Great Brak Sewer System Upgrades in Groot Brakrivier, Mossel Bay Municipality, Western Cape

Terrestrial Animal Species Specialist Assessment:

Site Sensitivity Verification Report and Compliance Statement

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Date: March 2025
Version: Final

DECLARATION OF SPECIALIST INDEPENDENCE

- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
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- I do not have any influence over decisions made by the governing authorities;
- I undertake to disclose all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by a competent authority to such a relevant authority and the applicant;
- I have the necessary qualifications and guidance from professional experts in conducting specialist reports relevant to this application, including knowledge of the relevant Act, regulations and any guidelines that have relevance to the proposed activity;
- This document and all information contained herein is and will remain the intellectual property of Confluent Environmental. This document, in its entirety or any portion thereof, may not be altered in any manner or form, for any purpose without the specific and written consent of the specialist investigators.
- All the particulars furnished by me in this document are true and correct.

Kim Daniels (MSc)

March 2025

SUMMARY OF EXPERIENCE AND ABRIDGED CV
- KIM DANIELS

Core skills

- MSc. Biodiversity and Conservation Biology (University of Cape Town) and 3 years of work experience (research assistance and education) for research projects aimed at investigating invertebrate diversity, plant diversity, insect ecology, disease ecology, invasive species, plant systematics, herpetology, and climate change impacts on a variety of taxa.
- Ecological and field work experience before, during, and after postgraduate degrees across a range of environments (mesic savanna, arid savanna, fynbos, succulent karoo, and Nama karoo) and taxa (plants, invertebrates, avifauna, amphibians, and small mammals).
- My postgraduate studies have been focused on vegetation change in the fynbos and parasitic plants as thermal refugia for arid savanna birds.

Work experience

- Teaching assistant at the Organization of Tropical Studies and Roots & Shoots
- Internships in Entomology, Horticulture, and Plant Conservation
- Research assistant at the Centre for Invasion Biology
- Field assistant at Valuing Orchard and Integrated Crop Ecosystem Services Project

Qualifications

- BSc. Biodiversity and Conservation Biology (2018, University of the Western Cape)
- BSc. Hons. Biodiversity and Conservation Biology (2021, University of the Western Cape)
- MSc. Conservation Biology (2023, University of Cape Town)

References

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ABBREVIATIONS AND ACCRONYMS

CBA	Critical Biodiversity Area
CD:NGI	Chief Directorate: National Geo-spatial Information
DFFE	Department of Forestry, Fisheries, and the Environment
ESA	Ecological Support Area
EWT	Endangered Wildlife Trust
NEMA	National Environmental Management Act
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SSVR	Site Sensitivity Verification Report
WCBSP	Western Cape Biodiversity Spatial Plan

1. INTRODUCTION

Confluent Environmental Pty (Ltd) was appointed by Cape EAPrac (Pty) Ltd to provide faunal specialist inputs for the proposed upgrade of sewerage infrastructure in Groot Brak. Upgrades involve (1) the replacement of the existing sewer pipeline along Sandhoogte Road along with internal upgrades to the Sandhoogte Pumpstation, (2) the installation of new sewer pipelines along un-serviced erven and (3) the upgrade/replacement of the Cricket Field Pumpstation (Figure. 1).

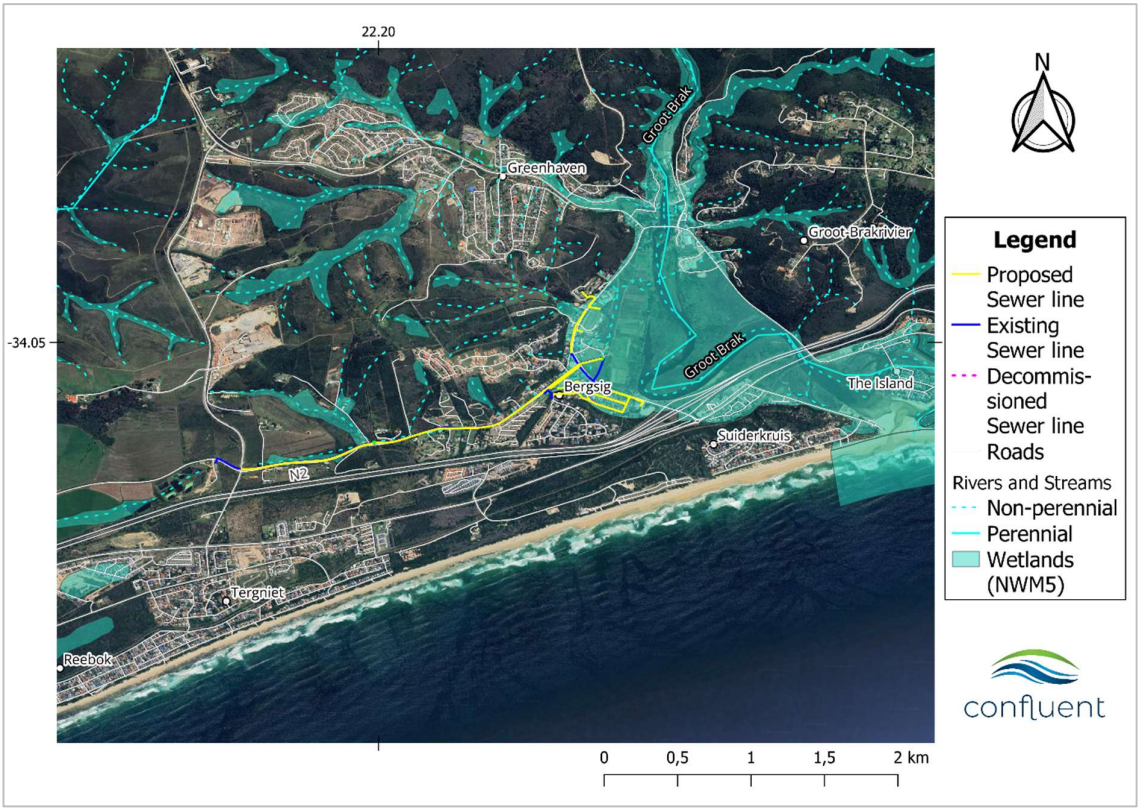

Figure 1. Location of the upgrade/ new sewer line, Groot Brak, Western Cape.

1.1 General Site Location and Infrastructure Layout

The infrastructure upgrade is planned to take place north of the N2 and west of the Groot Brak estuary. The Mossel Bay Municipality proposes upgrades involving (1) the replacement of the existing sewer pipeline along Sandhoogte Road along with internal upgrades to the Sandhoogte Pumpstation, (2) the installation of new sewer pipelines along un-serviced erven, (3) the upgrade/replacement of the Cricket Field Pumpstation. The proposed sewer line will be approximately 4,8 km in length with a construction footprint of 6m in width for installation during the construction phase.

1.2 Development Alternatives

Three development alternatives are proposed:

Alternative 1a (Figure 2)

- Renovation of the Existing Cricket Field Pumpstation and Expansion of the Existing Sump.
- Construction of a New Pumpstation next to Fourie Street.

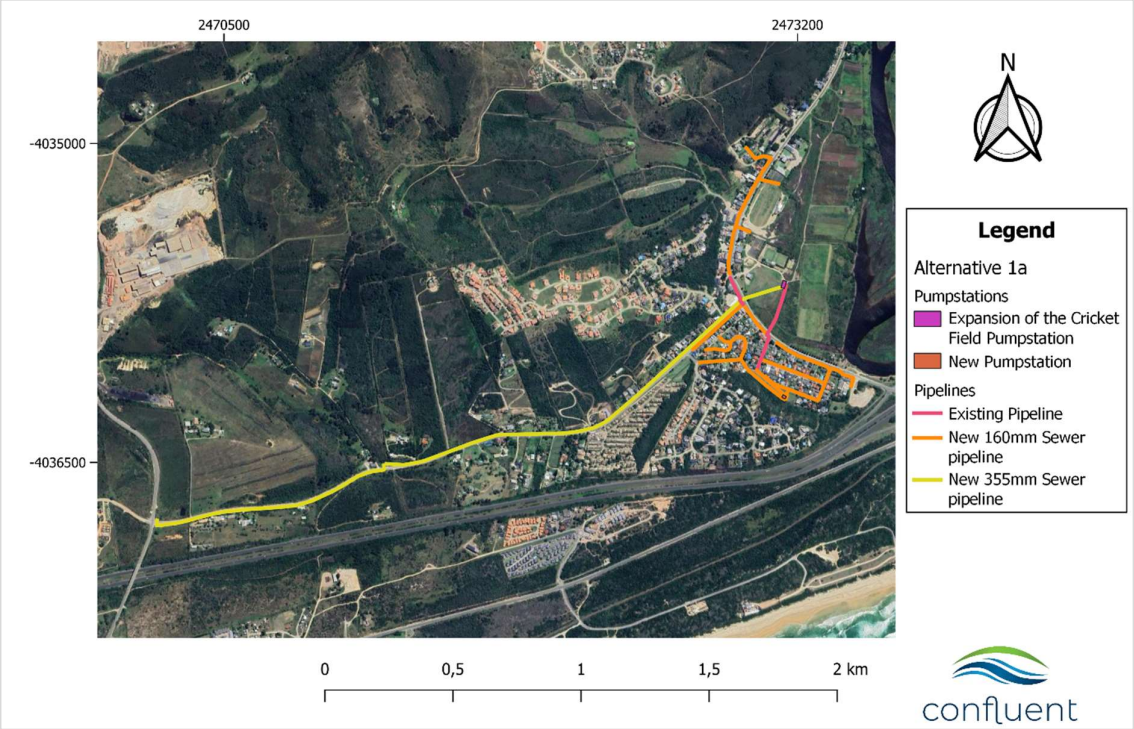

Figure 2. Alternative 1a for the Great Brak Sewer Line, Mossel Bay

Alternative 1b (Figure 3)

- New Pumpstation next to the Cricket Field Pumpstation.
- Decommissioning of the existing Cricket Field Pumpstation

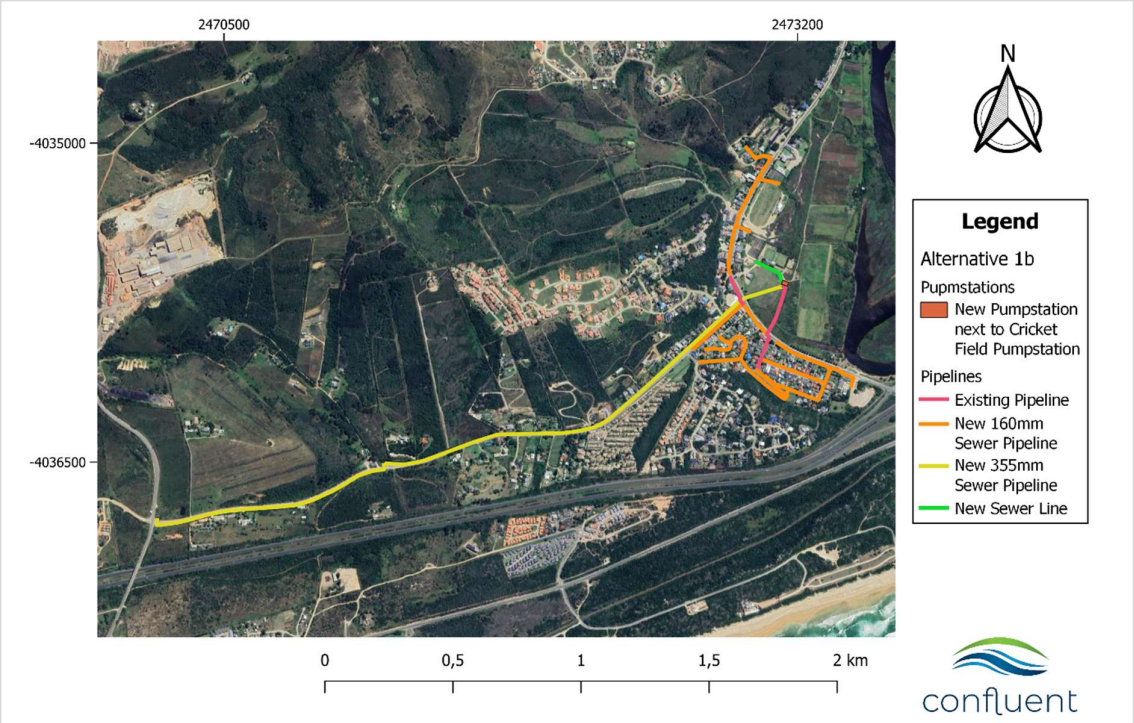

Figure 3. Alternative 1b for the Great Brak Sewer Line, Mossel Bay

Alternative 2 (Figure 4) preferred because it is located further from the estuary and closer to the 1:100 flood line

- New Pumpstation next to the Tennis Courts.
- Decommissioning of the existing Cricket Field Pumpstation.

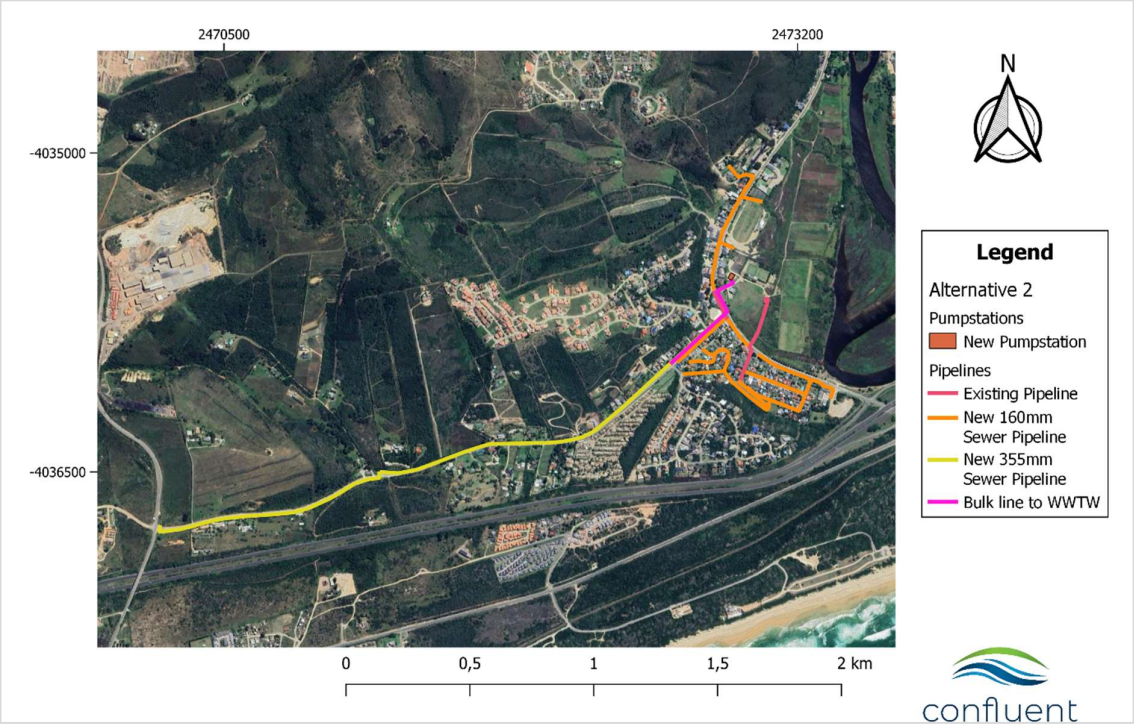

Figure 4. Alternative 2 for the Great Brak Sewer Line, Mossel Bay

All three alternatives include the following:

- Sewer System Upgrades along Sandhoogte Road.
    - New Ø355mm gravity sewer pipeline along Sandhoogte Road.
    - Upgrading of the Sandhoogte Pumpstation (only internal upgrades, no expansion).
- Sewer System Upgrades within Residential Neighbourhood.
    - New Ø160mm sewer pipeline to connect un-serviced erven to the sewer network.
    - The pipeline will be installed along Stander Street, Ebenezer Avenue, Wigget Street, Fourie Street, Van Rensburg Street, Long Street and Kerk Street.

The alternatives summarised above all have similar impacts on the faunal theme. The assessment in this report remains the same regardless of the final option that is chosen.

2. TERMS OF REFERENCE

2.1 Online Screening Tool

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA; Act 107 of 1998).

The Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool determined a HIGH and MEDIUM sensitivity for the terrestrial animal species theme across the project area (Figure. 6), with several animal Species of Conservation Concern (SCC) potentially present (Table 1).

As per Published Government Notice No. 1150 of the Government Gazette 43855 (30 October 2020):

A **HIGH** sensitivity rating indicates:

1. Confirmed habitat for SCC.

2. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.

These areas are unsuitable for development due to a very likely impact on SCC.

A **MEDIUM** sensitivity rating indicates:

1. Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species.

2. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY

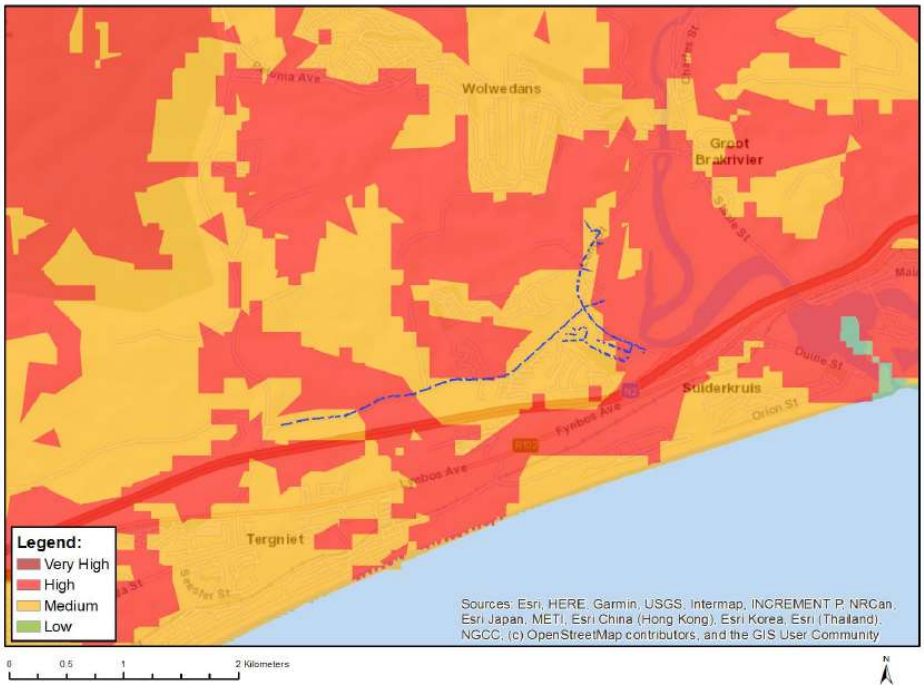

Figure 5. DFFE Online Screening Tool outcome for the terrestrial animal species theme for the project area. The sewerage infrastructure to be upgraded is indicated by the blue dashed line.

Table 1. Species of Conservation Concern highlighted by the DFFE Online Screening Tool for the project area.

Sensitivity	Classification	Scientific name	Common name	Red list status*
High	Avifauna	*Circus ranivorus*	Marsh Harrier	Endangered
High	Avifauna	*Hydroprogne caspia*	Caspian Tern	Vulnerable
High	Avifauna	*Neotis denhami*	Denham's Bustard	Vulnerable
High	Avifauna	*Bradypterus sylvaticus*	Knysna Warbler	Vulnerable
High	Avifauna	*Polemaetus bellicosus*	Martial Eagle	Endangered
Medium	Amphibian	*Lepidochrysops littoralis*	Coastal Nimble Blue	Endangered
Medium	Mammal	Sensitive species 8	-	Vulnerable
Medium	Invertebrate	*Aneuryphymus montanus*	Yellow-winged Agile Grasshopper	Vulnerable
Medium	Invertebrate	*Aloeides thyra orientis*	Red Copper Butterfly	Endangered

* Red list status as per SANBI's Red List of South African Species http://speciesstatus.sanbi.org.

2.2 Scope of Work

The purpose of this report is to verify the site sensitivity of the area proposed for infrastructure upgrades for the terrestrial animal species theme in accordance with the protocols specified in the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020).

The site sensitivity verification includes:

A desktop assessment, to:

- Characterize the vegetation, climate, general habitat features and topography of the property.
- Assess the property's location within the context of the Western Cape Biodiversity Spatial Plan (WCBSP).
- Conduct a historical assessment of the project area and immediate surroundings for any disturbances, development, and changes in land use or habitat characteristics over time.
- Provide information on the habitat requirements for Species of Conservation concern highlighted by the DFFE online screening tool, in addition to other SCC indicated through online resources (e.g. Virtual Museum, iNaturalist) for the property and surrounding areas.

On-site inspection(s) and field assessments to:

- Verify the current land use and identify current impacts or disturbances on the property.
- Characterize faunal habitats, determine the habitat suitability and the likelihood of SCC occurring on the property.
- Conduct taxa-specific sampling for SCC in suitable habitats.

Any other available and relevant information from

- Discussions with landowners/neighbours.
- Previous report findings for the property or surrounding areas.

Should the site sensitivity verification indicate a **LOW** sensitivity, then a Terrestrial Animal Species Compliance Statement will be issued.

Should the site sensitivity verification indicate a **HIGH** sensitivity, then a Terrestrial Animal Species Specialist Assessment will be compiled.

3. DESKTOP ASSESSMENT

3.1 Vegetation, Climate and General Habitat

Groot Brakrivier in Mossel Bay, Western Cape falls within the Fynbos biome and experiences a temperate climate year-round (Mucina and Rutherford 2006, Rebelo, *et al.* 2006). The mapped vegetation type at the site includes Garden Route Granite Fynbos, Hartenbos Dune Thicket, and Groot Brak Dune Strandveld- a detailed botanical specialist assessment is

available (B. Fouche, Confluent Environmental). Average temperatures range between 22℃ and 12℃, with the hottest days experienced from December to March peaking in February at around 32℃ and the coldest days experienced from June to August not falling below 1℃. Rain occurs throughout the year in a bimodal pattern with peaks in March and November (Figure 6).

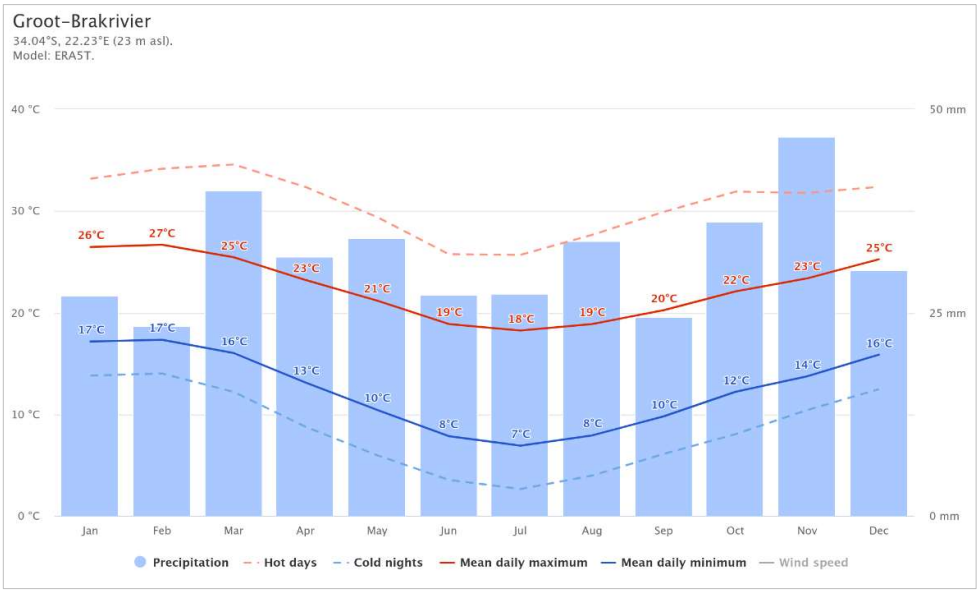

Figure 6. Summary of historical climate (modelled) for Groot Brakrivier (www.meteoblue.com).

Satellite imagery from Google Earth and Cape Farm Mapper was used to assess general vegetation structure, elevational gradients, and water bodies within the project area (Figure 7). The site mainly comprises of urban spaces, suburbs, infrastructure, and pasture. The highest elevation at the site is 80masl (the western extent of the Sanddhoogte road) and the lowest elevation is 5 metres above sea level (masl).

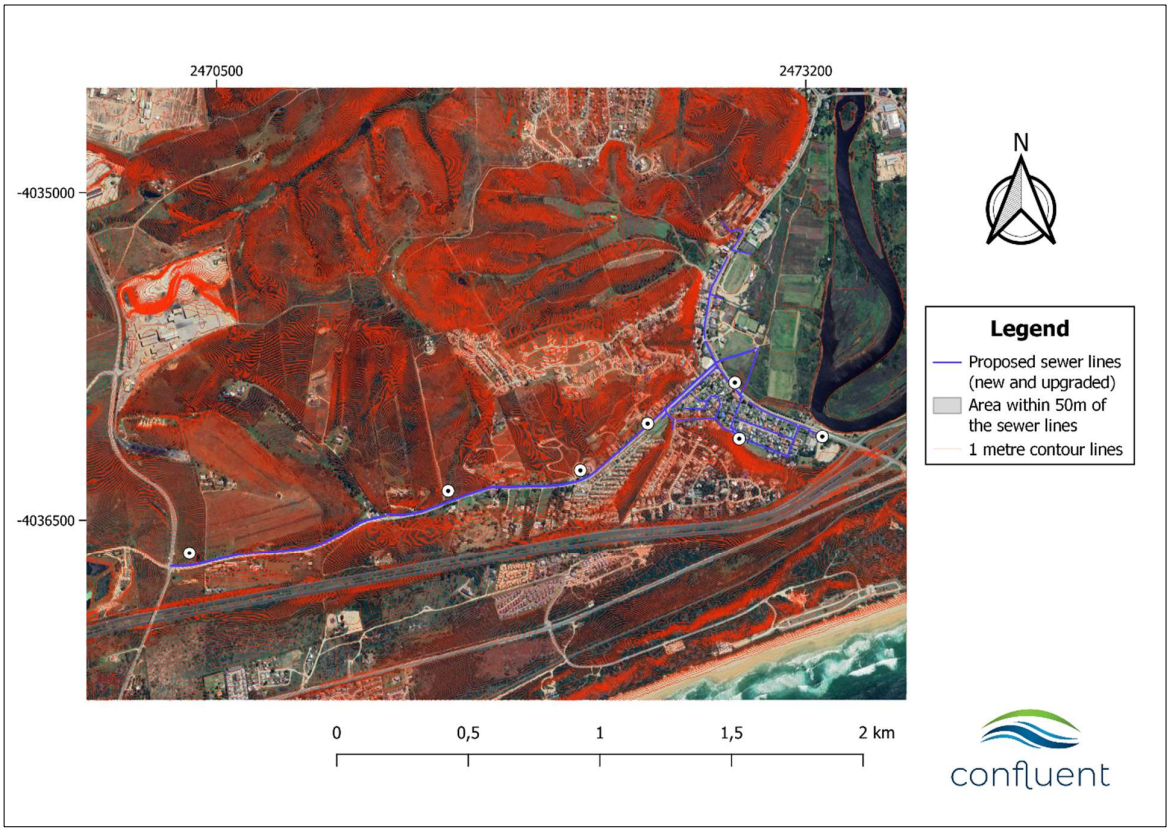

Figure 7. Satellite imagery of the proposed sewer line update and new infrastructure site (in blue) as well as topography (5m contours). The Groot Brak estuary is shown in the east.

3.2 Western Cape Biodiversity Spatial Plan

Additional mapping layers were applied to the project area to include the Western Cape Biodiversity Spatial Plan (CapeNature 2017), with Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) assessed in Figure 8 and Table 2. Most of the project area falls within a large CBA1 and ESA2 zone, with small areas of CBA2 and ESA1 along the sewerline (Figure 8). The reason for this assignment is due to the site containing key vegetation and aquatic zones flagged for protection:

Bontebok Extended Distribution Range

Canca Limestone Fynbos (LT)

Coastal resource protection- Eden

Groot Brak Dune Strandveld (EN)

South Coast Limestone Fynbos Flat Wetland

South Strandveld Western Strandveld Seep Wetland

Water source protection- Groot-Brak

Watercourse protection- Southern Coastal Belt

Western Cape Milkwood Forests (EN (C))

See also the Botanical Specialist Report by B. Fouche (Confluent Environmental) and Aquatic Specialist Report by J. Dabrowski (Confluent Environmental) for additional information on these mapped layers.

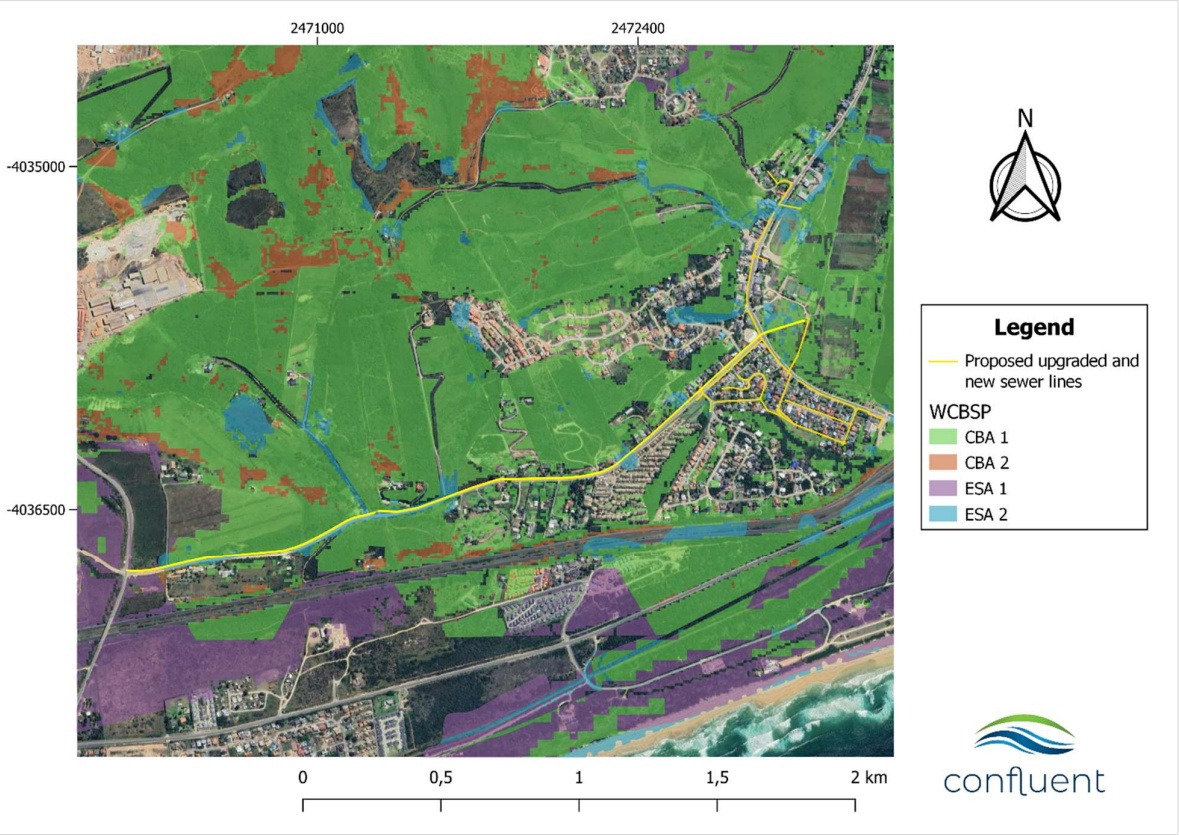

Figure 8. Location of the upgrade/ new sewer line, Great Brak with layers for the Western Cape Biodiversity Spatial Plan's Critical Biodiversity Areas 2017 (CBA1 and CBA2) and Ecological Support Areas (ESA1 and ESA2).

A newer version of the BSP was released in late 2024 (Cape Nature 2023), which shows no ESA areas in the landscape but maps CBA1 and CBA2 (degraded) areas instead (Figure 9).

Figure 9. Location of the upgrade/ new sewer line, Great Brak with layers for the Western Cape Biodiversity Spatial Plan's Critical Biodiversity Areas 2023 (CBA1 and CBA2), as sourced from Cape Farm Mapper.

Table 2. Definitions and objectives for conservation categories identified in the Western Cape Biodiversity Spatial Plan (CapeNature 2017) (Cape Nature 2023).

WCBSP Category	Definition	Management Objective
Critical Biodiversity Area 1 (CBA1)	Areas in a natural condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
Critical Biodiversity Area 2 (CBA2)	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.
Ecological Support Area 1 (ESA 1)	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.
Ecological Support Area 2	Areas severely degraded or have no natural cover and ecological functioning severely impaired. Not	Restoration required to return ecological functioning. Some limited habitat loss may be acceptable. A greater range of land uses

(ESA 2)	essential for meeting biodiversity targets but support ecological functioning and delivering ecosystem services.	over wider areas is appropriate but ensures the underlying biodiversity objectives and ecological functioning are not compromised.

3.3 Historical Assessment of Project Area

The eastern half of the area proposed for the upgrade and development of new infrastructure is heavily built up for housing and small businesses (Bergsig) whilst the western half (Sandhoogte) consists mainly of natural spaces, smallholdings and farmlands. There is an existing 200mm sewer pipeline within the road reserve of Sandhoogte road. It is proposed to replace this pipeline with a greater capacity pipeline. ew sewer pipelines are proposed along un-serviced erven in Great Brak River. This is proposed to happen under roads, within road reserves, and under paved sidewalks which represent a current disturbance for fauna.

In 2004, development existed in the east of the project area (Figure. 11). Evidence of further expansion exists in the form of roads developed in the area. The west of the project area has limited development with predominantly livestock grazing in the mid-section of Sandhoogte Road and vegetated waterways and natural spaces in the mid-section of the road dominated by shrub species. The area designated for the new pumpstation in the Bergsig suburb is already heavily grassed as it is today. The Cricket Field pumpstation is already in existence, and the locations for new pumpstations as outlined in the alternatives are transformed (grassed).

By 2006, new developments appear south of the proposed pipeline, east of the Sandhoogte Pumpstation. Additional clearing has taken place (in purple) to accommodate future development.

In 2011 new roads are seen in the area cleared by 2006 (in purple), and development has densified south-west of the proposed new pumpstation in the east as given in Alternative 1a.

The 2017 imagery shows no change to any element of the landscape close to the area to be upgraded or added.

Today, the area outlined in purple has a higher number of dwellings, which indicates that the town is continuing to grow. This necessitates the infrastructure changes proposed and assessed in this report.

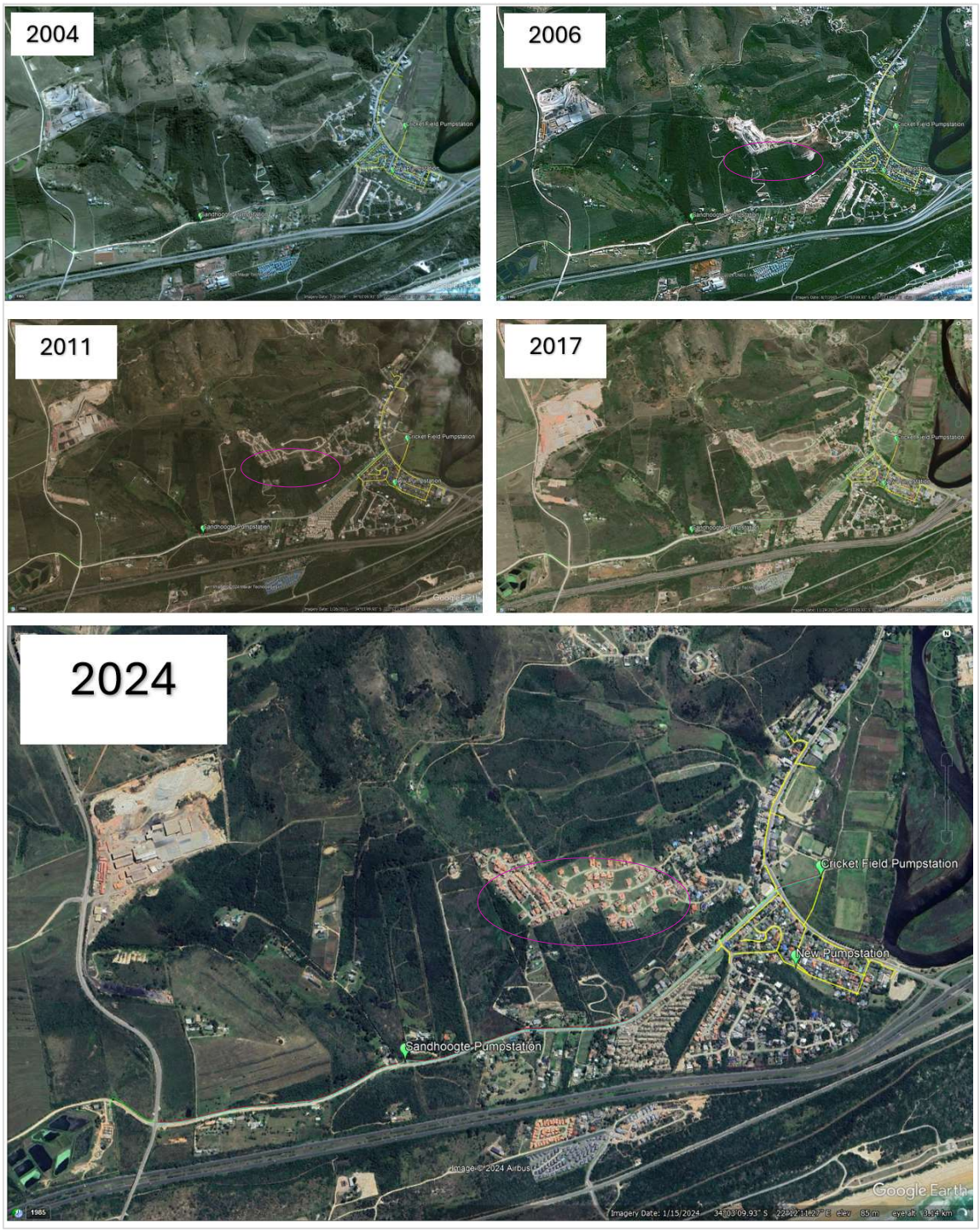

Figure 10. Historical imagery of Groot Brakrivier sourced from Google Earth.

3.4 Species of Conservation Concern (SCC)

In addition to the SCC highlighted by the DFFE screening tool (Table 1), the following public resources were consulted to provide additional SCC for the site and its immediate surroundings:

1. iNaturalist (all taxa) within approximately 2 km x 2 km of the project area (URL for iNaturalist search area).
2. Virtual Museum for herpetofauna, mammals and invertebrate taxa within the Quarter Degree Square (QDS) 3422AA: DungBeetleMAP, FrogMAP, LacewingMAP, LepiMAP, MammalMAP, OdonataMAP, ReptileMAP, ScorpionMAP, SpiderMAP.
3. South African Bird Atlas Project (SABAP2) for pentad 3400_2210.

Some SCC reported on the platforms were highly unlikely to occur at the site given either clearly unsuitable habitat or being deemed a vagrant/transient animal. For the purposes of this report these animals were excluded from further assessment (see also Section 4.2 and Appendix 1 for additional information).

The combined list of SCC (from DFFE Screening Tool and public resources) possibly occurring in Groot Brakrivier along with their habitat, breeding and feeding requirements are listed in Table 3. The information for each SCC presented in Table 3 stems largely from the online SANBI Red List of South African Species (http://speciesstatus.sanbi.org) in addition to a few key resources for each taxa:

4. Avifauna: Roberts Birds of Southern Africa VII (Roberts, et al. 2005)
5. Mammals: The Mammals of the Southern African Subregion (Skinner 2005)
6. Invertebrates:
    - Field guide to the insects of South Africa (Picker, Griffiths and Weaving 2019)
    - Field guide to the butterflies of South Africa (Woodhall 2005)
    - Field guide to the spiders of South Africa (Dippenaar-Schoeman 2023)

Any information presented from different sources is cited in the text.

Table 3. Summary of habitat, breeding and feeding requirements for animal SCC potentially occurring in Groot Brakrivier.

Species	Redlist status	Habitat	Breeding	Feeding
AVIFAUNA				
Circus maurus Black Harrier	Endangered	In Western Cape, mostly found in Fynbos, especially montane Fynbos and Strandveld. Less common in dry restios and renosterveld. Elsewhere, occurs in dry grassland, Karoo scrub, crop fields (wheat) and grasslands (sometimes at >3000m elevation). Many move from Fynbos to Karoo and grasslands during the winter, likely to follow rodent numbers (e.g. capitalise on late summer litter of Sloggett's ice rats in Free State and Lesotho). Birds move away following fires and don't return for several years.	Mainly monogamous but some polygamy observed. Mate fidelity is low. Usually solitary nester and territorial, but in Western Cape some semi-colonial nesting observed with less territorial behaviour. Nest is a small structure of grass, stems, and small twigs. Usually on or just above ground, in rank marsh grasses or near Fynbos bushes and sedges (*Juncus* sp.) Nests most often in marshes or next to small streams, but also on damp soil or dry ground. Nest areas reused in successive years (one observation of nest site used for 26 years).	Specialist predator of mice and birds. Predominantly rodents (vlei rats, mice) eaten by birds in Fynbos areas and small birds (Common Quail) dominate diet of birds in mountain areas. Also takes reptiles, frogs, and insects to a lesser extent. Sometimes caches prey. Forages most actively on blustery days (windy and rainy), hovers 1-3m above vegetation with buoyant flight. Flashes into vegetation, hits prey hard and eats on ground. Perch hunting rare.
Circus ranivorus Marsh Harrier	Endangered	Considered a waterbird. Roosts on taller trees around wetland edges from where it has a good vantage point. Can adapt to novel wetland habitats such as wastewater treatment works.	Breeding occurs between September and December. Egg-laying is from August to November in South Africa. Nests made of grass, reeds, stems or sticks. Nests in reedbeds, short sedge areas or in trees along the water's edge. The same nest is often reused by the same pair in following years.	Dietary assessment (Simmons et al., 1991) of pellets and prey deliveries to nests includes birds, frogs, fish, eggs and micromammals (*Rhabdomys*, *Otomys*, and Shrews). Hunts primarily in wetland habitats using various flight methods including soaring, hovering and low flight over wetlands and along the water's edge. May hunt in open grasslands or pastures near wetland areas.
Phalacrocorax capensis Cape Cormorant	Endangered	Restricted to inshore marine waters, estuaries and lagoons. Roosts at colonies and other coastal sites protected from predators (islands in wetlands) or open areas with good visibility (salt pans, broad beaches).	Monogamous. Colonial nester mostly in large colonies. In Namibia breeds on guano platforms. Breeding range extends from Ilha dos Tigres, southern Angola to Bird Island, Eastern Cape. Nest is a loose pile of sticks, feathers, bones. In waves from Western Cape year-round, with peak in Sep-Feb.	Forages 10-20km offshore but also in coastal wetlands. Feeds in association with other species (in wetlands with grebes, terns, gulls, egrets). Diet includes mainly pelagic schooling fish (e.g. sardines, anchovies) and to a lesser extent other fish species and crustaceans.

Polemaetus bellicosus Martial Eagle	Endangered	Savanna, Karoo shrubland, semi desert. Can occur in open farmland with clumps of trees. Rare in mountainous and forest areas.	Monogamous, pair bond lasts several seasons. Solitary nester. Nest is a substantial platform of sticks (up to 1.5m long and 3cm thick) on tall trees or pylons. Nest tree usually tallest in vicinity, and nest placed in a large fork below the canopy. Rarely uses rocky outcrops. One egg laid, incubation 48-53 days predominantly by female bird.	Mainly small mammals like hare, jackal, small antelope, mongoose, small baboons, but also small stock animals, birds (especially gamebirds) and reptiles (especially monitor lizards). Usually hunts on the wing by soaring high and attacking in long slanting stoop. Surprises prey by using available cover. Occasionally hunts from perch, especially at waterholes or along game trails. Prey killed by impact or strangulation and taken to high perch to eat.
Stercorarius antarcticus Brown skua	Endangered	Occurs year round in South Africa. Mainly over continental shelf, scarce in oceanic waters. Often close to shore but seldom on land	Breeding outside of South Africa.	Forages by surface seizing and aerial dipping or kleptoparasitism of other bird species. Predator of burrowing petrels. Eats hake and other fishery discards. Eats fish squid, crustaceans, molluscs, seabirds, and carrion.
Bradypterus sylvaticus Knysna warbler	Vulnerable	Inhabits dense understorey vegetation along riverbanks in fynbos forest patches, riverine woodland and afromontane forest and has even adapted to thickets of non-native brambles (e.g. *Rubus*). (BirdLife International, 2016).	Breeds from August and December coinciding with the greatest abundance of invertebrate species. (BirdLife International, 2016).	Mostly on ground, creeping through dense, matted vegetation and scratches in humus. Eats mostly grasshoppers, insect larvae, spiders, slugs, and worms
Falco biarmicus Lanner Falcon	Vulnerable	Most frequently in open grassland or cleared woodlands and agricultural lands. Breeding pairs favour habitat close to cliffs but will also be found near alternative roosting sites like electricity pylons, buildings, large trees.	Monogamous, long-term pair bond, territorial. Nest is typically a simple scrape on cliffs, buildings, or bird boxes but will occasionally use stick nests from other species (including White-necked raven, Verreaux's eagle, Bateleur) in trees or electricity pylons.	Hunts from high perch or from air, using speed to surprise and catch prey but also adept at using cover. Prey taken in air and on ground. Pairs can hunt cooperatively. Prey mostly birds (>80%) but will also take reptiles and insects.
Hydroprogne caspia Caspian Tern	Vulnerable	Concentrated at estuaries and sheltered bays along the coastline and at large, permanent inland waterbodies (natural and artificial). The primary threats to this species are during the breeding period when it is	Coastal breeding habitat is primarily offshore islands but increasingly uses sandy beaches. Inland breeding habitat includes small islets in dams/pans. Monogamous, pair bonds lasting from year to year.	Forages in clear, shallow water. Feeds throughout the day but most active the mornings. Diet almost entirely of fish, swallowed in flight.

		highly susceptible to human disturbance, predation by domestic dogs and kelp gulls, and extreme weather events.	Defends territory around nest site. Nest is shallow scrape on ground lined with dead vegetation. Laying dates in Western Cape are October- January. 1-3 eggs laid, incubation lasting 22-24 days.	
Neotis denhami Denham's Bustard	Vulnerable	Inhabits a mosaic of cultivated pastures, agricultural croplands and natural vegetation, with seasonal variation in their preferences (Allan, 2003). Cultivated pastures are favoured habitat during winter in the southern Cape (Allan, 2003). Harvested cereal crop fields (stubble fields) are favoured, but ploughed fields and fields with growing cereal crops are avoided (Allan, 2003). Primarily inhabits open grasslands and African savannas (Allan, 2003). Being large-bodied with low flight manoeuvrability also leads to preference for open habitat. Preference for grasslands with a mix of short and tall grasses, and good visibility for foraging. Proximity to water sources, such as rivers or wetlands, is important for drinking and potential foraging (Allan, 2003). Avoids dense forests and habitats with high human disturbance.	Male courtship displays occur between August and January, but mainly in September and October (Allan, 2003). Eggs are laid in September and October, with unfledged young present between September and January (Allan, 2003). Preference for natural vegetation over pastures during summer breeding months. Larger bird groupings occur in winter, while in summer smaller groupings or individual birds occur. Nesting sites are concealed in open grasslands, often near vegetation or shrubs. Females construct shallow ground nests lined with grass or plant materials. Clutches consist of 1-3 eggs, incubated primarily by the female. Incubation lasts around 21-24 days.	Ground-dwelling bird that forages in open grasslands and savannas (Tarboton, 1989). Diet is omnivorous including insects, seeds, fruit, and vegetation. Grasshoppers, beetles and termites are important insect prey, especially in the breeding season (Allan, 2003). Feeding technique is probing and pecking the ground with their long bills. Opportunistically feed on grasshopper swarms.
Sagittarius serpentarius Secretarybird	Vulnerable	Grassland, open savanna, Karoo shrubland with scattered trees. Can occupy other short-grass areas. Absent from rocky hills and dense woodlands.	Monogamous, solitary nester. Territorial with home ranges usually 50-60 km^2 around nests, actively defends against conspecifics. Nest is a large flat platform on top of flat thorn trees (*Senegalia* or *Vachellia* sp.) or black wattle (*Acacia mearnsii*). Nests can be reused in successive years. 1-3 eggs laid, incubation 40-46 days.	Anything it can overpower (insects, reptiles, birds, small mammals). Attracted to recently burnt areas for prey but does not eat carrion. Most prey caught on ground with bill and swallowed whole. Larger prey killed with downward blows of feet and torn up before swallowing.

Certhilauda brevirostris Agulhas Long-billed Lark	Near Threatened	Sparsely vegetated shrubs and agricultural fields. Less common in fynbos, with favouring sandy areas with restios. Endemic to Western Cape Province and largely restricted to the Agulhas Plain and Overberg wheatbelt, east of the Hottentots Holland Mountains.	Presumed to be monogamous. Males defend non-overlapping territories. Nest is a cup of dry grass lined with fine grass and roots located on the ground under cover of shrubs. Laying dates September-October.	Forages on ground, digging with bill or pulling vegetation with feet. Diet includes mostly insects with some seeds.
Grus paradiseus Blue Crane	Near Threatened	Open grassland, grassland/ Karoo, wetlands. Habitats with >300mm per year annual rainfall. Adapted to crop lands and pastures and tolerant of intense grazing or burnt grasslands.	Monogamous, solitary nester. Nests on wet ground (on a pad of vegetation) or dry ground (small layer of stones, dung, vegetation). Often reuses same nesting site for several years.	Pecking and digging with bill. Omnivorous, feeds on small bulbs, seeds, roots, insects, crabs, amphibians, fish, and small mammals. Eats crops (maize, lucerne, wheat) and sometimes noted as causing damage, but also eats insect pests. Commonly feeds at small stock feedlots
Limosa lapponica Bar-tailed Godwit	Near Threatened	Estuaries, sheltered embayments, and coastal lagoons with soft substrata. Small numbers forage on open sandy beaches, eg at Cape Recife, Eastern Cape. Occasionally at coastal sewerage works and commercial saltpans; in latter habitat, favours low salinity pans. Inland, on muddy edges of pans and vleis.	Breeding is extralimital.	Forages at water's edge on intertidal mud-sandflats, also in water up to ca. 150 mm deep; walks more slowly in water than on mud. Hunts mostly tactilely, both by shalow and deep probing , sometimes inserting bill fully; less often by surface pecking. Visual cues are also used in selecting probe sites. Eats polychaetes, molluscs, crustaceans, and fish fry.
Numenius arquata Eurasian Curlew	Near Threatened	Coastal wetlands; forages on intertidal mud- and sandflats and roosts on adjoining salt-marshes, sand-dunes, mangroves or rocks.	Extralimital two adults with possible chick at Swartkops estuary Eastern Cape is the only suggestion of breeding in South Africa.	Diet in non-breeding season is primarily aquatic invertebrates, including shellfish, mudprawns, small crabs, shrimps, and polychaete worms. Inland eats insects, insect larvae, sometimes small vertebrates and vegetable matter.
Phoenicopterus minor Lesser Flamingo	Near Threatened	Primarily open, eutrophic, shallow wetlands. In South Africa, breeds on saline lakes and saltpans. Non-breeding birds aggregate at coastal mudflats, saltworks and sewerage treatment works where salinities are high. Small ephemeral freshwater wetlands are	Nest is a small mound of mud built close to water on flooded saltpan. Height varies from a few centimetres on dry substrata to 0.4 m where damp mud is available. Laying: Botswana- November to April; Namibia- Jan to April.	Filters cyanobacteria and small diatoms. Can feed for up to 12 hours a day.

		very important for birds dispersing from breeding grounds.		
Phoenicopterus roseus Greater Flamingo	Near Threatened	Favours shallow saline or brackish waterbodies i.e. salt pans, large dams, coastal mudflats. Most important wetlands: Lake St. Lucia (KwaZulu-Natal), Leeupan/Barberspan (North-West), Kamfers Dam (Northern Cape) and Langebaan Lagoon, Strandfontein Sewage Works, and the Berg River Estuary (Western Cape).	Breeds at recently flooded saltpans, coastal mudflats, inland dams, sewerage treatment works, small ephemeral pans and river mouths. Monogamous, changing mates between year. Colonial nester. Laying dates Nov-Aug.	Wades in water to belly-depth. Filters small invertebrates in mud. Diet includes brine shrimp and brine flies. Also eats molluscs and diatoms.
Calidris ferruginea Curlew Sandpiper	Least Concern (Regional), Near Threatened (Global)	Estuaries, lagoons, sheltered coastlines and inland wetlands with muddy fringes.	Non-breeding migrant. Arrives in Aug and departs in Mar, with some juveniles overwintering in region.	Polychaete worms, molluscs, crustaceans, fly larvae
TERRESTRIAL INVERTEBRATES				
Aloeides thyra orientis Red Copper Butterfly	Endangered	Restricted range taxon endemic to the Western Cape from Witsand to Gouritsmond in the west, to the Brenton Peninsula near Knysna in the east. Declining because of alien plant encroachment and lack of regular burning of the fynbos. 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.	Adults are on wing from July to April with peaks in October and February. Several generations per year through the warmer months (Woodhall, 2005)	Larvae feed on *Aspalathus acuminata*, A. laricifolia and A. cymbiformis. The larvae are attended to by *Lepisiota capensis* ants (Woodhall, 2005).
Aloeides trimeni southeyae Trimen's Copper Butterfly	Endangered	Restricted range endemic to the southern coastal region in the Western Cape Province. Three widely separated (disjunct) populations between Albertinia in the west and Hartenbos in the east. Grassy Fynbos near Mossel Bay. Gentle north-facing	Two broods, Sep-Dec (peak Oct) and Jan-Apr (peak Feb).	Larval food includes *Aspalathus* sp. and *Hermannia depressa*.

		slopes, sparsely covered by low shrubs with bare ground in between. Flat lands.		
Lepidochrysops littoralis Nimble Coastal Blue	Endangered	Endemic to the Western Cape with severely fragmented and isolated populations existing between De Hoop Nature Reserve (near Bredasdorp) in the west to a few kilometres west of Mossel Bay in the east. Rocky limestone ridges or sand dunes in coastal fynbos. Usually found quite close to the sea-shore, as at Still Bay. May be suitable habitat between some of the known locations on rocky outcrops. Male has territories around clumps of shrubs, dune peaks and clearings in dense vegetation.	Extended brood from late Aug-Dec.	No larval food known.
Aneuryphymus montanus Yellow-winged Agile Grasshopper	Vulnerable	Very low area of occupancy between 100 and 1000 km^2. Threatened by declining habitat due to invasion by aliens and habitat transformation. Strong association with sclerophyllous fynbos vegetation on the southern slopes of the Outeniqua mountains, post-fire. Threats to the species include habitat transformation and invasion by alien plants.	Not known	Not known
Circellium bacchus Flightless dung beetle	Vulnerable	Endemic to South Africa, on the Southern coastline in the winter and bimodal rainfall regions. Habitat types include the Albany Thicket and Fynbos biome, including vegetation units in Shale Renosterveld (FRs), Limestone Fynbos (FFl), Sandstone Fynbos (FFs), Sand Fynbos (FFd), Strandveld (FS). Abundant in dense shrub/woodland on sandy soils; most uncommon in adjacent disturbed open vegetation (Davis et al. 2020). Flightless, ectothermic and diurnal with maximal	In Addo Elephant National Park buffalo and cattle dung preferred for breeding, but also recorded on dung of monkey, human, rhinoceros, hare, ostrich (Davis et al. 2020).	Elephant dung preferred for feeding but also recorded on dung of monkey, human, rhinoceros, hare, ostrich (Davis et al. 2020).

		activity between 18–26°C, particularly after rainfall (Davis et al. 2020).		
Aloeides pallida littoralis Knysna Pale Copper Butterfly	Near Threatened	Endemic taxon to the Western Cape Province. Relatively flat terrain near the coast, coastal Fynbos	Little known, but *Lepisiota capensis* ants are hosts for subspecies *A. p. grandis*.	Little is known, but larval food for the subspecies *A. p. pallida* and *A. p. jonathani* feed on *Aspalathus* species. The larvae of subspecies *A. p. grandis* are fed by trophallaxis by *Lepisiota capensis* ants and feed on these ant eggs.
Ceratogomphus triceraticus Cape Thorntail Dragonfly	Near Threatened	Wide range throughout the Western Cape. Pools in streams, and occasionally in reservoirs. Rocky, shallow rivers, with deposition pools, and possibly farm dams. Usually in fairly open or hilly countryside. Main threat is invasive alien trees, loss of habitat, water pollution and to lesser extent agriculture. Clearing of alien trees greatly benefits species.	Not known.	Little is known, but taxon is insectivorous.
MAMMALS				
Damaliscus pygargus pygargus Bontebok	Vulnerable	Suitable natural habitat within the indigenous natural range and coastal lowlands is limited to the remaining renosterveld patches and some grassy micro-habitat patches in the fynbos areas of the Overberg region. Bontebok also make use of small grassy microhabitats or recently burnt fynbos and strandveld habitats.	Males defend their territories throughout the year. The average nursery herd size is three adult females with 1.5 lambs. 3 ± 2.2 females have been found in a breeding herd with 18 individuals. Bachelor herds consist of males of all ages older than one year, as well as yearling females. Young males and females leave the nursery herd of their own accord and can remain solitary but usually join bachelor groups. Males do not seem to establish territories before the age of five to six years of age and return to bachelor herds once displaced from their territories. The main calving season is September–October and the rutting season from January to mid-March.	Bontebok are almost exclusively grazers with a preference for short grass and recently burnt veld. Water is an essential habitat requirement, and they stay within 1.5 km from surface water during the dry season.

Sensitive Species 8	Vulnerable	Specialised habitat requirements within a home range of ca. 0.75 ha (Skinner & Chimimba, 2005). Strong habitat preference for dense vegetation with good undergrowth providing good cover in which to retreat. Forest, thicket, dense coastal bush, independent of water. Can inhabit forest edges and transitional zones. Requires diverse plant community with variety of tree and shrub species. Can adapt to fragmented habitat given sufficient cover and food availability. Actively avoids open grasslands, and areas with human disturbance.	This species can breed throughout the year. Males establish territories and exhibit aggressive behaviours towards other males and to attract females.	Highly selective feeders, often feeding on food below troops of monkeys or frugivorous birds which drop lots of material. Preference for fruit, but also fallen leaves, flowers and insects. Seldom actively browse. Active in the early morning and late afternoon, foraging for around 8 hours a day within their territory.
Poecilogale albinucha African Striped Weasel	Near Threatened	Rare in range and easily overlooked, predominantly nocturnal and well adapted to subterranean lifestyle. Most abundant in savanna and grasslands, particularly with rainfall >600mm per year. But habitat tolerance is very broad, found in lowland rainforest, semi-desert grassland, fynbos (with dense grass) and pine plantations (Child et al. 2016).	Breeding season during spring and summer months in southern Africa. Usually only one litter per season, comprises of 1-3 pups, fully grown at 20 weeks.	Small mammal specialist, up to own body weight in size, but occasionally takes birds also. Has fast metabolism and requires an abundance of prey in territory (Child et al. 2016). Considered to have very close association with mole-rats, likely as a food source but also for habitat preference, especially in western, drier sections of its range (Child et al. 2016).

4. FIELD ASSESSMENT

4.1 Methods

Following the Species Environmental Assessment Guidelines (SANBI 2020) and Table 3, taxa-specific sampling techniques were conducted in habitats where SCC were likely to occur. Taxa-specific sampling was interspersed with a meander across the project area to collect additional opportunistic data for all fauna and inspect all habitat types (Table 4).

Table 4. Sampling techniques conducted for potential SCC occurring in Groot Brakrivier, Mossel Bay Municipality.

Taxa	Field methods	Public platform where observations were reported
Avifauna	• Meander* across site for direct observations. • 7 point counts (5-minute bird counts).	Birdlasser (species lists), iNaturalist (photos)
Mammals	• Meander* for direct observations, tracks, scats, and signs.	iNaturalist (photos)
Invertebrates	• Meander* across site for direct observations. • Active searching. • Sweep netting.	iNaturalist (photos)

*Meandering involved 4.3 km of slow walking across the site through various habitat types and key landscape s. Active observations took place for all fauna throughout this walk which was then supplemented by taxa specific sampling methods in habitats deemed most suitable for SCC.

4.2 Assumptions and Limitations

1. While the public platforms mentioned in Section 3.4 are excellent sources of additional information for animal species occurring within an area, these results require some expert interpretation to determine which of the SCC are relevant to include in the faunal assessment of the project area. For example, the coarse spatial scale of reporting within the Virtual Museum platforms (Quarter Degree Square level (27km x 27km) or SABAP2 pentad level (9km x 7 km)) can result in species records from habitats quite different to those present on site. Additionally, these platforms as well as iNaturalist sightings include sightings of vagrant or transient animals upon which an assessment cannot reasonably be based. Expert interpretation is therefore applied to the full list of SCC identified by the various public platforms (see Appendix 1) and some species are then excluded from further assessment due to the project area clearly lacking suitable habitat or the species clearly representing a vagrant or transient animal outside its normal range. The SCC assessed in this report therefore represent those which may reasonably occur on site. However, there is always the possibility that some SCC (although highly unlikely to occur on site) are overlooked in this process.
2. One field visit took place to the site for the faunal assessment. This only represents a “snap-shot” in time and it is possible that SCC occurring on site were not observed during these visits. These results should therefore be interpreted with this in mind and not be treated as an exhaustive list of species occurring on site.
3. Site visits took place during daylight hours so the likelihood of encountering nocturnal species was limited.

4. The site visit coincided with winter months. This may be of consequence for some species showing seasonal variation in breeding and activity patterns.
5. Evidence of animals in the form of tracks, scats, and signs always brings with it a level of uncertainty, but best efforts were made in this regard and uncertainties are highlighted in the report.

4.3 Site Inspection Details

One site visit took place in Groot Brakrivier on 7 July 2024. The weather was warm with clear skies and minimal wind. Habitat types found within 50m (an estimate for the geographic extent of potential noise disturbance by the sewerage infrastructure upgrades) of the project area consisted mainly of transformed areas, non-natural gardens/ lawns, thicket vegetation, and agricultural lands (pasture) (Figure. 12; Figure. 13). An effort was made to cover the project area with the meander and to conduct taxa specific sampling techniques across a range of suitable habitats for potential SCC (Figure. 14).

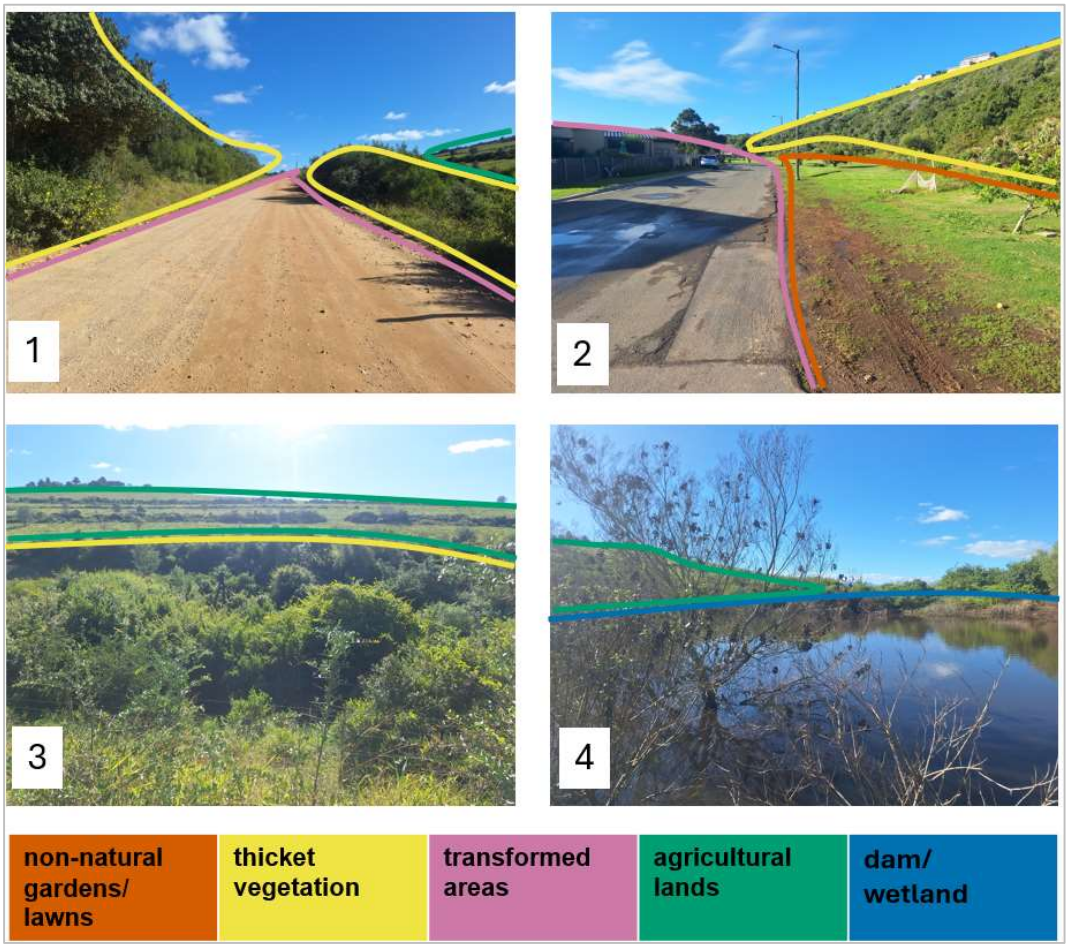

Figure 11: Habitat types identified in Groot Brakrivier withing 50m of the project area including a view of (1) the area in the mid-section of Sandhoogte Road where the dirt road begins; (2) Erf 111 in the Bergsig suburb where a pumpstation is proposed in Alternative 1a;

(3) a view on Sandhoogte Road and; (4) a dam seen along Sandhoogte road (western extent of the project area).

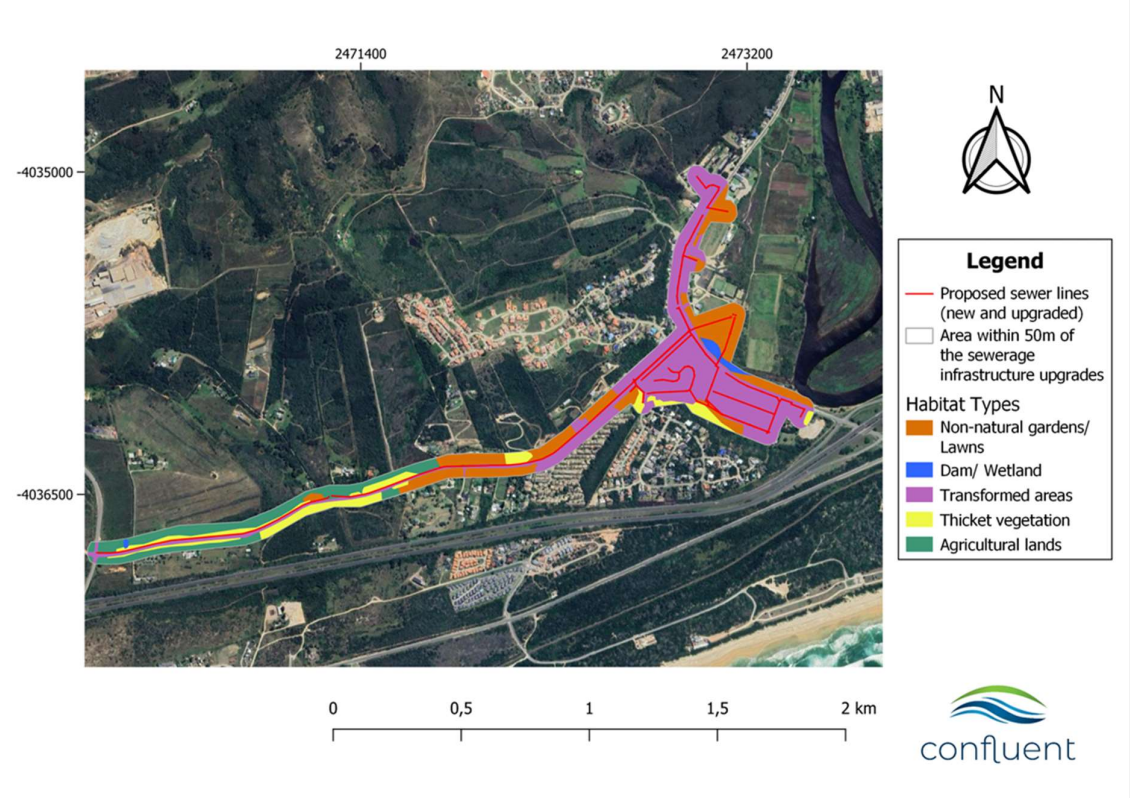

Figure 12. Habitats found within 50m of the proposed new or proposed upgraded sewer lines and pump stations in Groot Brakrivier, Mossel Bay municipality

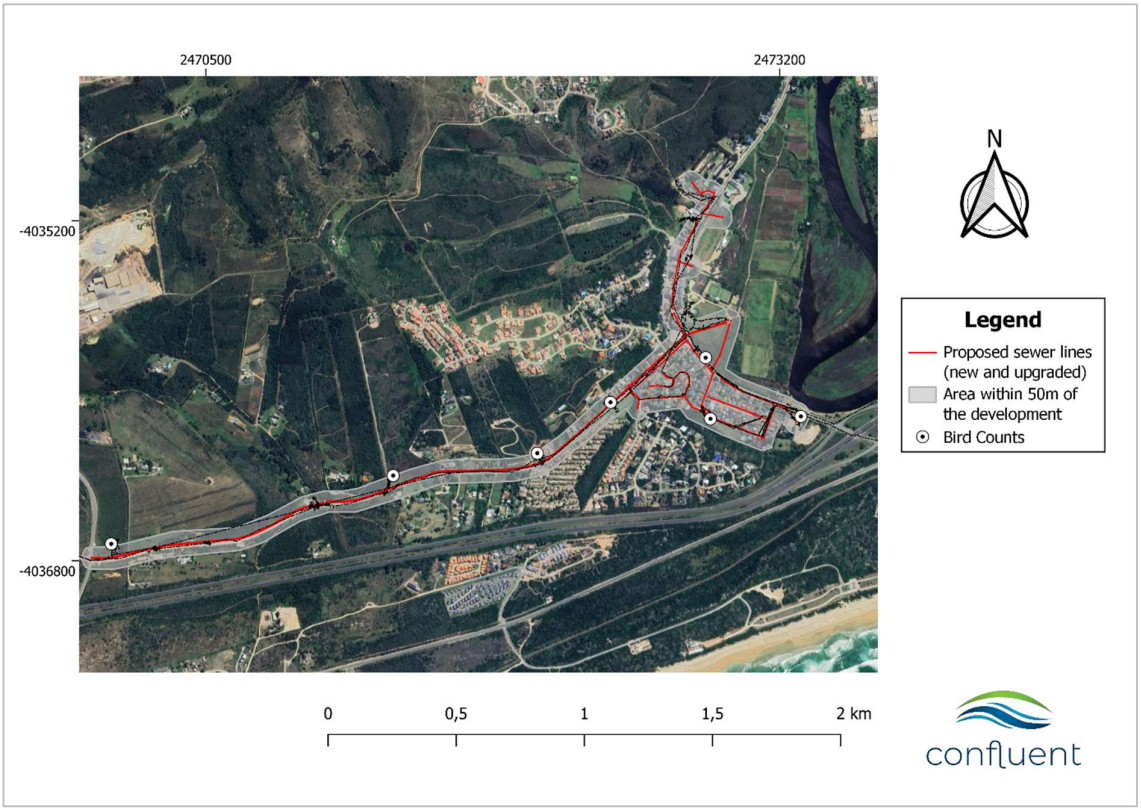

Figure 13. Area within 50m of the proposed new or proposed upgraded sewer lines and pump stations in Groot Brakrivier, Mossel Bay municipality.

4.4 Results

4.4.1 Avifauna

A Blue Crane (*Grus paradisea*) was seen flying overhead during the site visit. Seven bird counts were conducted across the project area, in addition to opportunistic sightings noted throughout the meander and searching for nests/roosting sites in suspected habitat. A total of 21 bird species were identified during the site visit (See Appendix 2).

4.4.2 Mammals

No SCC were found during the site visits. Droppings of domestic dog (*Canis familiaris*) and domestic cattle (*Bos taurus*) were found in the landscape. A Cape bushbuck (*Tragelaphus sylvaticus* subsp. *sylvaticus*) print was also found along the western extent of Sandhoogte Road (Figure. 15). Full list to be found in Appendix 3.

Figure 14. Cape Bushbuck (Tragelaphus sylvaticus subsp. sylvaticus) print found in Groot Brakrivier.

4.4.3 Terrestrial Invertebrates

No SCC were found at the site but evidence of working of scat of domestic cattle (*Bos taurus*) by dung beetle (subfamily Scarabaeinae) was found which could be indicative of the presence of the dung beetle SCC (Figure. 16). Species of insect found included African Blue Pansy (*Junonia orithya* subsp. *madagascariensis*), African Grass Blue (*Zizeeria knysna* subsp. *knysna*) and Common Dotted Border (*Mylothris agathina*) (Figure 16). Host ant species (*Lepisiota capensis*) for two butterfly SCC (namely, Knysna Pale Copper Butterfly and Red Copper Butterfly) were not found on site. Full list of species to be found in Appendix 4.

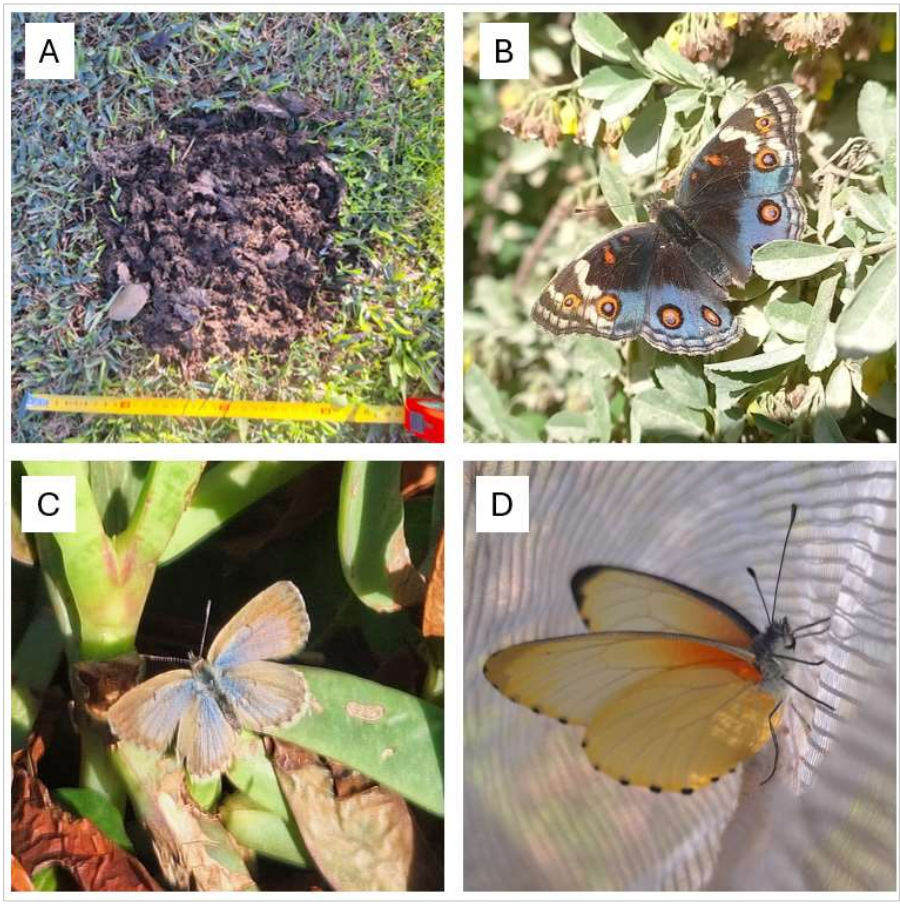

Figure 15. Insect signs and direct observations made at Groot Brakrivier. (A) Scat of domestic cattle suspected to be worked by dung beetle (Scarabaeinae); (B) African Blue Pansy (Junonia orithya subsp. madagascariensis), (C) African Grass Blue (Zizeeria knysna subsp. knysna), and (D) Common Dotted Border (Mylothris agathina).

4.4.4 Amphibians

No SCC were encountered during the site visit and no direct observations of amphibians were made. Two species of frog were heard calling from dams/wetlands west of the estuary (see the full list of species in Appendix 5).

4.4.5 Reptiles

No reptile SCC were highlighted for this site by the DFFE Screening Tool or any of the public platforms. As such, no targeted sampling took place for this group. No reptile species were encountered during the site visit.

4.4.6 Likelihood of Occurrence for SCC

Following site inspection, the possible SCC occurring in the region outlined in this report were evaluated according to their likelihood of occurrence. It is always possible that a species assessed as having a low probability of occurrence can occur on the site, especially for the golden moles species which have a low likelihood of detection (SANBI 2020). This table should only be used as a guideline.

Table 5. Likelihood of occurrence for terrestrial fauna SCC in Groot Brakrivier, Mossel Bay municipality.

Species	Red list status	Observed	Suitable habitat	Likelihood of occurrence	Reason
AVIFAUNA					
Circus maurus Black Harrier	Endangered	No	No	Low	Generalist diet of this SCC means that forage is readily available here however these habitats are not unique in this landscape. Habitat and breeding space are not available at this site.
Circus ranivorus Marsh Harrier	Endangered	No	No	Low	No suitable waterbodies are available at the site.
Phalacrocorax capensis Cape Cormorant	Endangered	No	No	Low	Possibly uses the larger estuarine environment, very low likelihood of disturbance or deterrence due to the sewerline upgrades proposed.
Polemaetus bellicosus Martial Eagle	Endangered	No	No	Low	Few very tall trees at the site.
Stercorarius antarcticus Brown skua	Endangered	No	No	Low	No suitable habitat, breeding, or feeding space at the site.
Bradypterus sylvaticus Knysna warbler	Vulnerable	No	No	Low	Although suitable thicket vegetation patches exist, they are affected by current disturbances in the urban space and along roads such as noise. Due to the small footprint of this project, thicket vegetation would not be directly affected by the sewerage infrastructure upgrades.
Falco biarmicus Lanner Falcon	Vulnerable	No	No	Low	Perches not scarce in the urban space but would not be used by the species due to noise disturbance in this area. More favourable perches are not scarce in the landscape.
Hydroprogne caspia Caspian Tern	Vulnerable	No	Yes	Low	Inland waterbodies are present, but the species is more likely to use the estuarine environment that over 50m away from the site.
Neotis denhami Denham's Bustard	Vulnerable	No	Yes	Low	Pasture is present in areas along Sandhoogte Road but is very common in the landscape. The wider landscape is also more likely to be used since the footprint is closer to roads which may be a cause of disturbance.
Sagittarius serpentarius Secretarybird	Vulnerable	No	Yes	Low	The wider landscape is more likely to be used since the site is closer to roads which may be a cause of disturbance. No suitable nesting site is available.
Certhilauda brevirostris	Near Threatened	No	No	Low	No suitable habitat.

Agulhas Long-billed Lark					
Grus paradiseus Blue Crane	Near Threatened	Yes	No	Low	Seen flying overhead. Pasture is present at the site but is very common in the landscape. The wider landscape is more likely to be used since the site is closer to roads which may be a cause of disturbance for breeding birds especially.
Limosa lapponica Bar-tailed Godwit	Near Threatened	No	No	Low	More likely to be found in the estuarine environment that falls outside of the site.
Numenius arquata Eurasian Curlew	Near Threatened	No	No	Low	No suitable habitat.
Phoenicopterus minor Lesser Flamingo	Near Threatened	No	No	Low	No suitable habitat and forage.
Phoenicopterus roseus Greater Flamingo	Near Threatened	No	No	Low	No suitable habitat and forage.
Calidris ferruginea Curlew Sandpiper	Least Concern (Regional), Near Threatened (Global)	No	No	Low	Likely to use the estuarine environment that is more than 50m away from the site.
TERRESTRIAL INVERTEBRATES					
Aloeides thyra orientis Red Copper Butterfly	Endangered	No	No	Low	The ant host species for this SCC was not found, and no suitable habitat is present.
Aloeides trimeni southeyae Trimen's Copper Butterfly	Endangered	No	No	Low	No suitable fynbos habitat.
Lepidochrysops littoralis Nimble Coastal Blue	Endangered	No	No	Low	No suitable sandy or rocky outcrop environment.
Aneuryphymus montanus Yellow-winged	Vulnerable	No	No	Low	No suitable fynbos habitat.

Agile Grasshopper					
Circellium bacchus Flightless dung beetle	Vulnerable	No	Yes	Low	Likely to use the larger landscape rather than this site which is not unique and has high disturbance and roads.
Aloeides pallida littoralis Knysna Pale Copper Butterfly	Near Threatened	No	No	Low	No ant host species present, nor is suitable habitat available.
Ceratogomphus triceraticus Cape Thorntail Dragonfly	Near Threatened	No	Yes	Low	The only suitable waterbody for this species is on private lands not subject to direct disturbance by sewerage infrastructure upgrades. Noise disturbance is common at this site due to roads.
MAMMALS					
Damaliscus pygargus pygargus Bontebok	Vulnerable	No	Yes	Low	The presence of this SCC is highly unlikely since it is rare outside of protected areas.
Sensitive Species 8	Vulnerable	No	Yes	Low	Thicket habitat may be suitable but have a low likelihood of falling within the project footprint which takes place largely along roads which are an existing disturbance.
Poecilogale albinucha African Striped Weasel	Near Threatened	No	No	Low	No natural grasslands are found in this area. Precipitation range is not suitable for SCC.

5. SITE SENSITIVITY VERIFICATION

After the site visit and fauna surveys, it is determined that the site sensitivity for the terrestrial animal theme for the upgrade and introduction of proposed sewer lines to Groot Brakrivier is **LOW** in contrast to the high and medium sensitivities highlighted by the DFFE Screening tool.

Based on the information in this report during the desktop and field assessment, the following reasons support this finding:

- The habitat types found within 50m of the site are not unique in the landscape. Due to high human activity (road and foot traffic) creating a landscape of fear, wildlife is more likely to use the larger landscape and avoid the roads along which the infrastructure is aligned. This point holds for the Blue Crane (*Grus paradisea*) seen flying overhead at the site.
- A distance of 50m was designated for outlining habitat types as an estimate for the distance of potential noise disturbance by the construction phase of the upgrades. However, since the upgrades will take place along a busy road noise is an existing disturbance. This also applies for Sandhoogte road which, despite being surrounded with largely private lands used as pasture, is increasingly used to access the town of Groot Brak and the road itself is being upgraded in the near future.
- The direct disturbance footprint of the upgrade to the sewer lines/ pump stations, addition of new sewer lines, and introduction of the pump stations is very small and exists along a road (already a modified landscape feature).

As per the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020), the **LOW** sensitivity allows for a Terrestrial Animal Species Compliance statement to be issued.

6. COMPLIANCE STATEMENT AND RECOMMENDATIONS

Following on from the site sensitivity verification for the Terrestrial Animal Species Theme, a compliance statement is issued for the proposed sewerage infrastructure upgrade. Some general recommendations for the project include:

- Comments on the best side of the road to develop infrastructure along may be applied as per the recommendations of the Aquatic Specialist's report (J Dabrowski, Confluent Environmental). However, this must be balanced with the recommendations made by the Botanical Specialist Report (B. Fouche, Confluent Environmental) to reduce impacts on any native vegetation and thereby associated fauna species.
- The thicket habitat close to the area designated for the new pumpstation in Bergsig must be left undisturbed as this may represent a habitat for faunal species or provide refuge and forage to fauna using the landscape.
- General recommendations and best practice guidelines should be followed for all animal species encountered (regardless of whether they are SCC or not) during any stage of sewerage infrastructure upgrades on a site. These are summarised in Box 1 below:

Box 1: Best practice principles for ALL fauna encounters during construction or operational phases of projects

If any animals are seen on site, a photo or a video should be taken if possible (to assist in identification) and all fauna encountered on site should be reported to the ECO immediately. This is particularly important when:

- An animal is harmed or compromised in any way during construction.
- Ground-dwelling animals their nests or eggs are unearthed during construction (e.g. moles, tortoise eggs, terrapins/frogs estivating).
- Any animal with limited mobility is found on site (e.g. tortoises, moles, chameleons).
- Any potentially dangerous animal is encountered. This includes any potentially venomous animal (e.g. snakes, scorpions) or any medium-large animal that has become cornered in an enclosed area such that it cannot escape (e.g. porcupines, monkeys, baboons, antelope). It is critical in the case of snakes/ scorpions o get pictures/videos to aid in identification and appropriate treatment of anyone needing medical assistance.
- Any animal that shows a reluctance to escape or move away from the construction site thereby increasing its exposure to harm or increasing the risk of injuring people on site.

The ECO should provide guidance or assistance to get all animals to safety, treating any injured animals, and issuing instructions on when to continue with construction (once they are satisfied that all animals have been removed from site) or put additional mitigation measures in place to protect animals on the site from harm.

For any injured animals or animals to be removed from site (domestic or wild):

A local SPCA or animal welfare society can collect and treat most animals and should be the first point of call for assistance. If they cannot directly assist, they will revert and notify the relevant authorities/vets.

For any assistance with snake removals/relocations, identifications, or bite treatment contact the African Snakebite Institute. The contact details of a suitably qualified snake handler can be found at the following link: https://snakeremoval.co.za/groot-brakrivier

SNAKEBITE EMERGENCIES:	
Poisons Information Helpline	+27 861 555 777
Dr Jenna Taylor	+27 83 631 4816
Dr Christoff Bell	+27 73 174 0199
Johan Marais	+27 82 494 2039
Jason Seale	+27 82 781 8498
Arno Naude	+27 83 739 9303
Dr PJC Buys	+26 481 127 5109 (Namibia)

GET THE FREE APP:

(Scan this code with your phone's camera.)

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APPENDIX 1: SCC IDENTIFIED FROM PUBLIC PLATFORMS FOR THE PROJECT AREA.

SCC were included or excluded from further analysis in this report based on expert interpretation for the presence/absence of key landscape and habitat s on site. See Section 4.2 Assumptions and Limitations for more information.

Species	Common name	Regional Assessment status	Source	Assessed in report Y/N
Alcedo semitorquata	Half-collared Kingfisher	Near Threatened	SABAP2	N
Aquila verreauxii	Verreaux's Eagle	Vulnerable	SABAP2	N
Bradypterus sylvaticus	Knysna Warbler	Vulnerable	SABAP2; Screening Tool	Y
Buteo trizonatus	Forest Buzzard	Least Concern	SABAP2	N
Calidris ferruginea	Curlew Sandpiper	Least Concern	SABAP2	Y
Campethera notata	Knysna Woodpecker	Near Threatened	SABAP2	N
Certhilauda brevirostris	Agulhas Long-billed Lark	Near Threatened	SABAP2	Y
Ciconia nigra	Black Stork	Vulnerable	SABAP2	N
Circus maurus	Black Harrier	Endangered	SABAP2	Y
Circus ranivorus	African Marsh Harrier	Endangered	SABAP2; Screening Tool	Y
Coracias garrulus	European Roller	Near Threatened	SABAP2	N
Falco biarmicus	Lanner Falcon	Vulnerable	SABAP2	Y
Grus paradisea	Blue Crane	Near Threatened	SABAP2	Y
Hydroprogne caspia	Caspian Tern	Vulnerable	SABAP2; Screening Tool	Y
Limosa lapponica	Bar-tailed Godwit	Least Concern, (Near Threatened Globally)	SABAP2	Y
Morus capensis	Cape Gannet	Vulnerable	SABAP2	N
Neotis denhami	Denham's Bustard	Vulnerable	SABAP2; Screening Tool	Y
Numenius arquata	Eurasian Curlew	Near Threatened	SABAP2	Y
Phalacrocorax capensis	Cape Cormorant	Endangered	SABAP2	Y
Phoeniconaias minor	Lesser Flamingo	Near Threatened	SABAP2	Y
Phoenicopterus roseus	Greater Flamingo	Near Threatened	SABAP2; iNaturalist	Y

Polemaetus bellicosus	Martial Eagle	Endangered	SABAP2; Screening Tool	Y
Procellaria aequinoctialis	White-chinned Petrel	Vulnerable	SABAP2	N
Sagittarius serpentarius	Secretarybird	Vulnerable	SABAP2	Y
Stercorarius antarcticus	Brown Skua	Endangered	SABAP2	Y
Aloeides pallida littoralis	Knysna Pale Copper	Near Threatened	Virtual Museum	Y
Aloeides thyra orientis	Red copper	Vulnerable	Screening tool	Y
Aloeides trimeni southeyae	Trimen's Copper	Endangered	Virtual Museum	Y
Aneuryphymus montanus	Yellow-winged agile grasshopper	Endangered	Screening tool	Y
Ceratogomphus triceraticus	Cape Thorntail	Near Threatened	Virtual Museum	Y
Circellium bacchus	Flightless Dung Beetle	Vulnerable	Virtual Museum	Y
Lepidochrysops littoralis	Coastal Nimble Blue	Endangered	Virtual Museum; Screening Tool	Y
Damaliscus pygargus pygargus	Bontebok	Vulnerable	Virtual Museum	Y
Panthera pardus	Leopard	Vulnerable	Virtual Museum	N
Poecilogale albinucha	African Striped Weasel	Near Threatened	Virtual Museum	Y
	Sensitive Species 8	Vulnerable	Virtual Museum; Screening Tool	Y

APPENDIX 2: AVIFAUNA SPECIES OBSERVED DURING SITE VISIT TO GROOT BRAKRIVIER, MOSSEL BAY

Species of Conservation Concern are indicated in red text.

Common name	Scientific name
Bar-throated Apalis	*Apalis thoracica*
Hadada Ibis	*Bostrychia hagedash*
Greater Double-collared Sunbird	*Cinnyris afer*
Cape Robin-chat	*Cossypha caffra*
Fork-tailed Drongo	*Dicrurus adsimilis*
Blue Crane	*Grus paradisea*

Cape Gull	*Larus dominicanus vetula*
Cape Wagtail	*Motacilla capensis capensis*
Helmeted guineafowl	*Numida meleagris*
Familiar chat	*Oenanthe familiaris*
Cape Sparrow	*Passer melanurus*
Cape Weaver	*Ploceus capensis*
Karoo Prinia	*Prinia maculosa*
Cape Spurfowl	*Pternistis capensis*
Cape Bulbul	*Pycnonotus capensis*
Laughing Dove	*Spilopelia senegalensis*
Ring-necked Dove	*Streptopelia capicola*
European starling	*Sturnus vulgaris*
Bokmakierie	*Telophorus zeylonus*
African Hoopoe	*Upupa epops* ssp. *africana*
Blacksmith Lapwing	*Vanellus armatus*

APPENDIX 3: MAMMAL SPECIES OBSERVED DURING SITE VISITS TO GROOT BRAKRIVIER, MOSSEL BAY

Order	Family	Common name	Scientific name	Notes
Artiodactyla	Bovidae	Cape bushbuck	*Tragelaphus sylvaticus* subsp. *sylvaticus*	Suspected from print identification
Artiodactyla	Bovidae	Domestic cattle	*Bos taurus*	Suspected species from dung identification
Carnivora	Canidae	Domestic dog	*Canis familiaris*	Suspected species from dung identification

APPENDIX 4: INVERTEBRATE SPECIES OBSERVED DURING SITE VISITS TO GROOT BRAKRIVIER, MOSSEL BAY

Order	Family	Common name	Scientific name
Lepidoptera	Nymphalidae	African Monarch	*Danaus chrysippus*
Lepidoptera	Lycaenidae	African Grass Blue	*Zizeeria knysna* subsp. *knysna*
Lepidoptera	Nymphalidae	Bush Brown	*Bicyclus safitza* subsp. *safitza*
Lepidoptera	Pieridae	Common Dotted Border	*Mylothris agathina*
Orthoptera	Acrididae	Grasshopper	Acrididae
Hymenoptera	Apidae	Honey Bee	*Apis mellifera*
Lepidoptera	Pieridae	Pieridae	Pieridae

Coleoptera	Scarabaeidae	Dung beetle (suspected from traces)	Scarabaeinae
Lepidoptera	Nymphalidae	African Blue Pansy	*Junonia orithya* subsp. *madagascariensis*
Lepidoptera	Nymphalidae	Painted Lady Butterfly	*Vanessa cardui*

APPENDIX 5: AMPHIBIAN SPECIES OBSERVED DURING SITE VISITS TO GROOT BRAKRIVIER, MOSSEL BAY

Common name	Scientific name
Bronze Caco	*Cacosternum nanum*
Clicking Stream Frog	*Strongylopus grayii*