Botanical and Terrestrial Biodiversity Compliance Statement for the Realignment and Extension of the Approved Thembalethu Sewer-Line to Accommodate Informal Human Settlement, George, Western Cape

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Date: 13 May 2024
Version: Draft

confluent

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.

Bianke Fouche (MSc Conservation Biology)

May 2024

BIANKE FOUCHE ABRIDGED CV

Qualifications

- B.Sc. Environmental Sciences (Nelson Mandela University),
- B.Sc. Honours in Botany (Nelson Mandela University),
- M.Sc. Conservation Biology (University of Cape Town)

SACNASP Registration No: 141757 (Candidate Botanical Scientist)

Skills and Core Competencies

- My MSc research will add to our understanding of plant community niche construction and Alternative Stable State (ASS) theory. The knowledge gained will be used to advise landscape stewardship practices, especially regarding reforestation initiatives in the Overstrand.
- I have worked closely with the conservation team of the Grootbos Foundation, where I assisted with vegetation surveys, mounting voucher specimens in the Grootbos herbarium, and taken part in controlled fynbos fires in the Overberg.
- Postgraduate studies of mine included assessing the allelopathic effects of *Eucalyptus* leaves on garden peas and leeks and assessing the accuracy of the climate leaf analysis multivariate programme (CLAMP) in predicting the climate of fynbos vegetation.
- In Cape Town I regularly took part in alien clearing activities and helped to identify relevant listed invasive plants.
- I am currently a member of SACNASP, the International Association for Impact Assessment (IAIA) in South Africa, Botanical Society of South Africa, and the custodians for rare and endangered wildflowers (CREW-Outramps) in George.

References

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ABBREVIATIONS

BPA	Biodiversity Priority Area
BSP	Biodiversity Spatial Plan
CARA	Conservation of Agricultural Resources Act (Act no 43 of 1983)
CBA	Critical Biodiversity Area
CD: NGI	Chief Directorate: National Geo-spatial Information
DFFE	Department of Forestry, Fisheries, and the Environment
EIA	Environmental Impact Assessment
EMP	Ecological Management Plan
EN	Endangered
ESA	Ecological Support Area
LC	Least Concern (referring ecosystems)
LT	Least Threatened (referring to ecosystems)
NEM:BA	National Environmental Management: Biodiversity Act
ONA	Other Natural Areas
PA	Protected Area
SACNASP	South African Council for Natural Science Professionals
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDP	Site Development Plan

1. INTRODUCTION

1.1 Background

Confluent Environmental was appointed by Cape EAPrac to undertake a specialist assessment for botanical and terrestrial sensitivity of the Thembalethu sewer line realignment and emergency sewer upgrades. According to the Department of Forestry, Fisheries, and the Environment (DFFE) Screening Tool, this SSVR is required because the terrestrial plant species theme has been highlighted as having a Medium sensitivity in some areas, and the terrestrial biodiversity has a Very High sensitivity. The proposed realignment covered in this report is for sections on Erf 5006 and Portion 50/197, Thembalethu. The general location of the sewer line is presented in Fig. 1.

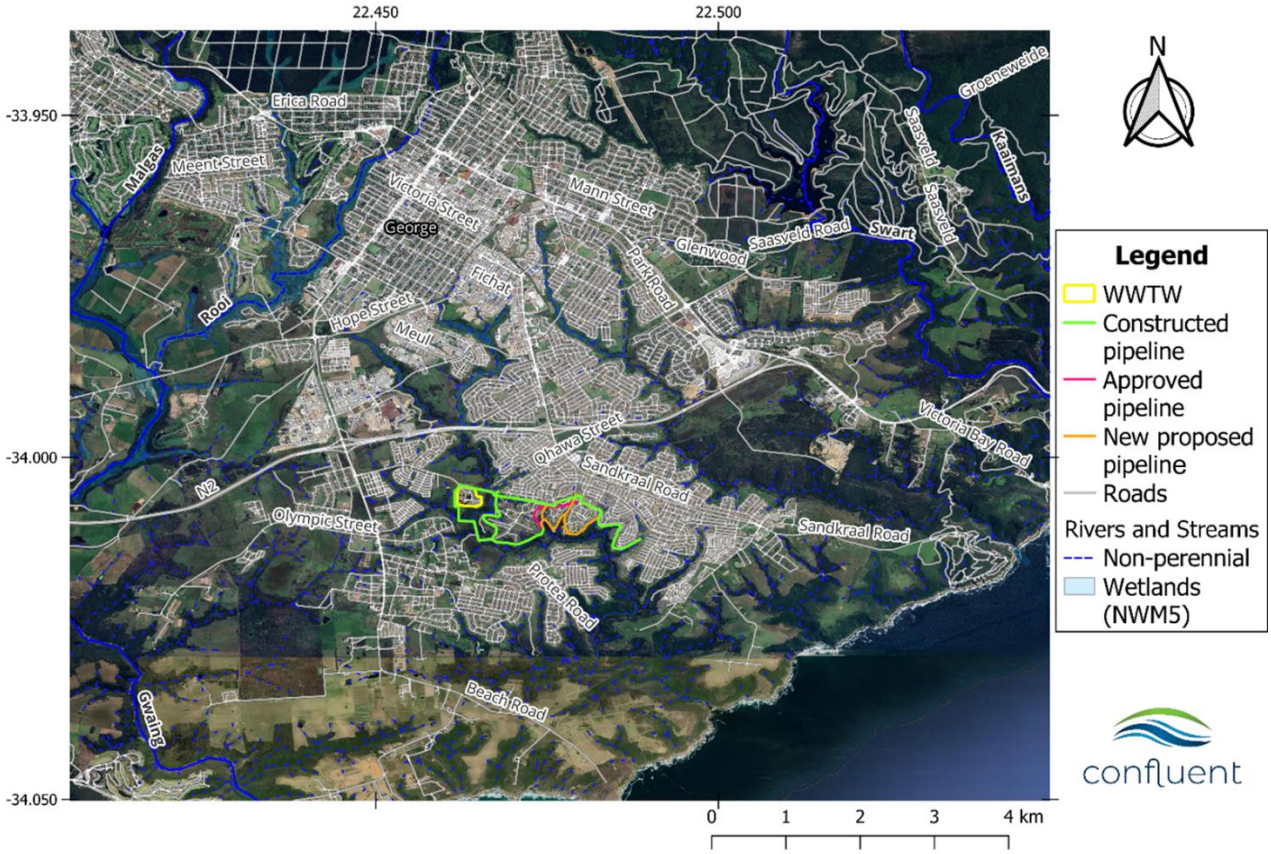

Figure 1: The general location of the Tembalethu sewer line.

1.2 Site Development Plan (SDP)

As mentioned above, a section of the sewer line needs to be realigned due to the encroachment of the informal settlement in the area, and another section requires emergency repair work (Fig. 2). Due to erosion, the constructed sewer line at the crossing watercourse crossing on Portion 58/197 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). This emergency upgrade will result in the installation of new infrastructure, and it is essential to prevent the failure (which could result due to the erosion, & increased load on the system) of the exiting sewer line.

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 north which is causing erosion of the banks and jeopardising the sewer line stability.

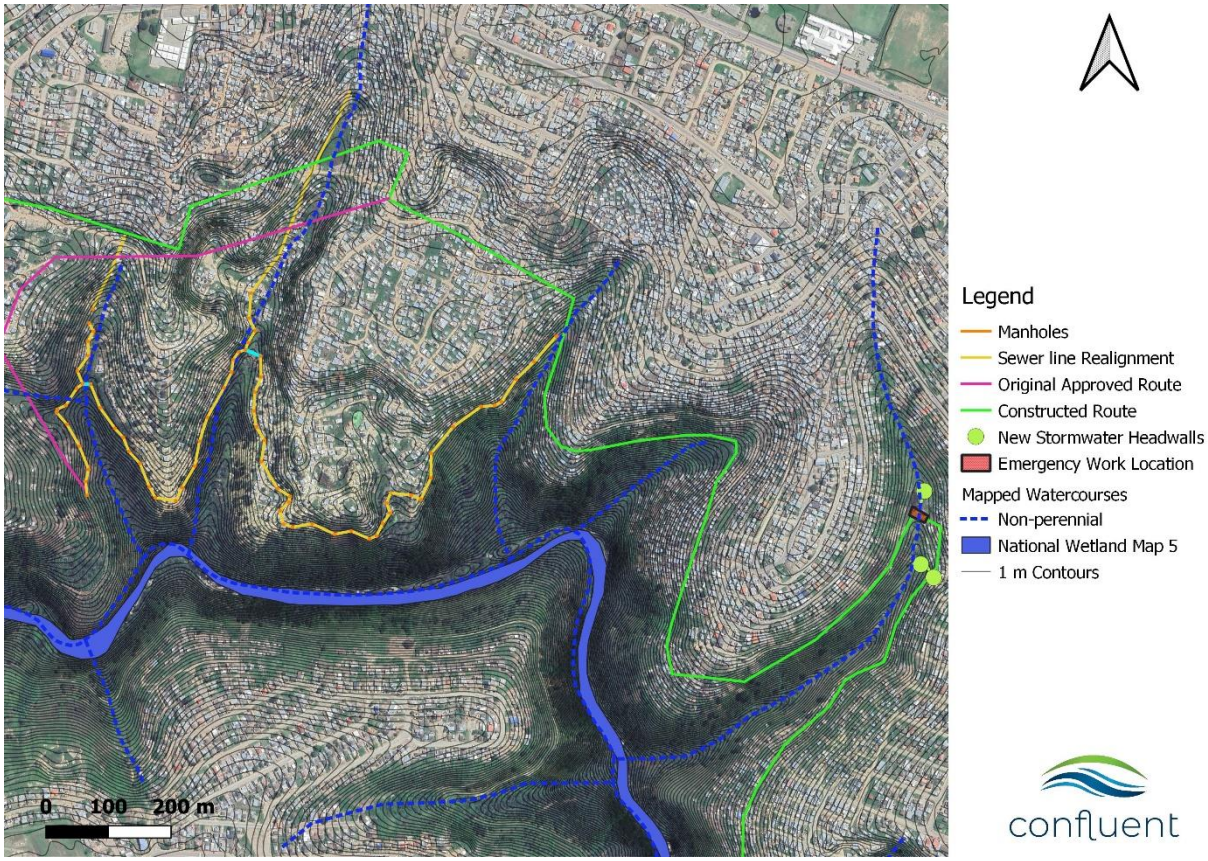

Figure 2: Original approved sewer line (pink) and proposed realignment (orange) moved towards the Skaapkop River showing crossings at tributaries (1-3) moved south. The new alignment ties into the approved and already constructed pipeline (green). Map credit: Jackie Dabrowski

2. TERMS OF REFERENCE

This screening tool sensitivity verification report provides information on Terrestrial and Botanical diversity and sensitivity of the proposed development. The results presented are based on a desktop and field assessment, which includes a consideration of historical photographic records of the site. The assessment presented in this report follows the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, and Terrestrial Plant Species themes.

This site sensitivity assessment follows the requirements of:

- The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), which includes:
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial plant species (28 July 2023).
    - The protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity (20 March 2020). Additional guidelines for the terrestrial biodiversity theme:
    - Ecosystem Guidelines for Environmental Assessment in the Western Cape (de Villiers et al., 2016).
    - The Western Cape Biodiversity Spatial Plan Handbook and summary booklet (CapeNature, 2017; Pool-Sandvliet et al., 2017).
    - The Subtropical Thicket Ecosystem Programme Handbook: Integrating the natural environment into land-use decisions at the municipal level: towards sustainable development (Pierce & Mader, 2006).
- Additional guidelines for the terrestrial plant species theme:
    - Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa (Verburgt et al., 2020).

The assessment was undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with relevant expertise in the field of Botanical and/or Ecological science.

2.1 Online Screening Tool

The Department of Forestry, Fisheries, and the Environment (DFFE) screening tool report for the development footprint has identified the **terrestrial plant species theme as having a Medium and Low sensitivity** in different areas along the route (Fig. 3), and the **terrestrial biodiversity theme as having a Very High sensitivity** (Fig. 3). Note that the Screening Tool plant species theme does not take Near Threatened plant populations into account.

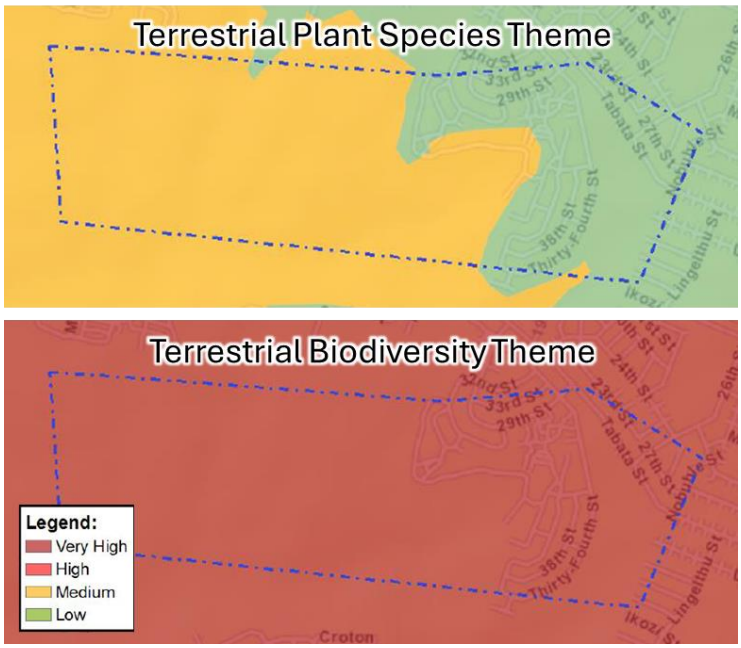

Figure 3: The screening tool generated site sensitivities for the Tembalethu sewer line.

A Very High sensitivity rating for terrestrial biodiversity according to the screening tool is triggered for all Biodiversity Priority Areas (BPAs) and other sensitive features (Stewart et al., 2021). BPAs include the various management layers of the Western Cape Biodiversity Spatial Plan (WC BSP), as well as the other sensitive features in Table 1 below. The entries of of Table 1 were triggered for the proposed sewer line realignment and emergency works in Thembalethu .

Table 1: Sources of BPA data for the Terrestrial Biodiversity Theme sensitivity (Stewart et al., 2021)*. Only BPAs that have been triggered for the Thembalethu sewer line by the screening tool are listed.*

Sensitivity layer	Data included and source
Red Listed Ecosystems	Any ecosystem that is listed as Vulnerable, Endangered, or Critically Endangered according to the "Revised National List of Ecosystems that are Threatened and in Need of Protection (NEM:BA Act no.10 of 2004, as amended in November 2022)
Critical Biodiversity Areas (CBAs)	Most recent terrestrial CBA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set.
Ecological Support Areas (ESAs)	Most recent ESA spatial footprint for metros, provinces, or bioregional plans, combined to create a national data set.
SAN Parks Buffer Areas	A buffer area for a National Park is defined in the February 2012 schedule on Biodiversity Policy and Strategy for South Africa's Strategy on Buffer Zones of National Parks. The buffer applicable here is the 10km wide buffer for the Garden Route National Park.
Strategic Water Source Areas (SWSAs) (terrestrial)	Surface strategic water source areas, delineated by Mervyn Lotter in October 2020 with substantial input from the SWSA spatial task team as part of the SWSA spatial task team. Note that the protocol only applies to the terrestrial parts of the SWSAs.

3. METHODOLOGY

3.1 Desktop Assessment

The desktop assessment was performed using Cape Farm Mapper and QGIS version 3.28.3 “Firenze”. Plant species data was obtained from the following sources:

- The DFFE screening tool listed SCC.
- Information on plant occurrence prior to the site visit was sourced from SANBIs Botanical Research and Herbarium Management System (BRAHMS) for the Plants of Southern Africa (POSA) database.
- iNaturalist observations of the property and surrounding areas.
- Specialist insight into the species likely present in the area.

Ecosystem/ vegetation type data was sourced from:

- The 2018 updated South African National Vegetation Map from SANBIs Biodiversity GIS (BGIS) database, and the National Biodiversity Assessment report of 2018 (Skowno et al., 2018).
- Shapefiles for the Western Cape Biodiversity Spatial Plan (WC-BSP) i.e., information on PAs, CBAs, ESAs, and ONAs were downloaded from BGIS database (CapeNature, 2017; Pool-Sandvliet et al., 2017).
- Cape Farm Mapper for additional spatial information required for the site.
- Chief Directorate: National Geo-spatial Information (CD: NGI) Geospatial Portal and Google Earth for the acquisition of historical aerial imagery of the site.
- The conservation status of ecosystems was found in the Revised National List of Ecosystems that are Threatened and in need of protection, published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004, as revised in Nov. 2022), and also using the Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2006).

3.2 Field Assessment

Field work was undertaken on the 23rd of April 2024. The method for identifying species was similar to a BioBlitz, also described as a “timed meander”, where the specialist especially keeps an eye out for rarer and threatened species. Some Red Listed Plant species are found more easily during a site survey than other species. This survey method is an attempt to account for the short and single survey period, where detection probability of some rare and threatened species (e.g., geophytes, small succulents, small perennials etc.) are low (Garrard et al., 2008; Wintle et al., 2012). Observations of individual species and environmental characteristics were documented using Nikon Coolpix camera. A species list and species accumulation curve is provided in the results section of this report.

3.3 Assumptions & Limitations

This assessment is subject to a few assumptions, uncertainties, and limitations, as listed below:

- Only one survey took place during Autumn on the 23rd of April 2024. Seasonal and time constraints limit the findings of botanical and ecological reports.
- The species list and SCC reported are not exhaustive, and more species could be added to the list should more sampling effort, and sampling in different seasons occur (Perret et al., 2023).
- Some rare and threatened plant species are difficult to locate and easily overlooked in the field (e.g., geophytes, small succulents, small shrubs, and cryptic spp.), however given the conditions and history of the area, it is highly unlikely SCC occur there.
- Environmental factors such as the prevailing fire regime, successional stage of the vegetation present, previous cultivation of the land, and the level of alien infestation at the site affects the species visible at the time of assessment (Cowling et al., 2010; Privett et al., 2001). It is not possible to know what the landscape was like prior to the severe transformation and degradation of the landscape.
- Informal settlements and a physically unsafe environment (e.g., steep eroded valleys, pollution, electrical wires) made it hard to gain access to some sections of the site. It is possible that focus on getting access to some parts of the site may have caused a lapse in concentration so that some observations could have been missed on the site.

4. RESULTS: DESKTOP ASSESSMENT

4.1 Terrestrial Biodiversity

4.1.1 Climate

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 4).

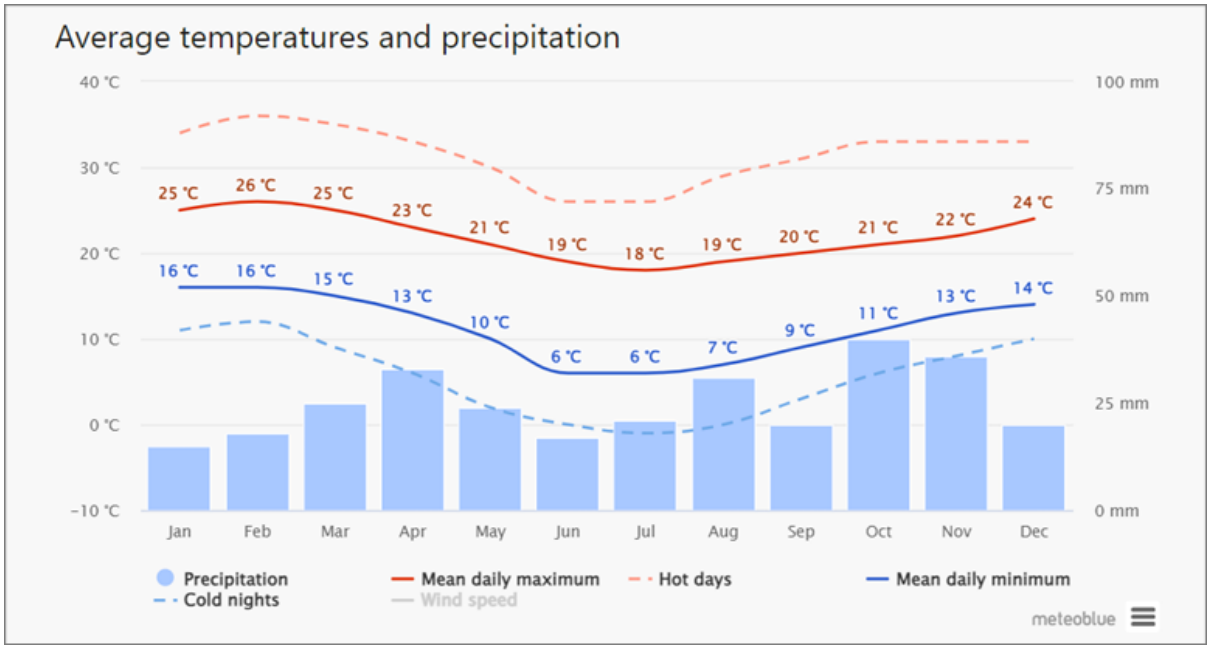

Figure 4: The climate of the George area summarised to indicate monthly patterns. (www.meteoblue.com).

4.1.2 Vegetation Type(s)

The mapped vegetation type according to the National 2018 vegetation map of South Africa is critically endangered (CR) Garden Route Granite Fynbos (Fig. 5). The Vlok vegetation map contains greater resolution at a local scale. The drainage lines are all mapped as “Groot Brak River Floodplain”. A section of vegetation south of the main drainage line is mapped as “Herolds Bay Thicket-Grassy Fynbos”, and the majority of the remaining area is mapped as “Wolwedans Grassy Fynbos” (which is the equivalent of Garden Route Granite Fynbos). The important taxa for Garden Route Granite Fynbos is in Table 2 below:

Table 2: A table with the important taxa that characterise Garden Route Granite Fynbos. No species are highlighted in green, as none of the important species were found during the site assessment.

Family	Growth Form	Species	Dominant
RUTACEAE	Low Shrubs	*Agathosma ovata*	
RUBIACEAE	Low Shrubs	*Anthospermum prostratum*	
FABACEAE	Low Shrubs	*Aspalathus asparagoides*	
POACEAE	Graminoids	*Brachiaria serrata*	
ROSACEAE	Low Shrubs	*Cliffortia falcata*	
ROSACEAE	Tall Shrubs	*Cliffortia serpyllifolia*	
ASTERACEAE	Low Shrubs	*Cullumia bisulca*	
POACEAE	Graminoids	*Eragrostis capensis*	
ERICACEAE	Low Shrubs	*Erica canaliculata*	
ERICACEAE	Low Shrubs	*Erica diaphana*	
ERICACEAE	Low Shrubs	*Erica discolor*	[d]
ERICACEAE	Low Shrubs	*Erica formosa*	
ERICACEAE	Low Shrubs	*Erica peltata*	[d]
ASTERACEAE	Low Shrubs	*Eriocephalus africanus*	
CYPERACEAE	Graminoids	*Ficinia nigrescens*	
MALVACEAE	Low Shrubs	*Hermannia angularis*	
POACEAE	Graminoids	*Heteropogon contortus*	
MESEMBRYANTHEMACEAE	Succulent Shrub	*Lampranthus sociorum*	
PROTEACEAE	Low Shrubs	*Leucadendron salignum*	
LOBELIACEAE	Low Shrubs	*Lobelia tomentosa*	
ASTERACEAE	Low Shrubs	*Metalasia pungens*	
PROTEACEAE	Low Shrubs	*Mimetes cucullatus*	
SANTALACEAE	Semiparasitic Shrubs	*Osyris compressa*	
THYMELAEACEAE	Tall Shrubs	*Passerina corymbosa*	[d]
GERANIACEAE	Low Shrubs	*Pelargonium fruticosum*	
POACEAE	Graminoids	*Pentaschistis eriostoma*	
RHAMNACEAE	Low Shrubs	*Phylica confusa*	[d]
PROTEACEAE	Tall Shrubs	*Protea coronata*	
PROTEACEAE	Tall Shrubs	*Protea lanceolata*	
PROTEACEAE	Tall Shrubs	*Protea neriifolia*	
ASTERACEAE	Low Shrubs	*Relhania calycina*	
RESTIONACEAE	Graminoids	*Restio triticeus*	
SCHIZAEACEAE	Geophytic Herb	*Schizaea pectinata*	
ASTERACEAE	Low Shrubs	*Syncarpha paniculata*	[d]
CYPERACEAE	Graminoids	*Tetraria cuspidata*	[d]
POACEAE	Graminoids	*Themeda triandra*	
SANTALACEAE	Semiparasitic Shrubs	*Thesium virgatum*	
VISCACEAE	Semiparasitic Epiphytic Shrub	*Viscum capense*	

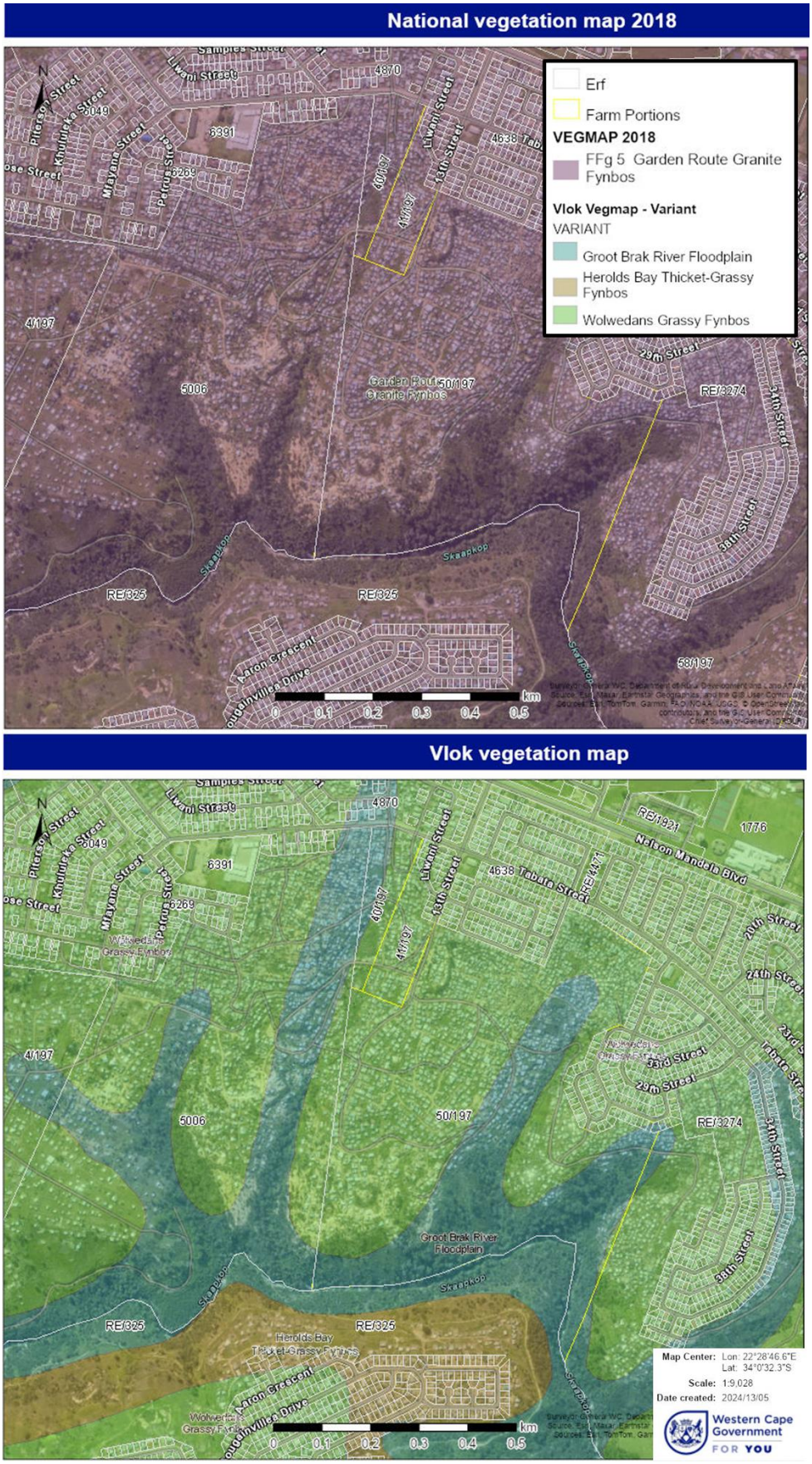

Figure 5: The vegetation maps for the proposed sewer line re-alignment area in Thembalethu.

4.1.3 Western Cape Biodiversity Spatial Plan

The Biodiversity Spatial Plan for the Western Cape (WC BSP) applies to Thembalethu (Fig. 6) and must be considered in terrestrial biodiversity reports. Explanations of the BSP categories on the site are in Box 1, and recommended land-uses for each category is provided in appendix 9.1. The reasons for the BSP layers mapped here are (grey entries either do not apply to the site or are outside of the scope of this report to provide comment on):

- **Bontebok Extended Distribution Range**: This is false due to the informal settlement here. Refer to the animal species specialist for more information on this trigger.
- **Water source protection- Kaaimans, and Watercourse protection- South-Eastern & Southern Coastal Belt**: While this trigger applies, the watersourses here are severely polluted and eroded / degraded. Refer to the aquatic specialist report for more comment on this trigger.

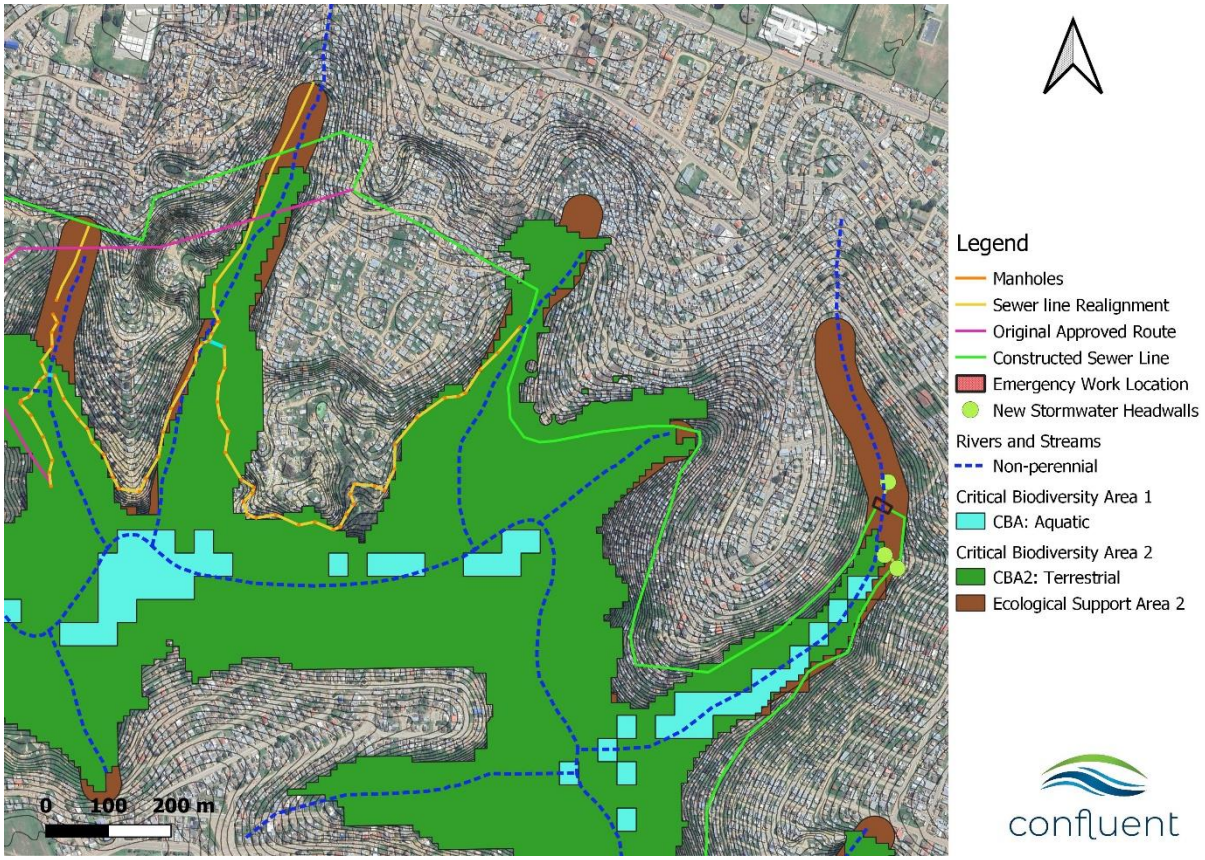

Figure 6: The mapped Western Cape Biodiversity Spatial Plan (WC BSP) categories that have been mapped for the project area in Thembalethu.

BOX 1: The Biodiversity Spatial Plan

Critical Biodiversity Area 1

Definition: Areas in a natural condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

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

Critical Biodiversity Area 2

Definition: Areas in a degraded or secondary condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.

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

Ecological Support Area 2

Definition: Not essential for meeting biodiversity targets. Important in supporting functioning of PAs or CBAs. Often vital for ecosystem services.

Objective: Restore/minimise impact on ecological infrastructure functioning, especially soil and water-related services.

4.1.4 SAN Parks Buffer Area

SAN Parks buffer areas are areas around National Parks that have been made to mitigate and reduce activities with negative ecological impacts taking place in close proximity to Parks, and to integrate National Parks into them into the landscape a little better. This concept has been widely recommended, including in the operational guidelines of UNESCO's World Heritage Convention 1. The purpose of these buffer zones are to:

- Protect the purpose and values of the national park, which is to be explicitly defined in the management plan submitted in terms of section 39(2) of the Act;
- Protect important areas of high value for biodiversity and/or to society where these extend beyond the boundary of the Protected Area;
- Assist adjacent and affected communities to secure appropriate and sustainable benefits from the national park and buffer zone area itself by promoting a conservation economy, ecotourism and its supporting infrastructure and services, and sustainability through properly planned harvesting.

According to the screening tool, the buffer that the proposed development site falls within is for the proposed realignment and extension of the Thembalethu sewer line. The sewer line is however located in the middle of highly invaded informal settlements, and therefore the purpose of the SAN Parks buffer has been compromised in this area.

4.1.5 Historical Aerial Imagery

The description of the historical imagery sourced from Google Earth is well summarised in the animal species report (written by Monica Leitner) as follows:

"*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 (Fig. 7). 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.*"

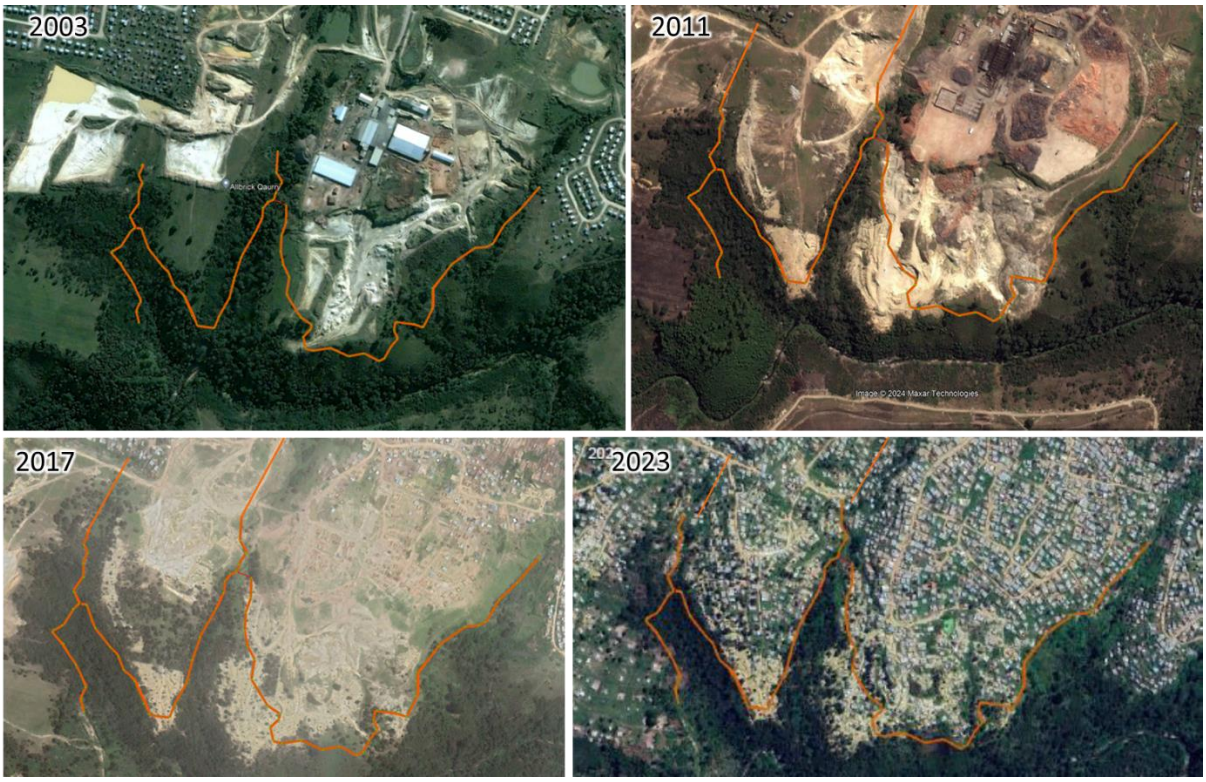

Figure 7: A series of historical imagery sourced from Google Earth.

4.2 Plant Species

The plant species theme sensitivity of Medium is dependent on the presence, or likely presence, of several plant species of conservation concern (SCC). The Red List categories are discussed later in the report.

4.2.1 Species of conservation concern (SCC) listed in the screening tool.

Several SCC have been flagged by the Screening Tool Report for the area. These species need to be assessed in terms of their likelihood of occurrence on the site, and they were actively searched for during the site assessment:

Diosma passerinoides	Sensitive species 500
Euchaetis albertiniana	Sensitive species 800
Lampranthus pauciflorus	Sensitive species 1024

Leucospermum glabrum	Sensitive species 1032

5. RESULTS: FIELD ASSESSMENT

5.1 Landscape and Vegetation Type.

The current state of the vegetation across the entire site assessment area was severely transformed, with drainage lines containing severely eroded and incised banks, multiple dumping grounds, polluted water, and a host of almost exclusively invasive plants. Fig. 8 shows multiple images from the emergency repair area, located to the east pf the proposed sever realignment section. Fig. 8A is an image of one of the new, and larger manholes that have been installed in this area. Fig 8B illustrates the wall of supporting gabions and trench dug out behind the wall for connecting the sewer line. This emergency intervention in this section of the sewer line also requires a reno mattress at the toe of the gabion wall to prevent a repeated failure due to the creation of a “plunge pool”. Refer to the aquatic specialist report by Dr. Jackie Dabrowski for more detail on the plans and reasons for the infrastructure put in place here.

Fig. 8C illustrates the northern section of the crossing which is dominated by *Typha capensis*. This reed species has been used in artificial wetland settings to aid in the purification of water, however in order for that to work the reeds need to be periodically cut down (to preserve their ability to take up harmful chemicals and heavy metals). The water running through the stand of *Typha capensis* was evidently very polluted. Fig. 8D represents a section on the slope adjacent to the drainage line that is being revegetated with plants sourced in Thembalethu. Although the majority of the planted vegetation is invasive kikuyu (*Cenchrus clandestinus*), this is preferrable over the erosion that could result if nothing was planted to stabilise the valley sides. Lastly, Fig. 8E is a large dump area along the westernmost section of the emergency sewage line repair area. This dump poses significant health threats and is surrounded by invasive and alien vegetation.

Figure 8: Images of the area where emergency repairs to the sewer line are taking place.

In addition to the emergency repairs, a section of the existing pipeline needs to be realigned, and this area is represented in the map in Fig. 9. Drainage lines are all very invaded, dominated either by black wattles (*Acacia mearnsii*) or by bugweed (*Solanum mauritianum*), like in Fig. 9A. The water quality along the entire proposed route is very poor, as illustrated in Fig, 9B. Fig. 9C shows a section where the new pipeline will cross between informal dwellings in an area that is severely eroded. Fig. 9D illustrates a point along the middle drainage line where a large informal dump is located in the middle of the drainage line. Fig. 9E represents an area where the proposed new sewer line crossed a narrow, eroded stream with numerous informal houses already established very near the stream. This section may prove a challenging area for the sewer line realignment project. Lastly, Fig. 9F was the closest point reached to the last sewer line connection section, and again the landscape was very eroded with numerous invasive plant species being dominant.

Figure 9: Images showing the landscape where the sewer line realignment is proposed. The blue line indicates the GPS track for the field assessment.

5.2 Species Observed.

A species accumulation curve for all the species recorded on the site during the assessment is presented in Fig. 10. All species that were observed during the site visit are in Table 3. The site assessment species list is not exhaustive. No SCC were found during the site assessment, and it is confirmed that the presence of plant SCC are highly unlikely.

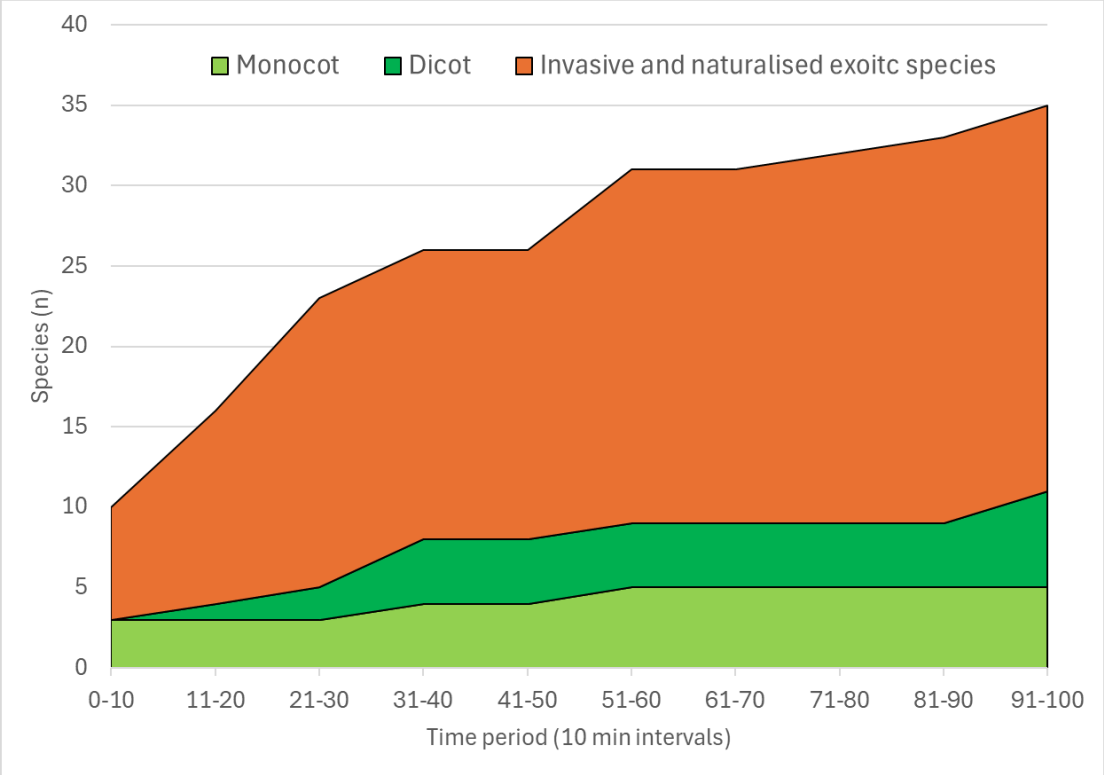

Figure 10: A plant species accumulation curve for the site assessment.

The plant species accumulation curve in Fig. 10 indicates that more species were likely present that were not recorded during the site assessment. However, they were more than likely additional invasive and naturalised exotic plants, or more native species that thrive in highly transformed and polluted environments. The species list below in Table 3 provides an explanation of each species in terms of its invasiveness and whether it is listed by the National Environmental Management: Biodiversity Act (NEMBA) and / or the Conservation of Agricultural Resources Act (CARA).

Table 3: A provisional species list made for plants found during the site assessment. Orange entries represent naturalised exotic plants and red entries are listed invasive plant species accorsing to thr NEMAB and CARA legislation.

Family	Species	Common name	Found in fynbos in Southern half of site? & Information
Liliopsida (Monocots)			
Araceae	*Colocasia esculenta*	Taro	Naturalised exotic but it should be on the Early Detection and Rapid Response (EDRR) programme of SANBI as it is an invader of streams programme
Araceae	*Zantedeschia aethiopica*	calla lily	Only in wet areas
Commelinaceae	*Commelina benghalensis*	tropical spiderwort	Naturalised exotic
Cyperaceae	*Cyperus congestus*	Purple Umbrella Sedge	Only in wet areas
Cyperaceae	*Eleocharis limosa*	Finger Rush	Only in wet areas
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	NEMBA category 1b; CARA category 1
Poaceae	*Cortaderia selloana*	Pampas Grass	NEMBA category 1b; CARA category 1
Poaceae	*Eragrostis curvula*	African love grass	This species often grows in transformed and highly disturbed areas
Poaceae	*Paspalum urvillei*	Vasey Grass	Naturalised exotic
Typhaceae	*Typha capensis*	Cape Bulrush	Where this species occurred, it was almost a monoculture, and many dumps are located right next to Typha.
Magnoliopsida (Dicots)			
Amaranthaceae	*Achyranthes aspera*	Devil's Horsewhip	Not NEMBA listed; CARA category 1
Amaranthaceae	*Chenopodium album*	Common Lambsquarters	Naturalised exotic
Asteraceae	*Cirsium vulgare*	Bull Thistle	NEMBA category 1b; CARA category 1
Asteraceae	*Erigeron sumatrensis*	tropical horseweed	Naturalised exotic
Asteraceae	*Euryops chrysanthemoides*	Paris Daisy	Naturalised, originally from the Eastern Cape and Kwa-Zulu Natal
Asteraceae	*Helichrysum foetidum*	Stinking Everlasting	This species often grows in transformed and highly disturbed areas
Asteraceae	*Helichrysum petiolare*	Licorice plant	This species often grows in transformed and highly disturbed areas
Asteraceae	*Nidorella ivifolia*	Ivy Vleiweed	Often on the edges of wetlands. This species often grows in transformed and highly disturbed areas
Asteraceae	*Xanthium spinosum*	spiny cocklebur	NEMBA category 1b; CARA category 1
Asteraceae	*Xanthium strumarium*	rough cocklebur	NEMBA category 1b; CARA category 1
Euphorbiaceae	*Ricinus communis*	castor bean	NEMBA category 2; CARA category 2
Fabaceae	*Acacia mearnsii*	black wattle	NEMBA category 2; CARA category 2

Fabaceae	*Erythrina caffra*	South African Coral Tree	Cultivated
Lamiaceae	*Coleus barbatus*	Woolly Plectranthus	NEMBA category 1b; CARA category 3
Lamiaceae	*Leonotis leonurus*	Common Lionspaw	This species often grows in transformed and highly disturbed areas
Lamiaceae	*Mentha longifolia*	Horse Mint	Naturalised exotic
Polygonaceae	*Persicaria lapathifolia*	pale smartweed	Naturalised exotic
Rosaceae	*Rubus pinnatus*	South African Raspberry	Although not quite exotic, this species still becomes invasive in disturbed areas.
Scrophulariaceae	*Selago corymbosa*	Stiff Bitterbush	This species often grows in transformed and highly disturbed areas
Solanaceae	*Datura stramonium*	jimsonweed	NEMBA category 1b; CARA category 1
Solanaceae	*Physalis peruviana*	Cape gooseberry	Naturalised exotic
Solanaceae	*Solanum chenopodioides*	tall nightshade	Naturalised exotic
Solanaceae	*Solanum linnaeanum*	Yellow Bitter-apple	This species often grows in transformed and highly disturbed areas
Solanaceae	*Solanum mauritianum*	bugweed	NEMBA category 1b; CARA category 1
Urticaceae	*Urtica urens*	Dwarf Nettle	Naturalised exotic
Polypodiopsida			
Dennstaedtiaceae	*Pteridium aquilinum capense*	Southern Bracken	

BOX 2: NEMBA categories for listed invasive alien plants.

Category 1a

Species which must be combatted or eradicated.

- Immediate steps must be taken to eradicate and combat or eradicate.
- Authorised officials must be permitted to enter properties to monitor, assist with or implement the combatting or eradication.
- If an Invasive Species Management Programme has been developed, a person must combat or eradicate the listed invasive species in accordance with such programme.

Category 1b

Species which must be controlled.

- Property owners and organs of state must control the listed invasive species within their properties.
- If an Invasive Species Management Programme has been developed, a person must control the listed invasive species in accordance with such programme.
- Authorised officials must be permitted to enter properties to monitor, assist with or implement the control of listed species.
- Any Category 2 listed species (where permits are applicable) which fall outside of containment and control, revert to Category 1b and must be controlled.
- Any Category 3 listed species which occur within a Protected Area or Riparian (wetland) revert to Category 1b and must be controlled.
- The Minister may require any person to develop a Category 1b Control Plan for one or more Category 1b species occurring on a property.

Category 2

Any species listed under Category 2 requires a permit issued by the Department of Forestry, Fisheries and the Environment (DFFE) to carry out a restricted activity (See Permit Applications.)

- A permit is required to carry out any restricted activity.
- No person may carry out a restricted activity in respect of a Category 2 listed invasive species without a permit.
- A person in control of a Category 2 listed species must take all necessary measures to ensure that specimens of the species do not spread outside of the land or area, such as an aviary) specified in the permit.

Category 3

Category 3 listed invasive species are subject to certain exemptions in terms of section 70(1)(a) of the NEMBA Act, which applies to the listing of alien invasive species.

- Any category 3 listed plant species that occurs in riparian areas must be considered as category 1b and the appropriate control measures instituted.

5.3 Additional SCC That May be Found

No SCC are likely to occur in the highly transformed, degraded, and polluted vegetation that was assessed during the site assessment.

6. SITE SENSITIVITY VERIFICATION

6.1 Terrestrial Biodiversity

The terrestrial biodiversity theme sensitivity is confirmed to be **Low**, mainly due to the severe degradation of the landscape and the loss of important ecological processes that cannot be easily restored. The triggers provided in the screening tool also do not apply to the area as they are defined, as discussed in Table 4 below.

Table 4: The original triggers for the terrestrial biodiversity theme sensitivity. Grey entries represent reasons that do not apply to the site, and green entries do apply to the site. Note in this case no triggers are applicable to the site due to the reasons provided.

Sensitivity layer	Explanation
Red Listed Ecosystems	The vegetation part of the proposed sewer line and emergency sewer line upgrades are severely transformed & invaded and does not represent indigenous vegetation. The vegetation is entirely transformed and degraded; it cannot be considered as Garden Route Granite Fynbos.
Critical Biodiversity Areas (CBAs)	The watercourses associated with aquatic CBA1 and terrestrial CBA2 categories do not match the reality on the site. These areas do not match the definitions & objectives of CBA areas, and the level of pollution here is a problem that will require not only effort, but long-term social engagement and programmes in order to meaningfully address.
Ecological Support Areas (ESAs)	Areas mapped as ESA areas are actually not providing a supporting function for biodiversity at all.
SAN Parks Buffer Areas	The objectives and principles that make good buffer and corridor areas next to National Parks do not apply here due to the severe transformation and pollution that reduces the quality of the habitat here.
Strategic Water Source Areas (SWSAs) (terrestrial)	Although this site is part of a SWSA, the water here is very polluted, and this is a problem that will require time and concerted effort to improve. Refer to the aquatic specialist report for more details on this trigger.

6.2 Botanical Diversity, Protected Species, & SCC

The botanical sensitivity of the site is confirmed to be **Low** because it is highly unlikely that any SCC would persist in the environment where the proposed sewer line and emergency upgrade is located. Alternative plant species that could be planted in this area include *Helichrysum patulum*, *Pelargonium capitatum*, *Nidorella ivifolia*, *Themeda triandra*, *Stenotaphrum secondatum*, and *Osteospermum moniliferum.*

7. CONCLUSION & COMPLIANCE STATEMENT

The realignment and emergency repair work to the Thembalethu sewer line will not negatively affect the larger conservation plans in the Western Cape and Garden Route. The realignment and upgrades proposed will also not result in a compromise or loss of plant species of conservation concern (SCC), because it is relatively certain that no SCC occur in the area. Because of the confirmation of a Low protocol sensitivity for both the Terrestrial Biodiversity and Plant species themes, a compliance statement for these two themes can be submitted for this project. Mitigation measures for this development and repair work are more relevant to the aquatic theme and are therefore summarised in the aquatic specialist report by Dr. Jackie Dabrowski. The replanting of the sides of the valleys that have been cleared during

construction is a good mitigation measure that is already being implemented in the emergency repair work area.

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9. APPENDIX

9.1 Land-Use Recommendations According to the WC BSP

Recommended acceptable land-uses for each BSP layer is outlined and summarised in Table 5.

Table 5: The land-use planning proposed by the Western Cape Biodiversity Spatial Plan. IUCN Red Listing Criteria for species.

LAND USE CATEGORIES		Conservation		Agriculture		Tourism and Recreational Facilities		Rural Accomodation		Urban			Business & Industrial				Infrastructure Installations			
LAND USE SUB-CATEGORIES (Refer to table 4.7 for descriptions)		Proclaimed Protected Areas	Other Nature Areas	Intensive Agriculture	Extensive Agriculture	Low Impact Facilities	High Impact Facilities	Agri-worker Accommodation	Small holdings	Urban Development & Expansion	Community Facilities & Institutions	New Settlements	Rural Business	Non-place-bound Industry (low-moderate impact)	Non-place-bound Industry (high impact)	Extractive Industry (incl. Prospecting)	Linear - roads & rail	Linear - pipelines & canals	Linear - powerlines	Other Utilities
MAP CATEGORY	DESIRED MANAGEMENT OBJECTIVE	Y = Yes: Permissible land uses that are not likely to compromise the biodiversity objective						R = Restricted: Land uses that may compromise the biodiversity objective are only permissible under certain conditions (refer to Table 4.7 for conditions)							N = No: Land uses that will compromise the biodiversity objective and are not permissible							
Protected Area	Must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.	Land use within proclaimed protected areas are subject to management plan drawn up for that specific protected area.																		
Critical Biodiversity Area 1	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Y	Y	N	R	N	N	N	N	N	N	N	N	N	N	N	N	N	R	N
Critical Biodiversity Area 2	Keep natural, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.	Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Ecological Support Area 1: Terrestrial	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	Y	Y	N	R	R	N	N	N	N	N	N	R	R	N	N	R	R	R	R
Ecological Support Area 1: Aquatic	Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.	Y	Y	N	R	R	N	N	N	N	N	N	N	N	N	N	R	R	R	N
Ecological Support Area 2	Restore and/or manage to minimise impact on ecological infrastructure functioning, especially soil and water-related services.	Y	Y	N	R	R	N	N	R	N	N	N	N	N	N	N	R	R	R	R
ONA: Natural to Near-Natural	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high impact land uses.	Y	Y	R	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
ONA: Degraded	Minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. Offers flexibility in permissible land uses, but some authorisation may still be required for high impact land uses.	R	R	R	Y	Y	R	R	Y	R	R	R	R	R	R	R	Y	Y	Y	Y
No Natural Remaining	These areas are suitable for development but may still provide limited biodiversity and ecological infrastructure functions and should be managed in a way that minimises impacts on biodiversity and ecological infrastructure.	R	R	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

confluent