of the Garden Route Dam Spillway on Portion 3/352, Remainder of 536 of Erf 221, Erf 3055 and Erf 3056, George, Western Cape
- 2019** Laingsburg Department of Agriculture
- Environmental Control Officer for the Construction Of Erosion Prevention Structures Within The One In Ten Year Flood Line Of The Buffels River, Laingsburg, Western Cape

- 2019** Williston Williston Municipality
- Environmental Control Officer for the Upgrading of bulk water network in Williston – Phase 3, Williston, Northern Cape
- 2019** George George Municipality
- Environmental Control Officer for the construction of new 66kV overhead line between Ballots Bay and Glanwood substations, George, Western Cape
- 2019** Oudtshoorn Department of Transport & Public Works
- Environmental Control Officer for the Periodic maintenance of Trunk Road 31, Section 6, km 23.3 to km 47.8 Calitzdorp to Oudtshoorn, Western Cape
- 2019** Kleinbrak Mossel Bay Municipality
- Environmental Control Officer for the Upgrading of Beyers Street, Kleinbrak River, Western Cape
- 2019** George Outeniqua Eye Clinic Body Corporate
- Environmental Control Officer for the proposed expansion of parking area on erf 5950 and part of remainder erf 464, George, Western Cape
- 2019** Mossel Bay Hey Innovations
- Basic Assessment Report for the proposed establishment of a residential development on Erf 2839, Great Brak River, Western Cape
- 2019** Oudtshoorn Oudtshoorn Municipality
- Environmental Management Programme for the Blossoms Emergency Supply Scheme, Oudtshoorn, Western Cape
- 2019** Humansdorp Clinkscapes Maughan-Brown
- Environmental Management Programme for the proposed construction of a new 22kV overhead powerline between Melkhout Substation and Allison Street, Humansdorp, Eastern Cape
- 2019** George PN&MR Lotter Family Trust
- Addendum to the Environmental Management Programme for the Establishment of a Township (Rivendale) on Portions 5, 15, 16 and 31 of the Farm Hansmoeskraal 202, Western Cape
- 2019** Oudtshoorn Department of Transport and Public Works
- Basic Assessment Report for the Proposed Maintenance Activities of Trunk Road 33/4 between km 4.6 and km 14.4, Meiringspoort, Western Cape
- 2019** George Dynarc Capital
- Substantive amendment of environmental authorisation for the proposed Development of Portion 130, 131 and 132 of the Farm Gwayang 208

- 2018** Mossel Bay Element Consulting Engineers
- Environmental Control Officer for the construction of a new 22kV overhead power line between the Midbrak and Kleinbrak Substations
- 2018** Mossel Bay Element Consulting Engineers
- Environmental Control Officer for the Upgrade of Amy Searle Canal – Phase 5, Great Brak River
- 2018** Gouritsmond Hessequa Consulting Engineers
- Environmental Control Officer for the Upgrade and expansion of the Gouritsmond Water Treatment Works on remainder of erf 140, Gouritsmond
- 2018** George Biprops 14
- Environmental Control Officer for the residential development on portion 5 of the farm Kraaibosch No. 195, Groenkloof Woods: Phase C & D
- 2018** Knynsa Knysna Municipality
- Environmental Control Officer for upgrading of Knysna bulk water supply scheme: phase 2B
- 2018** Plettenberg Bay Bitou Municipality
- Environmental Control Officer for the upgrade of the Kranshoek Bulk Water Supply Scheme: Construction of Pipelines, reservoirs and associated infrastructure near Plettenberg Bay.
- 2018** Mossel Bay SMEC
- Environmental Control Officer for the Upgrade of Kusweg and associated infrastructure in Rheeboek
- 2017** George EARP Construction
- Invasive Alien Management Plan for the proposed residential development on portions 21, 23, 24 & 48 of Farm Hansmoeskraal 202 near George
- 2017** Mossel Bay Mossel Bay Municipality
- Environmental Control Officer for the development of the new Mossel Bay municipal cemetery on erf 2001/0
- 2017** Knynsa Knysna Municipality
- Environmental Control Officer for the remedial work to prevent further settlement of the low-lift pump sump and retaining wall at Gouna River Pump Station
- 2017** Knynsa Knysna Municipality
- Environmental Control Officer for upgrading of Knysna bulk water supply scheme: phase 1

- 2017** George Biprops 14 (Pty) Ltd
- Environmental Control Officer for the residential development on portion 5 of the farm Kraaibosch No. 195
- 2017** Still Bay Hessequa Municipality
- Environmental Control Officer for the construction of a reservoir, booster pump station and associated infrastructure in Melkhoutfontein near Still Bay
- 2016 - 2017** Heidelberg Department of Transport & Public Works
- Environmental Control Officer for the flood damage repairs to structures in the Central Eden District Municipality Region, Heidelberg North
- 2016 - 2017** Riversdale Department of Transport & Public Works
- Environmental Control Officer for the flood damage repairs to structures in the Central Eden District Municipality Region, Riversdale East area
- 2016 - 2017** Still Bay Department of Transport & Public Works
- Environmental Control Officer for the upgrade of main road 332 near Still Bay
- 2016 - 2017** Mossel Bay The South Cape College
- Environmental Control Officer for the extension of the South Cape College: Phase 3, Mossel Bay Campus
- 2016 - 2017** Klein Brak Mossel Bay Municipality
- Environmental Control Officer for the removal of obstructions in the lower floodplain of the Klein Brak River Estuary
- 2016** Prince Albert Milway Trade and Invest 1014cc
- Basic Assessment for the proposed guest lodge on remainder of Farm Rietpoort 13
- 2016** Plettenberg Bay Bitou Municipality
- Basic Assessment for the proposed Qolweni phase 5 development near Plettenberg Bay
- 2016** Mossel Bay Element Consulting Engineers
- Environmental Management Programme for the replacement of 22kV overhead powerline between Power Town and Hartenbos and between Hartenbos and the Hartenbos sewage substation
- 2016** George SMEC
- Environmental Policy for the resurfacing of York Street, George

- 2016** Mossel Bay Department of Transport & Public Works
- Maintenance Management Plan for proposed upgrade of Louis Fourie Road.
- 2016** George Oaklands Bridge Country Estate HOA
- Maintenance Management Plan for proposed repair and maintenance of the riverbank at Oaklands Bridge Country Estate in Heather Park
- 2016** Gouritz Department of Transport & Public Works
- Update of the Maintenance Management Plan for proposed repair and maintenance of the Gouritz River Bridge bank protection along the R325 near Gouritzmond
- 2016** George Ivorybell Investment (Pty) Ltd
- Outeniqua Sensitive Coastal Area Environmental Impact Report for the proposed new house on erf 379 in Heralds Bay
- 2016** George George Municipality
- Environmental Assessment Report for the substantive amendment of environmental authorisation of the proposed upgrade and extension of the overhead power lines and associated substations
- 2016** Oudtshoorn SA Army Infantry School
- Environmental Control Officer for the construction of a fighting in built up areas (FIBUA) range on portion 10 of the farm Blaauwtjies Drift 110 in Oudtshoorn
- 2015 - 2016** Gouritz Department of Transport & Public Works
- Environmental Control Officer for the repair and maintenance of the Gouritz River Bridge bank protection along the R325 near Gouritzmond
- 2015 - 2016** Albertinia Garden Route Game Lodge (Pty) Ltd
- Environmental Control Officer for the five new units at the Garden Route Game Lodge
- 2015 - 2016** Mossel Bay Element Consulting Engineers
- Environmental Control Officer for the replacement of 22kV overhead powerline between Power Town and Hartenbos and between Hartenbos and the Hartenbos sewage substation
- 2014 - 2016** Plettenberg Bay Chauke Quantity Surveyers
- Environmental Control Officer for the Qolweni and Kwanokuthula High Density Units and engineering services
- 2016** Plettenberg Bay Bitou Municipality
- Environmental Control Officer for the civil engineering works for Kwanokuthula Phase 4 and the extension of Sishuba Street

- 2014 - 2016** Mossel Bay The South Cape College
- Environmental Control Officer for the extension of the South Cape College, Mossel Bay Campus
- 2016** George SMEC
- Environmental Control Officer for the resurfacing of York Street
- 2014 - 2015** Mossel bay The Muller Murray Trust
- Environmental Control Officer for the construction of gravity pipeline from the Nautilus take-off to the Boggomsbaai Reservoir phase 2
- 2015** Swellendam Casidra SOC Ltd
- Environmental Control Officer for the Grootvaderbos Groynes in the Buffeljags River
- 2015** George Element Consulting Engineers
- Environmental Control Officer for the upgrading and extension of overhead power lines and substations: construction of a new 66kV overhead line between Protea and Ballots Bay substation
- 2014 - 2015** George Department of Transport & Public Works
- Environmental Control Officer for the flood damage repair projects in the George and Knysna local municipal areas
- 2015** George BDE Consulting Engineers (Pty) Ltd
- Environmental Control Officer for the photovoltaic solar plant for the ACSA George Airport
- 2015** Heidelberg Bergstan South Africa
- Environmental Control Officer for the Duiwenhoks River stabilization works: Sites B31, B38 and B39
- 2015** Krakeel Element Consulting Engineers
- Environmental Control Officer for the construction of filling station at SSK Tuinrote Agri on portion 5 of the farm no. 320
- 2014 - 2015** Herbertsdale SMEC
- Environmental Control Officer for the flood damage repairs to structures in the Eden region: Herbertsdale area
- 2014 - 2015** George Department of Transport & Public Works
- Environmental Control Officer for the flood damage repair projects in the George and Knysna local municipal areas
- 2015** George SMEC
- Environmental Control Officer for the improvements to the Pacaltdorp interchange and new pedestrian bridge

2014 - 2015 Still Bay De Villiers & Moore Consulting Engineers

- Environmental Control Officer for the Still Bay 66kV substation and overhead powerline

2014 Beaufort West Worley Parsons Consulting Engineers

- Environmental Control Officer for the Nelspoort bulk water supply scheme northeast of Nelspoort

**TERRESTRIAL FAUNAL AND AVIFAUNAL SPECIES COMPLIANCE
STATEMENT REPORT FOR THE PROPOSED DEVELOPMENT ON
ERF 998, TERGNIET AND PORTION 5 OF THE FARM
ZANDHOOGTE NO. 139, MOSSEL BAY LOCAL MUNICIPALITY**

February 2024



Prepared for:

Sharples Environmental Services cc (SES)

Prepared by:

Blue Skies Research

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(PhD Zoology; Pr. Sci. Nat.)

Faunal Biodiversity Specialist

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Specialist details and expertise

Full Name: Jacobus Hendrik Visser

Professional registration: South African Council for Natural Scientific Professions,
Professional Natural Scientist (Zoological Science) – Registration number: 128018

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Qualifications

- PhD (Zoology), University of Johannesburg (2015 - 2017)
- MSc (Zoology), Stellenbosch University (2011 - 2013)
- BSc Honours (Zoology) cum laude, Stellenbosch University (2010)
- BSc (Biodiversity and Ecology) cum laude, Stellenbosch University (2007 - 2009)

Expertise

- 28 years of in-the-field naturalist experience involving all faunal groups
- Zoologist with 17 years of professional experience
- 14 Peer-reviewed publications in high impact national and international scientific journals on the patterns and processes which drive and maintain faunal biodiversity, as well as on aspects of faunal biology and ecology
- Five IUCN Red List assessments

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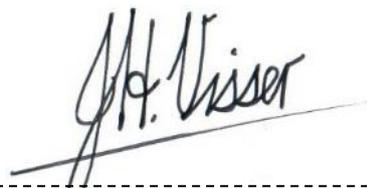
- Involved in the Southern African Bird Atlas Project 2 (SABAP2)
- Contributor on the National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria.

Declaration of independence by the independent person who compiled a specialist report or undertook a specialist process

I, Dr Jacobus Hendrik Visser, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations and any specific environmental management Act;
- have no and will not have any vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;

- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence.



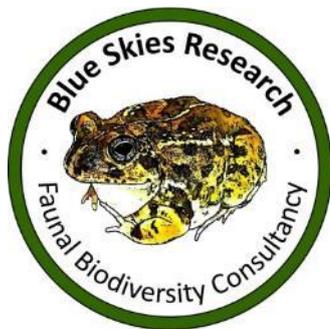
Dr Jacobus H. Visser

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08 February 2024

Date



Blue Skies Research

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08 February 2024

TERRESTRIAL FAUNAL AND AVIFAUNAL SPECIES COMPLIANCE STATEMENT REPORT FOR THE PROPOSED DEVELOPMENT ON ERF 998, TERGNIET AND PORTION 5 OF THE FARM ZANDHOOGTE NO. 139, MOSSEL BAY LOCAL MUNICIPALITY

1. Introduction

The applicant is proposing the construction of a business development on Erf 998, Tergniet and the Farm Zandhoogte No. 139, Western Cape (hereafter referred to as the “study area” or “site”). The study area is approximately 10.6 hectares in size, and three alternative layouts are being considered. These alternatives include the construction of roads (all alternatives), a service station (alternatives A and B), fast foods and takeaway area (alternative B), mixed use industrial zones (all alternatives), business zones (all alternatives), residential zones (all alternatives) and currently includes an existing nursery (see Section 11).

A combined botanical and faunal assessment report compiled by Chepri (Pty) Ltd has been provided for the project, but is missing certain information including an assessment of the alternatives and a clear indication of the way forward on the outcomes. To this end, it is required that the assessment of the various alternatives be completed, as well as an outcomes based management plan for the area (should this be recommended). Blue Skies Research was appointed by Sharples Environmental Services cc (SES) on behalf of the applicant to perform a terrestrial faunal and avifaunal assessment of the study area (see Sections 2 and 3), and perform an assessment of the various development alternatives. The current report represents a Compliance Statement for the proposed development alternatives, following a terrestrial faunal and avifaunal assessment of the site in accordance with

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the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment (EIA) Regulations 2014 (Government Notice (GN) 984), as amended.

2. Terms of Reference

2.1. General legislature pertaining to this report

This terrestrial faunal and avifaunal assessment report is compiled in accordance with the following guidelines:

- *Department of Environmental Affairs and Development Planning (DEA&DP) Guidelines for Involving Biodiversity Specialists in the EIA Process* (Brownlie, 2005).
- *Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes, Government Notice No. 320* (Gazetted 20 March 2020).
- *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species, Government Notice No. 1150* (Gazetted 30 October 2020).
- South African National Biodiversity Institute (SANBI). 2020. *Species Environmental Assessment Guideline. Guidelines for the implementation of the terrestrial fauna and terrestrial flora species protocols for environmental impact assessments in South Africa*. South African National Biodiversity Institute, Pretoria. Version 2.1 2021.

2.2 Other sources consulted

Other sources pertaining to this report are as follows:

- IUCN. 2021. The IUCN Red List of Threatened Species. Version 2021-3. <https://www.iucnlist.org>. Accessed on 25 January 2024.

- *National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of lists of critically endangered, endangered, vulnerable and protected species, Government Notice No. 2007 (Gazetted 14 December 2007).*

3. Reporting protocol

The DFFE Screening Tool Report generated for the proposed project footprint identifies the site as being of an overall “High” sensitivity under the “Relative Animal Species Sensitivity Theme”. This follows from the projected and possible occurrence of two mammal, four avifaunal and three invertebrate Species of Conservation Concern (SCC) (Table 1). The current report therefore considers the presence or likely presence of these mammal, avifaunal and invertebrate SCC within the study area based on a field survey to detect their potential presence, as well as the availability of suitable habitat for these species (Section 9).

Table 1 List of Species of Conservation Concern (SCC) identified in the DFFE Screening Tool Report (<https://screening.environment.gov.za/screeningtool/>). For each, the listed sensitivity (possibility of occurrence within the study area), scientific name and common name is shown, along with its current IUCN status. Of these, two species were assigned codes, with its identity hidden for protection, as these are species that are prone to illegal harvesting.

Sensitivity	Species	Common name	IUCN status
High	<i>Circus ranivorus</i>	African Marsh-harrier	Least Concern
High	<i>Neotis denhami</i>	Denham's Bustard	Near-Threatened
High	<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable
High	<i>Campethera notata</i>	Knysna Woodpecker	Near-Threatened
Medium	<i>Aloeides thyra orientis</i>	Red Russet	Endangered
Medium	<i>Chrysoritis brooksi tearei</i>	Brook's Opal	Endangered
Medium	<i>Sensitive Species 5</i>	Sensitive Species 5	Least Concern
Medium	<i>Sensitive Species 8</i>	Sensitive Species 8	Vulnerable
Medium	<i>Aneuryphymus montanus</i>	Yellow-winged Agile Grasshopper	Vulnerable

4. Overview of the study area

4.1 Geographic location

The study area encompasses Erf 998, Tergniet and the Farm Zandhoogte No. 139 with the proposed project footprint around 10.6 hectares in size and situated between the town of Groot Brakrivier and coastal village, Tergniet. The site is bordered by the provincial road R102, the N2 National Highway and a municipal road, Old Mossel Bay Road (Figures 1 and 2). The R102, which immediately borders and runs parallel to the site's southern fenceline, is a major regional road connecting various coastal towns. Old Mossel Bay Road runs immediately adjacent and parallel to the site's eastern border and is one of the major access roads between Groot Brakrivier and Tergniet and connects the rural communities further inland to the town and coastal villages. The N2 runs adjacent and parallel to the site's northern border.

The site's western fence line borders a residential property in the southernmost part and undeveloped land on the northern part. The landscape north of the site consists of a multitude of farming practices and diverse farm types including crop cultivation, livestock farming, horticulture, and specific practices such as vineyards and wineries. The landscape south of the site mainly consists of a densely developed residential area. A built-up area situated on the south-western corner of the site is fenced off from the undeveloped area and is currently used as a nursery and restaurant which include a parking lot, a building and footpaths.



Figure 1 Spatial location of the study area relative to surrounding residential areas and main roads on a broad scale (Red polygon = Study area; map generated in Cape Farm Mapper version 3, Western Cape Department of Agriculture).



Figure 2 Spatial location of the study area relative to surrounding residential areas and main roads at a finer scale (Red polygon = Study area; map generated in Cape Farm Mapper version 3, Western Cape Department of Agriculture).

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4.2 Topology

The larger northern part of the site slopes gently south-eastward, with the southern part sloping north-westward to create a slight depression in the southern section (Figure 3).



Figure 3 Topology of the study area showing 5 meter contour lines (Red polygon = Study area; map generated in Cape Farm Mapper version 3, Western Cape Department of Agriculture).

4.3 Vegetation

The Western Cape Biodiversity Spatial Plan (WCBSBP), 2017 (Pool-Stanvliet et al. 2017) and the National Vegetation Map (Dayaram et al. 2019) identifies the

vegetation types in the larger northern part of the site as Groot Brak Dune Strandveld with a small southern section harbouring Canca Limestone Fynbos. Currently, these vegetation types are listed as “Endangered” ecosystem and “Least Threatened ecosystem types respectively (Figure 4) according to *The Revised National List of Ecosystems that are Threatened and in Need of Protection* (Government Notice No. 2747 of 18 November 2022). In the 2018 beta Vegetation Map, however, the vegetation on the entire site has been mapped as Hartenbos Dune Thicket (VegMap, 2018; Figure 5). Even so, only small remnants of natural vegetation remain on the site (Section 7).

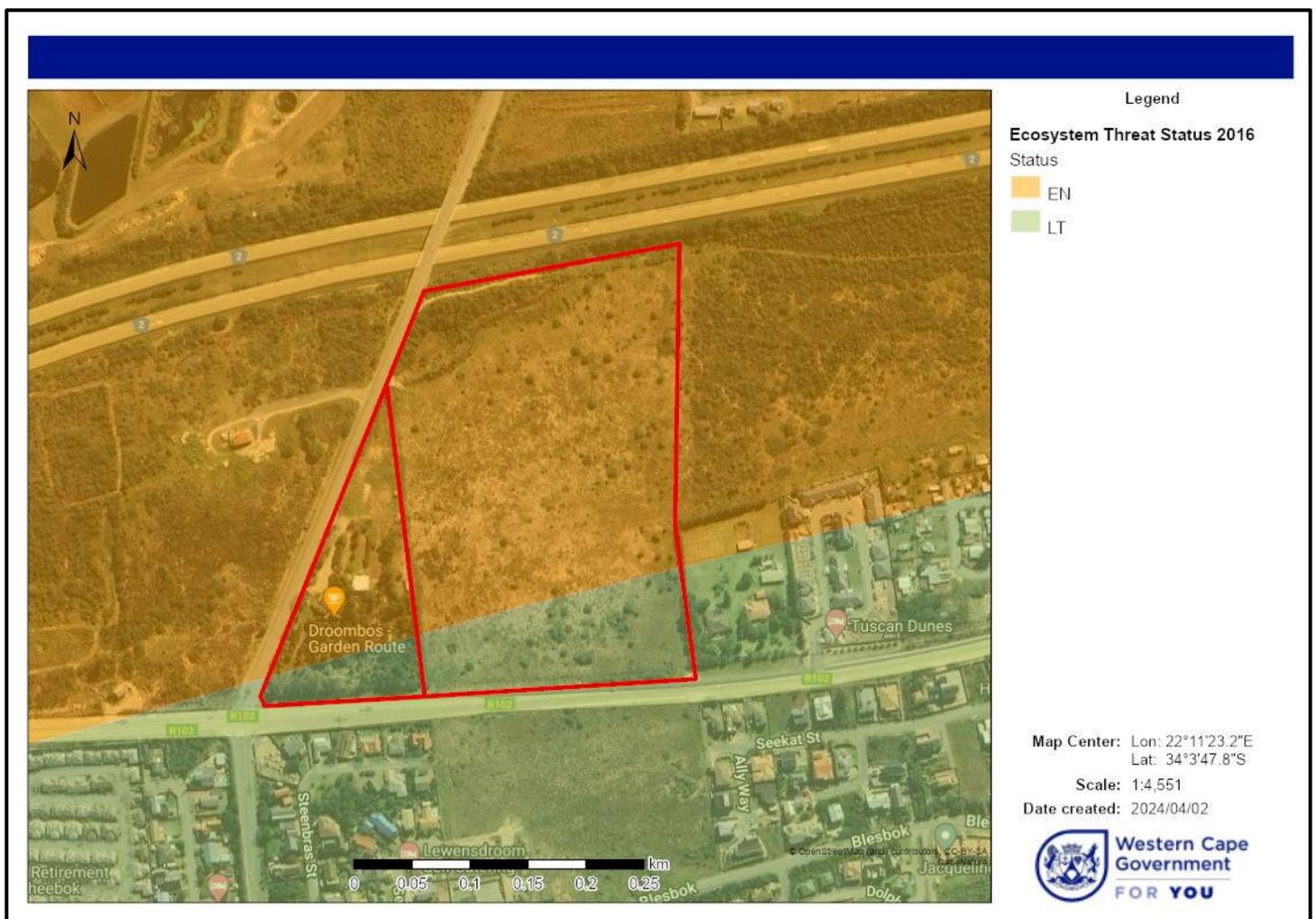


Figure 4 Spatial location of ecosystems and their threat statuses according to *The Revised National List of Ecosystems that are Threatened and in Need of Protection* (Government Notice No. 2747 of 18 November 2022, overlapping with the study area (Red polygon = Study area; information sourced from Cape Farm Mapper version 3, Western Cape Department of Agriculture).

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Figure 5 Vegetation type across the study area (VEGMAP, SANBI 2018; Red polygon = Study area; map generated in Cape Farm Mapper version 3, Western Cape Department of Agriculture).

4.4 Land cover

Land cover within the study area comprises commercial annual crops rain-fed / dryland over the larger part with smallholdings (trees) in the south-western portion and a mosaic of low shrubland (fynbos) and dense forest & woodland along the northern margin (Land Cover 73-class, Department of Environmental Affairs, 2020; Figure 6). Overall, these designations of land cover were found to accurately reflect the habitat conditions on the site (Section 7).

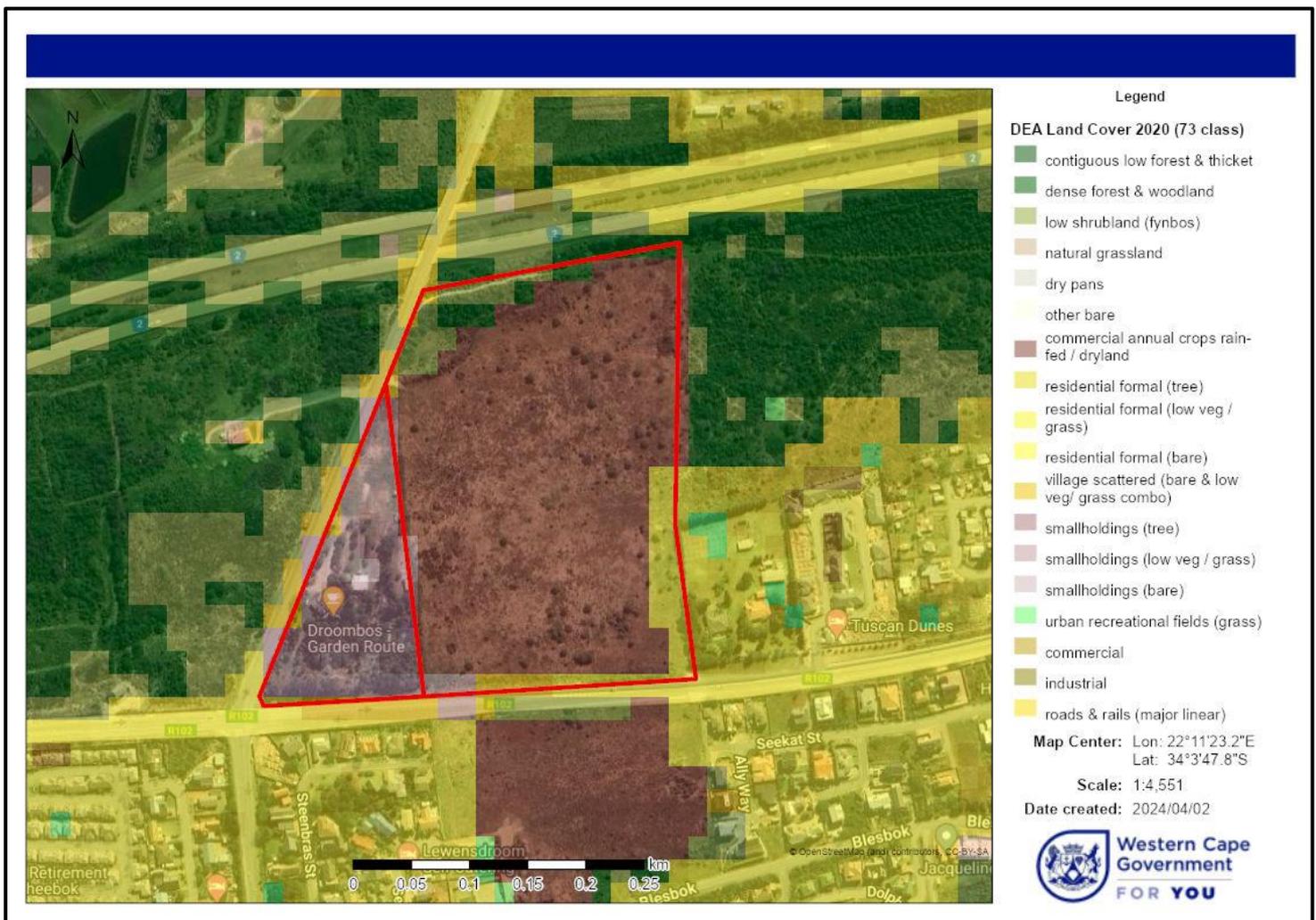


Figure 6 Land cover (Land Cover 73-class, Department of Environmental Affairs, 2020) within the study area (Red polygon = Study area; information sourced from Cape Farm Mapper version 3, Western Cape Department of Agriculture).

4.5 Critical Biodiversity Areas (CBAs)

Critical Biodiversity Areas (CBAs) are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan (Purves and Holmes, 2015). Currently, the northern margin of the site is mapped as a mix of terrestrial CBA1 and CBA2 (Figure 7). The presence and integrity of these CBAs are discussed in Section 12.

- 1.) Assess, define and create a spatial rendering of available faunal habitats across the study area based on information gathered during the field survey as well as through a desktop assessment using the latest satellite imagery,
- 2.) compile a faunal species list (including mammals, avifauna and grasshoppers) within the study area through field surveying so as to assess the possibility of occurrence any SCC which are present on the site, and
- 3.) generate spatial occurrence maps for the recovered faunal species within the study area to assess the spatial extent of areas supporting higher levels of diversity, and SCC subpopulations and habitats which may be of conservation concern.

5.2 Field survey

The study area was surveyed on foot over a single day on the 18th of January 2024, during the Summer season. Weather conditions during the surveying period were characterised by relatively warm daily temperatures, no cloud cover and moderate wind conditions (Figure 8).

Surveying included unconstrained point sampling through search meanders, as well as active searching under rocks and debris. All tracks surveyed were recorded by GPS (Garmin eTrex® 10, Garmin International Inc, USA) and are represented in Figure 9. Terrestrial faunal species (mammals) were identified by direct visual observation, or by their tracks, burrows, remains or scat. Avifaunal species were identified by visual observation, using a 180x zoom lens, or by auditory means. Finally, grasshopper were identified and photographed from less than one meter away. All observations were recorded by GPS and the species or evidence of species' presence or activity were photographed using a digital camera (Canon PowerShot SX430 IS, Canon Inc, USA). A species list for all fauna recorded within the study area is given in Appendix A.

Given relatively optimal weather conditions, faunal and avifaunal species' activity was observed to be high over the surveying period, thereby resulting in 53 recorded

observations across the study area (Figure 10, Appendix A), relating to one observation per every 0.2 hectares of study area (the study area is 10.6 hectares in extent). During surveying, faunal habitats were broadly identified in the field, and thereafter delineated through a desktop assessment of the study area using satellite imagery (CapeFarmMapper Version 3, Western Cape Department of Agriculture).

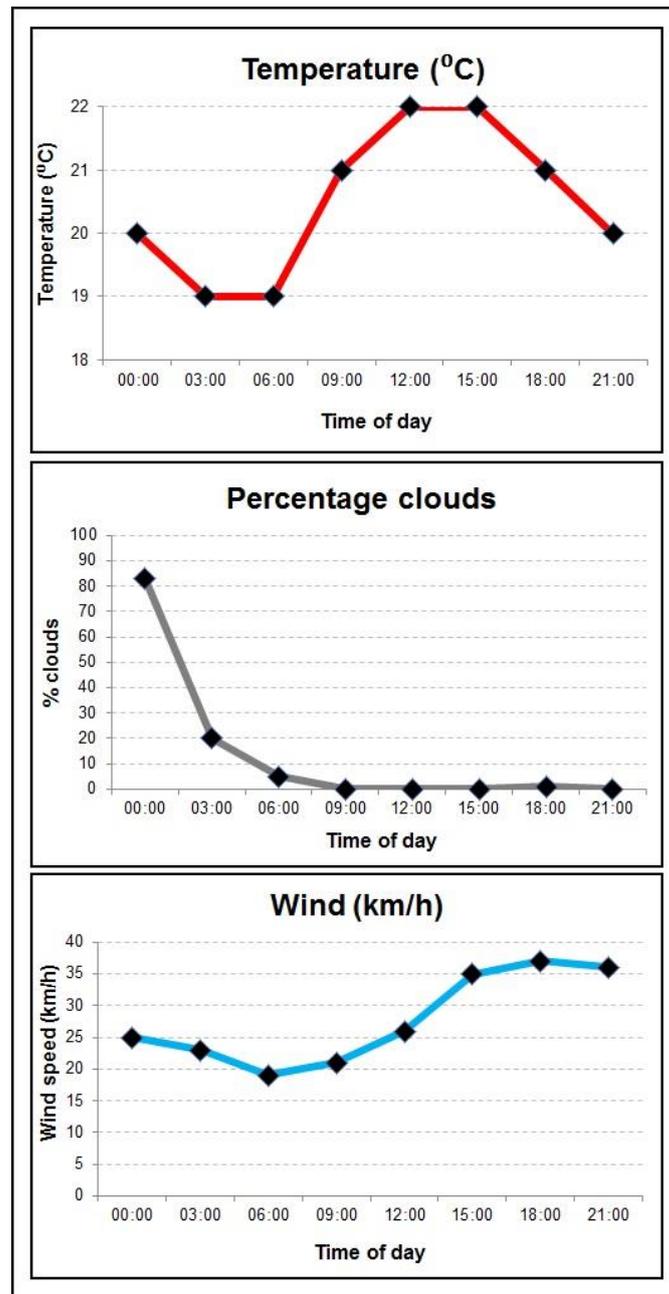


Figure 8 Weather conditions in the study area over the surveying period (18 January 2024). The time of day is indicated, along with the temperature (in °C), percentage cloud cover and wind speed (in km/h) (weather data sourced from <https://www.worldweatheronline.com>).

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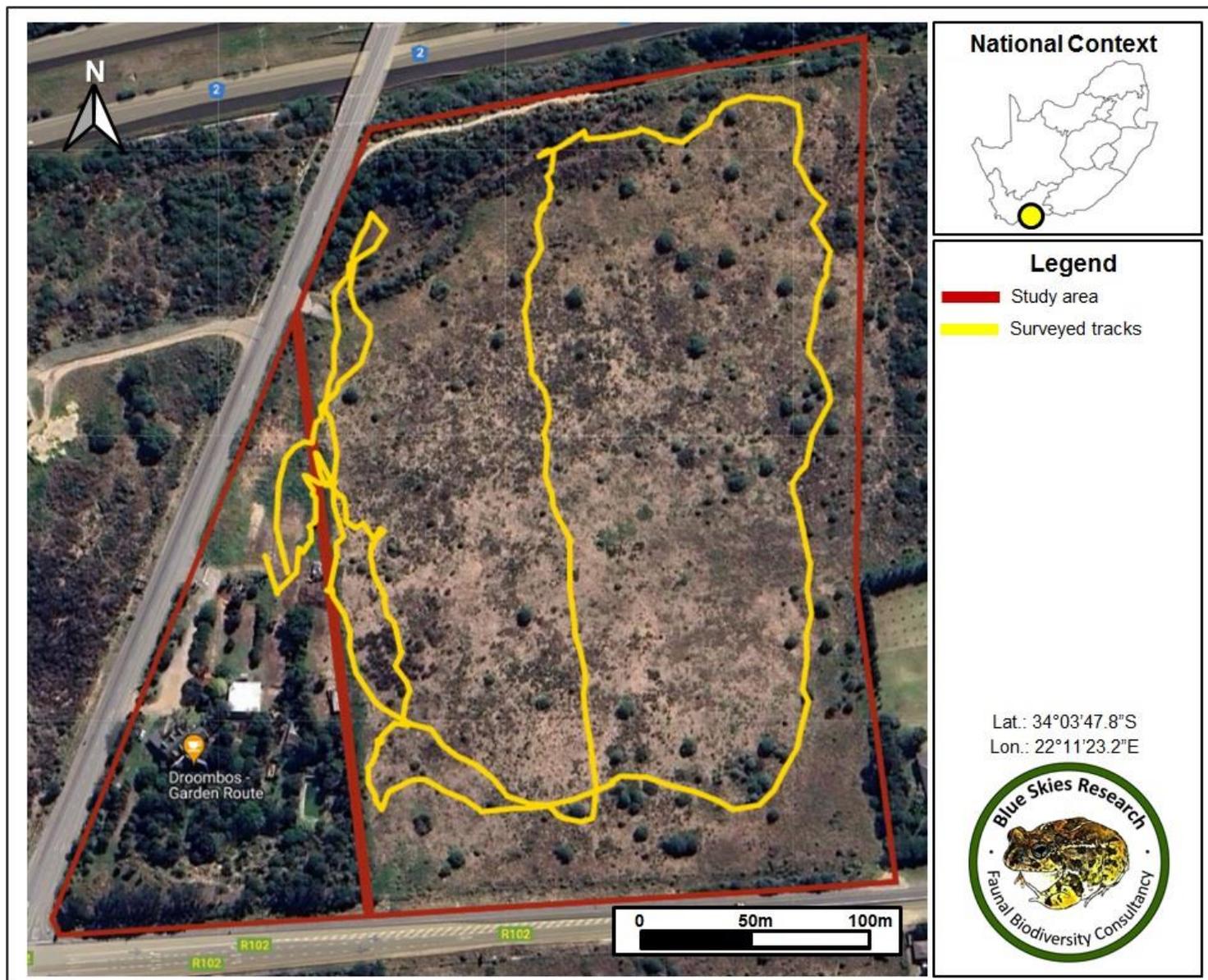


Figure 9 Spatial tracks recorded by GPS for all the search meanders across the study area over the surveying period.

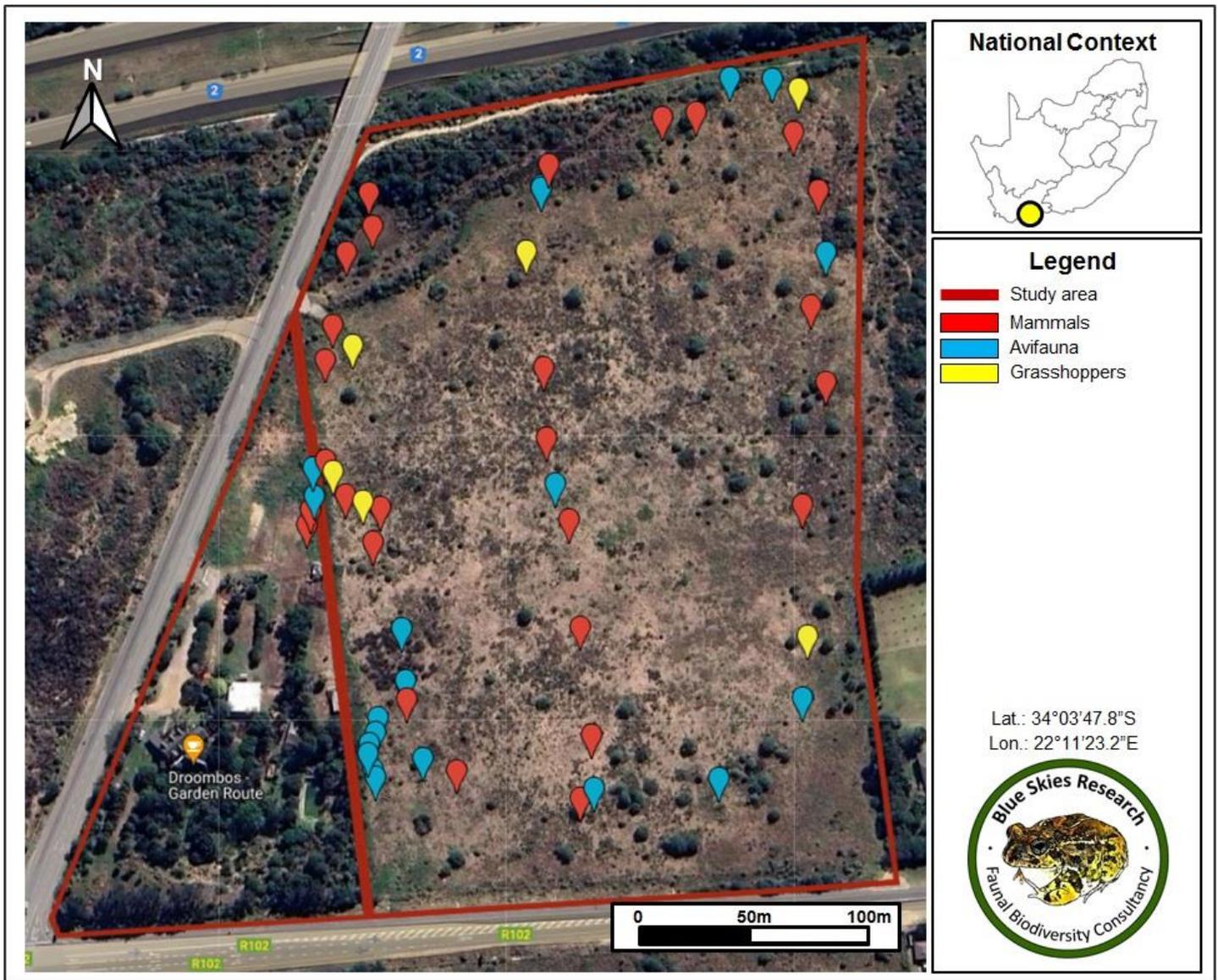


Figure 10 Spatial locations of all the faunal observations across the study area over the surveying period.

6. Assumptions and limitations

Weather conditions during the surveying period combined with an open and degraded habitat structure were relatively optimal for detecting a representative sample of the terrestrial faunal and avifaunal species diversity across the study area. Even so, it is possible that not all species could be observed (especially cryptic species). It is further possible that the surveying period did not correspond to the activity period or activity season of some species. The observed faunal composition of the study area therefore only partly reflects the species richness of, and faunal abundances within the study area (Appendix A).

7. Faunal habitat types within the study area

The study area is comprised of four broadly identified habitat features based on habitat composition and habitat integrity (Figure 11, Table 2). The natural vegetation on the site was transformed through radical clearing practices before 2004 (20 years ago) to a predominantly grassland phase and therefore exists in a highly degraded state with only remnant patches of recovering natural vegetation. The north-western corner of the site around the artificial dam is characterised by thicket and woody vegetation (trees) comprising a large number of alien and invasive species such as Port Jackson and Blackwattle. Finally, the south-western part of the site is characterised by a built-up area representing an existing nursery and restaurant which include a parking lot, a building and footpaths.

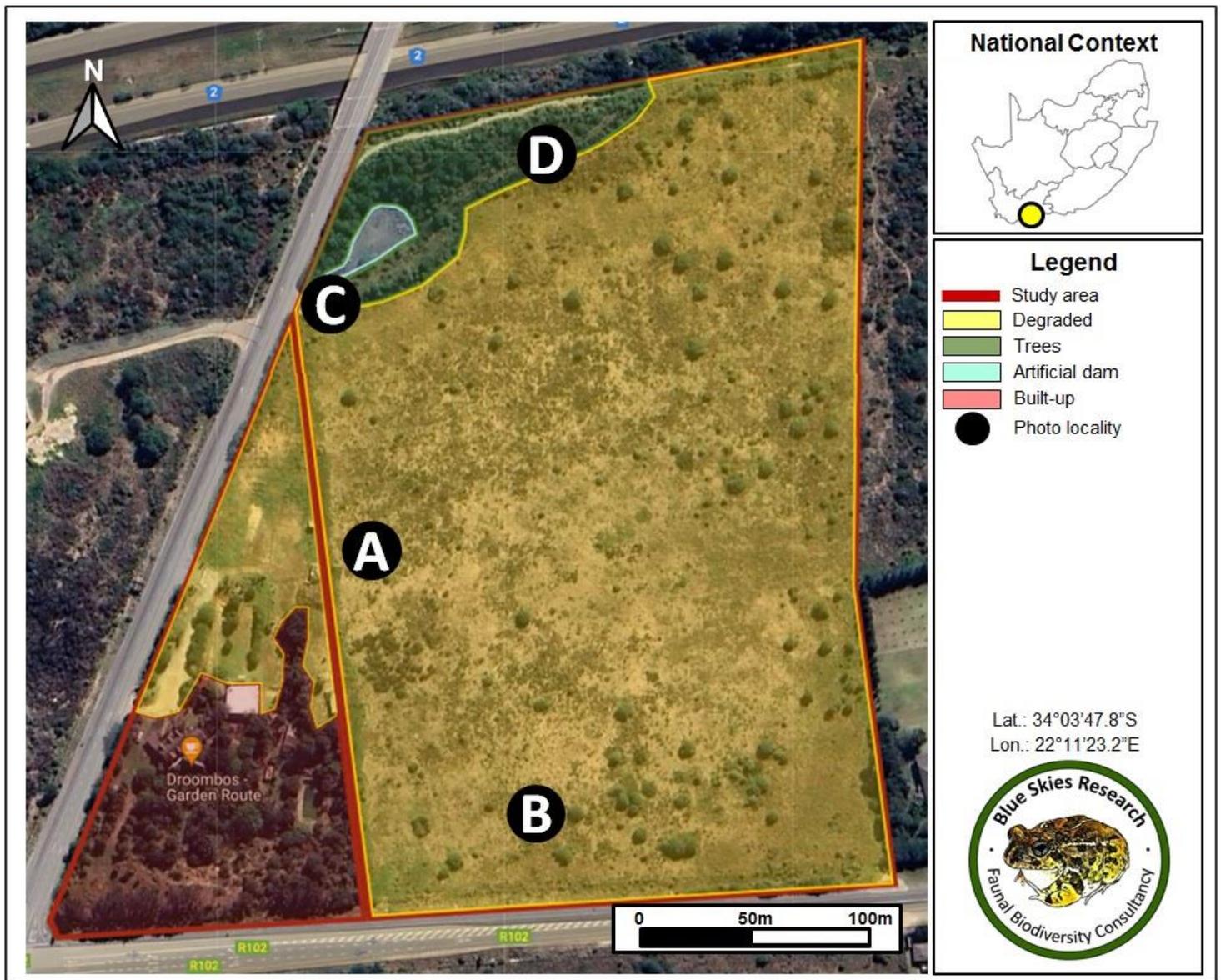


Figure 11 A broad indication of the spatial extent of habitat types overlapping the study area. Photo localities (A to D) correspond to the habitat photos in Table 2.

Table 2 Habitat locations, habitat descriptions and visual representations of the different habitat types within the study area. Location designations (A to D) correspond to the photo locations in Figure 11.

Location	Habitat description	Photo 1	Photo 2
<p>A -34.06333, 22.18899</p> <p>B -34.06439, 22.18978</p>	<p>Degraded (open)</p> <p>This habitat comprises the larger part of the site and consists of deep sandy soil with remnant patches of vegetation, common grass species and a number of alien and invasive trees.</p>		

C
-34.06235,
22.1888

D
-34.06176,
22.18984

Trees

This habitat encompasses a small section along the northern margin of the site and comprises thick and impenetrable stands of alien and invasive trees such as Port Jackson and Black Wattle. A small artificial dam is also located in the north-western part of the site (C).



8. Faunal and avifaunal composition within the study area

8.1 Mammals

Evidence of six mammal species were recovered within the study area (Figures 12 and 13), all of which are currently classified as “Least concern” by the IUCN (Appendix A). Given the deep sandy substrate of the site, the most prominent species pertains to the burrowing Cape Dune Mole-rat (*Bathyergus suillus*). Other burrowing rodent species are also present, including the African Mole-rat (*Cryptomys hottentotus*), Cape Porcupine (*Hystrix africaeaustralis*) and Cape Gerbil (*Gerbilliscus afra*). The site harbours very few terrestrial mammal species, with the most abundant being the Four-striped Grass Mouse (*Rhabdomys pumilio*) and with single incidences of the Cape Grysbok (*Raphicerus melanotis*) also noted.

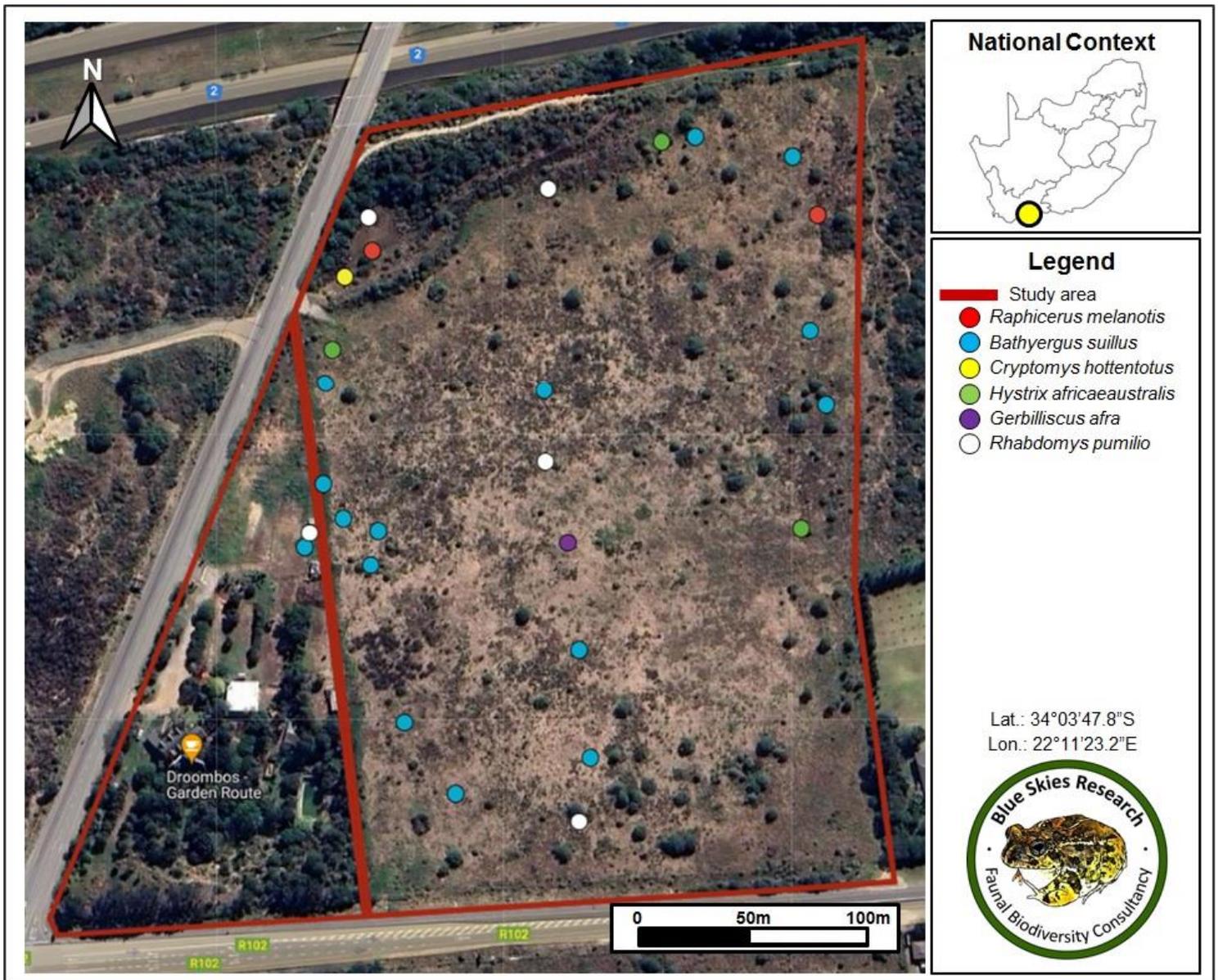


Figure 12 Spatial locations of the different mammal species recorded within the study area.

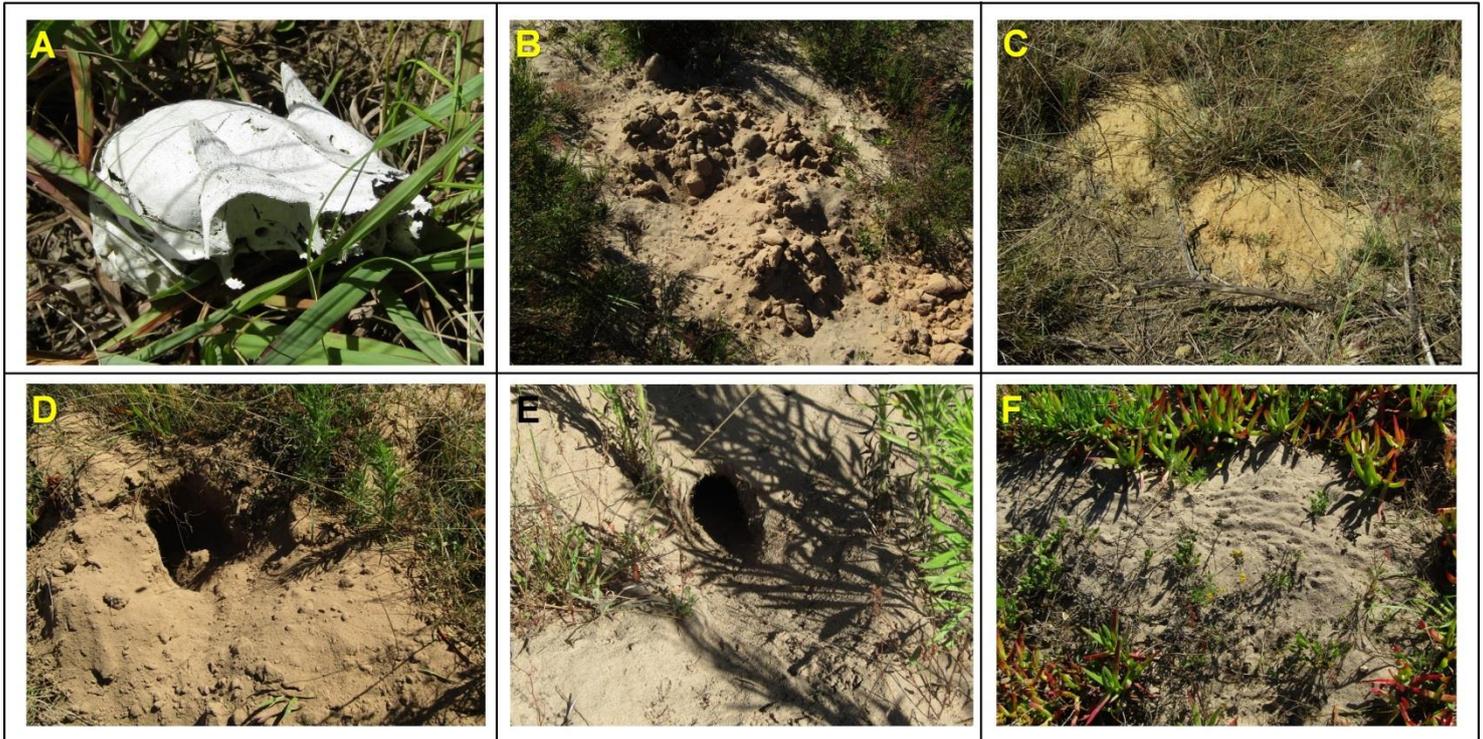


Figure 13 Photographic evidence of the different mammal species recorded in the study area. A) Remains of the Cape Gysbok (*Raphicerus melanotis*). B) Mounds of the Cape Dune Mole-rat (*Bathyergus suillus*). C) Mounds of the African Mole-rat (*Cryptomys hottentotus*). D) Feeding hole of the Cape Porcupine (*Hystrix africaeaustralis*). E) Burrow of the Cape Gerbil (*Gerbilliscus afra*). F) Tracks of the Four-striped Grass Mouse (*Rhabdomys pumilio*).

8.2 Avifauna

In total, only 19 bird species were recorded within the study area (Figures 14 and 15), all of which are currently classified as “Least concern” by the IUCN (Appendix B). All avifauna on the site constitute common species which are frequently encountered in an urban setting. Overall, avifaunal diversity on the site appears relatively impaired.

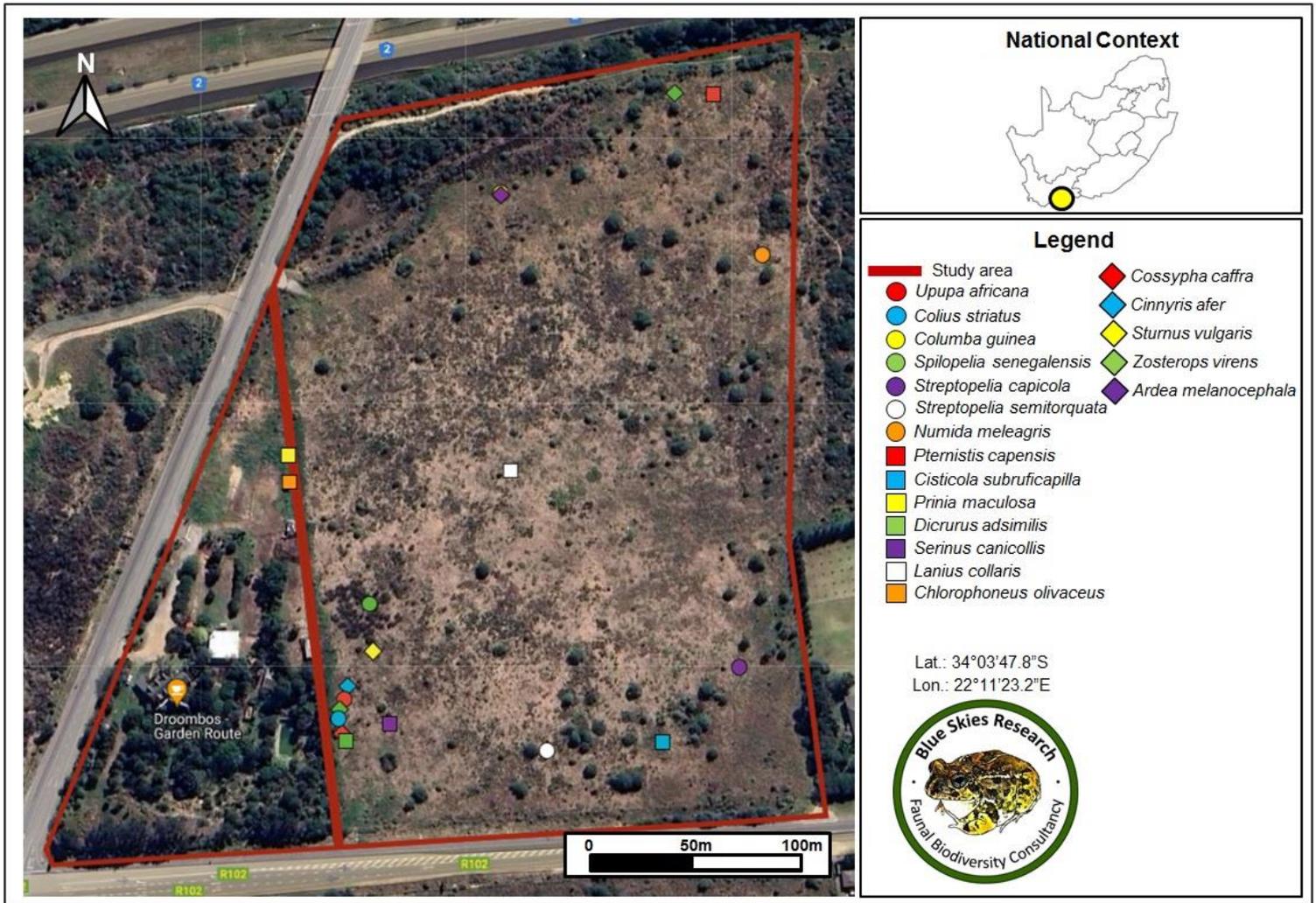


Figure 14 Spatial locations of the different avifaunal species recorded within the study area.



Figure 15 Photographic evidence of different avifaunal species recorded in the study area. A) Laughing Dove (*Spilopelia senegalensis*). B) Red-eyed Dove (*Streptopelia semitorquata*). C) Helmeted Guineafowl (*Numida meleagris*). D) Grey-backed Cisticola (*Cisticola subruficapilla*). E) Karoo Prinia (*Prinia maculosa*). F) Fork-tailed Drongo (*Dicrurus adsimilis*). G) Cape Canary (*Serinus canicollis*). H) Greater Double-collared Sunbird (*Cinnyris afer*). I) Common Starling (*Sturnus vulgaris*). J) Cape White-eye (*Zosterops virens*).

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8.3 Grasshoppers

Three grasshopper species were recorded within the study area (Figures 16 and 17), all of which are currently not assessed by the IUCN (Appendix A). These three species pertain to the widespread Common Stick Grasshopper (*Acrida acuminata*), Common Digging Grasshopper (*Acrotylus insubricus*) and Band-winged Grasshopper (*Morphacris fasciata*).

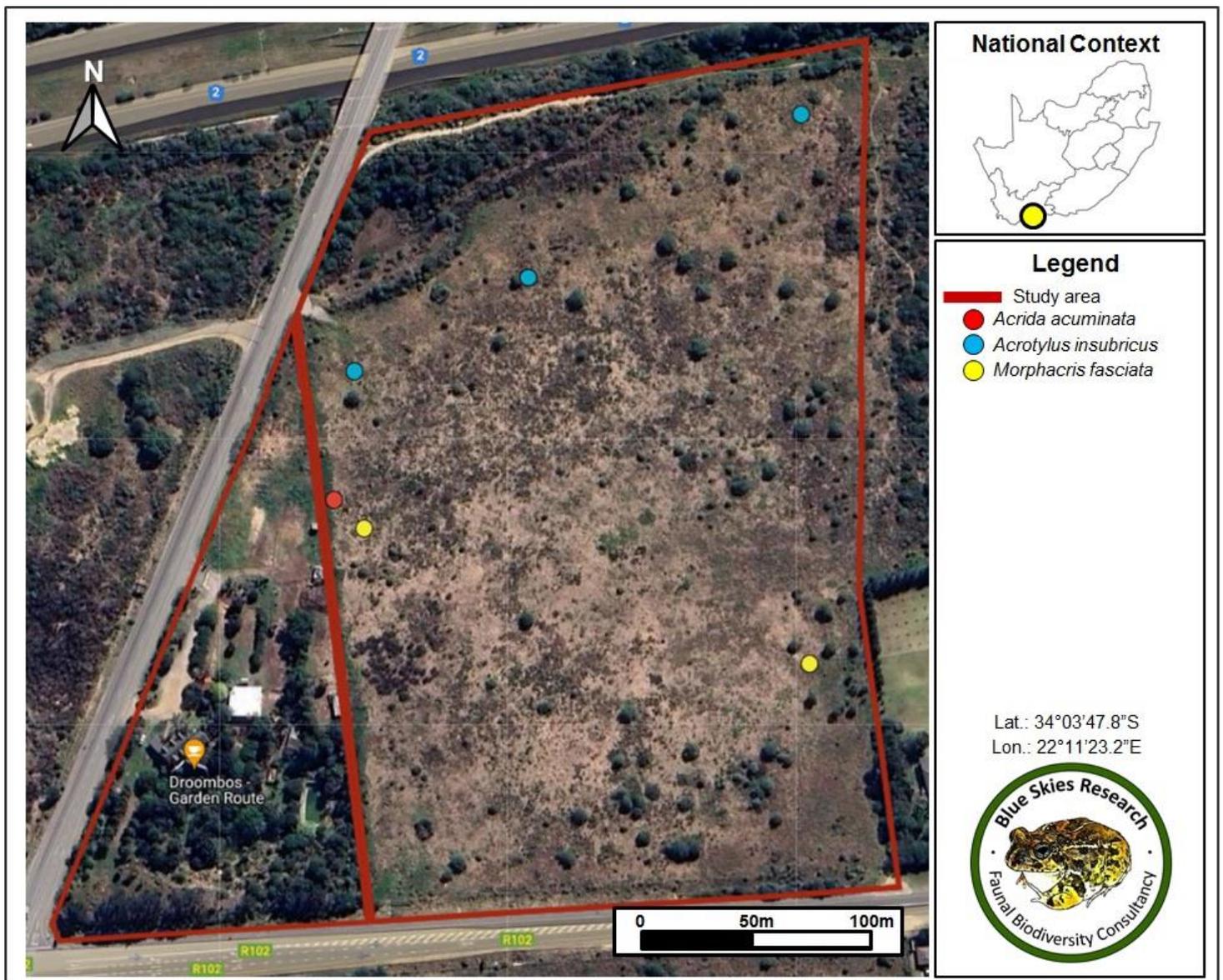


Figure 16 Spatial locations of the different grasshopper species recorded within the study area.



Figure 17 Photographic evidence of the different grasshopper species recorded in the study area. A) Common Stick Grasshopper (*Acrida acuminata*). B) Common Digging Grasshopper (*Acrotylus insubricus*). C) Band-winged Grasshopper (*Morphacris fasciata*).

8.4 Faunal and avifaunal diversity within the study area

Overall, terrestrial faunal and avifaunal diversity and abundances appears relatively low and is comprised of relatively common species of “Least Concern” (IUCN, 2021). This impaired faunal diversity is likely a result of the degraded and isolated nature of the site. For instance, the larger part of the site exists in a degraded and open state from radical clearing practices that took place before 2004 (20 years ago), with the north-western corner characterised by alien and invasive plant species and the south-western part comprising a built-up area. Furthermore, the site is situated next to busy roads (national highway, provincial and municipal roads from where daily noise and vibration is evident), a densely populated residential area to the south and south-east border, and developed agricultural farmlands to the north which isolates the site from surrounding natural areas in the landscape.

Taken together, there appears to be very few intact predator-prey dynamics on the site, with ecosystem dynamics appearing highly compromised. To this end, the study area does not appear to function as an important ecological link and faunal dispersal corridor in the study area landscape, rendering it of a lower sensitivity in a biodiversity and ecological context.

9. Species of Conservation Concern

The potential presence of nine (two mammal, four avifaunal and three invertebrate) SCC listed in the DFFE Screening Tool (Table 1) was considered. The probability of occurrence of each specific SCC within the study area landscape was assessed based on the following criteria:

Confirmed - The species was confirmed as present within the study area during the field survey.

High - The species was not confirmed as present within the study area during the field survey but has been recorded in the overlapped pentad (3400_2210) recently (less than 2 years ago) and in high number (>10 times) and is therefore likely to also occur in the study area, given suitable habitat characteristics.

Medium - The species was not confirmed as present within the study area during the field survey, but it has been recorded a number of times (<10 times) in the overlapped pentad (3400_2210) recently (less than 2 years ago). Suitable habitat for the species is also present in the study area.

Low - No suitable habitat for the species is present in the study area. Further, the species has been recorded a low number of times (<2 times) or more than five years ago in the overlapped pentad (3400_2210).

All of the SCC considered have a low likelihood of occurring on the site, given a lack of suitable habitat characteristics along with high levels of daily disturbances. The larger part of the site exists in a degraded and open state from radical historical clearing practices, with the north-western corner characterised by alien and invasive plant species and the south-western part comprising a built-up area. Furthermore, the site is situated next to busy roads (national highway, provincial and municipal roads), a densely populated residential area to the south and south-east border, and developed agricultural farmlands to the north. To this end, all considered SCC are highly unlikely to occur on the site.

Table 3 Probability of occurrence of specific SCC in the study area. For each species, the taxonomic Family, scientific name and common name is shown, along with its current classification under the IUCN Red List of Threatened Species (IUCN, 2021). In addition, the species' preferred habitat and the probability that the species occurs within the study area is given, along with a justification for listing this probability.

Order	Family	Species	Common name	Status	Habitat	Probability of occurrence in the study area	Justification of probability
Sensitive Species 8	Sensitive Species 8	<i>Sensitive Species 5</i>	<i>Sensitive Species 5</i>	-	-	Low	The presence of the species was not recorded during the field survey and it is highly unlikely that this species will occur in the study area given a lack of suitable thicket habitats.
Sensitive Species 8	Sensitive Species 8	<i>Sensitive Species 8</i>	<i>Sensitive Species 8</i>	-	-	Low	This species occurs only in protected areas and is therefore highly unlikely that the species will be present on the site.
Accipitriformes	Accipitridae	<i>Circus ranivorus</i>	African Marsh Harrier	Least Concern	The species breeds in wetlands, foraging primarily over reeds and lake margins (Harrison <i>et al.</i> 1997). Its diet consists largely of small mammals, particularly striped mouse <i>Rhabdomys pumilio</i> (Kemp and Dean, 1988).	Low	The species was not recorded in the study area landscape during the field survey. Furthermore, the species has only been recorded once in the study area landscape more than 10 years ago (April 2012). Coupled to this, the site does not harbour any of the reedbed habitats required by this species, and habitats on the site exist in an open and degraded state with a high level of daily disturbances. It is therefore highly unlikely that the species will be present on the site.
Otidiformes	Otididae	<i>Neotis denhami</i>	Denham's Bustard	Near-Threatened	The species inhabits grasslands, grassy <i>Acacia</i> -studded dunes, fairly dense shrubland, light woodland, farmland, crops, dried marsh and arid scrub plains, also grass-covered ironstone pans and burnt savanna woodland in Sierra Leone and high rainfall sour grassveld, planted pastures and cereal croplands in fynbos in South Africa (del Hoyo <i>et al.</i> 1996). It feeds on insects, small vertebrates and plant material (Collar, 1996).	Low	The species was not recorded in the study area landscape during the field survey. Even so, the species has been recorded a number of times (31 times) in the study area landscape, with the latest observation in October 2023. Even so, habitats on the site exist in an open and degraded state with a high level of daily disturbances. It is therefore highly unlikely that the species will be present on the site.
Passeriformes	Locustellidae	<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable	The species occurs in thick, tangled vegetation along the banks of watercourses, or covering drainage lines in fynbos forest patches, or on the edges of afro-montane forest. It breeds in dense understorey vegetation (Pryke <i>et al.</i> 2010).	Low	The species was not recorded in the study area landscape during the field survey, but has been recorded a number of times (87 times) in the study area landscape, with the latest observation in December 2023. Even so, habitats on the site exist in an open and degraded state with a high level of daily disturbances. It is therefore highly unlikely that the species will be present on the site.

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Piciformes	Picidae	<i>Campethera notata</i>	Knysna Woodpecker	Near-Threatened	The species is confined to coastal areas of forest, woodland, dense bush, Euphorbia scrub, or open country with large trees.	Low	The species was not recorded in the study area landscape during the field survey, but has been recorded a number of times (seven times) in the study area landscape, with the latest observation in December 2021. Even so, habitats on the site exist in an open and degraded state with a high level of daily disturbances. It is therefore highly unlikely that the species will be present on the site.
Lepidoptera	Lycaenidae	<i>Aloeides thyra orientis</i>	Red Russet	Endangered	It occurs in a variety of habitats, including the sea-shore, sandy scrub-covered ground (e.g. coastal fynbos on flat sandy ground (either naturally occurring or from anthropogenic disturbances such as footpaths or unsurfaced track) between 40 m to 240 m above sea level) and at high altitudes in mountains. It also penetrates into parts of the Karoo. Larval host plants for <i>Aloeides thyra</i> are not differentiated between subspecies, and so the larval host plants for this taxon are assumed to include <i>Aspalathus acuminata</i> , <i>A. tulbaghensis</i> , <i>A. cymbiformis</i> and <i>A. laricifolia</i> (see e.g. Henning et al. 2009, Mecenero et al. 2013, Williams 2016).	Low	The species was not recorded in the study area landscape during the field survey. Furthermore, the site does not harbour any of the <i>Aspalathus</i> host plants preferred by the species, with habitats on the site existing in an open and degraded state with a high level of daily disturbances. It is therefore unlikely that the species will be present on the site.
Lepidoptera	Lycaenidae	<i>Chrysothrix brooksi tearei</i>	Brook's Opal	Endangered	Found on sandy, low hills, sparsely covered by shrubs. Reasons for decline are encroachment of alien plants, expansion of agricultural activities, and grazing by domestic livestock.	Low	The species was not recorded in the study area landscape during the field survey. Furthermore, although the site does harbour the site does harbour low hills sparsely covered by shrubs, habitats on the site existing in an open and degraded state with a high level of daily disturbances. It is therefore unlikely that the species will be present on the site.
Orthoptera	Acrididae	<i>Aneurypymus montanus</i>	Yellow-winged Agile Grasshopper	Vulnerable	The species is associated with fynbos vegetation, where it has been collected "amongst partly burnt stands of evergreen Sclerophyll in rocky foothills" (Brown 1960). It prefers south-facing cool slopes (Kinvig 2005).	Low	The species was not confirmed as present on the site during the field survey. The site is furthermore devoid of any of the partly burnt stands of evergreen Sclerophyll in rocky foothills, or south-facing cool slopes preferred by the species. It is therefore highly unlikely that the species will be present on the site.

10. Evaluation of Site Ecological Importance (SEI)

10.1 Evaluating SEI for habitats in the study area

Evaluation of the Site Ecological Importance (SEI) for habitats in the study area was performed following the methods and criteria outlined in the Species Environmental Assessment Guideline (SANBI, 2020). Evaluation of SEI was performed for mammals, avifauna and invertebrates combined (given the low likelihood of SCC within any of these faunal groups being present on the site, Table 3). In short, SEI is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/faunal community or habitat type present on the site) and its resilience to impacts (Receptor Resilience, RR) as follows: $SEI = BI + RR$. Biodiversity Importance (BI) is in turn a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows: $BI = CI + FI$.

To calculate the Conservation Importance (CI) and Functional Integrity (FI) of each habitat within the study area, the criteria outlined in Table 4 and Table 5 were respectively used.

According to the Species Environmental Assessment Guideline, Conservation Importance (CI) may be defined as follows:

Conservation Importance (CI): "The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes."

Table 4 Conservation importance (CI) criteria (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Conservation Importance (CI)	Fulfilling Criteria
Very high	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of < 10 km ² .
	Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km ² . IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining.
	Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.
	Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC.
	No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very low	No confirmed and highly unlikely populations of SCC.
	No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

According to the guideline, Functional Integrity (FI) is defined as:

Functional integrity (FI): *“The receptors’ current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is: ‘A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.’”*

Table 5 Functional integrity (FI) criteria (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Functional Integrity (FI)	Fulfilling Criteria
Very high	<p>Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types.</p> <p>High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches.</p> <p>No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).</p>
High	<p>Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types.</p> <p>Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches.</p> <p>Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.</p>
Medium	<p>Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types.</p> <p>Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.</p> <p>Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.</p>
Low	<p>Small (> 1 ha but < 5 ha) area.</p> <p>Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential.</p> <p>Several minor and major current negative ecological impacts.</p>
Very low	<p>Very small (< 1 ha) area.</p> <p>No habitat connectivity except for flying species or flora with wind-dispersed seeds.</p> <p>Several major current negative ecological impacts.</p>

Based on assessments of CI and FI for habitats within the study area, the Biodiversity Importance (BI) of each habitat was calculated using the matrix in Table 6 (based on the formula: $BI = CI + FI$). As Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor, BI can be derived from a simple matrix of CI and FI as follows:

Table 6 Matrix for calculating Biodiversity Importance (BI) (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	High	Medium	Low	Very low
Functional Integrity (FI)	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Finally, the Receptor Resilience for each habitat was evaluated following the criteria listed in Table 7. According to the Species Assessment Guidelines, Receptor resilience (RR) may be defined as follows:

Receptor resilience (RR): *“The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.”*

Table 7 Receptor Resilience (RR) criteria (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Receptor Resilience (RR)	Fulfilling Criteria
Very high	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

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Taken together, the Site Ecological Importance (SEI) was calculated for each habitat within the study area using the formula: $SEI = BI + RR$, and following the matrix outlined in Table 8. The interpretation of the development actions allowed for each SEI category are outlined in Table 9.

Table 9 Matrix for calculating Site Ecological Importance (SEI) (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Site Ecological Importance (SEI)		Biodiversity Importance (BI)				
		Very high	High	Medium	Low	Very low
Receptor Resilience (RR)	Very high	Very high	Very high	High	Medium	Low
	High	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	Low	High	Medium	Low	Very low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Table 9 Guidelines for interpreting SEI in the context of the proposed development activities (table adapted from the Species Environmental Assessment Guideline, SANBI, 2020).

Site Ecological Importance (SEI)	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

10.2 SEI for habitats in the study area

The SEI results for habitats within the study area are given in Table 10 with the spatial representation for each habitat and its concomitant SEI category portrayed in Figure 18. Because all habitats on the site do not constitute suitable habitat for any of the SCC considered, and further exist in a degraded and isolated state, these habitats are retrieved as having a “Very low” SEI, allowing for development activities of medium to high impact without restoration activities being required (Table 9). To this end, this renders the entire site as less sensitive from a faunal perspective.

Table 10 Evaluation of SEI within the study area. BI = Biodiversity Importance, RR = Receptor Resilience.

Habitat type	Conservation Importance	Functional Integrity	Receptor Resilience	Site Ecological Importance
Degraded (open)	Very low - No confirmed and a highly unlikely presence of populations of terrestrial faunal and avifaunal SCC.	Low - Several minor and major current negative ecological impacts (little remaining natural vegetation with a high level of daily disturbances and an isolated nature in the landscape).	Very high - Because this habitat exists in a degraded state, the faunal species diversity on the site already appears reduced, with only common species present. As such, this species diversity can recover relatively quickly (less than 5 years).	Very low - BI = Very low; RR = Very high
Trees	Very low - No confirmed and a highly unlikely presence of populations of terrestrial faunal and avifaunal SCC.	Very low - Several major current negative ecological impacts (a high incidence of alien and invasive vegetation).	Very high - Because this habitat consists of thick stands of alien and invasive vegetation, this habitat will recover to this state relatively quickly (less than 5 years).	Very low - BI = Very low; RR = Very high
Artificial dam	Very low - No confirmed and a highly unlikely presence of populations of terrestrial faunal and avifaunal SCC.	Very low - Several major current negative ecological impacts (a small artificial non-perennial dam).	Very high - Because this habitat is artificial, it can only recover to this artificial state.	Very low - BI = Very low; RR = Very high
Built-up	Very low - No confirmed and a highly unlikely presence of populations of terrestrial faunal and avifaunal SCC.	Very low - Several major current negative ecological impacts (established buildings and infrastructure).	Very high - This area comprises existing buildings and infrastructure and can only recover to this state.	Very low - BI = Very low; RR = Very high

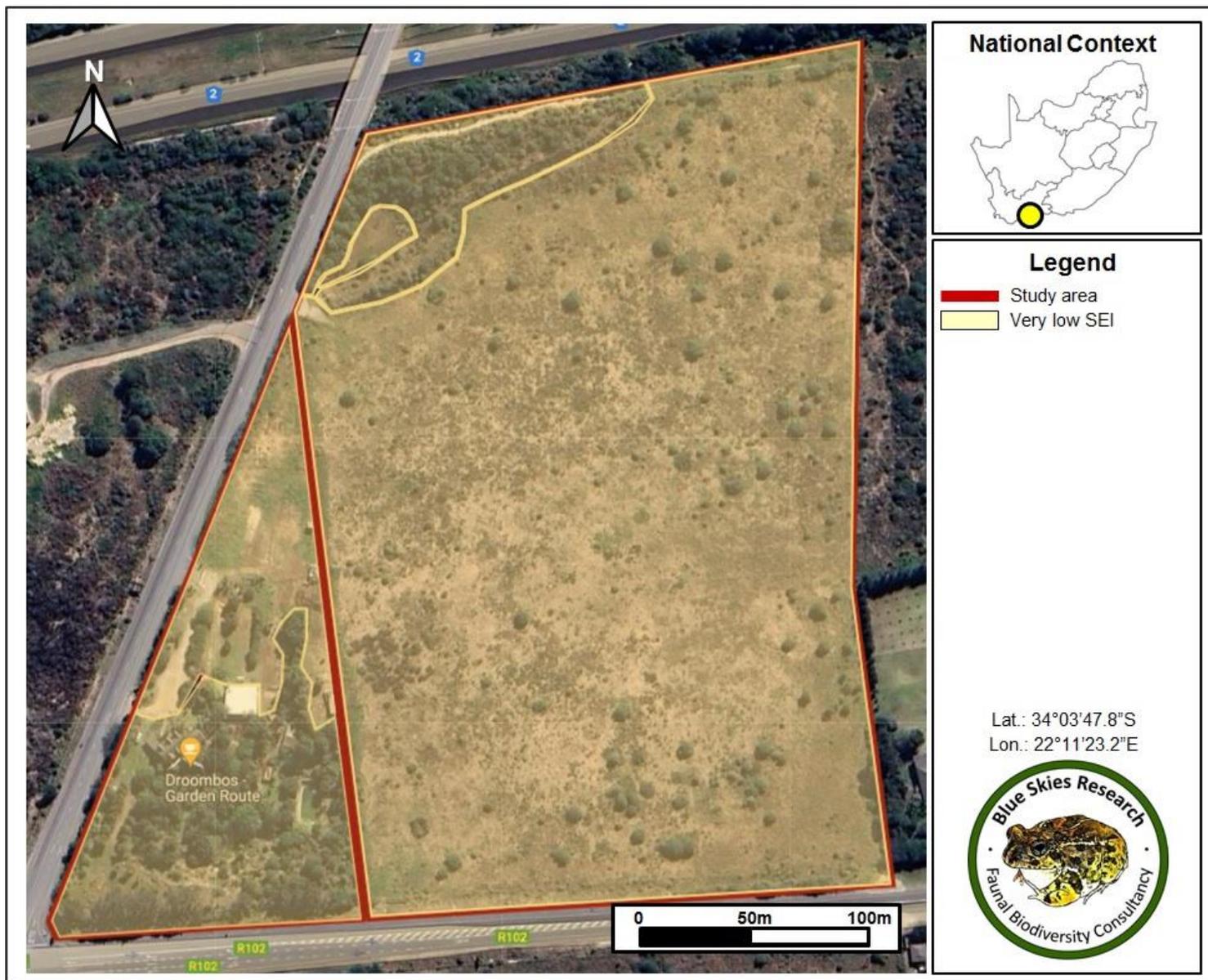


Figure 18 Spatial representation of the SEI for habitats within the study area.

11. Current impacts, project-related impacts and mitigation measures

11.1 Current impacts

Current impacts within the study area include the following:

- The study area has been subjected to radical past vegetation clearance, thereby degrading the habitat structure to a predominantly grassland phase.
- The northern-western part of the site harbours thick stands of alien and invasive vegetation.
- The study area is fenced over its entirety.
- The property is situated next to very busy roads (including a national highway, a provincial road and a municipal road) on its northern, western and southern borders, densely populated residential area next to its south and south-eastern border and developed agricultural farmlands to its north thereby isolating the site and limiting its functionality as a corridor for faunal movement.
- The south-western corner of the site comprises a fenced off area which is currently used as a nursery and restaurant which include a parking lot, a building and footpaths.
- A non-perennial man-made dam is situated on the north-western corner of the property.
- The site does not harbour suitable habitat for any of the faunal SCC considered.

Currently, these impacts appear severe to the point where the ecological integrity of the site has been compromised to such a degree that only a low number of common terrestrial faunal and avifaunal species are present.

11.2 Anticipated project impacts

Planned development activities for the proposed development footprint will include the clearing of vegetation, soil preparation, installation of roads and services and construction of building and infrastructure.

Impacts from these activities during the construction phase will include:

- Destruction of habitat,
- direct mortality of fauna, and
- vibration and noise (from machinery and people).

The placement of the proposed project footprint currently overlaps a relatively small area (10.6 hectares) of degraded habitat which harbours a low faunal diversity, is retrieved as having a “Very low” SEI and does not serve as an important ecological link in the broader landscape. To this end, impacts from the proposed development are expected to lead to the loss of only a relatively small area of degraded habitats and small subpopulations of burrowing species of “Least Concern” during the construction phase. From a broader conservation perspective, this loss of habitat and species is acceptable given that this should not compromise biodiversity targets on either a local, regional or national scale.

During the operational phase the entire study area will be developed for business and residential purposes. Impacts to the surrounding environment will therefore include:

- Possible pollution of the surrounding environment,
- predation by domestic pets (cats and dogs),
- collision of fauna with vehicles, and
- vibration and noise (from vehicles and people).

Considering the spatial location of the study area along with existing impacts (see Subsection 11.2), these impacts will not be a novel feature to the surrounding

receiving environment, and are not expected to drastically affect biodiversity and ecological patterns in the broader study area landscape.

11.3 Potential development layouts and proposed mitigation measures

The three development alternatives considered include the construction of roads (all alternatives), a service station (alternatives A and B), fast foods and takeaway area (alternative B), mixed use industrial zones (all alternatives), business zones (all alternatives), residential zones (all alternatives) and currently includes an existing nursery (Figures 19 to 21).

Considering the compromised biodiversity and ecological characteristics and ecosystem dynamics of the site, its isolated nature, the degraded state of habitats and their retrieval as having a “Very low” SEI, this renders the entire site is developable from a faunal perspective (Figure 22). To this end, any of the three development layouts may be considered for the study area without restoration activities being required.

It is, however, recommend that the newly developed area be fenced off so as to curb the potential predation by domestic pets and collision of fauna with vehicles. Furthermore, it is recommend that the development footprint be kept at the provided minimum to minimise disturbance of surrounding natural habitats. Furthermore, every effort should be made to save and relocate any mammal, reptile, amphibian, bird, or invertebrate that cannot flee of its own accord, encountered during site preparation (i.e., to avoid and minimise the direct mortality of faunal species). These animals should be relocated to a suitable habitat area immediately outside the project footprint, but under no circumstance to an area further away.

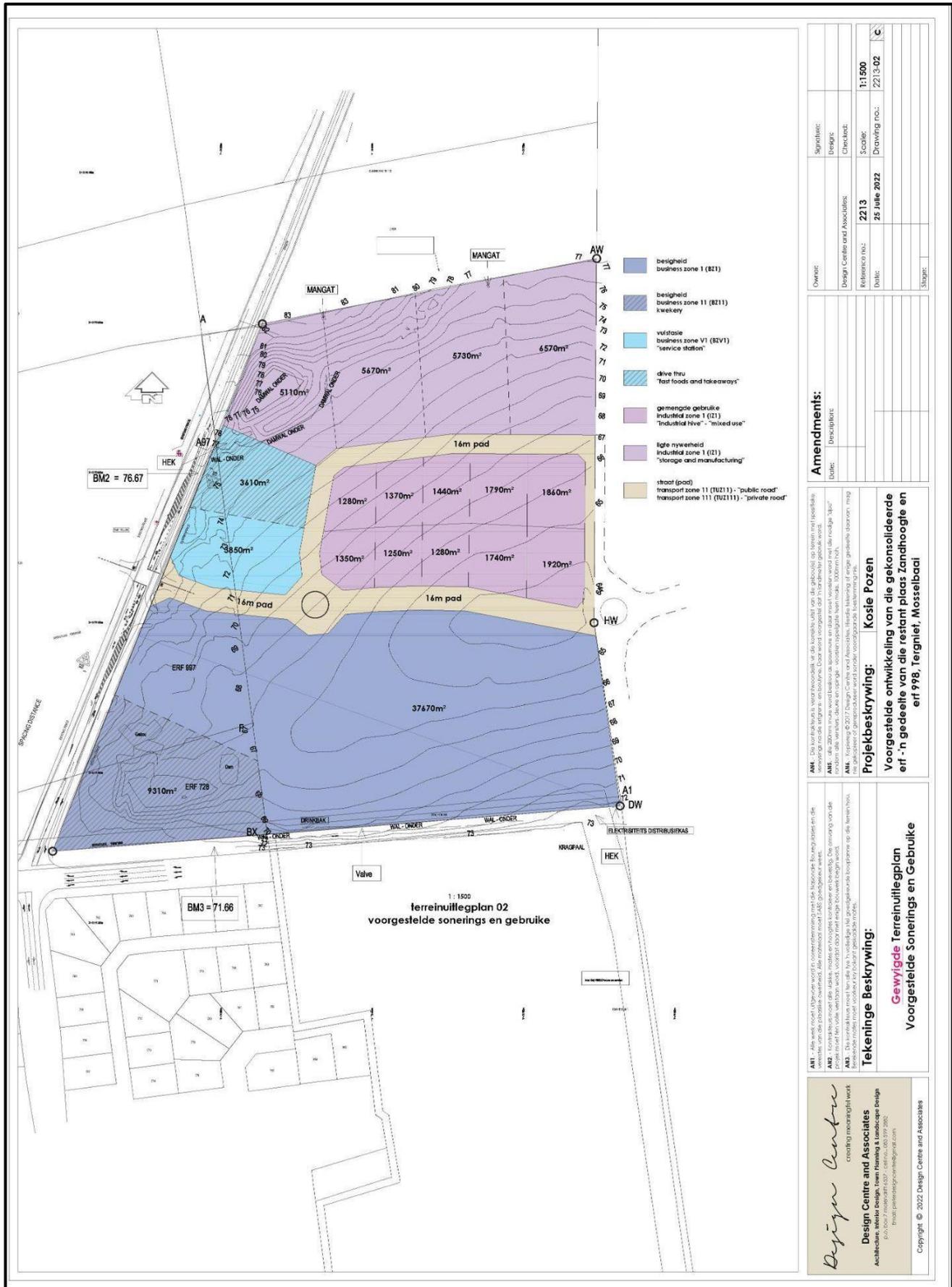


Figure 20 Proposed site development plan (SDP) for the study area under alternative B.

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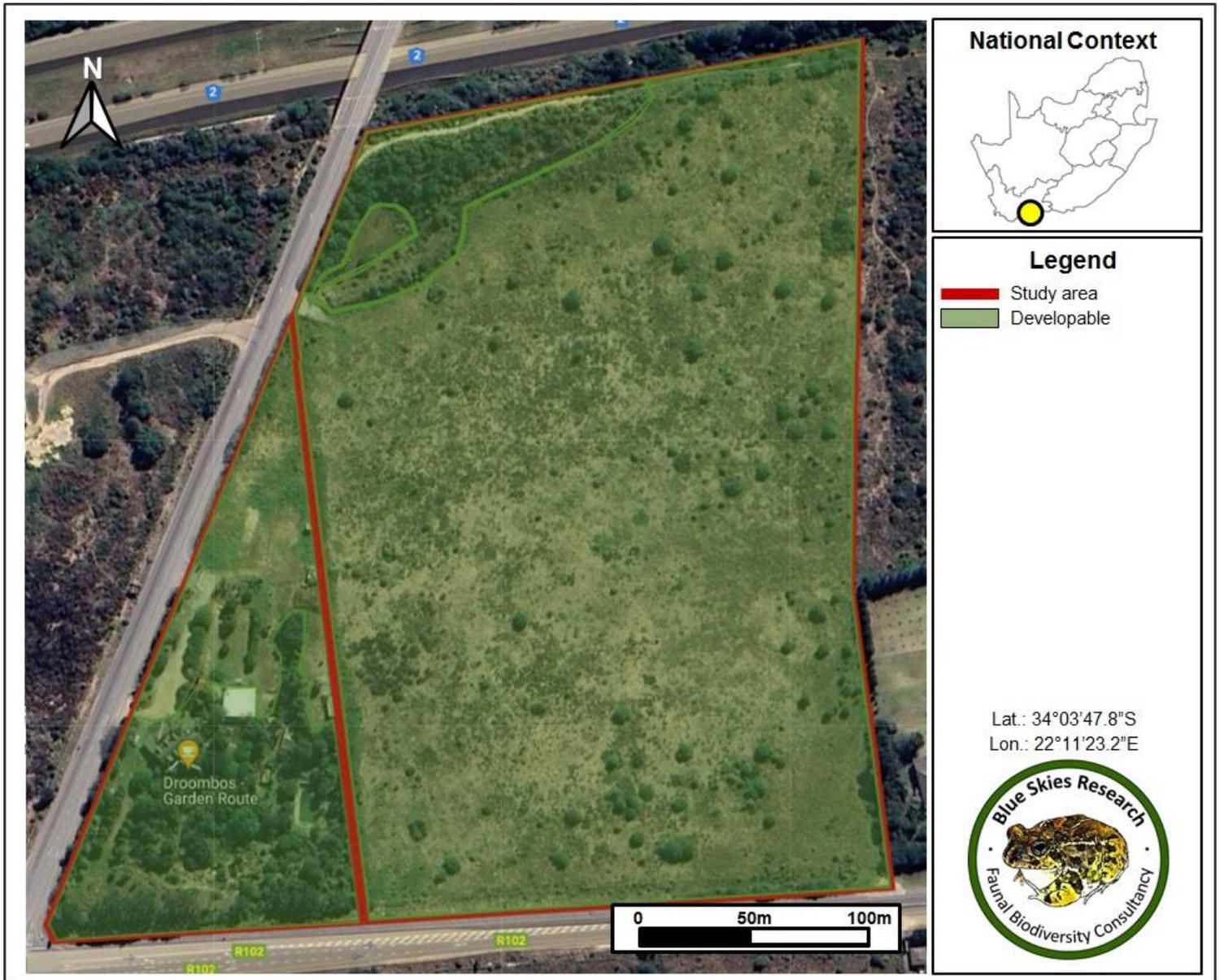


Figure 22 “Constraints and Opportunities” map of the study area showing the spatial overlap with areas which are suitable for potential development without considering mitigation.

12. Conclusion

12.1 Listed sensitivity in the DFFE Screening Tool Report

The results from this report confirm the site sensitivity of the proposed project footprint to be “Low” rather than “High” as identified in the DFFE Screening Tool Report (Section 3). This follows from degraded nature of the on-site habitat which offers little in the way of faunal habitats, does not provide a functional link in providing ecosystem services and which does not represent suitable habitat for any faunal or avifaunal SCC (Section 9).

12.2 Overlap with Critical Biodiversity Areas (CBAs)

Following the ground-truthing phase, the following conclusions may be drawn:

- The site harbours degraded habitats retrieved as having a “Very low” SEI.
- The site harbours an impaired terrestrial faunal and avifaunal diversity.
- The site displays compromised biodiversity and ecological characteristics and ecosystem dynamics.
- The site does not serve as an important or highly functional ecological corridor in the broader study area landscape.

Although the northern margin of the site is mapped as a mix of terrestrial CBA 1 and CBA 2, the study area therefore fails to meet the criteria of these categories defined as:

CBA 1: “*Areas in a natural condition that are required to meet biodiversity targets for species, ecosystems, or ecological processes and infrastructure.*”

and

CBA 2: “Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.”

Taken together, the study area is of little value in meeting biodiversity targets and offering ecosystem services or supporting ecological processes. To this end, this further indicates that the site is of a lower sensitivity, and is therefore developable from a faunal sensitivity perspective.

12.3 Conclusion

This report provides a representative faunal and avifaunal assessment of the study area considering facets of:

- Terrestrial faunal and avifaunal habitat composition (Section 7),
- terrestrial faunal and avifaunal components (Section 8),
- the presence of any terrestrial faunal and avifaunal SCC on the site (Section 9),
- the SEI of habitats within the study area, with associated acceptable development activities (Section 10), and
- a “Constraints and opportunities” map of the site (Section 11).

Taken together, the results of the report indicate the following:

- The study area is comprised of four broadly identified habitat features with the larger part existing in a highly degraded state, the north-western corner harbouring an artificial dam and a large number of alien and invasive trees and the south-western part representing a built-up area (Section 7).
- Terrestrial faunal and avifaunal diversity and abundances in the study area appear low which likely results from the degraded and isolated nature of the site. To this end, predator-prey dynamics and ecosystem dynamics appearing highly compromised, with the study area not forming an important ecological link and faunal dispersal corridor in the landscape (Section 8).

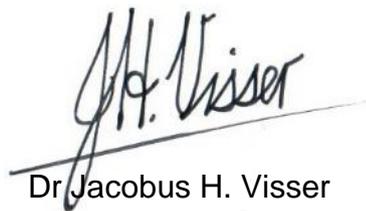
- Given a lack of suitable habitat characteristics along with high levels of daily disturbances, all considered SCC are highly unlikely to occur on the site (Section 9).
- All habitats on the site are retrieved as having a “Very low” SEI, allowing for development activities of medium to high impact without restoration activities being required (Section 10).
- Current impacts within the study area appear severe to the point where the ecological integrity of the site has been compromised to such a degree that only a low number of common terrestrial faunal and avifaunal species are present (Section 11).
- Impacts from the proposed development during the construction phase are expected to lead to the loss of only a relatively small area of degraded habitats and small subpopulations of burrowing species of “Least Concern”, with this loss being acceptable given that it should not compromise biodiversity targets on either a local, regional or national scale (Section 11).
- During the operational phase impacts to the surrounding environment will not be a novel feature to the surrounding receiving environment, and are not expected to drastically affect biodiversity and ecological patterns in the broader study area landscape (Section 11).
- Considering the compromised biodiversity and ecological characteristics and ecosystem dynamics of the site, its isolated nature, the degraded state of habitats and their retrieval as having a “Very low” SEI, this renders the entire site is developable from a faunal perspective, and any of the three development layouts may be considered for the study area without restoration activities being required (Section 11).
- The results from this report confirm the site sensitivity of the proposed project footprint to be “Low” rather than “High” as identified in the DFFE Screening Tool Report (Subsection 12.1).
- Following the ground-truthing phase, the study area fails to meet the criteria of the overlapped CBA 1 and CBA 2 categories further indicating that it is of a lower sensitivity, and is therefore developable from a faunal sensitivity perspective (Subsection 12.2).

Taken together therefore, the relatively limited spatial extent of the proposed project footprint along with the limited impact of its limited impact on the receiving environment is therefore acceptable from a faunal conservation perspective. Also considering the socio-economic benefits in the Western Cape, this development is therefore supported from a faunal biodiversity perspective.

13. Conditions to which this statement is subjected

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Since environmental impact studies deal with dynamic natural systems, additional information may come to light at a later stage which is not listed in this report. As such, the conclusions and recommendations made in this report are done in good faith based on information gathered at the time of the investigation.

This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of the report, which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.



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Appendix A

Appendix A Species list of the faunal species recovered within the study area during the field survey. For each, the taxonomic Order, Family, species binomial name and species common name are shown, along with the current IUCN Red List classification of the species, and the number of records of the species during the surveying period.

Mammals					
Order	Family	Species	Common name	IUCN status	Number of observations
Cetartiodactyla	Bovidae	<i>Raphicerus melanotis</i>	Cape Grysbok	Least Concern	2
Rodentia	Bathyergidae	<i>Bathyergus suillus</i>	Cape Dune Mole-rat	Least Concern	15
		<i>Cryptomys hottentotus</i>	African Mole-rat	Least Concern	1
	Hystriidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern	3
	Muridae	<i>Gerbilliscus afra</i>	Cape Gerbil	Least Concern	1
		<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse	Least Concern	5
Avifauna					
Order	Family	Species	Common name	Status	Number of observations
Bucerotiformes	Upupidae	<i>Upupa africana</i>	African Hoopoe	Least Concern	1
Coliiformes	Coliidae	<i>Colius striatus</i>	Speckled Mousebird	Least Concern	1
Columbiformes	Columbidae	<i>Columba guinea</i>	Speckled Pigeon	Least Concern	1
		<i>Spilopelia senegalensis</i>	Laughing Dove	Least Concern	1
		<i>Streptopelia capicola</i>	Cape Turtle Dove	Least Concern	1
		<i>Streptopelia semitorquata</i>	Red-eyed Dove	Least Concern	1
Galliformes	Numididae	<i>Numida meleagris</i>	Helmeted Guineafowl	Least Concern	1
	Phasianidae	<i>Pternistis capensis</i>	Cape Spurrow	Least Concern	1
Passeriformes	Cisticolidae	<i>Cisticola subruficapilla</i>	Grey-backed Cisticola	Least Concern	1
		<i>Prinia maculosa</i>	Karoo Prinia	Least Concern	1

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	Dicruridae	<i>Dicrurus adsimilis</i>	Fork-tailed Drongo	Least Concern	1
	Fringillidae	<i>Serinus canicollis</i>	Cape Canary	Least Concern	1
	Laniidae	<i>Lanius collaris</i>	Southern Fiscal	Least Concern	1
	Malaconotidae	<i>Chlorophoneus olivaceus</i>	Olive Bushshrike	Least Concern	1
	Muscicapidae	<i>Cossypha caffra</i>	Cape Robin-Chat	Least Concern	1
	Nectariniidae	<i>Cinnyris afer</i>	Greater Double-collared Sunbird	Least Concern	1
	Sturnidae	<i>Sturnus vulgaris</i>	Common Starling	Least Concern	1
	Zosteropidae	<i>Zosterops virens</i>	Cape White-eye	Least Concern	2
Pelecaniformes	Ardeidae	<i>Ardea melanocephala</i>	Black-headed Heron	Least Concern	1
Grasshoppers					
Order	Family	Species	Common name	IUCN status	Number of observations
Orthoptera	Acrididae	<i>Acrida acuminata</i>	Common Stick Grasshopper	Not Assessed	1
		<i>Acrotylus insubricus</i>	Common Digging Grasshoppe	Not Assessed	3
		<i>Morphacris fasciata</i>	Band-winged Grasshopper	Not Assessed	2

Appendix B

Curriculum Vitae of Jacobus Hendrik Visser

Full Name: Jacobus Hendrik Visser

SACNASP Registration: Professional Natural Scientist (Zoological Science) –
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Qualifications

- PhD (Zoology), University of Johannesburg (2015 - 2017)
- MSc (Zoology), Stellenbosch University (2011 - 2013)
- BSc Honours (Zoology) cum laude, Stellenbosch University (2010)
- BSc (Biodiversity and Ecology) cum laude, Stellenbosch University (2007 - 2009)

Scientific publications

- **Visser J.H.** (2013). Gene-flow in the rock hyrax (*Procavia capensis*) at different spatial scales. MSc thesis, Stellenbosch University, Stellenbosch, South Africa. <https://core.ac.uk/download/pdf/37420485.pdf>
- **Visser J.H.** (2017). Evolution of the South African Bathyergidae: patterns and processes. PhD dissertation, University of Johannesburg, Johannesburg, South Africa.

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- **Visser J.H.**, Bennett N.C., Jansen van Vuuren B. (2014). Local and regional scale genetic variation in the Cape dune mole-rat, *Bathyergus suillus*. PLoS ONE 9(9):e107226. <https://doi.org/10.1371/journal.pone.0107226>
- **Visser J.H.**, Bennett N.C., Jansen van Vuuren B. (2017). Distributional range, ecology and mating system of the Cape mole-rat, *Georychus capensis* family Bathyergidae. Canadian Journal of Zoology 95 (10): 713-726. <https://doi.org/10.1139/cjz-2017-0016>
- **Visser J.H.**, Bennett N.C., Jansen van Vuuren B. (2018). Spatial genetic diversity in the Cape mole-rat, *Georychus capensis*: Extreme isolation of populations in a subterranean environment. PLoS ONE 13(3): e0194165. <https://doi.org/10.1371/journal.pone.0194165>
- **Visser J.H.**, Bennett N.C., Jansen van Vuuren B. (2019). Evolutionary and ecological patterns within the South African Bathyergidae: Implications for taxonomy. Molecular Phylogenetics and Evolution 130, 181-197. <https://doi.org/10.1016/j.ympev.2018.10.017>
- **Visser J.H.**, Bennett N.C., Jansen van Vuuren B. (2019). Phylogeny and biogeography of the African Bathyergidae: a review of patterns and processes. Journal of Biogeography PeerJ 7:e7730. <https://doi.org/10.7717/peerj.7730>
- **Visser J.H.**, Geerts S. (2020). Describing sexual dimorphism and fine scale spatial distributions in the Drab Thick-tail Scorpion, *Parabuthus planicauda*. African Zoology 55 (3): 250-256. <https://doi.org/10.1080/15627020.2020.1796525>
- **Visser J.H.**, Geerts S. (2021). Static allometry and sexual dimorphism in the Striped Lesser-thicktail Scorpion, *Uroplectes lineatus*. Arachnology 18 (7), 700–707. <https://doi.org/10.13156/arac.2020.18.7.700>
- **Visser J.H.**, Geerts S. (in review). Sexual dimorphism and static allometry in the burrowing scorpion, *Opisthophthalmus pallipes*. African Zoology.
- **Visser J.H.**, Geerts S. (2021). Sexual dimorphism and static allometry in the South African scorpion *Opisthophthalmus karrooensis*. Arachnology 18 (9), 1057-1063.
- **Visser J.H.**, Geerts S., Jansen van Vuuren B. (2021). Phylogeographic patterns in a semi-lithophilous burrowing scorpion from South Africa, *Opisthophthalmus pallipes*. Zoological Science 38 (1): 36-44. <https://doi.org/10.2108/zs200094>

- **Visser J.H.**, Robinson T.J., Jansen van Vuuren B. (2020). Spatial genetic structure in the rock hyrax (*Procavia capensis*) across the Namaqualand and western Fynbos areas of South Africa - a mitochondrial and microsatellite perspective. *Canadian Journal of Zoology* 98 (8): 557-571.
<https://doi.org/10.1139/cjz-2019-0154>
- Uhrová M., Mikula O., Bennett N.C., Van Daele P., Piálek L., Bryja J., **Visser J.H.**, Jansen van Vuuren B., Šumbera R. (2022). Species limits and phylogeographic structure in two genera of solitary African mole-rats *Georychus* and *Heliophobius*. *Molecular Phylogenetics and Evolution* 167 (2022) 107337

IUCN Red List Assessments

- Bennett N.C, Jarvis J.U.M., **Visser J.H.**, Maree, S. (2016). A conservation assessment of *Georychus capensis*. In: Child M.F., Roxburgh L., Do Linh San E., Raimondo D., Davies-Mostert H.T. (Eds). The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa. https://www.ewt.org.za/wp-content/uploads/2019/02/16.-Cape-Mole-rat-Georychus-capensis_LC.pdf
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- Maree S., Jarvis J.U.M., Bennett N.C., **Visser J.H.** (2017). *Bathyergus suillus*. The IUCN Red List of Threatened Species 2017:e.T2620A110017759.
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- Maree S., **Visser J.H.**, Bennett N.C., Jarvis J.U.M. (2017). *Georychus capensis*. The IUCN Red List of Threatened Species 2017:e.T9077A110019425.
<http://dx.doi.org/10.2305/IUCN.Uk.2017-2.RLTS.T9077A110019425.en>.
- **Visser J.H.**, Wimberger K. (2016). A conservation assessment of *Procavia capensis*. In: Child M.F., Roxburgh L., Do Linh San E., Raimondo D., Davies-Mostert H.T. (Eds). The Red List of Mammals of South Africa, Swaziland and

Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa. https://www.ewt.org.za/wp-content/uploads/2019/02/3.-Rock-Hyrax-Procavia-capensis_LC.pdf

List of fauna reports

- **Visser, J.H.** Terrestrial Animal Species Compliance Statement Report For A Portion of Remainder of Farm 630, Rawsonville, Breede Valley Municipality. November 2021. Prepared for inClover Environmental Consulting.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Compliance Statement Report for a Portion of Brazil 329, Nama Khoi Municipality, Namakwa District. April 2022. Prepared for WNel Environmental Consulting Services.
- **Visser, J.H.** Terrestrial Faunal And Avifaunal Species Scoping Report for the Proposed Waste Management Facility at Portions 1 and 6 of Farm 32 Brakkefontein, City of Cape Town. April 2022. Prepared for SLR Consulting.
- **Visser, J.H.** Terrestrial Faunal And Avifaunal Species Impact Assessment Report for a Portion of Riet Valleij (Somerset Vale, Farm Portion RE/150), Estelm Boerdery, Swellendam Municipality, Overberg District. June 2022. Prepared for PHS Consulting.
- **Visser, J.H.** Site Sensitivity Verification Report for Remainder of Farm De Draay No 563, Overstrand Municipality. August 2022. Prepared for PHS Consulting.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Impact Assessment Report for Remainder of Farm Rooilandia No. 472, Breede Valley Municipality. October 2022. Prepared for McGregor Environmental Services.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for Portion 3 of Farm 781, Theewaterskloof Local Municipality. December 2022. Prepared for PHS Consulting.
- **Visser, J.H.** Terrestrial Faunal Species Compliance Statement Report for Farm Portion 49, Hansmoeskraal Farm 202, George Local Municipality. April 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Compliance Statement Report for Farm 153 Vissershok (C1038: Upgrading of TR11/1), City of Cape

Town Municipality. May 2023. Prepared for Sharples Environmental Services cc (SES).

- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for Farm Witteklip 69/123, Vredenburg, Saldanha Bay Municipality. June 2023. Prepared for Ecosense Environmental Consultants.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for the Proposed Greenvalley Mixed-use Development on Portion 28, 31 and 32 of the Farm Wittedrift No. 306, and Associated Bulk Infrastructure, Plettenberg Bay, Bitou Municipality. June 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Compliance Statement Report for the Upgrade of the Schaapkop Sewer Rising Main on Remainder of Erf 464 and Erf 13486, George Local Municipality. July 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for the Proposed Mixed-use Housing Development on Portions 7 and 8 of the Farm Kranshoek No. 432, Plettenberg Bay, Bitou Municipality. July 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Compliance Statement Report for the Proposed Sandmine on Portion 109 of the Farm Zwarte Jongers Fontein No. 489, Hessequa Municipality. August 2023. Prepared for Pro-Earth Consulting.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for the Upgrading of Herold's Bay Sewer Pump Station and Associated Rising Main on Remainder of Farm Brakfontein 236, Portion 10 of Farm Brakfontein 236 and Erven RE/95 and 116, Herholds Bay, George Municipality. September 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for the Proposed Flood Damage Repairs, Rehabilitation and Other Mitigation Measures in Van Riebeeck Gardens and Camphersdrift, George, George Municipality. September 2023. Prepared for Sharples Environmental Services cc (SES).

- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Compliance Statement Report for the Proposed Hartenbos Waste Water Treatment Works PV Solar Plant on Remainder of Portion 101 of the Farm Hartenbosch 217, Mossel Bay, Mossel Bay Municipality. September 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Site Sensitivity Verification Report for the Proposed Construction of Tourist Accommodation on Portions 10, 11 and 13 of the Farm Arieskraal A 456, Elgin. September 2023. Prepared for PHS Consulting.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Impact Assessment Report for the Proposed Multifunctional Agricultural Development on Remainder of Farm De Draay No 563, Overstrand Municipality. November 2023. Prepared for PHS Consulting.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Site Sensitivity Verification Report for Portion 7 of the Farm Witteklip No. 123, Saldanha Bay Municipality. November 2023. Prepared for Ecosense Environmental Consultants.
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Compliance Statement Report for the Proposed Construction of Two Hard Water Reservoirs and Associated Infrastructure at the Koeberg Nuclear Power Station Located on the Farm Duynefontyn No. 1552, City of Cape Town Metropolitan Municipality. November 2023. Prepared for Sharples Environmental Services cc (SES).
- **Visser, J.H.** Terrestrial Faunal and Avifaunal Species Site Sensitivity Verification Report for Portion 7 of The Farm Hans Moes Kraal No. 202, George Local Municipality. December 2023. Prepared for Sharples Environmental Services cc (SES).

Other projects

- Southern African Bird Atlas Project 2 (SABAP2)
- Endemism, genetic variance and conservation priorities in the highlands of south-western Africa.
- Biodiversity and ecology of scorpions in the Cape Floristic Region.

- National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries, Pretoria.

Conferences

- Presenter at the 2017 conference of the South African Wildlife Management Association (Presentation title: The influence of commercial game farming on maintaining genetic diversity in the sable antelope (*Hippotragus niger*) and roan antelope (*Hippotragus equinus*)
- Presenter at the 2017 conference of the Zoological Society of Southern Africa (Presentation title: Evolution of the South African Bathyergidae: Patterns and processes)
- Presenter at the 2010 conference of the Zoological Society of Southern Africa (Presentation title: Local and regional scale genetic variation in the Cape dune mole-rat, *Bathyergus suillus*)

19 February 2026

TO WHOM IT MAY CONCERN

BOTANICAL COMMENT

Portion 5 of Farm Zandhoogte 139, Mossel Bay

The botanical comment below was requested by Sharples Environmental Services (SES), George. The undersigned was appointed as an independent botanical specialist to comment specifically on the ecological corridor (passage) proposed in a terrestrial biodiversity assessment report for the above properties. The latter report was prepared by Chepri Scientific Services in June 2023.

The applicant is currently investigating development opportunities on the above property, which is located between the R102 and the N2, north of Tergniet (**Figure 1**). The site is currently lying vacant (fallow). Erf 998, the triangular property directly west of the site, is also part of the larger site, but it is completely transformed and of no botanical interest.



Figure 1: Locality map.

Site survey

A brief botanical survey of the site was undertaken on 18 January 2024 by the undersigned, in the company of the faunal specialist Dr Jaco Visser. Special attention was given to the proposed ecological corridor on the northern side of the site, next to the N2. An additional assessment of the type and condition of vegetation on site, disturbances and presence of alien species and species of conservation concern (SCC) was carried out. Reference is also made to the 2018 South African Vegetation Map.

Biodiversity Planning Context

The site is located in a semi transformed strandveld environment in the southern Cape coastal region. The 2018 Vegetation Map of South Africa classifies the vegetation type found here as Hartenbos Dune Thicket. The latter is currently listed as Endangered¹. It is described as “a mosaic of low (1-3 m) thicket, occurring in small bush clumps dominated by small trees and woody shrubs, in a mosaic of low (1-2 m) asteraceous fynbos. Thicket clumps are best developed in fire-protected dune slacks, and the fynbos shrubland occurs on upper dune slopes and crests”.

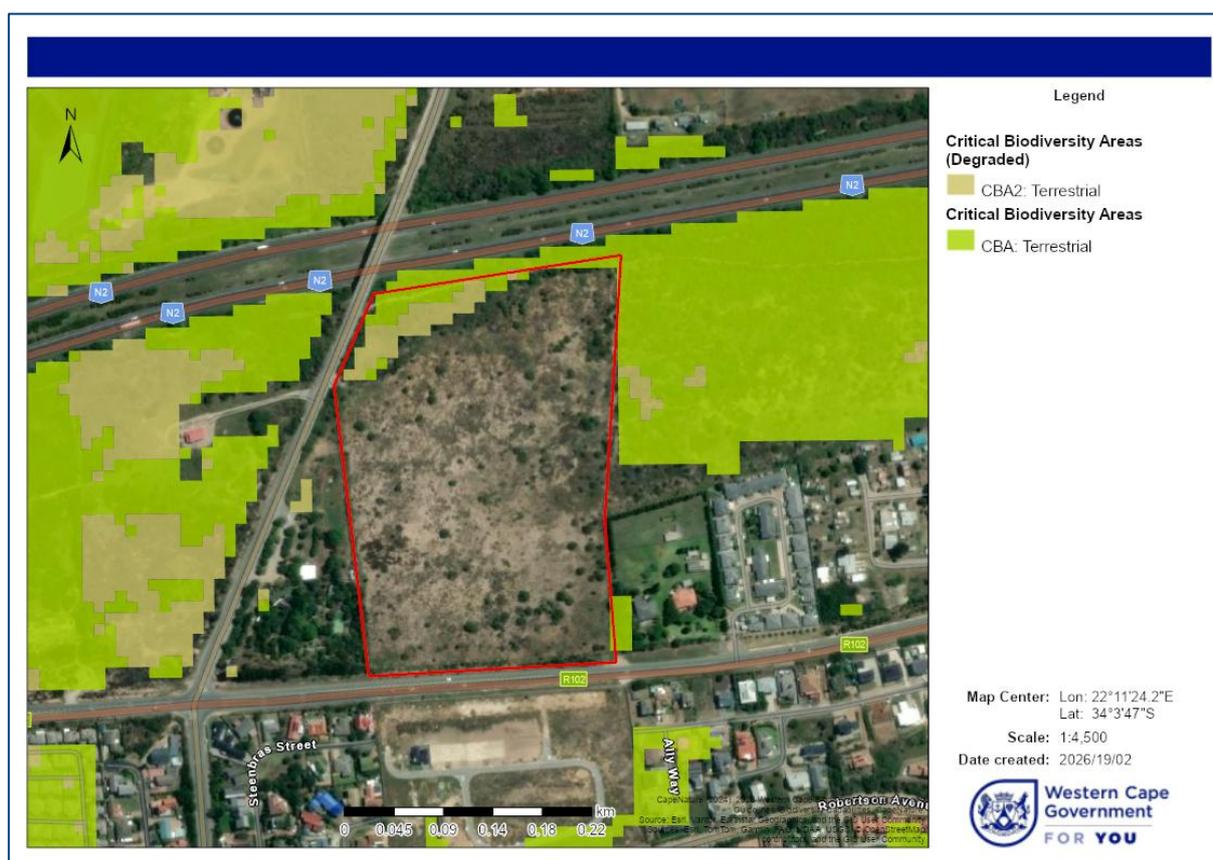


Figure 2: Biodiversity network (CBA) map.

¹ [Ecosystem Detail - Biodiversity BGIS \(sanbi.org\)](https://www.sanbi.org/)

From a biodiversity network perspective, the northern side of the site encroaches on a terrestrial critical biodiversity area (CBA) and a degraded critical biodiversity area (CBA2) (see **Figure 2** above). CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure². Many of these areas support known occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended. The site forms part of an ecological link between the Groot Brak and Klein Brak Estuaries. However, the link may have been compromised by development approvals further away to the west between the R102 and the N2! There is also an unrehabilitated or active sand mine 500 m away to the west that also impacts on the link, The areas to the north and south of the site have been transform for agricultural and residential purposes. Other (probably lesser) links run along the railway line, the N2 road reserve and primary dune above the beach.

Findings & recommendation

The site is situated in a shallow dune slack and the vegetation can be described as an open grassy (dune) thicket or strandveld type, typically associated with dune slacks (**Figures 3 to 5**). It comprises mainly grasses, restioids (*Thamnochortus insignis*) and a few scattered shrubs and trees, including *Osteospermum moniliferum*, *Helichrysum cymosum*, *H. patulum*, *H. odoratissimum*, *Chrysocoma ciliata*, *Senecio burchellii*, *Metalasia* sp, *Seriphium plumosum*, *Wiborgia obcordata*, *Carpobrotus edulis*, *Passerina corymbosa*, *Cliffortia cf linearifolia*, *Muraltia ericoides*, *Pelargonium capitatum*, *Leonotis ocyimifolia*, *Crassula cf subulata* and *Selago corymbosa*. There are also a few dune thicket elements here and there, such as *Searsia glauca*, *S. crenata*, *S. pallens*, *Sideroxylon inerme*, *Pittosporum viridiflorum*, *Gymnosporia buxifolia*, *Grewia occidentalis*, *Diospyros dichrophylla* and *Aloe arborescens*. Both *Sideroxylon inerme* (milkwood) and *Pittosporum viridiflorum* (kasuur) are protected tree species under the National Forests Act (Act 84 of 1998). The farm dam in the north-western corner of site is surrounded by tall shrubs and trees, including several exotics such as *Schinus terebinthifolia* and *Psidium guajava* (**Figure 6**). One would not expect any notable species of conservation concern (SCC) to occur here, but the site certainly has some value as a part of the local biodiversity network.

The recommendation for an ecological corridor on the N2 side of the site is supported, which will provide a passage for fauna (pollinators & seed dispersal agents) to migrate across the site. This will theoretically maintain the ecological link between the natural vegetation on the western and eastern sides of the site. The N2 road reserve could serve as an extension to this corridor. The minimum width for such a corridor is difficult to determine, but probably depends on what is required from the corridor. In this instance

² Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. The Western Cape Biodiversity Spatial Plan Handbook. CapeNature, Stellenbosch.

there is probably no need to accommodate significant natural habitat, but more a need to maintain the functioning of the larger biodiversity network. I would suggest a minimum width of 40 m in order to minimise undesirable edge influences. A width of 40-50 m is considered suitable for small fauna, such as amphibian movement according to Cotter *et al*³. The biodiversity assessment report recommended a width of ±80 m for the corridor.



Figure 3: Botanical attributes of the site. The untuned area is degraded.

Site ecological importance (SEI) was determined by applying the criteria described in the Species Environmental Assessment Guideline (SANBI, 2020). The SEI considers the biodiversity importance of the affected area or habitat and its resilience to impacts. The habitat in this instance is described as degraded strandveld. SEI has been determined to be Medium for the site due to its size, the threat status of the vegetation type and limited connectivity that remains. This means that minimisation and restoration mitigation is recommended according to the Guideline.

Currently, motivation for the ecological corridor seems weak if development proposals further away to the west between the R102 and the N2 are going ahead. These will sadly further compromise the biodiversity link between the Groot Brak and Klein Brak Estuaries and other vegetation remnants in the area, such as the one in Reebok, 1 km southwest of the site. In a previous study for the municipality, I motivated for a connection between the latter and the biodiversity corridor between the R102 and the N2.

³ Cotter, M., Berkhoff, K., Gibreel, T., Ghorbani, A., Golbon, R., Nuppenau, E.-A. & Sauerborn, J. 2014. Designing a sustainable land use scenario based on a combination of ecological assessments and economic optimization. *Ecological Indicators*, 36, 779– 787



Figure 4: Open grassy thicket in the centre of the site.



Figure 5: Patch of dekriet (*Thamnochortus insignis*).



Figure 6: Farm dam surrounded by tall shrubs and trees.

Management of the corridor

The most important management or maintenance task for the corridor would be to keep it clear of aliens. Ideally, all exotic species should be removed from the corridor. A simple alien clearing plan should suffice. It is important to note that the aliens must be cleared on an annual basis. To improve biodiversity inside the corridor, it is recommended that topsoil containing seeds of indigenous species and salvageable plants, such as *Carpobrotus* spp and *Aloe arborescens*, be collected from the development areas and deposited or planted inside the corridor.

The corridor should also not be fenced off on the sides facing away from the development. If fencing is needed for security reasons, a permeable fence should be erected that will allow small mammals through. Pedestrian traffic should be minimised. But if access needs to be provided for the residents, a path network should be established. The corridor should also be assessable for fire protection purposes.

Prepared by:

A handwritten signature in black ink, appearing to read 'M. L. Berry'.

Mark Berry Pr Sci Nat (reg. no. 400073/98), PhD

HERBICIDES FOR ALIEN PLANT CONTROL

HERBICIDES FOR ALIEN PLANT CONTROL					PPE			Medical Biomonitoring		Frequency and Duration		Environmental monitoring
Chemical group	MOA	Examples	Hazard Group	Hazard Criterion	Type	Pictogram	Classification	Blood	Urine	Blood	Urine	Environmental monitoring
1	Imidazolinones	Group 2: ALS: AHAS inhibitors	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H319 (causes serious eye irritation) H335 (Respiratory irritant) H315 (causes skin irritation)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p> <p>3.Safety boots</p> <p>4.Face & Eye protection</p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	      	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>	N/A	<p>5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test</p>	N/A	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave the programme</p>	
			8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>								<p>Hazard criterion 7 and 8 are linked to environmental risks</p>

					 H412 (harmful to aquatic life with long lasting effects)								
2	Sulfonylureas	Group 2: ALS: AHAS inhibitors	Metsulfuron-methyl (Brush-off, Climax, Forester, Extreme, Nikanor)	7	Acute toxicity to aquatic organisms GHS09 WARNING  H400 (Very toxic to aquatic life)								
				2	Acute toxicity to mammals and birds GHS07 WARNING  H315 (causes skin irritation) H335 (Respiratory tract irritant) H319 (Causes serious eye irritation)	1. Chemically resistant nitrile gloves  2. Type 3 and Type 4 protective clothing   3. Safety boots  4. Face & Eye protection  5. Half-face respirators  6. Particulate air filters for respirators  7. Apron/ Knapjack  8. Long-sleeved shirts	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	N/A	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	N/A	1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave the programme		

Carboxylic acids	Group 4: Synthetic auxins	Picloram (Access, Browser, Scrubber)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H302 (harmful if swallowed) H312 (harmful in contact with skin) H319 (Causes serious eye irritation) H332 (harmful if inhaled)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p>   <p>3.Safety boots</p>  <p>4.Face & Eye protection</p>  <p>5.Half-face respirators</p>  <p>6.Particulate air filters for respirators</p>  <p>7.Apron/ Knapjack</p>  <p>8. Long-sleeved shirts</p>	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>		5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every year.</p> <p>3. All workers need to be tested once they leave they programme</p>				
			3	<p>Carcinogenicity GHS07 WARNING</p>  <p>H335 (May cause respiratory irritation)</p>	Same as above	Same as above	Same as above	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per</p>				

					8. Long-sleeved shirts							
				7	Acute toxicity to aquatic organisms GHS09 WARNING  H400 (Very toxic to aquatic life)							
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects) H412 (harmful to aquatic life with long lasting effects)							
Phenoxy acids	Group 4: Synthetic auxins	Alkylchlorophenoxy (2,4D)	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (Harmful if swallowed) H317 (May cause an allergic reaction) H318 (causes serious eye damage)	1.Chemically resistant nitrile gloves  2.Type 3 and Type 4 protective clothing   3.Safety boots  4.Face & Eye protection 	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every year. 3. All workers need to be tested once they leave the programme				

					<p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p>	 	<p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>				
			3	<p>Carcinogenicity GHS07 WARNING</p>  <p>H335 (May cause respiratory irritation)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>    <p>3. Safety boots</p>  <p>4. Face & Eye protection</p>  <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p>  <p>7. Apron/ Knapjack</p> 	     	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>		

				5	<p>Developmental & Reproductive toxicity GHS08 DANGER</p>  <p>H361 (Suspected of damaging fertility or the unborn child)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p> <p>Type 5 protective clothing</p> <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	      	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>		
				8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>							

					 H412 (Harmful to aquatic life with long lasting effects)							
			Pyridine compounds as butoxy ethyl esters (Garlon 4, Garlon max, Nuvogon, Triclon, Viroaxe, Triclomax, Turbador)	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (Harmful if swallowed) H317 (May cause an allergic reaction) H319 (causes serious eye irritation) H373 (May cause damage to organs – heart, liver, kidneys)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack	     	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme		
				5	Developmental and Reproductive toxicity GHS08 DANGER  H360 (May damage fertility or the unborn child)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing	 	EN ISO 20345 EN 166:2001 EN140	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per		

					 Type 5 protective clothing  3.Safety boots  4.Face & Eye protection  5.Half-face respirators  6.Particulate air filters for respirators  7.Apron/ Knapjack  8. Long-sleeved shirts	    	EN 149 EN 143:2000 R95, R99, R100			day for 5 days per week, an additional test needs to be done every 5 years.. 3. All workers need to be tested once they leave the programme		
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H411 (Toxic to aquatic life with long lasting effects)								
Quinoline carboxylic acid	Group 4: Synthetic auxins	Pyridine compounds such As Triclopyr as amine salts	2	Acute toxicity to mammals and birds GHS07 WARNING 	1.Chemically resistant nitrile gloves 	EN 374:2016		5cc fresh urine sample refrigerated. Tested		1.All workers need to be tested before they start working.		

		(Lumberjack, Timbrel)		 H302 (Harmful if swallowed) H317 (May cause an allergic reaction) H318 (Causes serious eye damage) H315 (Causes skin irritation) H335 (may cause respiratory irritation) H336 (may cause drowsiness or dizziness) H360 (may damage fertility or the unborn child)	2.Type 3 and Type 4 protective clothing   3.Safety boots 4.Face & Eye protection  5.Half-face respirators  6.Particulate air filters for respirators  7.Apron/ Knapjack 	EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	using ELIZA dipstick test	2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme			
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H411 (Toxic to aquatic life with long lasting effects)							
Quinoline carboxylic acid	Group 4: Synthetic auxins	Pyridine compounds such as fluroxypyr (Tomahawk,	8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation							

			Starane, Voloxypr)		GHS09 WARNING  H411 (Toxic to aquatic life with long lasting effects)							
Quinoline carboxylic acid	Group 4: Synthetic auxins	Pyridine compounds such as Aminopyralid s (Sendero)	2	Acute toxicity to mammals and birds GHS07 WARNING  H315 (Causes skin irritation) H318 (causes serious eye damage) H319 (Causes serious eye irritation) H335 (may cause respiratory irritation)	1.Chemically resistant nitrile gloves  2.Type 3 and Type 4 protective clothing   3.Safety boots  4.Face & Eye protection  5.Half-face respirators  6.Particulate air filters for respirators  7.Apron/ Knapjack 	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme				
			7	Acute toxicity to aquatic organisms GHS09 WARNING  H400 (Very toxic to aquatic life)								

				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H411 (Toxic to aquatic life with long lasting effects)							
Combinations	Group 4: Synthetic auxins	Quinoline carboxylic acid such as Picloram + Pyridine compound such as Fluroxypyr (Plenum, Gladiator)	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (harmful if swallowed) H312 (harmful in contact with skin) H319 (Causes serious eye irritation) H332 (harmful if inhaled)	1. Chemically resistant nitrile gloves  2. Type 3 and Type 4 protective clothing   3. Safety boots  4. Face & Eye protection  5. Half-face respirators  6. Particulate air filters for respirators  7. Apron/ Knapjack 	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave the programme				
			3	Carcinogenicity GHS07 WARNING	1. Chemically resistant nitrile gloves	EN 374:2016	20cc fresh blood sample.	1. All workers need to be				

					 H335 (May cause respiratory irritation)	2.Type 3 and Type 4 protective clothing  3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack	     	EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	AChE tests done with Test-Mate model 400 device	tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme		
			6	Endocrine Disrupting Chemicals (EDC) GHS08 DANGER  H370 (causes damage to organs – lungs)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing  Type 5 protective clothing 	  	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done			

					<p>3.Safety boots</p> <p>4.Face & Eye protection</p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	  	R95, R99, R100			every 2 years.. 3. All workers need to be tested once they leave the programme		
			7	<p>Acute toxicity to aquatic organisms GHS09 WARNING</p>  <p>H400 (Very toxic to aquatic life)</p>								
			8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>  <p>H410 (Very toxic to aquatic life with long lasting effects) H412 (harmful to aquatic life with long lasting effects)</p>								

Combinations	Group 4: Synthetic auxins	Pyridine compounds such as Fluroxypyr + Pyridine compounds such as Triclopyr as Pyridyloxy compound (Impala)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H302 (Harmful if swallowed) H317 (May cause an allergic reaction) H319 (causes serious eye irritation) H373 (May cause damage to organs – heart, liver, kidneys)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p>  <p>3.Safety boots</p>  <p>4.Face & Eye protection</p>  <p>5.Half-face respirators</p>  <p>6.Particulate air filters for respirators</p>  <p>7.Apron/ Knapjack</p>  <p>8. Long-sleeved shirt</p>	      	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>		5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test		<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p> <p>3. All workers need to be tested once they leave they programme</p>	
			5	<p>Developmental and Reproductive toxicity GHS08 DANGER</p>  <p>H360 (May damage fertility or the unborn child)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p> 		<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p>	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per day for 5 days per</p>			

					<p>Type 5 protective clothing </p> <p>3.Safety boots </p> <p>4.Face & Eye protection </p> <p>5.Half-face respirators </p> <p>6.Particulate air filters for respirators </p> <p>7.Apron/ Knapjack </p> <p>8. Long-sleeved shirts</p>	<p>EN 143:2000</p> <p>R95, R99, R100</p>			<p>week, an additional test needs to be done every 5 years..</p> <p>3. All workers need to be tested once they leave the programme</p>	
			8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING </p> <p>H411 (Toxic to aquatic life with long lasting effects)</p>						
Combinations	Group 4: Synthetic auxins	Quinoline carboxylic acid such as Picloram + Pyridine compound	2	<p>Acute toxicity to mammals and birds GHS07 WARNING </p>	<p>1.Chemically resistant nitrile gloves </p> <p>2.Type 3 and Type 4</p>	<p>EN 374:2016</p> <p>EN 14605:2005</p>				

			such Triclopyr as trimethylamine salt (Kaput gel)		<p>H302 (harmful if swallowed) H312 (harmful in contact with skin) H315 (causes skin irritation) H317(May cause allergic skin reaction) H319 (Causes serious eye irritation) H332 (harmful if inhaled) H335 (May cause respiratory irritation) H336 (may cause drowsiness or dizziness)</p>	<p>protective clothing   3.Safety boots 4.Face & Eye protection  5.Half-face respirators  6.Particulate air filters for respirators  7.Apron/ Knapjack </p>	<p>EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100</p>			
				3	<p>Carcinogenicity GHS07 WARNING  H335 (May cause respiratory irritation)</p>	<p>1.Chemically resistant nitrile gloves  2.Type 3 and Type 4 protective clothing   3.Safety boots 4.Face & Eye protection  5.Half-face respirators </p>	<p>EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be</p>	

					6.Particulate air filters for respirators 7.Apron/ Knapjack	 	EN 140, EN149, EN 143:200 R95, R99, R100		tested once they leave the programme		
			5	Developmental and Reproductive toxicity GHS08 DANGER  H360 (May damage fertility or the unborn child)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing Type 5 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long-sleeved shirts	      	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years.. 3. All workers need to be tested once they leave the programme		

				6	<p>Endocrine Disrupting Chemicals (EDC) GHS08 DANGER</p>  <p>H370 (causes damage to organs – lungs)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>   <p>Type 5 protective clothing</p>  <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	     	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>		
				7	<p>Acute toxicity to aquatic organisms GHS09 WARNING</p>							

					 H400 (Very toxic to aquatic life)							
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects) H411 (Toxic to aquatic life with long lasting effects) H412 (harmful to aquatic life with long lasting effects)							
Combinations	Group 4: Synthetic auxins	Pyridine compounds such as Triclopyr as amine salt + Pyridine compounds such as Clopyralid (Confront, Astra)	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (Harmful if swallowed) H315 (Causes skin irritation) H317 (May cause an allergic reaction) H318 (causes serious eye damage) H319 (causes serious eye irritation) H335 (May cause respiratory irritation) H373 (May cause damage to organs)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators	    	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme			

					- heart, liver, kidneys)	7.Apron/ Knapjack			R95, R99, R100				
			5	Developmental and Reproductive toxicity GHS08 DANGER  H360 (May damage fertility or the unborn child)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing  Type 5 protective clothing  3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long-sleeved shirts	       	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years.. 3. All workers need to be tested once they leave the programme				

				8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>  <p>H411 (Toxic to aquatic life with long lasting effects)</p>							
Combinations	Group 4: Synthetic auxins	Pyridine compounds such as Triclopyr as triethyl ammonium + Aminopyralid (Confront super)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H317 (May cause an allergic skin reaction) H318 (Causes serious eye damage) H319 (Causes serious eye irritation) H315 (Causes skin irritation) H335 (may cause respiratory irritation) H336 (may cause drowsiness or dizziness)</p>	<p>1.Chemically resistant nitrile gloves</p>  <p>2.Type 3 and Type 4 protective clothing</p>   <p>3.Safety boots</p>  <p>4.Face & Eye protection</p>  <p>5.Half-face respirators</p>  <p>6.Particulate air filters for respirators</p>  <p>7.Apron/ Knapjack</p> 	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme</p>				

				5	<p>Developmental and Reproductive toxicity GHS08 DANGER</p>  <p>H360 (may damage fertility or the unborn child)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>   <p>Type 5 protective clothing</p>  <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	      	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years.. 3. All workers need to be tested once they leave the programme</p>		
				7	<p>Acute toxicity to aquatic organisms GHS09 WARNING</p> 							

					H400 (Very toxic to aquatic life)								
				8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>  <p>H410 (Very toxic to aquatic life with long lasting effects) H11 (Toxic to aquatic life with long lasting effects)</p>								
Combinations	Group 4: Synthetic auxins	Pyridine compounds such as Triclopyr as Butoxy ethyl ester + Aminopyralid (Garlon Max)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H302 (Harmful if swallowed) H315 (causes skin irritation) H317 (May cause an allergic reaction) H318 (causes serious eye damage) H319 (causes serious eye irritation) H335 (may cause respiratory irritation) H336 (may cause drowsiness or dizziness) H373 (May cause damage to organs)</p>	<p>1.Chemically resistant nitrile gloves</p>  <p>2.Type 3 and Type 4 protective clothing</p>   <p>3.Safety boots</p> <p>4.Face & Eye protection</p>  <p>5.Half-face respirators</p>  <p>6.Particulate air filters for respirators</p>  <p>7.Apron/ Knapjack</p> 	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p>	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme</p>					

					- heart, liver, kidneys)			R95, R99, R100					
				5	<p>Developmental and Reproductive toxicity GHS08 DANGER</p>  <p>H360 (May damage fertility or the unborn child)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>   <p>Type 5 protective clothing</p>  <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	      	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years.. 3. All workers need to be tested once they leave the programme</p>			

				8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>  <p>H410 (Very toxic to aquatic life with long lasting effects)</p>							
Uracils	Group 5: Photosynthetic inhibitors at Photosystem II, Site A.	Bromacil (Bushwacker)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H302 (Harmful if swallowed) H315 (Causes skin irritation) H319 (Causes serious eye irritation) H335 (may cause respiratory irritation)</p>	<p>1. Chemically resistant nitrile gloves</p>  <p>2. Type 3 and Type 4 protective clothing</p>   <p>3. Safety boots</p>  <p>4. Face & Eye protection</p>  <p>5. Half-face respirators</p>  <p>6. Particulate air filters for respirators</p>  <p>7. Apron/ Knapjack</p> 	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1. All workers need to be tested before they start working.</p> <p>2. If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p> <p>3. All workers need to be tested once they leave the programme</p>				

				7	Acute toxicity to aquatic organisms GHS09 WARNING  H400 (Very toxic to aquatic life)							
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects)							
Ureas	Group 7: Photosynthetic inhibitors at Photosystem II, Site B.	Tebuthiuron (Limpopo, Molopo)	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (Harmful if swallowed)	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p> <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p>	     	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p>	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1. All workers need to be tested before they start working.</p> <p>2. If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p> <p>3. All workers need to be tested once they leave the programme</p>			

								R95, R99, R100				
				7	Acute toxicity to aquatic organisms GHS09 WARNING  H400 (Very toxic to aquatic life)							
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects)							
Combinations	Group 5 (Uracil) + Group 7 (urea)	Bromacil + Tebuthiuron (Bundu)	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (Harmful if swallowed) H315 (Causes skin irritation) H319 (Causes serious eye irritation) H335 (may cause respiratory irritation)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators		EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave the programme			

					6.Particulate air filters for respirators 	EN 140, EN149, EN 143:200						
					7.Apron/ Knapjack 	R95, R99, R100						
				7	Acute toxicity to aquatic organisms GHS09 WARNING  H400 (Very toxic to aquatic life)							
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects)							
Glycines	Group 9: Inhibitors of EPSP synthesis.	Phosphonoglycines such as Glyphosate isopropylamine salts (Seismic, tangleweed) POE-T free	2	Acute toxicity to mammals and birds GHS07 WARNING  H318 (Causes serious eye damage)	1.Chemically resistant nitrile gloves  2.Type 3 and Type 4 protective clothing   3.Safety boots 	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once				

						<p>4.Face & Eye protection </p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators </p> <p>7.Apron/ Knapjack </p>	<p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>			they leave they programme
Glycines	Group 9: Inhibitors of EPSP synthesis.	Phosphonoglycines such as Glyphosate sodium salts (Kilo max)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING </p> <p>H318 (Causes serious eye damage)</p>	<p>1.Chemically resistant nitrile gloves </p> <p>2.Type 3 and Type 4 protective clothing </p> <p>3.Safety boots </p> <p>4.Face & Eye protection </p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators </p> <p>7.Apron/ Knapjack </p>	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p> <p>3. All workers need to be tested once they leave they programme</p>		

	Glycines	Group 9: Inhibitors of EPSP synthesis.	Phosphonoglycines such as glyphosate (all GBH's containing POE-T such as Roundup etc)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H318 (Causes serious eye damage)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p> <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p>	     	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>		5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test		<p>1. All workers need to be tested before they start working.</p> <p>2. If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p> <p>3. All workers need to be tested once they leave the programme</p>	
				3	<p>Carcinogenicity GHS07 WARNING</p>  <p>H335 (May cause respiratory irritation) H336 (may cause drowsiness or dizziness)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>	 	<p>EN 374:2016</p> <p>EN 14605:2005</p>	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device		<p>1. All workers need to be tested before they start working.</p> <p>2. If the worker sprays 8 hours per</p>		

					<p>H315 (Causes skin irritation) H319 (causes serious eye irritation)</p> 	<p>3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack</p>    	<p>EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100</p>		<p>day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>		
			8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>  <p>H411 (Toxic to aquatic life with long lasting effects)</p>							
Organoarsenicals	Group 17: Unknown	Monosodium methylarsonate (MSMA)	2	<p>Acute toxicity to mammals and birds GHS07 WARNING</p>  <p>H302 (Harmful if swallowed) H315 (causes skin irritation) H319 (Causes serious eye irritation)</p> 	<p>1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing</p>  	<p>EN 374:2016 EN 14605:2005 EN 345: 1993</p>		<p>5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test</p>	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p>		

					H332 (Harmful if inhaled)	<p>3.Safety boots</p> <p>4.Face & Eye protection</p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p>	   	<p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>				3. All workers need to be tested once they leave they programme
			3	<p>Carcinogenicity GHS07 WARNING</p>  <p>H335 (May cause respiratory irritation) H336 (May cause drowsiness or dizziness)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p>  <p>3.Safety boots</p> <p>4.Face & Eye protection</p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p>	     	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p>	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years..</p> <p>3. All workers need to be tested once they leave the programme</p>			

							R95, R99, R100						
				6	<p>Endocrine Disrupting Chemicals (EDC) GHS08 DANGER</p>  <p>H371 (may cause damage to organs (kidneys and liver)) H372 (causes damage to organs through prolonged effect (liver and kidneys))</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>  <p>Type 5 protective clothing</p>  <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	      	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>			

Bipyridyliums	Group 22: Cell membrane disruptors	Diquat dibromide (Scuba, Midstream) & Paraquat (Gramoxone)	2	<p>Acute toxicity to mammals and birds</p> <p>GHS06 DANGER</p>  <p>H301(Toxic if swallowed) H311(Toxic in contact with skin) H330(Fatal if inhaled)</p> <p>GHS07 WARNING</p>  <p>H315(Causes skin irritation) H319(causes serious eye irritation) H335(May cause respiratory irritation) H372(Causes damage to organs)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p> <p>3.Safety boots</p> <p>4.Face & Eye protection</p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p>	     	<p>EN 374:2016</p> <p>EN 14605:2005</p> <p>EN 345: 1993</p> <p>EN ISO 20345</p> <p>EN 166:2001 EN 140, EN149, EN 143:200</p> <p>R95, R99, R100</p>	5cc fresh urine sample refrigerated. Tested using ELIZA dipstick test	<p>1.All workers need to be tested before they start working.</p> <p>2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</p> <p>3. All workers need to be tested once they leave the programme</p>		
			7	<p>Acute toxicity to aquatic organisms</p>  <p>H400 (Very toxic to aquatic life)</p>							

				8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING</p>  <p>H411 (Toxic to aquatic life with long lasting effects)</p>								
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PESTICIDES FOR INVASIVE ANIMAL CONTROL

	Chemical group	MOA	Examples	Hazard Group	Hazard Criterion	PPE			Medical Biomonitoring		Frequency and Duration		Environmental monitoring
						Type	Pictogram	Classification	Blood	Urine	Blood	Urine	
1	Rodenticides	Inhibits vitamin K, anti-coagulant	Difenacoum, Brodifacoum Coumatetralyl	2	<p>Acute Toxicity to mammals and birds GHS06 DANGER</p>  <p>H300 (Fatal if swallowed) H310 (Fatal in contact with skin) GHS07 WARNING</p>  <p>H373 (Causes damage to organs through prolonged or repeated exposure – blood)</p>	<p>1. Chemically resistant nitrile gloves</p>  <p>2. Type 3 and Type 4 protective clothing</p>  <p>Type 5 protective clothing</p>  <p>3. Safety boots</p>  <p>4. Face & Eye protection</p>  <p>5. Half-face respirators</p> 	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2001</p> <p>R95, R99, R100</p>	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device		<p>1. All workers need to be tested before they start working.</p> <p>2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years..</p> <p>3. All workers need to be tested once they leave the programme</p>			

						<p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>						
				5	<p>Developmental and Reproductive toxicity GHS08 DANGER</p>  <p>H360D (May damage the unborn child)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p>  <p>Type 5 protective clothing</p>  <p>3.Safety boots</p> <p>4.Face & Eye protection</p>  <p>5.Half-face respirators</p>  <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p>	     	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>		

						8. Long-sleeved shirts							
				6	<p>Endocrine Disrupting Chemicals (EDC) GHS08 DANGER</p>  <p>H372 (Causes damage to organs through prolonged or repeated exposure – blood)</p>	<p>1. Chemically resistant nitrile gloves</p> <p>2. Type 3 and Type 4 protective clothing</p>   <p>Type 5 protective clothing</p>  <p>3. Safety boots</p> <p>4. Face & Eye protection</p> <p>5. Half-face respirators</p> <p>6. Particulate air filters for respirators</p> <p>7. Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>	     	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>			

				7	Acute toxicity to aquatic organisms  H400 (Very toxic to aquatic life)							Ensure environmental monitoring is complied with such as ESRA protocols
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects)							Ensure environmental monitoring is complied with such as ESRA protocols
		Cholecalciferol	2	Acute Toxicity to mammals and birds GHS06 DANGER  H301 (Toxic is swallowed) H311 (Toxic in contact with skin) H330 (fatal if inhaled)	1.Chemically resistant nitrile gloves  2.Type 3 and Type 4 protective clothing  Type 5 protective clothing  3.Safety boots  4.Face & Eye protection  5.Half-face respirators 	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme				

					<p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p> <p>8. Long-sleeved shirts</p>						
			6	<p>Endocrine Disrupting Chemicals (EDC) GHS08 DANGER</p>  <p>H372 (Causes damage to organs through prolonged or repeated exposure)</p>	<p>1.Chemically resistant nitrile gloves</p> <p>2.Type 3 and Type 4 protective clothing</p>  <p>Type 5 protective clothing</p>  <p>3.Safety boots</p> <p>4.Face & Eye protection</p> <p>5.Half-face respirators</p> <p>6.Particulate air filters for respirators</p> <p>7.Apron/ Knapjack</p>	     	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>		

						8. Long-sleeved shirts							
2	Avicides	Sedative powder	alphachloralose	2	<p>Acute Toxicity to mammals and birds GHS06 DANGER</p>  <p>H301 (Toxic if swallowed)</p> <p>GHS07 WARNING</p>  <p>H332 (Harmful if inhaled) H336 (may cause drowsiness or dizziness)</p>	<p>1. Chemically resistant nitrile gloves</p>  <p>2. Type 3 and Type 4 protective clothing</p>   <p>Type 5 protective clothing</p>  <p>3. Safety boots</p>  <p>4. Face & Eye protection</p>  <p>5. Half-face respirators</p>  <p>6. Particulate air filters for respirators</p>  <p>7. Apron/ Knapjack</p>  <p>8. Long-sleeved shirts</p>	<p>EN ISO 20345</p> <p>EN 166:2001</p> <p>EN140 EN 149</p> <p>EN 143:2000</p> <p>R95, R99, R100</p>	<p>20cc fresh blood sample. AChE tests done with Test-Mate model 400 device</p>	<p>1. All workers need to be tested before they start working. 2. If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme</p>				

				7	Acute toxicity to aquatic organisms  H400 (Very toxic to aquatic life)							Ensure environmental monitoring is complied with such as ESRA protocols
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects)							Ensure environmental monitoring is complied with such as ESRA protocols
	Uptake orally resulting in hepatic necrosis and eventual death	DRC 1336/Starlicide	2	Acute Toxicity to mammals and birds GHS06 DANGER  H301 (Toxic if swallowed) H311 (Toxic in contact with skin) GHS07 WARNING  H315 (Causes skin irritation) H317 (May cause an allergic skin reaction) H319 (Causes serious eye irritation) H332 (Harmful if inhaled)	1.Chemically resistant nitrile gloves  2.Type 3 and Type 4 protective clothing  Type 5 protective clothing  3.Safety boots  4.Face & Eye protection  5.Half-face respirators 	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years.. 3. All workers need to be tested once they leave the programme				

					6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long-sleeved shirts							
				7	Acute toxicity to aquatic organisms  H400 (Very toxic to aquatic life)							Ensure environmental monitoring is complied with such as ESRA protocols
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING  H410 (Very toxic to aquatic life with long lasting effects)							Ensure environmental monitoring is complied with such as ESRA protocols
3	Piscicides	Mitochondrial NADH: ubiquinone reductase inhibitor and toxin	Rotenone	2	Acute Toxicity to mammals and birds GHS06 DANGER  H301 (Toxic if swallowed) GHS07 WARNING  H315 (Causes skin irritation)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing  	 	EN ISO 20345 EN 166:2001 EN140 EN 149	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done		

					<p>H319 (Causes serious eye irritation) H335 (May cause respiratory irritation)</p>	<p>Type 5 protective clothing </p> <p>3. Safety boots </p> <p>4. Face & Eye protection </p> <p>5. Half-face respirators </p> <p>6. Particulate air filters for respirators </p> <p>7. Apron/ Knapjack </p> <p>8. Long-sleeved shirts</p>	<p>EN 143:2000</p> <p>R95, R99, R100</p>			<p>every 2 years.. 3. All workers need to be tested once they leave the programme</p>	
			7	<p>Acute toxicity to aquatic organisms </p> <p>H400 (Very toxic to aquatic life)</p>							<p>Ensure environmental monitoring is complied with such as ESRA protocols</p>
			8	<p>Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING </p> <p>H410 (Very toxic to aquatic life with long lasting effects)</p>							<p>Ensure environmental monitoring is complied with such as ESRA protocols</p>

