Terrestrial Biodiversity Compliance Statement

Proposed development of a Residential Estate on the Remainder of Portion 21 of Farm 195, George, Western Cape

Compiled for: Sharples Environmental Services cc (SES)

Applicant: Pieter Koen Trust

Pieter Koen Property Development [Updated report]

September 2023

Report Information

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Table of Contents

DRAFT

List of Figures

DRAFT

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Jonathan Colville of Terrestrial Ecologist & Faunal Surveys has over fourteen years post-PhD experience in the fields of terrestrial ecology, including investigating the spatial patterns of South Africa's animal and plant diversity. Between 2009 and 2019, Jonathan was involved with the South African National Biodiversity Institute's (SANBI) Biodiversity, Research, Assessment and Monitoring Division (BRAM) undertaking ecological research on South Africa's animal and plant diversity. Since 2020 Jonathan has been operating as a specialist faunal consultant for EIAs and conservation projects. A detailed CV is provided below in Appendix 1.

Signed Statement of Independence:

In terms of Chapter 5 of the National Environmental Management Act of 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, specialists involved in Environment Assessment Processes must declare their independence and provide their contact details, relevant experience, and a curriculum vitae.

I, Jonathan F. Colville, as the appointed independent specialists, do hereby declare that I am financially and otherwise independent of the client and their EAP, and that all opinions expressed in this document are my own and based on my scientific and professional knowledge, and available information.

Jonathan F. Colville

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Conditions Pertaining to this Report

The content of this report is based on my best scientific and professional knowledge, and available information. Jonathan Colville reserves the right to modify the report in any way deemed fit should new, relevant, or previously unavailable or undisclosed information becomes known to him from on-going research or further work in this field, or pertaining to this investigation, and he will inform SES accordingly. This report must not be altered or added to without the prior written consent of Jonathan Colville. 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 refer 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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Introduction

SES has been engaged by Peter Koen Trust to undertake a Basic Assessment for a proposed residential development on the remainder of portion 21 of the Farm 195 in George (Western Cape). The size of the property is 23.30 ha, with 17 ha available for housing development (Conceptual layout given in Appendix 3). The estate will comprise the following developments:

A. 128 Single Residential II Zoning – 3 Storey Apartments
B. Business Zone III with neighbourhood shop and flats above
C. Historic Precinct (Clubhouse, Restaurant, Gym)
D. 40 High density group housing (cottages)
E. 47 Group housing
F. 101 Single residential erven

SES utilised the National Web based Environmental Screening Tool (https://screening.environment.gov.za/screeningtool/) to generate an online site sensitivity report. The screening tool uses spatial biodiversity priority and feature layers, including ecosystem and species level datasets provided by the South African National Biodiversity Institute (SANBI).

The Screening Tool rated the development footprint of the above project as "**Very High**" sensitivity for terrestrial biodiversity:

- Critical biodiversity area 1: Very High
- Critical biodiversity area 2: Very High
- Ecological support area 1: Very High
- Ecological support area 2: Very High
- Strategic Water Source Areas: Very High
- Critically endangered ecosystem: Very High

The Screening Tool also identified the development footprint of the above project as being rated:

- **High** for animal species (6 species; 2 birds, 1 amphibian, 2 mammals, and 1 invertebrate)
- **Medium** for plant species (12 plant taxa; 8 of these classed as species sensitive to illegal harvesting).

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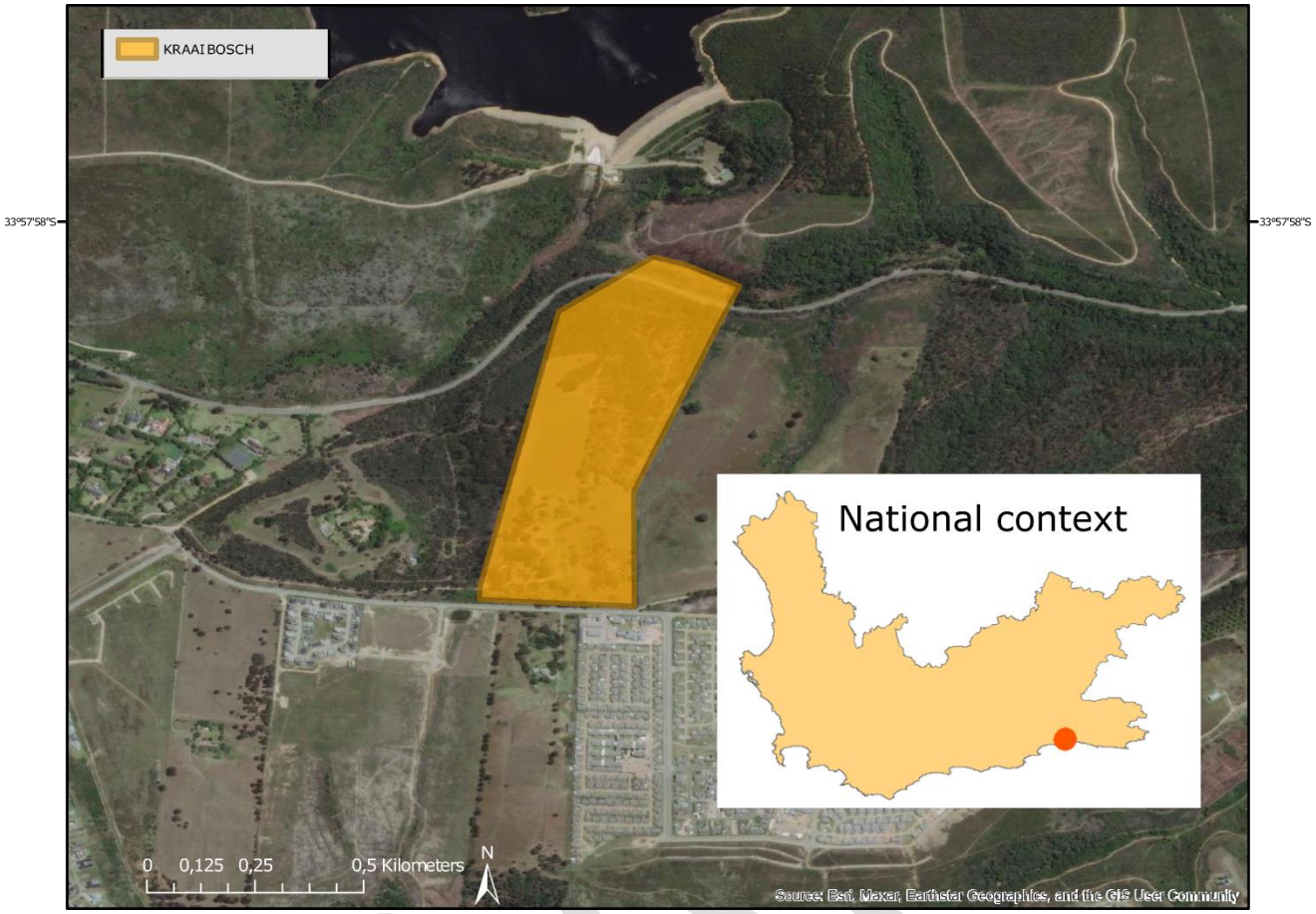

Figure 1: Location of the proposed development area on the remainder of portion 21 of the Farm 195 in, and its regional context in the Western Cape Province.

Terms of Reference

I, Jonathan Colville, was appointed by SES on 20 January 2023 to conduct a site sensitivity verification of the development area, located on the remainder of portion 21 of Farm 195 (George). This would entail two phases, a desktop study and a site visit to assess the physical and biological characteristics of the site with regards to terrestrial biodiversity sensitivity theme as flagged in the screen report. Based on the information obtained from these two phases, either a Terrestrial Biodiversity Compliance Statement would then be issued, or a Terrestrial Biodiversity Specialist Assessment would subsequently be required, as stipulated in the Government Gazette, No. 43110 (Published in Government Notice No. 320) of 20 March 2020: "Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity".

1. Carry out a desktop study to provide a baseline description of the broad ecological characteristics of the site:
    a. Community and ecosystems:
        i. Vegetation type
        ii. Threatened or vulnerable ecosystems
    b. Other ecological patterns:

i. Significant landscape features or rare or important vegetation associations (e.g. seasonal wetlands, seeps, geological features, etc.).

ii. The extent of alien plant cover on the site.

iii. The condition of the site in terms of current or previous land uses.

2. Conduct a site visit of the project area (preferred Alternative A) to ground truth the desktop biodiversity data and to assess the physical and biological characteristics of the site and identify any sensitive areas, buffer zones, no-go areas, and possible alternatives. In addition, assess the physical and biological characteristics of the site with regards to habitat suitability and sensitivity for the animal and plant SCC flagged.

3. Prepare a report detailing the findings of the desktop study and site visit, with conclusions and the issuing of a Terrestrial Biodiversity Compliance Statement or a recommendation that a Terrestrial Biodiversity Specialist Assessment would be required.

Assumptions and Limitations

The following limitations and assumptions apply to this assessment:

- It is assumed that all third-party information used (e.g. GIS data) was correct at the time of generating this report.
- A one-day site visit was undertaken during summer on a warm and sunny day. Undertaking a site visit in summer is seasonally a suitable time of the year to detect most of the listed animal and plant SCC at the project site.
- However, due to the highly disturbed nature of the project area, seasonality of the survey was considered not to be an important factor in this regard.

Site Sensitivity Verification

The screening tool indicated "**Very High**" sensitivity for the terrestrial biodiversity theme. Given the highly disturbed and transformed nature of the proposed development area, it is the opinion of the specialists, that the site is of **Low sensitivity**. A **Low sensitivity** rating for the project area was also given by the botanical (Berry, 2023), faunal (Colville and Cohen, 2023), and aquatic (Fordham, 2023) specialists. The broad ecological characteristics of the project site and any potential remaining sensitive habitats are discussed below.

Methodology

The methodology used in this report, including a background desktop study and site visit, is outlined in the subsections below.

Desktop Study

- Ecosystem-level data was assessed using the following resources:
    - Vegetation Map of South Africa (SANBI, 2018; Skowno et al., 2019).

  - Western Cape Biodiversity Spatial Plan (CapeNature, 2017; Pool-Stanvliet *et al.*, 2017).
  - Ecosystem Threat Status and Protection level of South Africa's ecosystems (Skowno *et al.*, 2019; South African National Biodiversity Institute and Department of Forestry, 2021).
  - Land cover based habitat modification (Skowno, 2020).
  - Strategic Water Source Areas (SWSA) for surface water and groundwater (Le Maitre *et al.*, 2018b, 2018a; Lötter and Le Maitre, 2021).
  - South Africa's Important Bird Areas (IBA) (Marnewick *et al.*, 2015): IBAs are selected using the presence of globally threatened species, groups of species with a restricted range (<50 000 km2), species assemblages confined to a single biome, and congregations of one or more species.
- See specialists' reports for faunal (Colville and Cohen, 2023) and botanical SCC (Berry, 2023) for species-level data used to assess the flagged SCC.

Site Visit

- The project area (Figure 1) was surveyed on 31 January 2023 to assess habitat quality, in terms of the type and amount of natural vegetation remaining. The extent of disturbance that the project area has experienced, in terms of changes to its vegetation and physical properties (e.g. soil) was also considered.
- Season: Summer.
- Areas at and around selected points on the track surveyed by the specialists were investigated across the project area and photographed (Figure 12 - 24).
- Seasonal Relevance:
  - It must be noted that this terrestrial biodiversity sensitivity verification focussed on surveying the state of the habitat quality at the project area and its connectivity to surrounding natural vegetation and to areas of known biodiversity importance. In addition, the project site sits in an area of historically high land use activity and falls outside of any protective area. Seasonality need only be considered for surveys of plant and animal SCC species should the required habitat be present.

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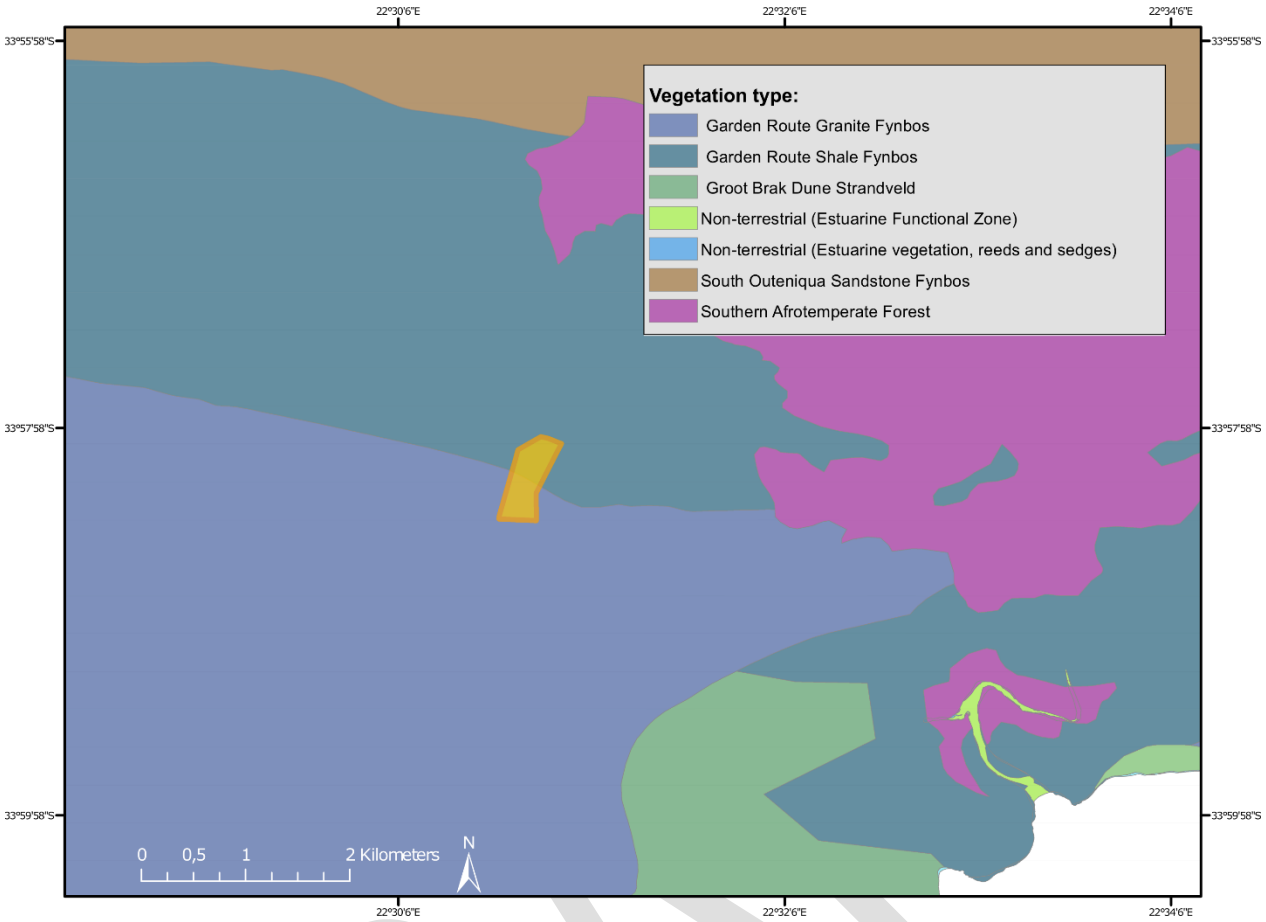

Figure 2: The vegetation types found at, and bordering, the project area (SANBI, 2018; Skowno et al., 2019).

Results

Desktop Study

The main vegetation types (SANBI, 2018; Skowno *et al.*, 2019; and the November 2022 updates to the Red List of Ecosystem Status) found at the project site (Figure 2) are:

- Garden Route Shale Fynbos (Endangered)
- Garden Route Granite Fynbos (Critically Endangered)

Only 37% natural habitat of Garden Route Shale Fynbos and 44% of Garden Route Granite Fynbos remain. The project area bisects small fragments of these natural remaining areas along its north-western boundary (Garden Route Shale Fynbos) (Figure 3). Loss of natural habitat of most of the project area appears to have happened several decades ago (pre-1990; Figure 4. See also Figure 11 in the aquatic report of Fordham (2023)) primarily due to land use practices such as forestry (Skowno, 2020).

The far northern areas of the project area fall marginally within Critical Biodiversity Areas (CBA1: terrestrial, forest, river; and CBA2: terrestrial) (Figure 5 & 6), essentially associated with threatened vertebrate (Bontebok) and water resource protection. A small section of the north-eastern parts

of the project area are classed as a CBA based on several factors: critically endangered vegetation (grassy fynbos), indigenous forest, river type, threatened vegetation type (Garden Route Shale Fynbos), threatened vertebrate (Bontebok), and water resource protection. The project area also bisects Ecological Areas of Support (ESA1 & ESA2) (Figure 7). These play an important role in supporting the functioning of CBAs and the aim is to maintain them in a functional, or near-natural state. The project area does not bisect any Other Natural Areas (ONA) (Figure 8); these areas retain most of their natural character and the objective is to minimise habitat and species loss of ONAs as they perform biodiversity and ecological infrastructure functions. The project area falls across a broad Biosphere Reserve conservation area. It does not fall over any protected areas (PA); a PA falls close (~500 m) to the north of the project area (Figure 8). The northern boundary of the project area abuts a large 'priority focus area' identified by the national protected areas expansion strategy for South Africa (Balfour *et al.*, 2018) (Figure 9).

The far northern parts of the project area borders the Outeniqua Mountains Important Bird Area (Marnewick *et al.*, 2015) (Figure 10). The Garden Route Biodiversity Sector Plan for the George, Knysna and Bitou Municipalities (Vromans *et al.*, 2010) consider the Garden Route area as of high conservation importance for South Africa's largest eagle species: Martial Eagle (*Polematus bellicosus*) and Crowned Eagle (*Stephanoaetus coronatus*).

The project area falls across an area identified as a Strategic Water Source Area (SWSA) for surface water (SW) (Figure 11; see also Fordham's (2023) aquatic specialist report). These areas are of high important as they contribute significantly to the water supply of South Africa. They are key ecological infrastructure assets for South Africa, supporting growth and development, and their protection is of high national priority (Le Maitre *et al.*, 2018b, 2018a; Lötter and Le Maitre, 2021).

See specialist reports for detailed desktop information regarding the faunal (Colville and Cohen, 2023) and botanical SCC (Berry, 2023) flagged for the project area.

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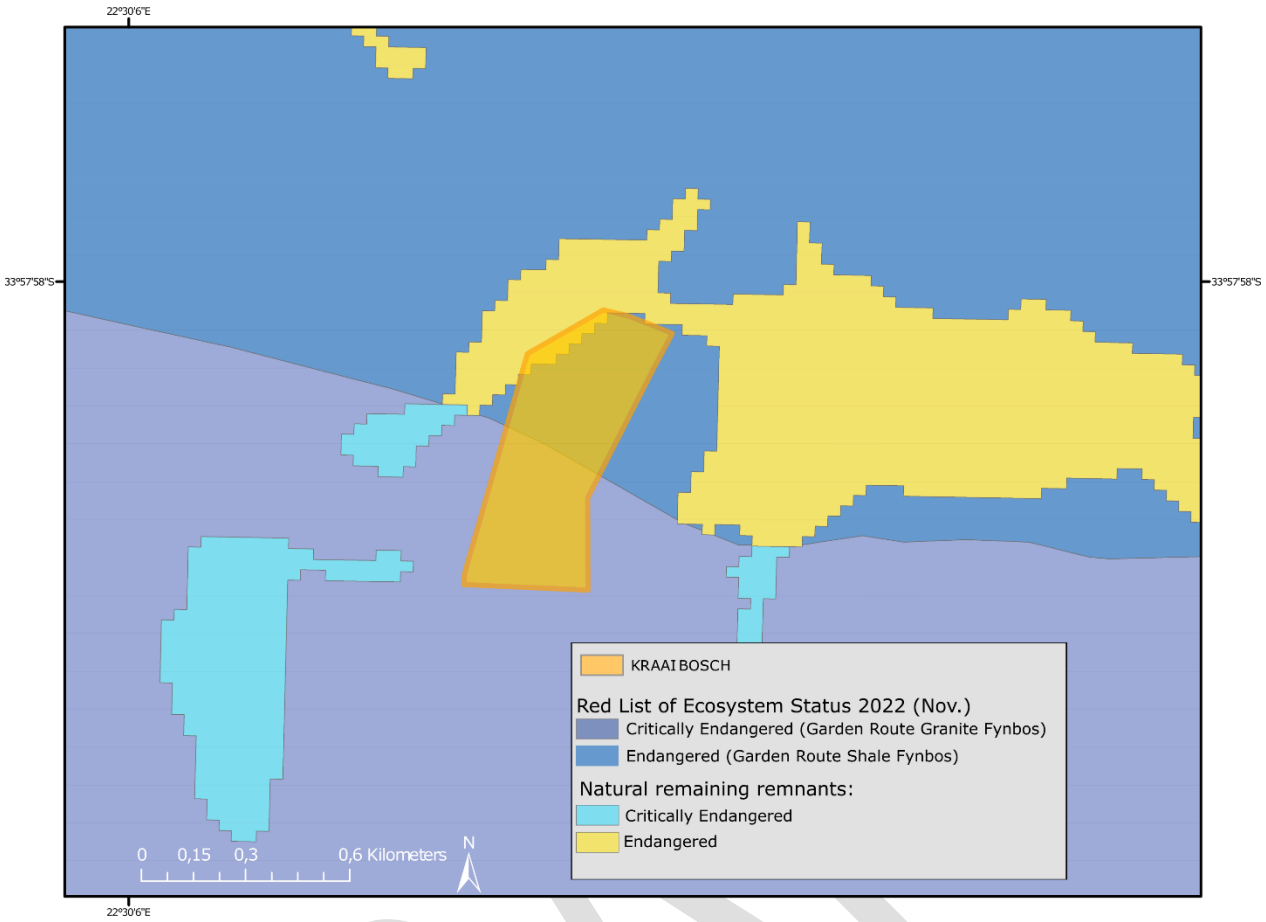

Figure 3. Red List of Ecosystems Status for the terrestrial realm of South Africa and the current remaining natural extent (ca. 2018) of an ecosystem type (South African National Biodiversity Institute and Department of Forestry, 2021).

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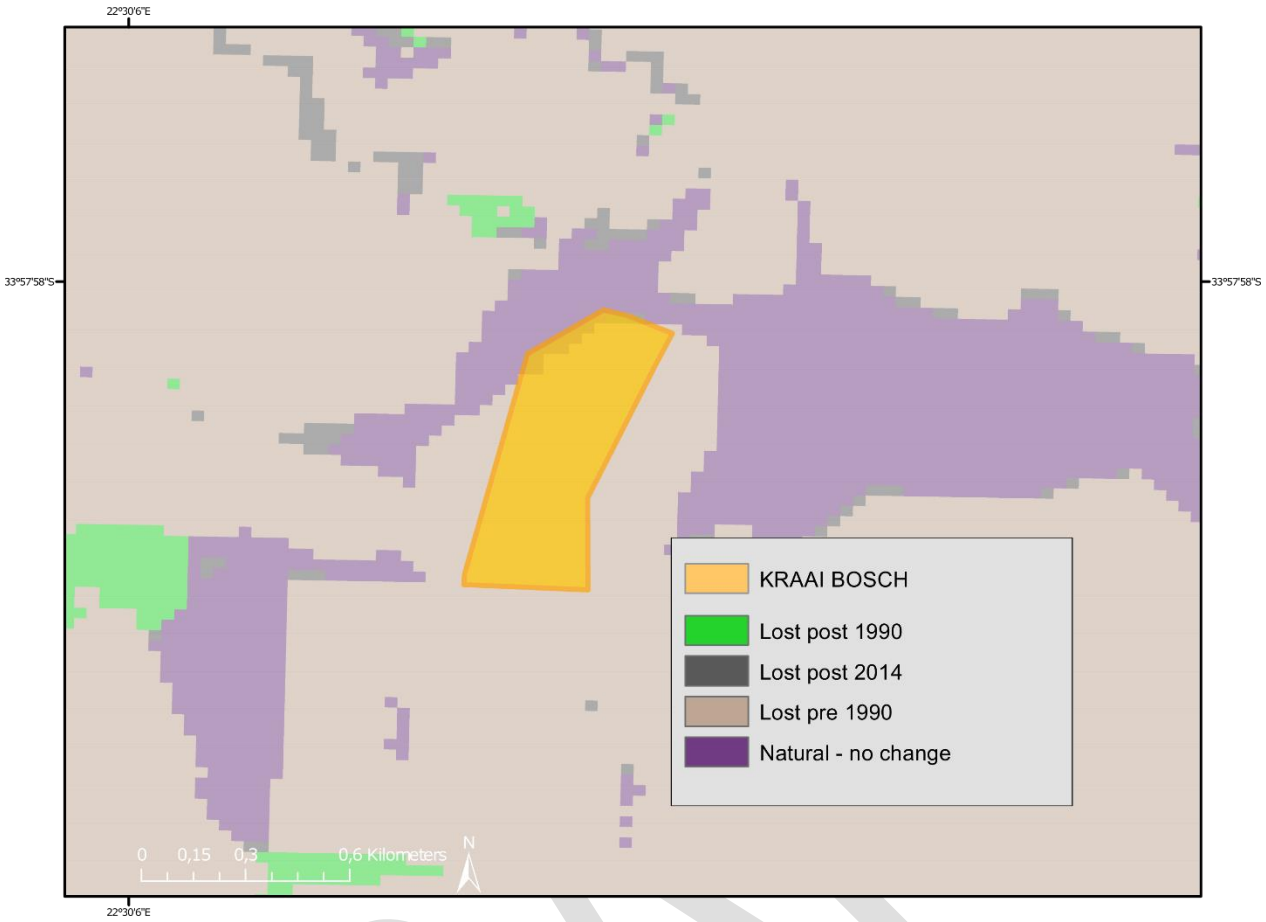

Figure 4. Land cover derived terrestrial habitat change layer showing that most of the natural habitat of the project area was altered pre-1990 (Skowno, 2020).

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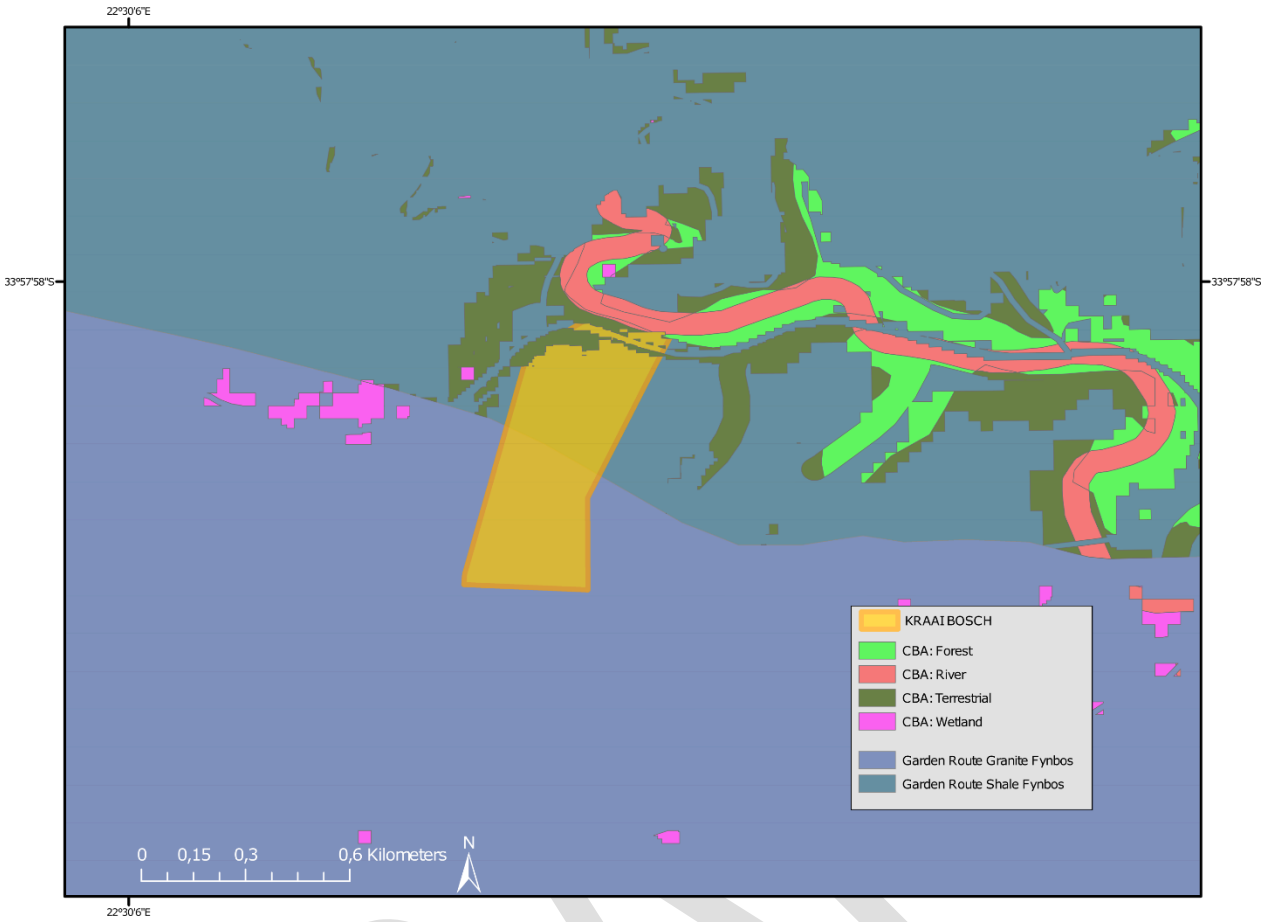

Figure 5. Critical Biodiversity Areas (CBA1) of the Western Cape Biodiversity Spatial Plan that bisect the northern parts of the project area.

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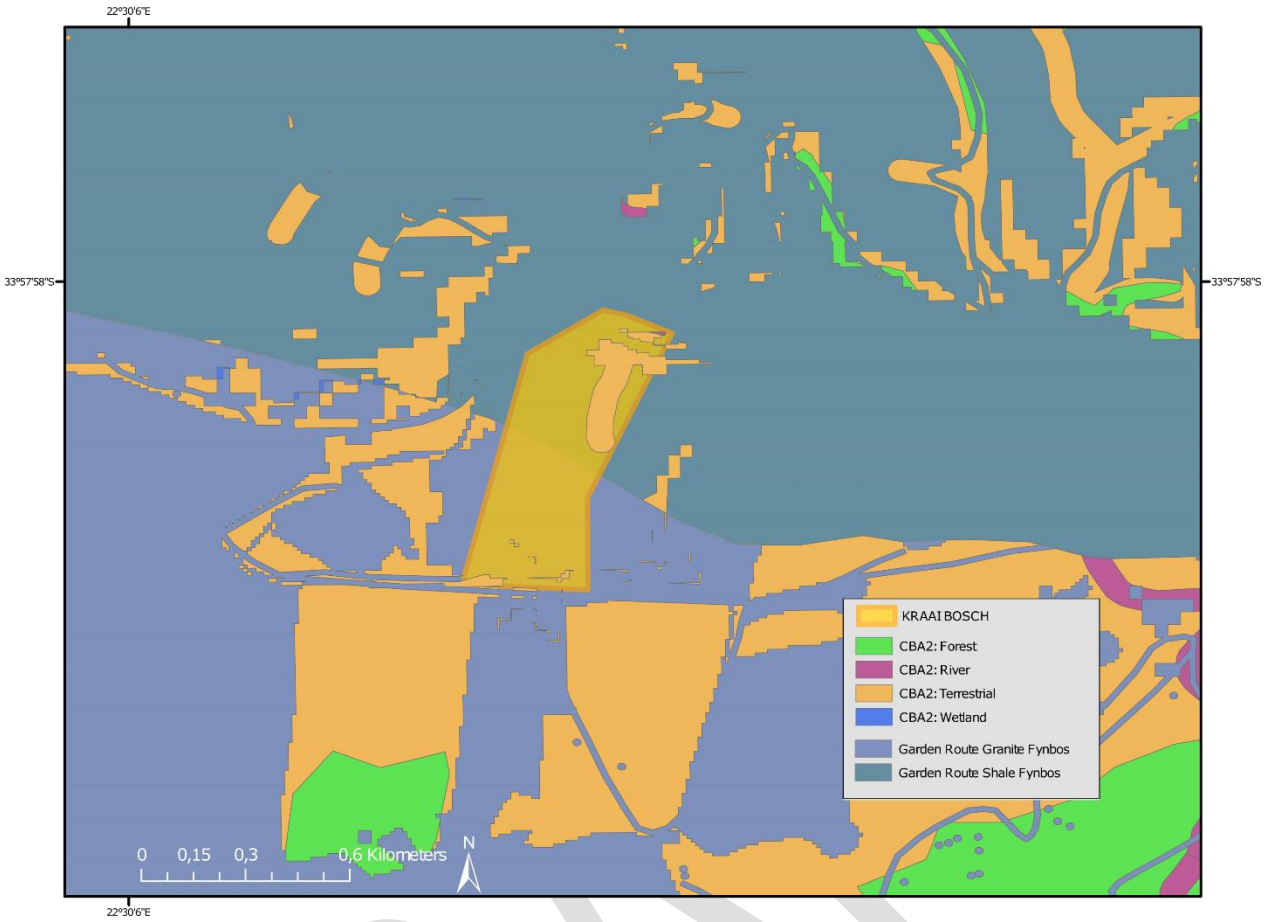

Figure 6. Critical Biodiversity Areas (CBA2) of the Western Cape Biodiversity Spatial Plan that bisect the north-eastern parts of the project area.

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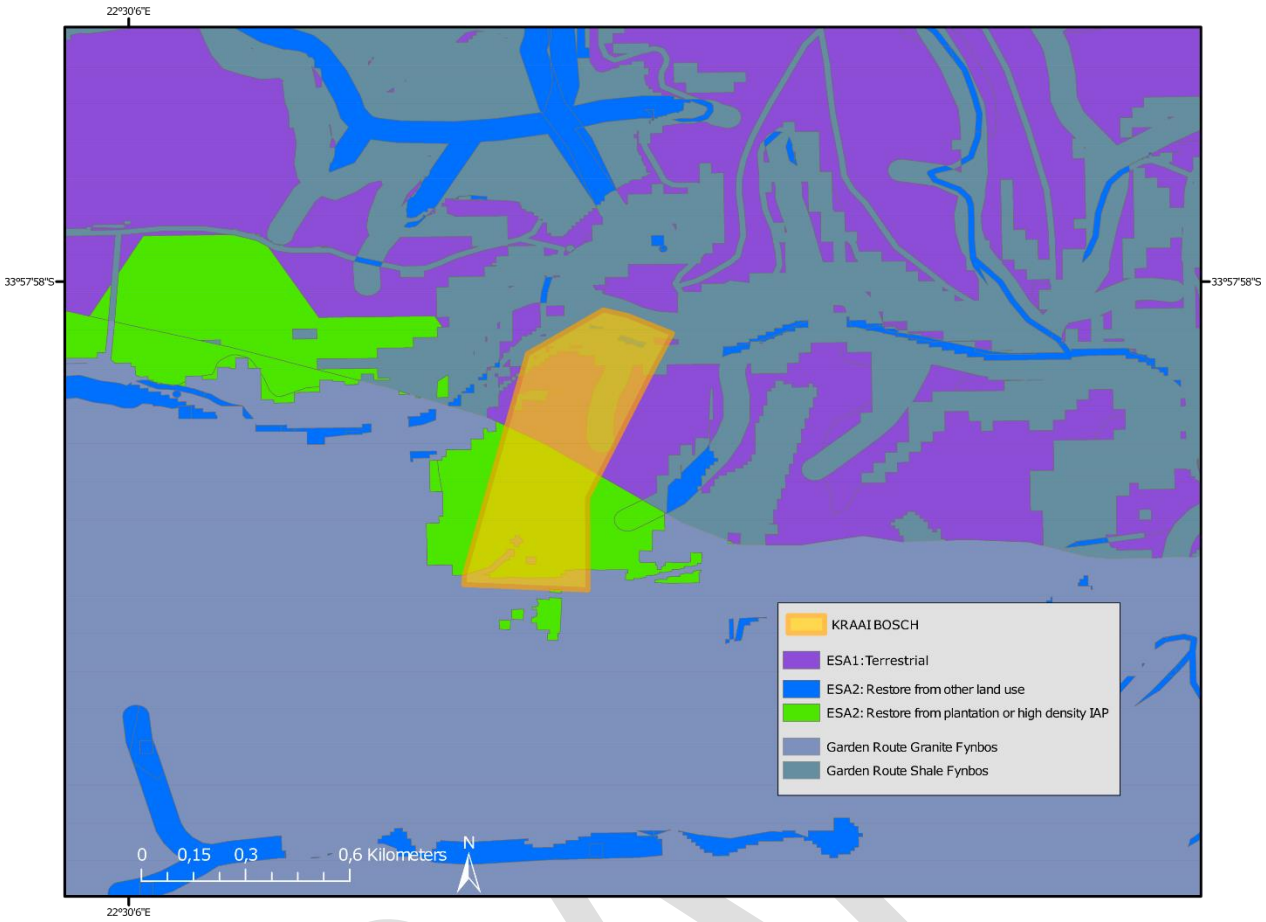

Figure 7. Ecological Support Areas (ESA1 & ESA2) of the Western Cape Biodiversity Spatial Plan that the project area bisects.

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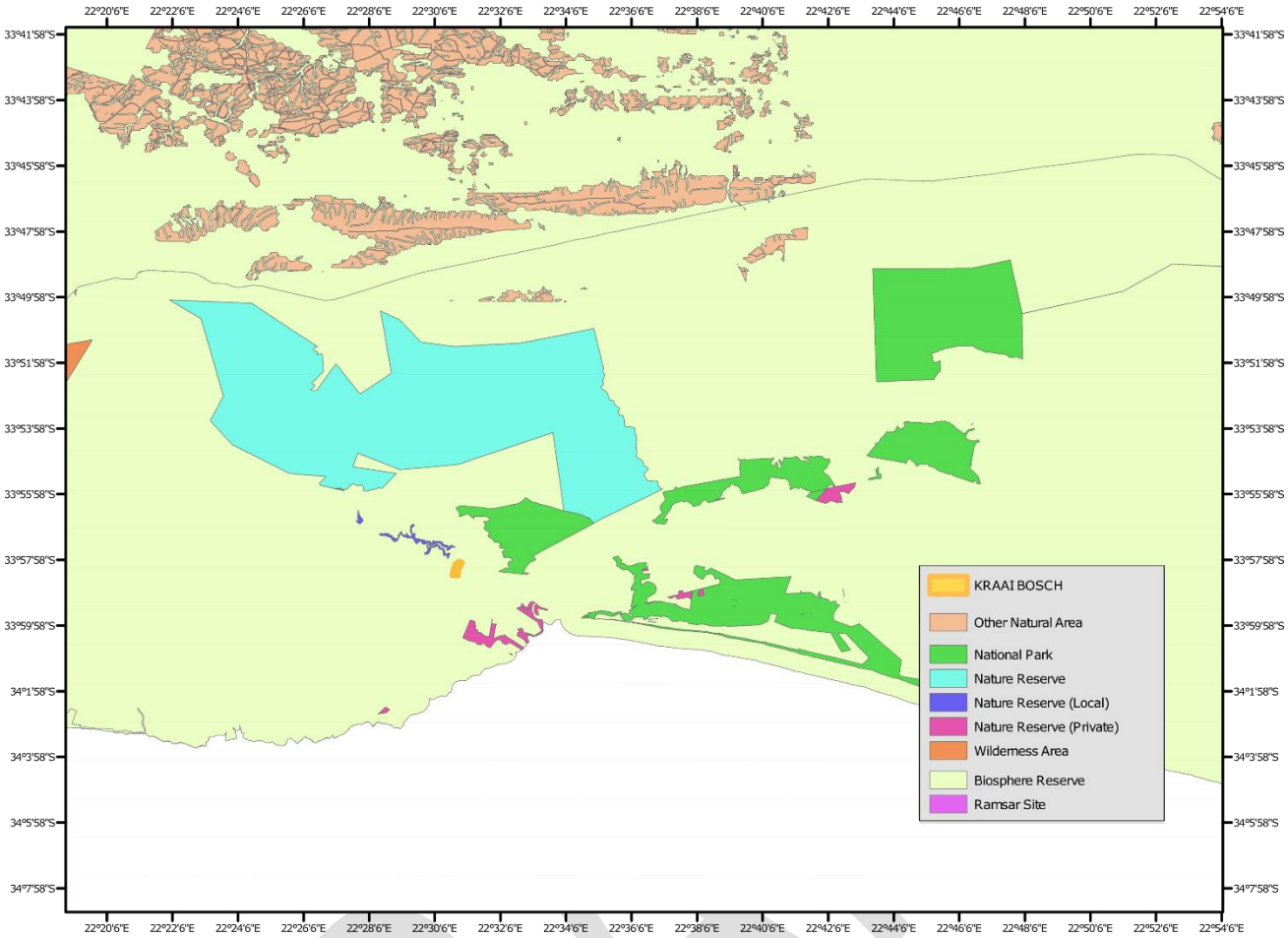

Figure 8. Other Natural Areas (ONA) of the Western Cape Biodiversity Spatial Plan and protected areas (PA) and conservation areas (CA) in relation to the project area.

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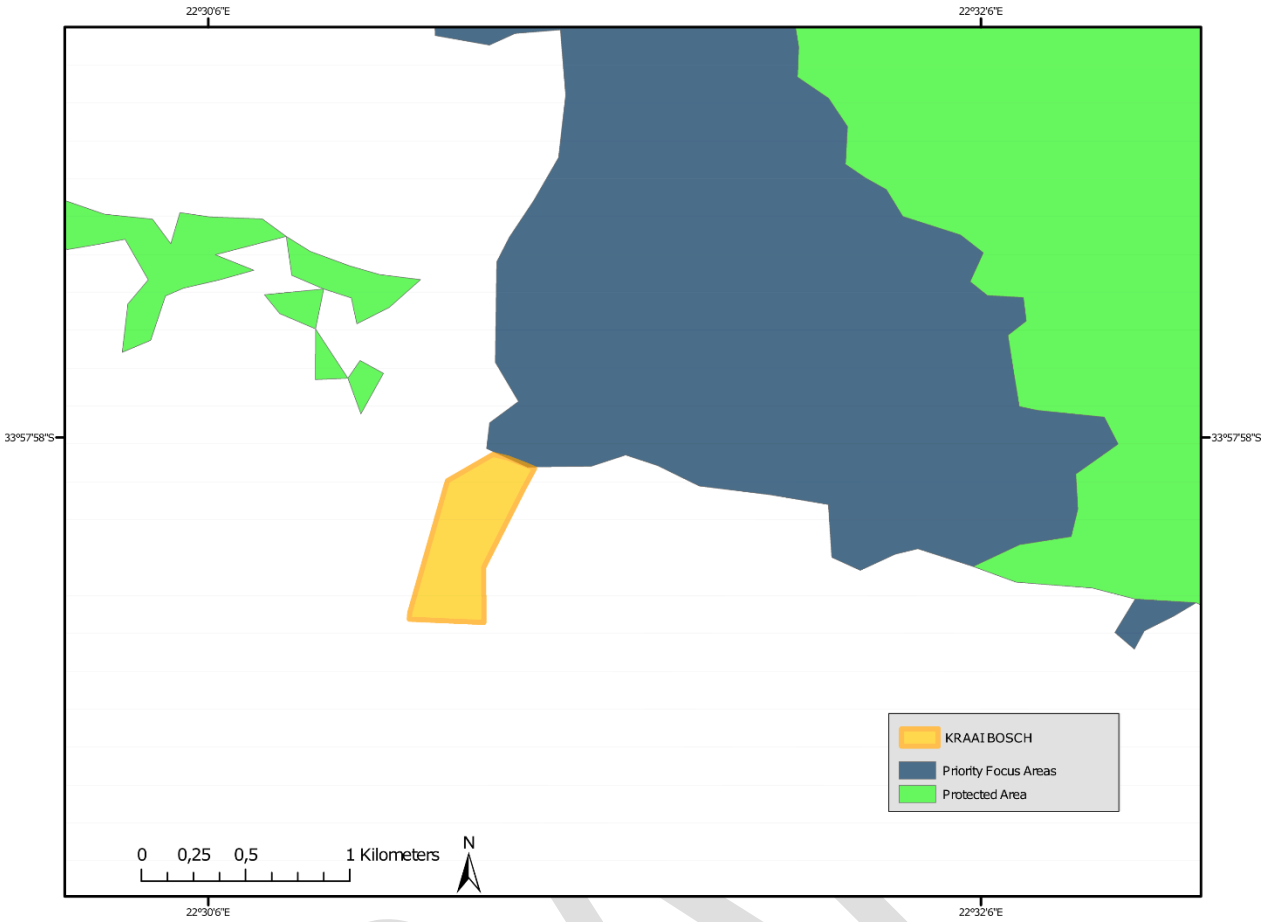

Figure 9. A priority focus area, identified by the national protected areas expansion strategy for South Africa, lies to the immediate north of the project area.

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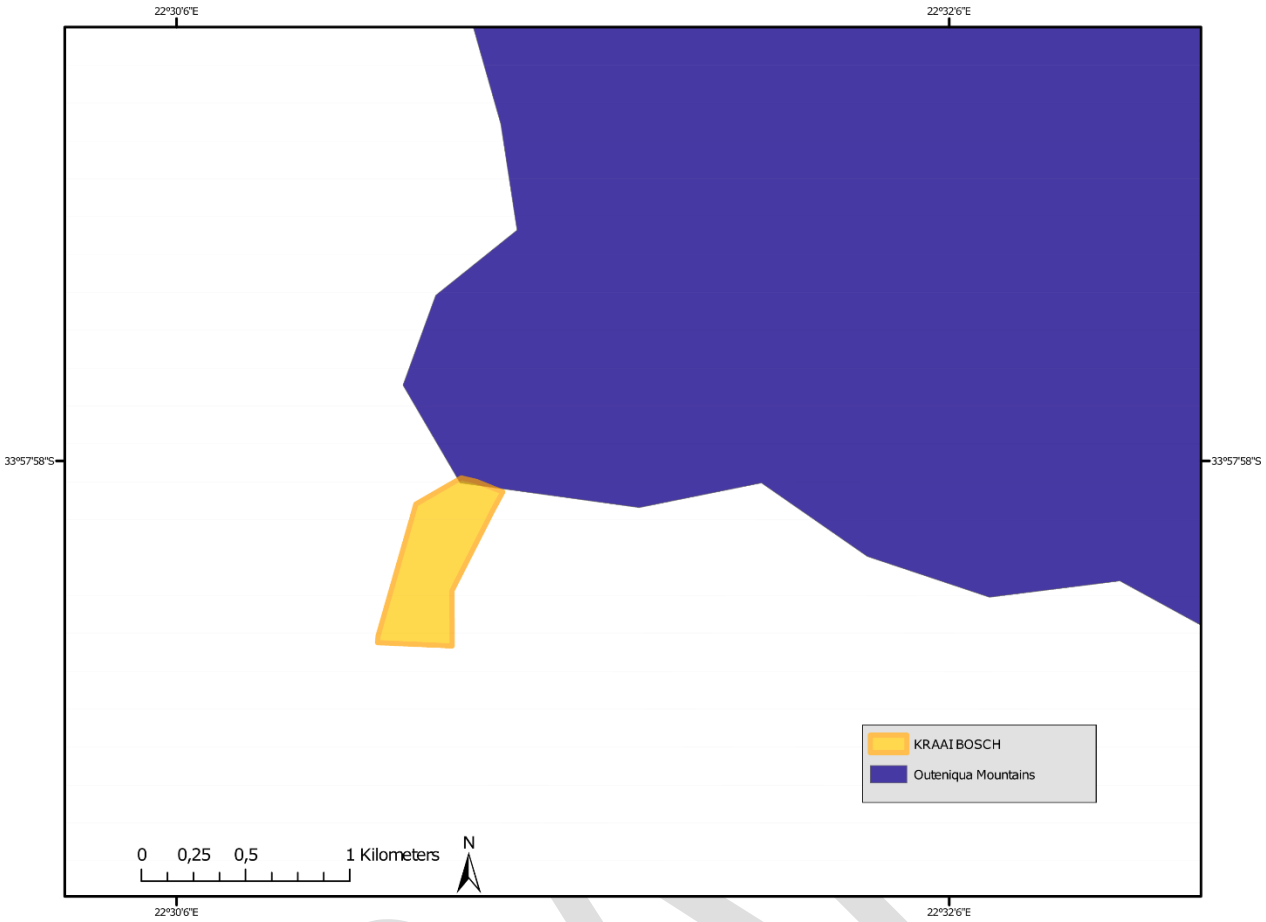

Figure 10. The project area in relation to the Outeniqua Mountains Important Bird Area identified for South Africa (Marnewick *et al.*, 2015).

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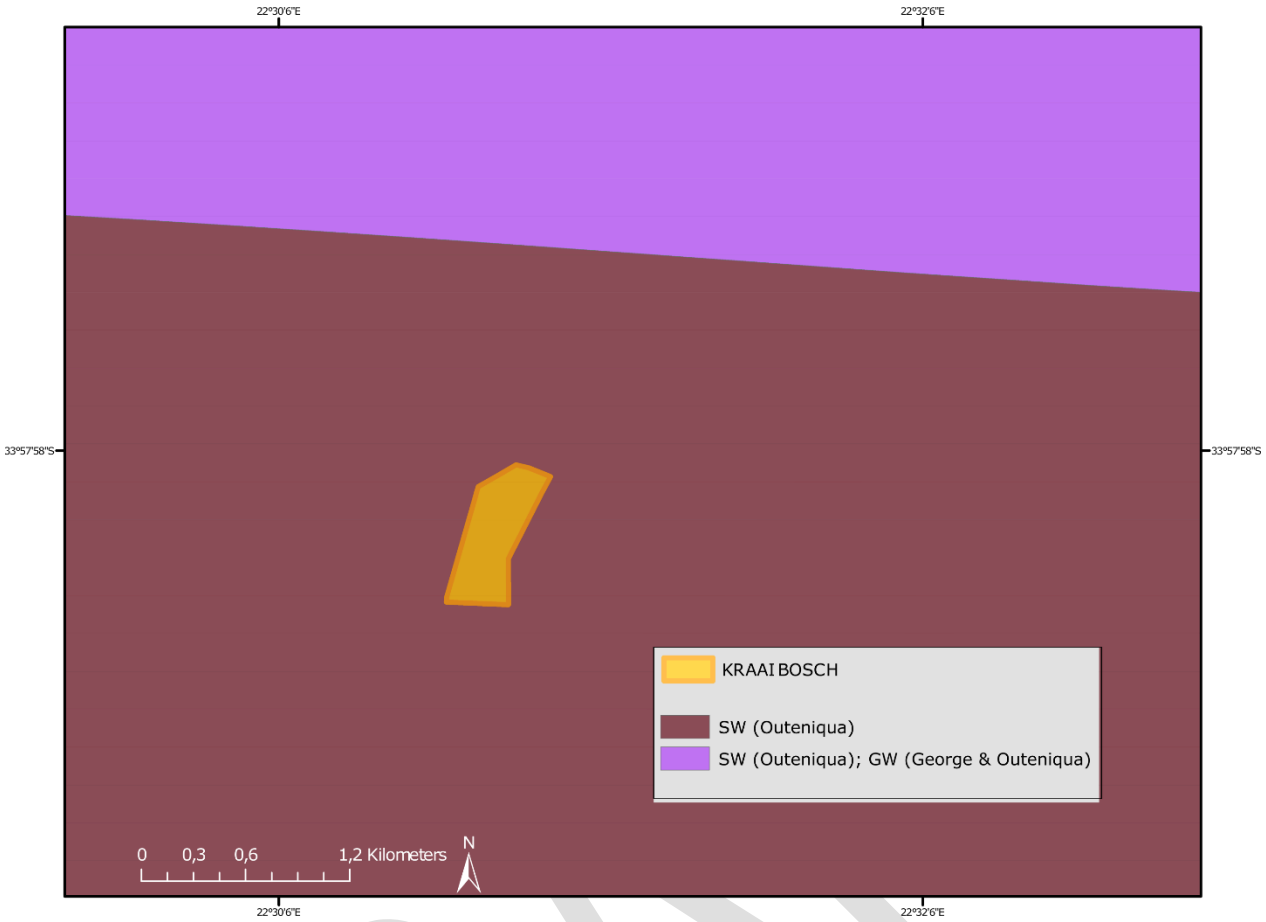

Figure 11. Strategic Water Source Areas (SWSA) for surface water (SW) and groundwater (GW) in relation to the project area.

Site Visit

- The weather was warm and sunny.
- The site and surrounds were investigated spanning the proposed development areas (Figure 12- Figure 26).
- Habitat characteristics found around each picture site are given below.

Figure 12 The north-eastern parts of the site are heavily infested with *Eucalyptus* that is currently being removed. As these areas fall across, or border CBA1 and CBA2 areas of terrestrial and aquatic importance, removal of alien plants and restoration of the small stream would be required. [GPS: 33°58'12.99" S 22°30'50.91" E].

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Figure 13. Dense alien plant infestations clogging up the stream; looking upstream (right) and downstream (left). [GPS: 33°58'9.11"S 22°30'51.75"E].

Figure 14. Several different species of invasive alien plants were found clogging the stream (e.g. bugweed, bamboo, and gums). [GPS: 33°58'8.84"S 22°30'51.45"E].

Figure 15. The majority of the project area has been heavily transformed through a long period of land change associated with activities such as forestry. Most of the project area is considered as Low Sensitivity from a terrestrial biodiversity perspective. [GPS: 33°58'11.14" S 22°30'51.88" E].

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Figure 16. Further evidence (old maize crops) of land use practices that have resulted in significant habitat transformation of almost all of the project area. [GPS: 33°58'13.78" S 22°30'50.54" E].

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Figure 17. Further evidence (grass lawns) of land use practices that have resulted in significant habitat transformation of almost all of the project area. [GPS: 33°58'15.79"S 22°30'45.40"E].

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Figure 18. Several (planted) well-established and new-growth indigenous trees (e.g. Outeniqua yellowwood) are found near the central western parts of the project site and these should be protected and retained. [GPS: 33°58'16.58"S 22°30'45.51"E].

Figure 19. A few small ponds near the farmhouse; these areas are of faunal sensitivity and should be retained and require a small buffer (see specialist aquatic report by Fordham (2023)). [GPS: 33°58'17.25" S 22°30'46.86" E].

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Figure 20. Open lawn grass fields in the northern part of the site indicating the highly transformed nature of the habitat within the project area. These areas are considered of Low Sensitivity from a terrestrial biodiversity perspective. [GPS: 33°58'17.65" S 22°30'47.61" E].

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Figure 21. Heavy infestation of weedy shrubs and grasses; these areas are unsuitable for faunal SCC and highlights the transformed habitat with the loss of plant SCC (see the botanical specialist report of Berry, (2023)). [GPS: 33°58'16.78" S 22°30'46.7" E].

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Figure 22. Houses with trees and small ponds; the small ponds are potentially of importance for frog and aquatic invertebrates and should be retained. [GPS: 33°58'27.15" S 22°30'44.8" E].

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Figure 23. Ruined house with alien grasses near the southern end of the project area highlighting the long history of disturbance and land transformation of the southern parts of the project area. [GPS: 33°58'27.23" S 22°30'46.57" E].

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Figure 24. Indigenous forest that is found to the north and east of the project area; ideally faunal links between such areas and the project area should be established and maintained where possible.

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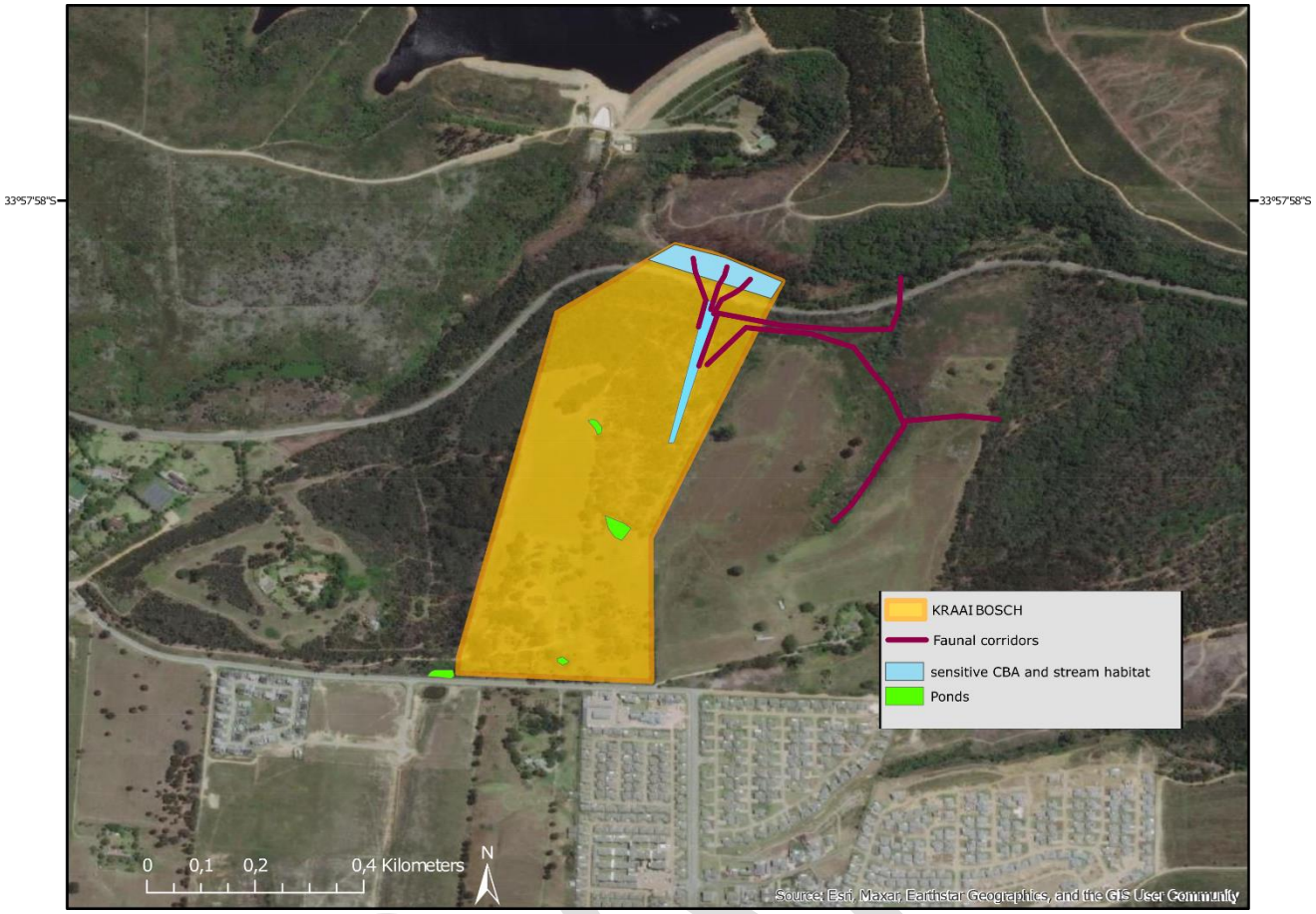

Figure 25. Sensitive stream and CBAs and potential faunal corridors that link the project area to forested areas (see above figure) to the north and east.

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Conclusions

- This statement concerning the Terrestrial Biodiversity Compliance Statement is applicable to the project area shown in **Figure 1**, and as described in the documentation provided by SES.
- Based on available ecosystem-level data for habitat and important biodiversity areas and the heavily transformed and disturbed nature of most parts of the project development area, it is considered that the project will be of overall **low sensitivity** for the terrestrial biodiversity theme.
- The proposed development (preferred Alternative A) will most likely have a **low to no impact** on areas of low sensitivity (most of the project area), and a **small negative impact** on potential areas of high sensitivity.
- A **low sensitivity** category was also given in specialists' reports for faunal, botanical, and aquatic themes.
- Both the faunal and botanical reports did not record the listed SCC on the project site, and both reports indicated a generally **low probability** on any of the SCC occurring on site.
- Within the proposed development, potential areas of terrestrial biodiversity sensitivity (Figure 25) are associated with:
    - Small aquatic habitats (ponds). Although some appear to be artificial, they appear well-established and would likely offer habitat for the frog SCC and several other frog species, damselfly and dragonfly species, and other aquatic invertebrates. A ~15m proposed buffer line is recommended to prevent undue disturbance of these aquatic habitats. Should these need to be impacted, an offset to provide wetland habitat in a more suitable place on the site should be implemented with guidance from an aquatic specialist. This could be done to increase the likelihood of colonisation by *Afrixalus knysnae*.
    - The stream running on the western boundary is potentially an important faunal corridor with the Swartrivier and forest habitat, particularly for faunal Sensitive Species 8 and the Knysna Warbler.
    - The stream also directly links the project northwards to a CBA1 (river) area, and the area around the stream is classed as a CBA2 (terrestrial).
    - The project area on its northern, north-eastern, and eastern parts bisects/borders, or is very close (< 200m) to several key biodiversity areas of high sensitivity. For example: CBA1 (terrestrial, forest, river), CBA2 (terrestrial), a focus area as part of a protected areas expansion strategy, and an Important Bird Area.
    - Several potential faunal corridors link the forested/wooded riparian stream habitat on the project area to other patches of forested areas (CBA1) to the north and east (Figures 24 and 25).
    - The proposed buffer area of preferred Alternative A should alleviate the above concerns.
    - Small stands of indigenous trees near the southern and central parts of the project area.
  - Recommended mitigation:
    - Clearing invasive plants across the project area and implementing an alien plant management programme. The stream is currently clogged with several

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invasive plant species; several of these are Category 1b and 2 invaders and require mandatory removal and control. The stream habitat should be cleared of invasive alien plants, and the riparian habitat restored. The proposed buffer of preferred Alternative A should prevent undue disturbance of the stream and riparian habitat. Although the far northern parts of the project area, those that bisect/borders CBA areas, fall outside the development, clearing of alien plants should also be focussed here considering that this area connects to important biodiversity areas to the north and east.

- From the conceptual layout (Appendix 3), the stream habitat falls outside of the development footprint, and it appears that this area will be retained as 'natural vegetation'. Therefore, this offers an opportunity to restore this habitat which should increase the potential for faunal connectivity to the north and east of the project area. The buffer area proposed by preferred Alternative A should help with faunal connectivity as long as it is cleared of alien plants.
- No fencing plan was provided as part of the conceptual plans; however, a fencing plan will be required that does not unduly block faunal movement.
- All indigenous trees should ideally be retained if practical, especially the large Outeniqua yellowwoods (*Afrocarpus falcatus*); although, if these need to be removed, suitable offset indigenous species should be planted in the rehabilitated and any landscaped areas.
- If the above concerns can be accommodated, then this compliance statement of low sensitivity will hold.

Acknowledgments

CapeNature is thanked for collecting permits: CN44-87-20545 and CN44-59-13497.

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Appendix-1 CV Jonathan Colville

CURRICULUM VITAE – JONATHAN F. COLVILLE

EDUCATION

PhD (Zoology): University of Cape Town, 2009. Thesis title: "*Understanding the evolutionary radiation of the megadiverse monkey beetle fauna (Scarabaeidae: Hopliini) of South Africa*".

Postdoctoral research fellowship: South African National Biodiversity Institute, 2009-2010.

PRIOR EMPLOYMENT

National Research Foundation Research Career Advancement Fellow: South African National Biodiversity Institute (2014-2019).

Researcher, South African National Biodiversity Institute, GEF/UNEP/FAO Global Pollination Project – South Africa (2010-2014).

PUBLICATIONS

Books edited:

- Allsopp, N., **Colville, J.F.**, Verboom, G.T. (2014). *Fynbos: Ecology, Evolution, and Conservation of a Megadiverse Region* (16 chapters; pp 1-377). Oxford University Press.

Book chapters:

- Forest F., **Colville J.F.**, Cowling R.M. (2018). Evolutionary diversity patterns in the Cape Flora of South Africa. In: *Phylogenetic Diversity: Applications and challenges in biodiversity science*. R. Scherson, D. Faith (Eds), Springer International Publishing.
- Lebuhn, G., Connor, E.F., Brand, M., **Colville, J.F.**, Keday, D., Resham, B.T., Muo, K., Ravindra, K.J. (2015). Monitoring pollinators around the world. In: *Pollination services to agriculture*. B. Gemmill-Herren (Ed), Routledge.
- **Colville, J.F.**, Potts, A.J., Bradshaw, P.L., Measey, G.J., Snijman, D., Picker, M.D., Procheş, Ş., Bowie, R.C.K., Manning, J.C. (2014). Floristic and faunal Cape biochoria: do they exist? In: *Fynbos: Ecology, Evolution, and Conservation of a Megadiverse Region*. N. Allsopp, J.F. Colville, G.A. Verboom (Eds), Oxford University Press.
- Lach, L., Picker, M.D., **Colville, J.F.**, Allsopp, M.H., and Griffiths, C.L. (2002). Alien invertebrate animals in South Africa. In: *Biological invasions: Economic and environmental costs of alien plant, animal, and microbe species*. D. Pimentel (Ed), CRC Press, London.

Journal articles:

- Barraclough, D.A., and **Colville, J.F**. (2022). The first species of Nemestrinidae (Diptera) endemic to Madagascar: A remarkable new species of *Atriadops* Wandolleck, 1897. *Zootaxa*. 5196 (1): 145–150.
- Dombrow, H., **Colville, J.F.**, Bowie, R.C.K. (2022). Review of the genus *Amblymelanoplia* Dombrow, 2002 (Coleoptera: Scarabaeidae: Melolonthinae: Hopliini) with the description of ninety-three new species from South Africa and observations on its biogeography and phylogeny. *Zootaxa*. 5163 (1): 1-278.
- Melin, A., and **Colville, J.F**. (2022). Description of the male of *Rediviva steineri* Kuhlmann 2012 (Hymenoptera: Melittidae), an endemic oil-collecting bee species from South Africa. *African Entomology*. 30: e11178.
- Allen-Perkins, A., Magrach, A., Dainese, M., Garibaldi, L., … **Colville, J.F.**, et al. (2022). CropPol: A dynamic, open, and global database on crop pollination. *Ecology*. 103, 3, e3614.

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- Dorchin, N.; van Munster, S.; Klak, C.; Bowie, R.C.K.; **Colville, J.F**. (2022). Hidden diversity – A new speciose gall midge genus (Diptera: Cecidomyiidae) associated with succulent Aizoaceae in South Africa. *Insects*. 13, 75. https://doi.org/10.3390/insects13010075
- Cohen, C., Liltved, W.R., **Colville, J.F**., Shuttleworth, A., Weissflog, J., Svatos, A., Bytebier, B., Johnson, S.D. (2021). Sexual deception of a beetle pollinator through floral mimicry. *Current Biology*. 31: 1–8.
- Krenn, H.W., Karolyi, F., Lampert, P., Melin, A., **Colville, J.F**. (2021). Nectar uptake of a long-proboscid *Prosoeca* fly (Nemestrinidae) – Proboscis morphology and flower shape. *Insects*. 12(371): 1–13.
- McLeod, L., and **Colville, J.F.** (2021). Observations on unusual feeding and mating behaviour of a monkey beetle genus *Amblymelanoplia* Dombrow (Coleoptera: Scarabaeidae: Hopliini). *African Entomology*. 29(1): 301–306.
- **Colville, J.F**., Beale, C.M., Forest, F., Altwegg, R., Huntley, B., Cowling, R.M. (2020). Plant species richness, turnover and evolutionary diversity track gradients of stability and ecological opportunity in a megadiversity centre. *Proceedings of the National Academy of Sciences (PNAS)*. 117 (33): 20027–20037.
- Dombrow, H. & **Colville, J.F.** (2020). Review of the genus *Beckhoplia* Dombrow with the description of fifteen new species from South Africa and observations on its biogeography (Coleoptera: Scarabaeidae: Melolonthinae: Hopliini). *Zootaxa*. 4823(1): 1-64.
- Melin, A., Altwegg, R., Manning, J.C., and **Colville, J.F.** (2020). Allometric relationships shape foreleg evolution of long-legged oil bees (Melittidae: *Rediviva*). *Evolution*. https://doi.org/10.1111/evo.14144.
- Melin, A. & **Colville, J.F**. (2020). A nesting aggregation of *Rediviva intermixta* (Melittinae: Melittidae) with males sleeping together in nests (Namaqualand, South Africa). *The Journal of the Kansas Entomological Society*. 92 (3): 561–568.
- Melin, A., **Colville, J.F**., Duckworth, G.D.; Altwegg, R.; Slabbert, R.; Midgley, J.J.; Rouget, M.; Donaldson, J.S. (2020). Diversity of pollen sources used by managed honeybees in variegated landscapes. *Journal of Apicultural Research*. Doi10.1080\00218839.2020.1750757.
- Melin, A., Krenn, H.W., Manning, J.C., **Colville, J.F.** (2019). The allometry of proboscis length in Melittidae (Hymenoptera: Apoidae) and an estimate of their foraging distance using museum collections. *PLoS ONE*. 14(6): e0217839.
- Melin, A. & **Colville, J.F.** (2019). A review of 250 years of Southern African bee taxonomy and exploration (Hymenoptera: Apoidea: Anthophila). *Transactions of the Royal Society of South Africa*. 74:1, 86-96. [**Featured on Cover Page**]
- Rink, A.R., Altwegg, R., Edwards, S., Bowie, R.C.K., **Colville, J.F.** (2019). Contest dynamics and assessment strategies in combatant monkey beetles (Scarabaeidae: Hopliini). *Behavioural Ecology*. 40: 713–723.
- Barraclough, D., **Colville, J.F.**, Karolyi, F., Krenn, H.W. (2018). A striking new species of *Prosoeca* Schiner, 1867 (Diptera: Nemestrinidae): An important pollinator from the Bokkeveld Plateau, Northern Cape Province, South Africa. *Zootaxa* 4497: 411–421.
- **Colville, J.F.**, Picker, M.D., Cowling, R.M. (2018). Feeding ecology and sexual dimorphism in a speciose flower beetle clade (Hopliini: Scarabaeidae). *PeerJ*: 6:e4632.
- Melin, A., Mathieu, R., **Colville, J.F**., Midgley, J.J., Donaldson, J.S. (2018). Quantifying and evaluating distributed floral resources for managed honeybee pollination using an expanded concept of supporting ecosystem services. *PeerJ*: e5654.
- Cowling, R.M, Bradshaw, P.L., **Colville, J.F.**, Forest, F. (2017). Levyns' Law: Explaining the evolution of a remarkable longitudinal gradient in Cape plant diversity. *Transactions of the Royal Society of South Africa*. 72: 184-201.
- Treurnicht M., **Colville J.F.**, Joppa L.N., Huyser O., Manning J.C. (2017) Counting complete? Finalising the plant inventory of a global biodiversity hotspot. *PeerJ*: 5:e2984.

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- Janion-Scheepers, C., Measey, G.J., Braschler, B., Chown, S.L., Coetzee, L., **Colville, J.F.**, Dames, J., Davies, A.B., *et al*. (2016). Soil biota in a megadiverse country: Current knowledge and future research directions in South Africa. *Pedobiologia*. 59: 129-174.
- Karolyi F., Hansal T., Krenn H.W., **Colville J.F.** (2016). Comparative morphology of the mouthparts of the megadiverse South African monkey beetles (Scarabaeidae: Hopliini): Feeding adaptations and guild structure. *PeerJ*: 4:e1597.
- Bradshaw, P.L., **Colville, J.F.**, Linder, H.P. (2015). Optimising regionalisation techniques: Identifying centres of endemism in the extraordinarily endemic-rich Cape Floristic Region. *PLoS ONE*. 10: e0132538.
- Cowling, R.M., Potts, A.J., Bradshaw, P.L., **Colville, J.F.**, Arianoutsou, M., Ferrier, S., Forest, F., Fyllas, N.M., Hopper, S.D., Ojeda, F., Procheş, Ş., Smith, R.J., Rundel, P.W., Vassilakis, E., Zutta, B.R. (2015). Variation in plant diversity in Mediterranean-climate ecosystems: The role of climatic and topographical stability. *Journal of Biogeography*. 42: 552-564.
- Kleijn, D., Winfree, R., Bartomeus, I., Carvalheiro, L.G., Henry, M., Isaacs, R., Klein, A-M., Kremen, C., M'Gonigle, L.K., Rader, R., Ricketts, T., Williams, N.M, Adamson, N-L., Ascher, J.S., Baldi, A., Batary, P., Benjamin, F., Biesmeijer, J.C., Blitzer, E.J., Bommarco, R., Brand, M.R., Bretagnolle, V., Button, L., Cariveau, D.P., Chifflet, R., **Colville, J.F.**, Danforth, B.N., Elle, E., Garratt, M.P.D., Herzog, F., Holzschuh, A., Howlett, B.G., Jauker, F., Jha, S., Knop, E., Krewenka, K.M., Le Feon, V., Mandelik, Y., May, E.M., Park, M.G., Pisanty, G., Reemer, M., Riedinger, V., Rollin, O., Rundlof, M., Sardinas, H.S., Scheper, J., Sciligo, A.R., Smith, H.G., Steffan-Dewenter, I., Thorp, R., Tscharntke, T., Verhulst, J., Viana, B.F., Vaissiere, B.E., Veldtman, R., Westphal, C., Potts, S.G. (2015). Delivery of crop pollination services is an insufficient argument for wild pollinator conservation. *Nature Communications*. 6: 7414**.**
- Manning, J.C., Goldblatt, P., **Colville, J.F.**, Cupidoa, C.N. (2015). Hopliine beetle pollination in annual *Wahlenbergia* species (Campanulaceae) from western South Africa, and the new species *W. melanops*. *South African Journal of Botany*. 100: 58-62.
- Mecenero, S., Altwegg, R., **Colville, J.F.**, Beale, C.M. (2015). Roles of spatial scale and rarity on the relationship between butterfly species richness and human density in South Africa. *PLoS ONE*. 10: e0124327.
- Forest, F., Goldblatt, P., Manning, J.C., Baker, D., **Colville, J.F.**, Devey, D.S., Jose, S., Kaye, M., Buerki, S. (2014). Pollinator shifts as trigger of speciation in painted petal irises (*Lapeirousia*: Iridaceae). *Annals of Botany*. 113: 357-71.
- Karolyi, F., **Colville, J.F.**, Handschuh, S., Metscher, B.D., Krenn, H.W. (2014). One proboscis, two tasks: Adaptations to blood-feeding and nectar-extracting in long-proboscid horse flies (Tabanidae, *Philoliche*). *Arthropod Structure & Development*. 43: 403-413.
- Karolyi, F., Morawetz, L., **Colville, J.F.**, Handschuh, S., Metscher, B.D., Krenn, H.D. (2013). Time management and nectar flow: Flower handling and suction feeding in long-proboscid flies (Nemestrinidae: *Prosoeca*). *Naturwissenschaften*. 100: 1083-1093. [**Featured on Cover Page**]
- Ryan, P.G., **Colville, J.F.**, Picker, M.D. (2013). Juvenile African Pipit feeding on monkey beetles. *Ornithological Observations*. 4: 6-8.
- Karolyi, F., Szucsich, N.U., **Colville, J.F.**, Krenn, H.W. (2012). Adaptations for nectar-feeding in the mouthparts of long-proboscid flies (Nemestrinidae: *Prosoeca*). *Biological Journal of the Linnean Society*. 107: 414-424.
- Picker, M.D., **Colville, J.F.**, Burrows, M. (2012). A cockroach that jumps. *Biology Letters*. 8: 390-392.
- **Colville, J.F.** (2009). Understanding the evolutionary radiation of the mega-diverse monkey beetle fauna (Scarabaeidae: Hopliini) of South Africa. *Frontiers in Biogeography*. 1: 24-29.
- Bohn, H., Picker, M.D., Klaus-Dieter, K. & **Colville, J.F.** (2010). A jumping cockroach from South Africa, *Saltoblattella montistabularis*, gen. nov., spec. nov. (Blattodea: Blattellidae). *Arthropod Systematics & Phylogeny*. 68: 53-69. **[Featured as a "Top 10 New Species discovery" by the International Institute for Species Exploration**].

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- **Colville, J.F.**, Picker, M.D., Cowling, R.M. (2002). Species turnover of monkey-beetles (Scarabaeidae: Hopliini) along environmental and disturbance gradients in the Namaqualand region of the Succulent Karoo, South Africa. *Biodiversity and Conservation*. 11: 243–264.
- Picker, M.D., **Colville, J.F.**, van Noort, S. (2002). Mantophasmatodea now in South Africa. *Science*. 297: 1475.

Technical reports:

- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Grace Rock Equestrian Farm. Prepared for Delta Ecology and Legacy Environmental Management Consulting.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Dana Bay Access Road. Prepared for Sharples Environmental Services cc (SES).
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Biodiversity Specialist Assessment. Duyker Eiland Prospecting Rights. Prepared for Elemental Sustainability (Pty) Ltd.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Proposed mixed use housing development. Prepared for EcoSense CC.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Proposed agricultural development. Prepared for McGregor Environmental Services.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Blue Sky's Project Prepared for Doug Jeffery – Environmental Consultants.
- **Colville, J.F.**, and Cohen, C. (2022). Terrestrial Animal Species Specialist Assessment. Proposed Expansion of Nature's View Dam near Citrusdal. Prepared for Earth Grace Environmental Consultancy.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Proposed enlargement of existing Kleigat Dam. Prepared for Earth Grace Environmental Consultancy.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Moorreesburg Wastewater Treatment Works Upgrade Project. Prepared for Zutari (Pty) Ltd.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Maxnau Citrus Development. Prepared for Charl de Villiers Environmental Consulting.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Gletwyn Estate Mixed Use Development. Prepared for Johan Neethling Environmental Services cc.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Moorreesburg Wastewater Treatment Works Upgrade Project. Prepared for Zutari (Pty) Ltd.
- **Colville, J.F.** (2021). Terrestrial Animal Species Specialist Assessment. Proposed Development of Solar Photo-Voltaic Renewable Energy Power Station. Prepared for Resource Management Services (RMS).
- **Colville, J.F.** & Picker, M.D. (2009-2010). *Invertebrate impact assessment – Oudekraal, Table Mountain*. Prepared for Doug Jeffery Environmental Consultants.
- Picker, M.D. & **Colville, J.F.** (2007). *Invertebrate impact assessment: Worcester Island Development*. SRK Environmental impact report for Consulting Engineers and Scientists, Cape Town.
- Picker, M.D. & **Colville, J.F.** (2006). *Baseline faunal investigation for proposed development at Altona, Worcester, Western Cape Province*. Environmental impact report for SRK Consulting Engineers and Scientists, Cape Town.
- **Colville, J.F.** & Picker, M.D. (2005). *Scoping Phase II: The impact of development of Worcester on the insect and scorpion fauna*. Environmental impact report for Chand Environmental Consultants, Cape Town.
- **Colville, J.F.** (2001) *Scoping and faunal assessment for proposed housing development, Skapenberg, Somerset West*. Prepared for Design consultants CNdV Africa.

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MEMBERSHIPS/RESEARCH ASSOCIATE

- Membership of Entomological Society of Southern Africa (2007-current).
- Membership of Lepidopterists Society of Southern Africa (2014-current).
- Honorary Research Associate (HRA), Statistics in Ecology, Environment and Conservation (SEEC), Department of Statistical Sciences, UCT (2014-current).
- SACNASP registration for Ecological Science (Professional Natural Scientist) (member#: 134759).

PROFESSIONAL SERVICES

- Editorial board *African Entomology* (2010-current).
- Editorial board *Metamorphosis* (2017-current).
- Editorial board *PeerJ* (2019-current).
- CAPE Invasive Alien Animal (IAA) Working Group (2016-2018).

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Appendix-2 CV Callan Cohen

ABRIDGED CURRICULUM VITAE DR CALLAN COHEN

Education

PhD in Ornithology (Zoology), University of Cape Town, 2011.

Positions held:

Director: Birding Africa. 1997 – present.

Research Associate: FitzPatrick Institute of African Ornithology, Department of Biological Sciences, University of Cape Town. 2012 – present.

Experience

Acknowledged expert on African birds, based on over 1000 field trips, research studies and surveys from 1990 to present, in over 25 African countries, but focused largely across South Africa. First author of 2 books on African birds, and contributor to almost 10 others. Also publications and reports on Odonata, Lepidoptera, Herpetology and Botany.

Selected Books

Cohen, C., Spottiswoode, C. & Rossouw, J. 2006. **Southern African Birdfinder: where to find 1400 species in southern Africa and Madagascar**. Cape Town: Struik New Holland Publishers, 456 pp. Reprinted 2007, 2012, 2022.

Cohen, C. & Spottiswoode, C. 2000. **Essential Birding in Western South Africa: Key routes from Cape Town to the Kalahari.** Cape Town: Struik New Holland Publishers, 136 pp. Reprinted 2001.

Klaas-Douwe B. Dijkstra & **Callan Cohen**. 2021. **Dragonflies and Damselflies of Madagascar and the western Indian Ocean Islands**. Association Vahatra Antananarivo, Madagascar. 198 pages.

Contributed 20 species accounts in: Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. & Brown, C.J. (Eds). 1997. **The Atlas of Southern African Birds**. Johannesburg: BirdLife South Africa.

Contributed 10 species accounts in: Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. (Eds). 2005. **Roberts' Birds of Southern Africa**. Seventh edition. Cape Town: John Voelcker Bird Book Fund.

Contributor to Red Data Book on Birds: BARNES, K.N. (ed.) 2000. **Threatened Birds of South Africa, Lesotho and Swaziland**. Johannesburg: BirdLife South Africa.

Species account written: African Marsh Harrier

Other Publications

About 100 journal articles and over 50 reports, e.g. most recent:

Cohen, C. 2021. **Deciphering South Africa's first Crested Honey Buzzard**. African Birdlife 9(4): 26-29.

Cohen, C., N. J. Collar, A. Dagnee, L. D. C. Fishpool, S. J. Marsden, C. N. Spottiswoode & S. R. Wotton. 2021. **Status of Taita Falcon Falco fasciinucha in Ethiopia and the identification problem posed by African Hobby F. cuvierii**. Bull ABC Vol 28 No 2: 225-233

Mills, Michael S. L., Julian Francis, Nik Borrow, Nigel Redman, Washington Wachira and **Callan Cohen**. 2021. **English bird names in common use: a framework to achieve a stable world list despite ongoing taxonomic changes, and a call to establish a broad-based African Bird Names Committee.** Bull ABC Vol 28 No 1: 93-98.

Appendix-3 Conceptual layout

Conceptual project diagramme as given by SES for preferred Alternative A:

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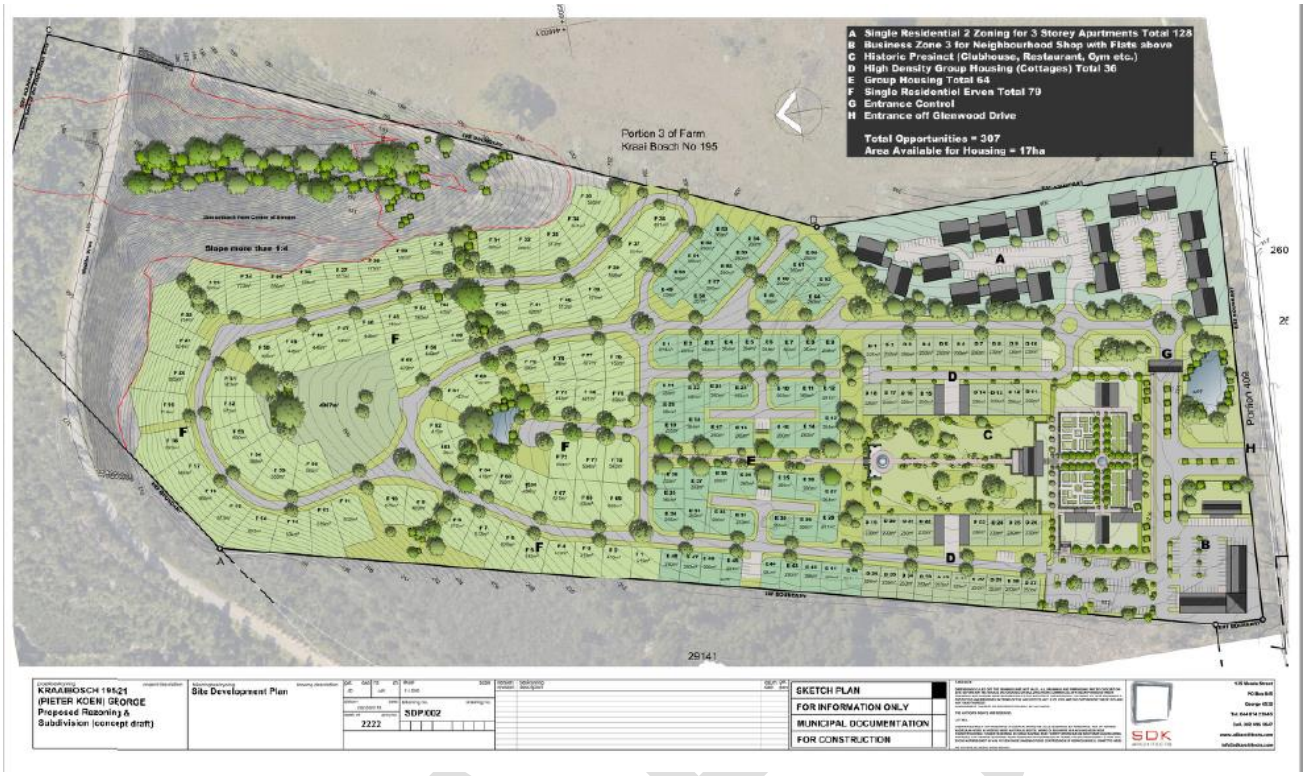
A Single Residential 2 Zoning for 3 Storey Apartments Total 128
B Business Zone 3 for Neighbourhood Shop with Flats above
C Historic Precinct (Clubhouse, Restaurant, Gym etc.)
D High Density Group Housing (Cottages) Total 36
E Group Housing Total 64
F Single Residential Erven Total 79
G Entrance Control
H Entrance off Glenwood Drive
Total Opportunities = 307
Area Available for Housing = 17ha
Portion 3 of Farm
Kraal Bosch No 195
Slope more than 1:4
Portion 409
28141
KRAALBOSCH 195/21
(PIETER KOEN) GEORGE
Proposed Rezoning &
Subdivision (concept draft)
Site Development Plan
SDP002
2222
SKETCH PLAN
FOR INFORMATION ONLY
MUNICIPAL DOCUMENTATION
FOR CONSTRUCTION
SDK

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