Realignment and extension of the approved Thembalethu sewer line to accommodate informal human settlement, George, Western Cape

Terrestrial Animal Species:

Site Sensitivity Verification Report and Compliance Statement

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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;
- I declare that there are no circumstances that may compromise my objectivity in performing this specialist investigation. I do not necessarily object to or endorse any proposed developments, but aim to present facts, findings and recommendations based on relevant professional experience and scientific data;
- 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;
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- All the particulars furnished by me in this document are true and correct.

Monica Leitner (MSc; Pr. Sci. Nat. Ecological Sciences)

May 2024

SUMMARY OF EXPERIENCE AND ABRIDGED CV - MONICA LEITNER

Core skills

- MSc. Zoology (University of Pretoria) and 5 years of work experience (project management and field work) for ecological research projects aimed at invertebrate diversity, ecological functioning, and large mammal ecology.
- Extensive ecological and field work experience (before, during and after postgraduate degrees) across a range of environments (mesic to arid savanna, grasslands and mountain terrain, sub-Antarctic) and taxa (invertebrates, avifauna, amphibians, reptiles, small mammals and large mammals).
- Two overwintering years on Marion Island, with extensive field work as Environmental Conservation Officer and seabird monitor (2018-2019), and a marine mammal ecologist (2022-2023).

Work experience

- 2022-2023: Marine mammal field assistant on sub-Antarctic Marion Island (Marion Island Marine Mammal Programme, University of Pretoria)
- 2016-2018; 2019-2022: Project Coordinator (University of Pretoria) for international Soil Fauna in Africa consortium (funded by the United Kingdom's Royal Society and Department for International Development).
- 2019-2022: Research assistant for Marion Island Marine Mammal Programme (University of Pretoria).
- 2018-2019: Environmental Conservation Officer on sub-Antarctic Marion Island (Department of Environmental Affairs).
- 2016-2018: Research assistant for Sani Pass (Drakensburg) long term invertebrate and ecosystem monitoring project (Centre for Invasion Biology, University of Pretoria).

Qualifications

- BSc. Environmental Sciences (2011, University of Pretoria)
- BSc. Honours Zoology (with distinction, 2012, University of Pretoria)
- MSc. Zoology (with distinction, 2015, University of Pretoria)

Publications

- Trisos MO, Parr CL, Davies AB, Leitner M & February EC. 2021. Mammalian herbivore movement into drought refugia has cascading effects on savanna insect communities. Journal of Animal Ecology, https://doi.org/10.1111/1365-2656.13494
- Leitner M, Davies AB, Robertson MP, Parr CL & Van Rensburg BJ. 2020. Termite mounds create heterogeneity in invertebrate communities across a savanna rainfall gradient. Biodiversity and Conservation, 29(4), pp.1427-1441
- Leitner M, Davies AB, Parr CL, Eggleton P & Robertson MP. 2018. Woody encroachment slows decomposition and termite activity in an African savanna. Global change biology, 24(6), pp.2597-2606

SACNASP Registration - Professional Natural Scientist (Ecological Sciences), 166055.

References

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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
NEMA	National Environmental Management Act
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDP	Site Development Plan
SSVR	Site Sensitivity Verification Report
WCBSP	Western Cape Biodiversity Spatial Plan

1. INTRODUCTION

Confluent Environmental was appointed by Cape EAPrac to provide terrestrial animal specialist inputs for the proposed realignment of an approved bulk sewer line in Thembalethu, George (Figure 1). The original alignment was approved by Water Use License number 16/K30C/CI/2723 in December 2014. The original Environmental Authorisation is reference number 16/3/1/1/D2/50/0060/12 which was issued in March 2014. The proposed realignment covered in this report is for sections on Erf 5006 and Portion 50/197, Thembalethu.

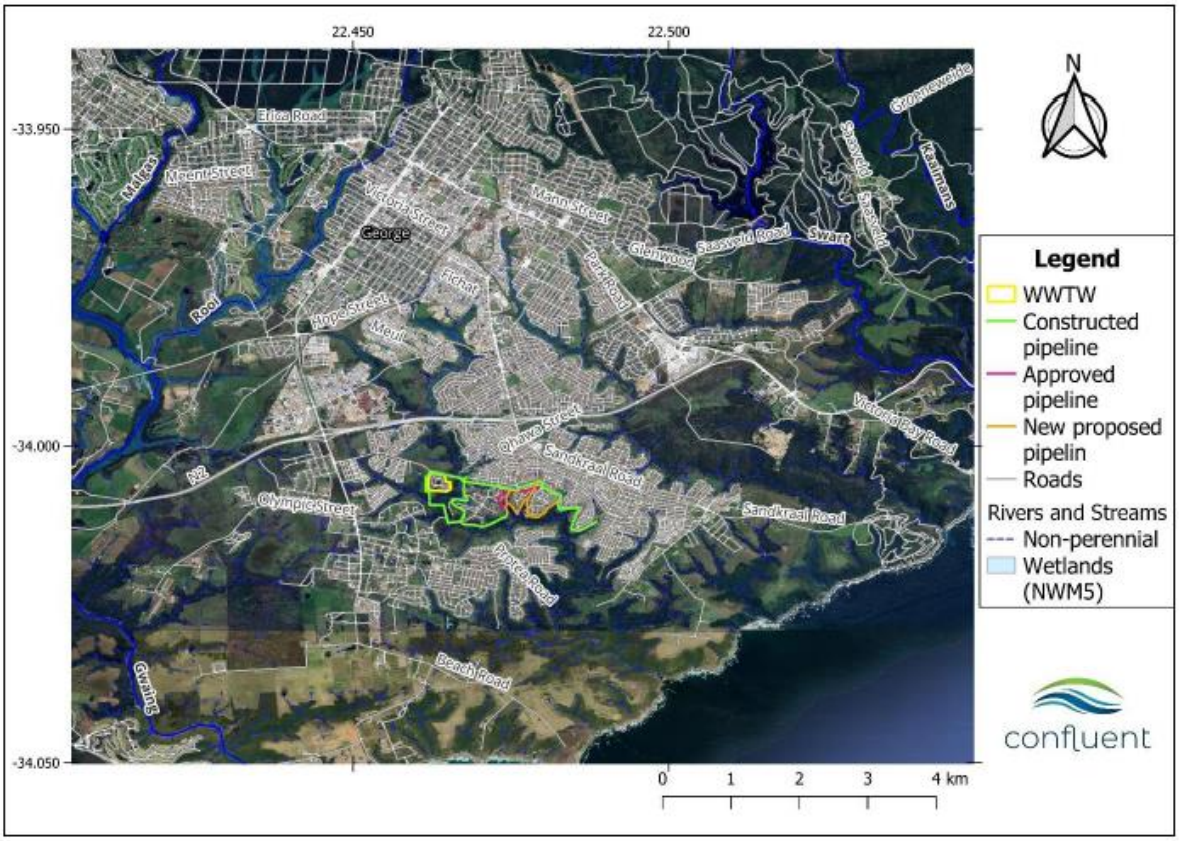

Figure 1. General location of the existing and proposed realignment of the bulk sewer line in Thembalethu, George.

In addition to the proposed realignment, emergency work to repair erosion and stabilise the constructed sewer line at a watercourse crossing on Portion 58/197 Sand Kraal (aka Tylora Farm) has been undertaken in terms of Section 20 of the National Water Act. Permission to undertake this work was granted by the Breede-Olifants Catchment Management Agency (BOCMA). Subsequent to completion of this work, the engineer has now recommended additional support to the watercourse in the form of the following interventions:

- Protect the stream bed below the sewer line crossing in the form of a reno mattress.
- Formalise informal stormwater entering the stream from the east and west which is causing erosion of the banks and jeopardising the sewer line stability.

The above interventions represent new infrastructure proposed but are considered essential in supporting the already approved sewer line given that the area is actively eroding and under continuous pressure due to informal settlement. This emergency work area was also inspected and assessed in this report.

A section of the original alignment needs to be moved to accommodate the informal expansion of human settlement since the original approval (Figure 2). The realignment needs to run below the new human settlement to maintain gravity flow and eventually service these areas once / if formalised in the future.

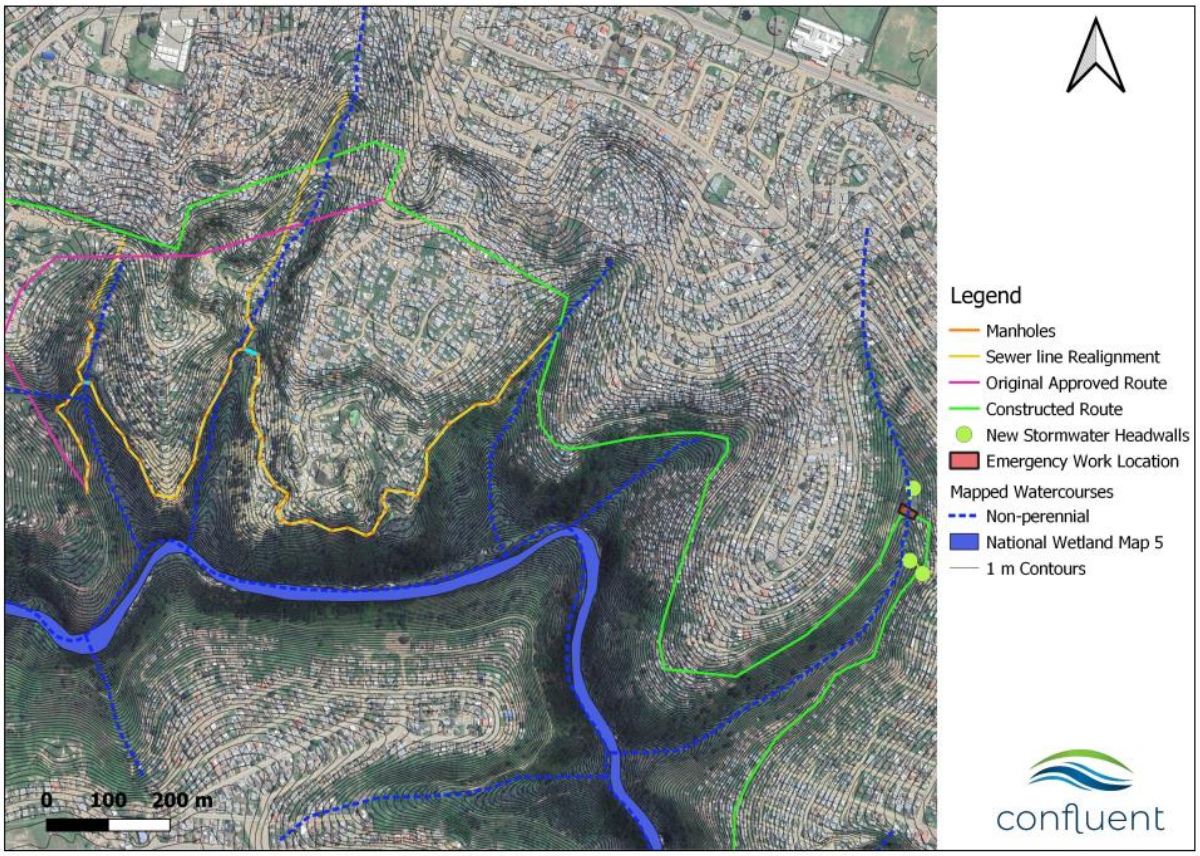

Figure 2. Original approved sewer line (pink) and proposed realignment (orange) moved towards the Skaapkop River showing crossings at tributaries (1-3) moved south. The new alignment ties into the approved and already constructed pipeline (green).

1.1 Proposed infrastructure

A detailed, surveyed layout of the pipeline route was provided at the time of writing, but it is understood that the 'as built' pipeline may deviate slightly from this route by 5-10m in either direction depending on site-specific topographical variation, existing erosion on sloped areas, and the location of informal housing. It is envisaged that the end result of installing the pipeline will be a level road cut into the slope in places which will enable access and maintenance of the sewer line. An example from an existing portion of the installed sewer line is shown in Figure 3. Manhole covers will be custom made security concrete to prevent tampering with drains. Pipes along the realignment are to be uPVC measuring 200 mm diameter with a maximum flow rate of 13 L/s flow rate which includes estimated stormwater ingress.

Figure 3. Example of the bulk sewer line installed on the opposite side of the Skaapkop River in Pacaltsdorp where the sewer line has become a single lane dirt track following benching. Photo credits: J. Dabrowski.

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 **MEDIUM** sensitivity for the terrestrial animal species theme across the project area (Figure 4), with several Species of Conservation Concern (SCC) highlighted (Table 1).

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

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.

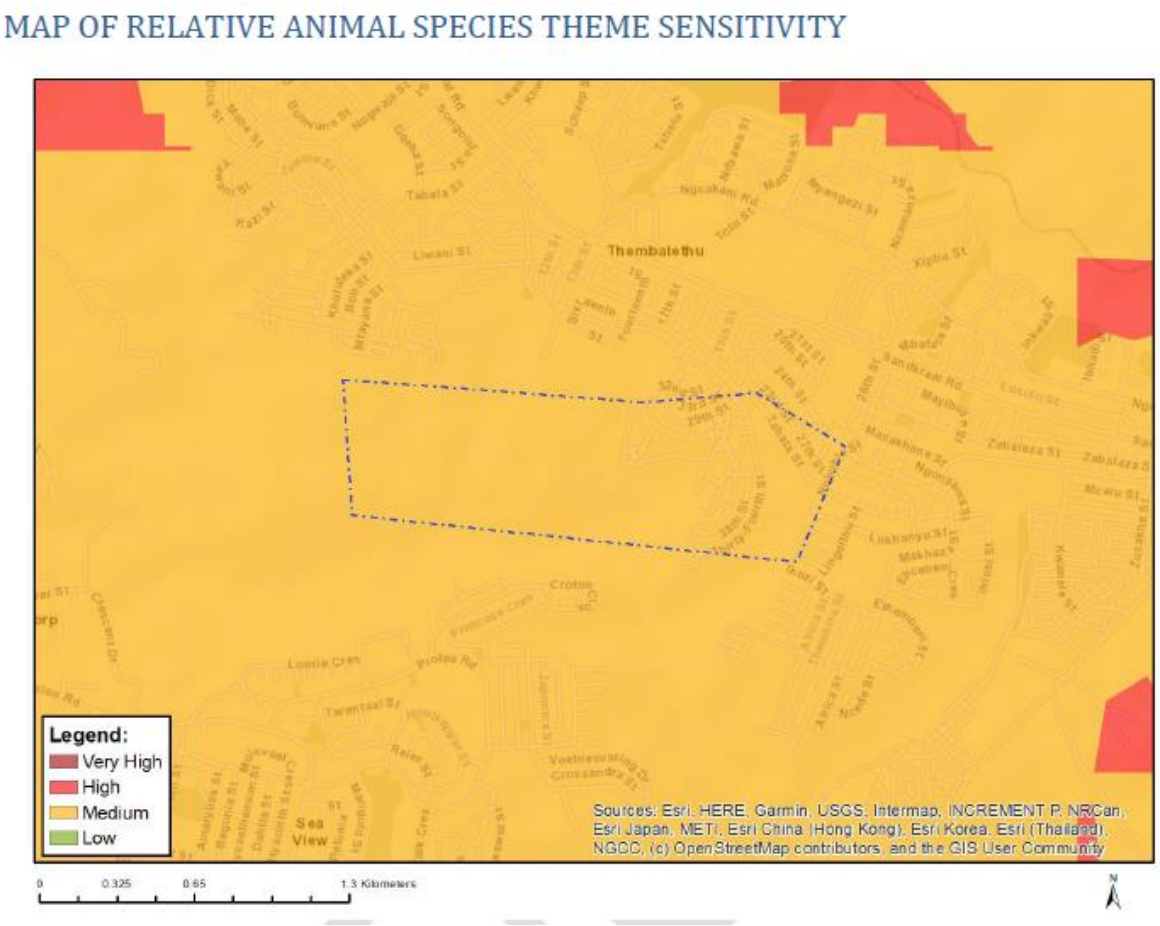

Figure 4. DFFE Online Screening Tool outcome for the terrestrial animal species theme along the bulk water pipeline upgrade footprint. The disturbance footprint is indicated by the blue dashed line.

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

Sensitivity	Classification	Scientific name	Common name	Red list status*
Medium	Amphibian	*Afrixalus knysnae*	Knysna Leaf-folding Frog	Endangered
Medium	Avifauna	*Circus ranivorus*	Marsh Harrier	Endangered
Medium	Avifauna	*Neotis denhami*	Denham's Bustard	Vulnerable
Medium	Avifauna	*Bradypterus sylvaticus*	Knysna Warbler	Vulnerable
Medium	Mammal	*Chlorotalpa duthieae*	Duthie's Golden Mole	Vulnerable
Medium	Mammal	*Sensitive species 8*	-	Vulnerable
Medium	Invertebrate	*Aneuryphymus montanus*	Yellow-winged Agile Grasshopper	Vulnerable

2.2 Scope of work

The purpose of this report is to verify the site sensitivity within the disturbance footprint of proposed pipeline 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 property 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 including an impact assessment will be compiled.

3. DESKTOP ASSESSMENT

3.1 Vegetation, Climate and General Habitat

George, Western Cape is in the Fynbos biome and experiences a temperate climate year-round (Mucina L. &., 2006; Rebelo A. G., 2006). Average temperatures range between 26℃ and 6℃, with the hottest days experienced from January to March and peak around 35℃, and the coldest days experienced from June-August and rarely fall below 0℃. Rain occurs throughout the year showing a bimodal pattern with peaks in spring (April) and autumn (October) (Figure 5).

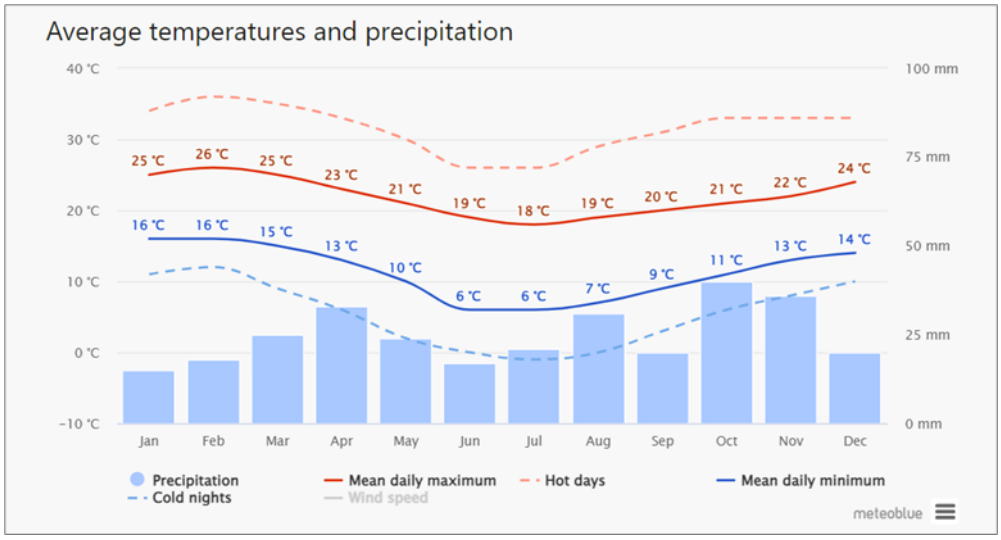

Figure 5. Historical summary of historical climate (modelled) for George Airport (www.meteoblue.com)

The mapped vegetation type for the project area includes Garden Route Granite Fynbos (Critically Endangered), although in reality the project area and surroundings have been significantly transformed due the presence and expansion of an informal settlement which includes some subsistence agricultural practices, alien plant invasions and road infrastructure (formal and informal) (Figure 6). A detailed Botanical and Terrestrial Specialist Assessment (B. Fouche, Confluent Environmental) and Aquatic Specialist Assessment (J. Dabrowski, Confluent Environmental) is also available for the project area.

Figure 6. Satellite imagery of the Thembalethu sewer line project area (in red*) and emergency work being conducted to the east (red star).*

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) depicted in Figure 7 and explained in Table 2. Mapped layers coincide largely with the non-perennial watercourses with the newly proposed pipeline falling within CBA2 areas and some ESA2 zones in the northern extensions.

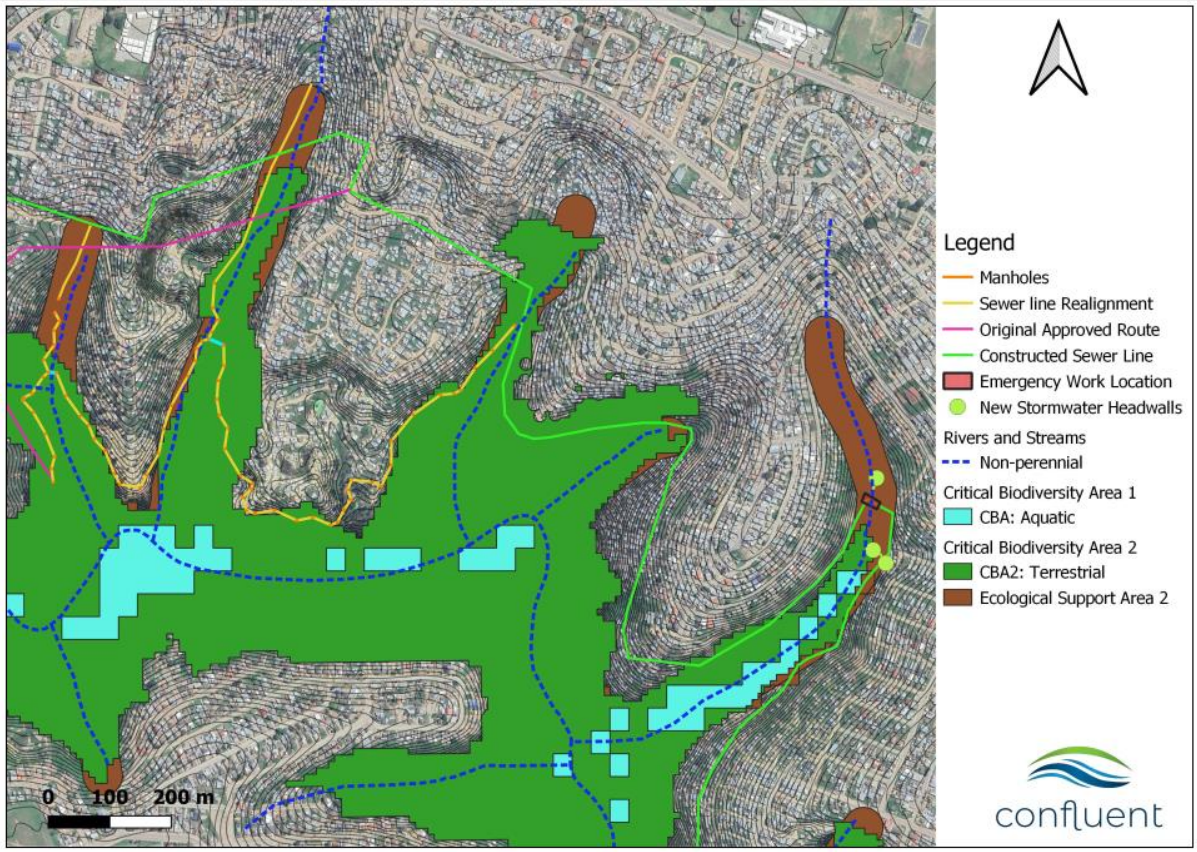

Figure 7. Project area of the sewer pipeline in relation to mapped layers for the Western Cape Biodiversity Spatial Plan's Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA

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

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. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure	Maintain in a functional, natural, or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.

Ecological Support Area 2 (ESA 2)	Areas severely degraded or have no natural cover and ecological functioning severely impaired. Not essential for meeting biodiversity targets but support ecological functioning and delivering ecosystem services.	Restoration required to return ecological functioning. Some limited habitat loss may be acceptable. A greater range of land uses 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 realigned pipeline traverses the steep edge of land that was previously used as a quarry for brick-making. The quarry was active for approximately 2 decades appearing in the mid to late 1990s. Areas were alternately mined then rehabilitated, and the quarry was finally closed in around 2017. Following this, informal settlement of the area began which has progressed to high density settlement of the area in poorly suited areas including drainage lines and steep slopes (Figure 8). It is clear from the series of satellite images presented that the realigned pipeline traverses areas of significant historical disturbance due to mass earthworks. More recent disturbances include sprawling informal settlement in close proximity to watercourses with associated informal waste disposal of solids and liquids.

Figure 8. Historical imagery of the proposed realignment of the Thembalethu sewer line.

3.4 Species of Conservation Concern

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 project area and its immediate surroundings:

1. iNaturalist (all taxa) within 2 km x 1 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) 3422AB: DungBeetleMAP, FrogMAP, LacewingMAP, LepiMAP, MammalMAP, OdonataMAP, ReptileMAP, ScorpionMAP, SpiderMAP.
3. South African Bird Atlas Project (SABAP2) for pentad 3400_2225.

Some SCC reported on the platforms were highly unlikely to occur the site given either clearly unsuitable habitat or being deemed a vagrant/transient animal. For example, given that the property does not contain any rocky outcrops or coastal habitat, all animals reliant on such habitat features for their existence are highly unlikely to occur on site. For the purposes of this report these animals were excluded from further assessment (see also Section 4.1 and Appendix 1 for additional information).

The combined list of SCC (from DFFE Screening Tool and public resources) possibly occurring on the project area 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:

1. Avifauna: Roberts Birds of Southern Africa VII (Roberts, Hockey, Dean, & Ryan, 2005)
2. Mammals: The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005)
3. Invertebrates:
    - Field guide to the insects of South Africa (Picker, Griffiths, & Weaving, 2019)
    - Field guide to the butterflies of South Africa (Woodhall, 2005)
    - Field guide to the spiders of South Africa (Dippenaar-Schoeman, 2023)
4. Amphibians: A complete guide to the frogs of Southern Africa (Du Preez & Carruthers, 2015)
5. Reptiles: A guide to the reptiles of Southern Africa (Alexander, 2013)

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

Table 3. Summary of habitat, breeding and feeding requirements for terrestrial animal SCC possibly occurring in the project area. Bold text indicates SCC highlighted by DFFE Online Screening Tool.

Red list status	Species	Habitat	Breeding	Feeding
AVIFAUNA				
Endangered A2c+3c+4c;C1	***Circus ranivorus*** **Marsh Harrier**	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, reed stems or sticks 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.
Vulnerable A3c; B2b(ii,iii,v); C1+2a(i)	***Bradypterus sylvaticus*** **Knysna warbler**	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, worms

Red list status	Species	Habitat	Breeding	Feeding
Vulnerable A2bcd+3bcd+4bcd; C1	***Neotis denhami*** **Denham's Bustard**	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.
Near Threatened C1	*Campethera notata* Knysna Woodpecker	Territorial, occurring in thornveld, Euphorbia thickets, riparian and montane evergreen forests. Marginal occurrence in Protea communities, coastal white Milkwood (*Sideroxylon inerme*) thickets and alien trees	Monogamous, solitary nester Hole in trunk/branch of tree, usually in a dead stem 1.2-6m off the ground. Holes infrequently reused in successive years, but a new hole can be excavated in the same branch. Laying from August-November	Forages at all levels of trees, especially mid-canopy. Pecks and probes for ants and termites on dead branches, but occasionally forages on ground.

Red list status	Species	Habitat	Breeding	Feeding
Least Concern (Regional), Near Threatened (Global)	*Buteo trizonatus* Forest Buzzard	Afromontane forests and plantations (mainly Pine, but also Eucalyptus). Generally unobtrusive, perching on large branches partially concealed under canopy, sometimes perching in open at the edge of forest edge.	Monogamous, territorial, solitary nester. Nest is platform of sticks, cup-lined with green leaves. Nests in plantations are smaller than in native forests. Laying dates from August-November. Breeding is confined to the Western Cape and Eastern Cape Provinces.	Forages along forest edges and within (also plantations). Hunts mainly from perch. Diet consists of small mammals (mice and moles), small birds, snakes, lizards, frogs and invertebrates.
MAMMALS				
Vulnerable B1ab(iii)+2ab(iii)	***Chlorotalpa duthieae* Duthie's Golden Mole**	Occur on alluvial sands and sandy loams in southern Cape Afrotemperate forests (Bronner, 2014). Preference for forest vegetation over fynbos. Narrow coastal band 275 km long between Wilderness and Port Elizabeth with fairly disjunct populations. Can occur in gardens and pastures adjoining forests. Mainly active at night.	Little is known but a female was recorded with a litter of two young in November (Bronner, 2014).	Shallow subsurface foraging tunnels radiate outwards from beneath the roots of trees. Forages at night in tunnels and through the leaf litter. Diet includes earthworms.

Red list status	Species	Habitat	Breeding	Feeding
Vulnerable B2ab(ii,iii,v)+C2a(i)	**Sensitive Species 8 (Blue Duiker)**	Specialised habitat requirements within a home range of approximately 0.75 ha. 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.
INVERTEBRATES				
Vulnerable B2ab(iii,v)	**Aneuryphymus montanus *Yellow-winged Agile Grasshopper***	Very low area of occupancy between 100 and 1 000 km2. 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
AMPHIBIANS				

Red list status	Species	Habitat	Breeding	Feeding
Endangered B1ab(i,ii,iii,v)+ 2ab(i,ii,iii,v)	***Afrixalus knysnae*** **Knysna Leaf-folding Frog**	Typically inhabit endorheic (inward draining) wetlands with shallow water (< 50cm), high clarity, and sufficient vegetation suitable for breeding (De Lange & Du Preez, 2018). No streaming or running water recorded at any of the sites where they've been recorded. The frog is associated with vegetation it can use for breeding which includes indigenous and exotic species. For example, slender knotweed (*Persicaria decipiens*) and kikuyu grass (*Pennisetum clandestinum*). It requires a habitat with diverse plant species, including shrubs, grasses, and ferns, providing shelter and breeding sites (Lange and Preez, 2018).	Females lay eggs on leaves which are folded and sealed by males, creating a protected environment. Breeding occurs during warmer wetter months such as September to November (De Lange, 2019). Breeding takes place near deeper parts of the waterbody, but still close to the water's edge.	The Knysna Leaf-folding Frog is an insectivorous amphibian feeding on small invertebrates found in its habitat (e.g. insects and spiders). Foraging behaviour includes actively searching for prey on the forest/fynbos floor and in the leaf litter. The frog uses its sticky, projectile tongue to capture and quickly ingest prey. It is primarily active at night, relying on its vision to locate and capture prey in the darkness.

4. FIELD ASSESSMENT

4.1 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 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. The site visit took place during daylight hours so the likelihood of encountering nocturnal species was limited.
3. The site visit coincided with autumn in the project area. This is of consequence for SCC showing seasonal variation in breeding and activity patterns, thereby altering their likelihood of detection. For the frog SCC the site visit fell outside its breeding season and decreased its likelihood of detection. Golden moles are most active during warm and wet conditions, but the temperate climate and year-round rainfall on site increase the chances of detecting the SCC despite temperatures being generally cooler in autumn/winter months.
4. The project area falls within an informal settlement and the entire length of the proposed pipeline was not accessible either due to limited road access or safety concerns. As such, various points along the project area were inspected and this was deemed sufficient for the assessment of the habitat suitability for terrestrial animal species within the project area given its highly transformed nature and the range of negative impacts present (high levels of alien invasion, pollution, informal housing/road infrastructure and limited natural vegetation). While unlikely, it is possible that some signs or evidence of animals were overlooked in this process.

4.2 Site Inspection Details and Methods

A site inspection was conducted on the 23 April 2024 whereby sections of the project area in Thembalethu were inspected. Given the highly transformed nature of the project area and extensive negative impacts present (high levels of alien plant invasion, pollution, informal housing/road infrastructure and limited natural vegetation) limited sampling was conducted for SCC given the lack of natural or suitable habitat and the highly unlikely occurrence of SCC so close to human disturbance. Three 5-minute bird counts were conducted (Figure 9), with 12 species of indigenous/wild birds and two domestic fowl (chickens, geese) observed within the project area and surrounds (See Appendix 2). Three species of free ranging domestic mammal were also seen during the site: dogs, cattle and pigs (See Appendix 3).

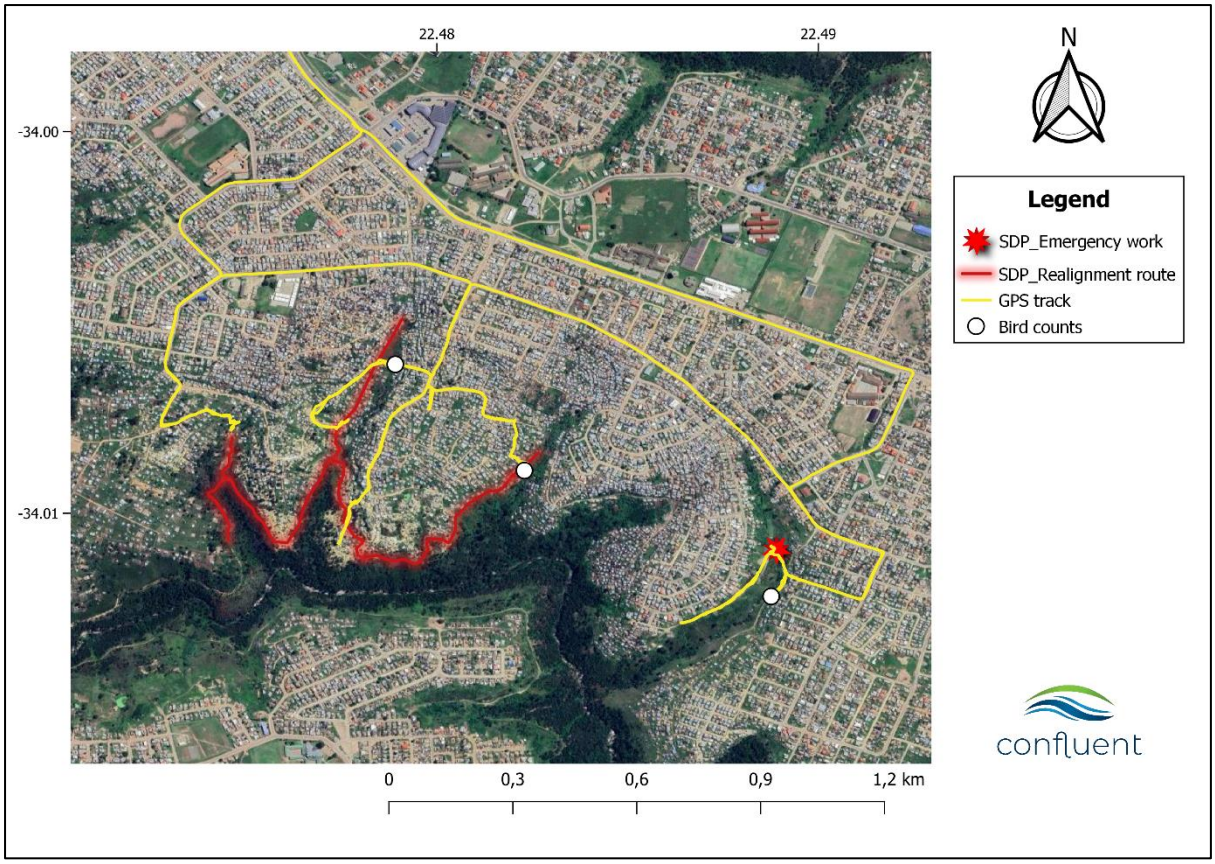

Figure 9. GPS track and waypoints for site inspection to the Thembalethu sewer line project area for the realignment and emergency work.

4.3 Habitat Types within the Project Area

The project area for the sewer line consists of highly transformed and degraded habitat due to its placement within the Thembalethu informal settlement and various associated negative impacts thereof (pollution, soil erosion, alien plant invasion, etc.). Habitat types along the project area and immediate surroundings are depicted in Figure 10 below and include non-perennial streams/drainage lines, wetland habitat, dense stands of alien plant invasion and degraded slopes with soil erosion.

Figure 10. Site photos depicting prolific negative impacts and transformed habitats within the Thembalethu sewer line project area.

4.4 Likelihood of Occurrence for SCC

Following the site inspection, possible SCC occurring in the project area were evaluated according to their likelihood of occurrence. It is always possible that a species assessed as having a low probability of occurrence can still occur on the site, especially for the those listed as having a low likelihood of detection (SANBI, 2020), and therefore this table should only be used as a guideline.

Table 4. Likelihood of occurrence for terrestrial fauna SCC in project area. Bold text indicates SCC highlighted by DFFE Online Screening Tool.

Red list status	Species	Observed on site	Suitable habitat	Likelihood of occurrence	Reason
AVIFAUNA					
Endangered A2c+3c+4c;C1	***Circus ranivorus*** **Marsh Harrier**	No	No	Low	No suitable habitat.
Vulnerable A3c; B2b(ii,iii,v); C1+2a(i)	***Bradypterus sylvaticus*** **Knysna warbler**	No	No	Low	No suitable habitat. Water courses are also heavily polluted and a lot of human/domestic animal disturbance is present.
Vulnerable A2bcd+3bcd+4bcd; C1	***Neotis denhami*** **Denham's Bustard**	No	No	Low	No suitable habitat.
Near Threatened C1	*Campethera notata* Knysna Woodpecker	No	No	Low	No suitable habitat. Some trees exist but all alien invasives, low potential to support SCC.
Least Concern (Regional), Near Threatened (Global)	*Buteo trizonatus* Forest Buzzard	No	Possible	Low	Alien invasive trees possibly suitable, but unlikely to be favoured by SCC given high levels of human/domestic animal disturbance. Limited hunting/prey availability.
MAMMALS					
Vulnerable B1ab(iii)+2ab(iii)	***Chlorotalpa duthieae*** **Duthie's Golden Mole**	No	No	Low	No suitable forest habitat in vicinity.
Vulnerable B2ab(ii,iii,v)+C2a(i)	**Sensitive Species 8**	No	No	Low	No suitable forest/thicket habitat. SCC will be deterred by high levels of human/domestic animal disturbance.
INVERTEBRATES					
Vulnerable B2ab(iii,v)	***Aneuryphymus montanus*** **Yellow-winged Agile Grasshopper**	No	No	Low	No suitable fynbos habitat.

AMPHIBIANS					
Endangered B1ab(i,ii,iii,v)+ 2ab(i,ii,iii,v)	***Afrixalus knysnae* Knysna Leaf-folding Frog**	No	No	Low	No suitable endorheic wetland habitat.

5. SITE SENSITIVITY VERIFICATION AND COMPLIANCE STATEMENT

Based on the information in this report following the desktop and field assessments, the site sensitivity for the terrestrial animal theme is determined to be **LOW** in contrast to the medium sensitivities highlighted by the DFFE Screening tool.

The following reasons support this finding:

- The low likelihood of occurrence of terrestrial animal SCC and fauna overall within the project footprint. Very little natural vegetation and habitat exists within the project footprint. Most of the site consists of highly transformed and modified areas within the Thembalethu informal settlement and adjacent areas, all heavily impacted by pollution, soil erosion, alien plant invasions and the expansion of informal housing/infrastructure.
- The limited footprint of the project area within which excavations and construction activities will take place is unlikely to cause changes to the existing habitat structure, which is currently already highly modified. In many cases the current SDP for the project runs between existing informal housing/infrastructure and not through natural habitat.
- It is highly unlikely that SCC will occur in close proximity to the project footprint given the high levels of disturbance from human activity (traffic, noise) and free-roaming domestic animals (especially dogs which likely hunt wildlife).
- The temporary nature of the excavations or construction activities (disturbance) associated with the project, as well as its proximity to existing infrastructure and disturbance regimes is unlikely to cause additional or significant disturbance to terrestrial animal species in the surrounding areas.

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. RECOMMENDATIONS

- Water course protection is of high biological importance (most likely to support general biodiversity and human health) in the area. Recommendation made within the Aquatic Specialist Report (J. Dabrowski, Confluent Environmental) should be implemented to minimize impacts to aquatic environments, thereby reducing impacts to associated fauna species.
- Recommendations made by the Botanical Specialist Report (B. Fouche, Confluent Environmental) should be implemented to reduce the impacts any native vegetation and thereby associated fauna species.
- 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 development on a site. These are summarised in Box 1 below:

BOX 1: Best practice principles for ALL fauna encountered during construction or operational phases of projects.

If any animals are seen on site, a photo or video should be taken if at all 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 earthworks (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 a room/enclosed area such that it cannot escape (e.g. porcupines, monkeys, baboons, antelope). It is critical in the case of snakes/scorpions to get pictures/videos to aid in identification and appropriate treatment of anyone needing medical assistance.
- Any animal that shows 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.

Some helpful contact details numbers for the ECO/Site manager's disposal include:

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

A local SPCA can collect and treat most animals, and should be a first point of call for assistance. If they cannot directly assist, they will revert and notify the relevant authorities/vets. In the Garden Route please contact:

SPCA George: 044 878 1990

SPCA Mossel Bay: 044 693 0824

For any assistance with snake removals/relocations, identifications, or bite treatment:

African Snakebite Institute (all details available on www.africansnakebiteinstitute.com)

General Enquiries: +27 73 186 9176

Snakebite Emergencies: +27 82 494 2039

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APPENDIX 1: SCC IDENTIFIED FROM PUBLIC PLATFORMS FOR THE QUARTER DEGREE SQUARE, SABAP2 PENTAD AND INATURALIST SEARCH AREA FOR THE PROJECT.

SCC were included or excluded from further analysis in this report based on expert interpretation for the presence/absence of key habitat features on site. See Section 4.1 Assumptions and Limitations for more information.

Taxa	Species	Common name	Regional Assessment status	Source	Assessed in report Y/N	Reason
Avifauna	*Bradypterus sylvaticus*	Knysna Warbler	VU	SABAP2	Y	
Avifauna	*Buteo trizonatus*	Forest Buzzard	LC, NT	SABAP2	Y	
Avifauna	*Campethera notata*	Knysna Woodpecker	NT	SABAP2	Y	
Avifauna	*Circus maurus*	Black Harrier	EN	SABAP2	N	No suitable habitat, within urban area
Avifauna	*Falco biarmicus*	Lanner Falcon	VU	SABAP2	N	No suitable habitat, within urban area
Avifauna	*Grus paradisea*	Blue Crane	NT	SABAP2	N	No suitable habitat, within urban area
Avifauna	*Morus capensis*	Cape Gannet	VU	SABAP2	N	Marine species
Avifauna	*Neotis denhami*	Denham's Bustard	VU	SABAP2	N	No suitable habitat, within urban area
Avifauna	*Phalacrocorax capensis*	Cape Cormorant	EN	SABAP2	N	Marine species
Avifauna	*Polemaetus bellicosus*	Martial Eagle	EN	SABAP2	N	No suitable habitat, within urban area
Avifauna	*Sagittarius serpentarius*	Secretarybird	VU	SABAP2	N	No suitable habitat, within urban area
Mammal	*Damaliscus pygargus pygargus*	Bontebok	VU	Virtual Museum	N	No suitable habitat, within urban area
Mammal	*Philantomba monticola*	Blue Duiker	VU	Virtual Museum	N	No thicket/forest habitat
Invertebrate	*Aloeides pallida littoralis*	Knysna Pale Copper	NT	Virtual Museum	N	No grassy fynbos habitat
Invertebrate	*Aloeides trimeni southeyae*	Trimen's Copper	EN	Virtual Museum	N	No coastal fynbos habitat

APPENDIX 2: PRELIMINARY LIST OF AVIFAUNA SPECIES OBSERVED IN PROJECT AREA

Common name	Scientific name
Cape Robin-Chat	*Cossypha caffra*
Cape Sparrow	*Passer melanurus*
Cape Wagtail	*Motacilla capensis*
Cape White-eye	*Zosterops virens*
Common Starling	*Sturnus vulgaris*
Domestic Goose	*Anser anser domesticus*
Domestic Chicken	*Gallus gallus domesticus*
Forest Canary	*Crithagra scotops*
Hadada Ibis	*Bostrychia hagedash*
Karoo Prinia	*Prinia maculosa*
Laughing Dove	*Spilopelia senegalensis*
Red-eyed Dove	*Streptopelia semitorquata*
Sombre Greenbul	*Andropadus importunus*
Southern Double-collared Sunbird	*Cinnyris chalybeus*

APPENDIX 3: PRELIMINARY LIST OF MAMMAL SPECIES OBSERVED IN PROJECT AREA

Order	Family	Common name	Scientific name	Notes
Carnivora	Canidae	Domestic dog	*Canis lupus familiaris*	Free ranging
Artiodactyla	Bovidae	Domestic cattle	*Bos taurus*	Free ranging
Artiodactyla	Suidae	Domestic pig	*Sus domesticus*	Free ranging and in pens