



SCIENTIFIC TERRESTRIAL SERVICES

PLANT SEARCH, RESCUE AND RELOCATION, AND HABITAT MANAGEMENT PLAN

**FOR THE AUTHORISED 132 KILOVOLT
TRANSMISSION POWERLINES TO CONNECT THE
200 MEGAWATT SIBANYE GOLD PHOTOVOLTAIC
ENERGY FACILITY FOR SIBANYE GOLD LIMITED IN
WESTONARIA, GAUTENG PROVINCE.**

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Report Reference: STS 222029
Date: May 2022
Amended January 2023



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ACRONYM LIST

ARC	Agricultural Research Council
ARC	Agricultural Research Council
CARA	Conservation of Agricultural Resources Act, 1983 [Act No. 43 of 1983]
ECO	Environmental Control Officer
EM	Environmental Manager
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development
GPS	Global Positioning System
IUCN	International Union for Conservation of Nature
KV	kilovolt
MW	megawatt
NEMA	National Environmental Management Act, 1998 [Act No. 107 of 1998]
NEMBA	National Environmental Management: Biodiversity Act, 2004 [Act No. 10 of 2004]
PV	Photovoltaic
SANBI	South African National Biodiversity Institute
STS	Scientific Terrestrial Services CC



1 INTRODUCTION AND BACKGROUND TO THE PROJECT

Scientific Terrestrial Services CC (STS) was appointed to develop a Plant Search, Rescue and Relocation, and Habitat Management Plan for the first phase of the authorised 132-kilovolt (KV) transmission powerlines (Authorisation register number: 14/12/16/3/3/1/1606) to connect the 200-megawatt (MW) Sibanye Gold Photovoltaic (PV) energy facility (Authorisation register number: 14/12/16/3/3/2/919) for Sibanye Gold Limited in Westonaria, Gauteng Province; henceforth collectively referred to as the “**Sibanye PV Energy Facility Phase 1**”. Individually, the 132-KV transmission powerlines (Phase 1) will henceforth be referred to as the “**132-KV Powerline Phase 1**” with the 200-MW Sibanye Gold PV energy facility referred to as the “**Phase 1 PV Facility**” (Figures 1 & 2).

The Sibanye PV Energy Facility Phase 1 is located in the West Rand District Municipality of the Gauteng Province, approximately 8 km southwest of Westonaria near the Sibanye Gold Driefontein and Kloof mining operations. The 132-KV Powerline Phase 1 crosses over three roads, namely the R501 in its northern extent (just before connecting to the Phase 1 PV Facility), the N12 in its central extent, and a small unnamed road to the Sibanye Gold training academy in its southern extent. The 200-MW PV energy facility is entirely on agricultural fields, with the 132-KV Powerline Phase 1 crossing over both agricultural fields as well as large stretches of open veld and a ridge.

During the site walkdown, protected and threatened plants were only encountered along the 132-KV Powerline Phase 1 and, hence, the focus of this Plant Search, Rescue and Relocation, and Habitat Management Plan will be on the 132-KV Powerline Phase 1. No species of concern were recorded in the Phase 1 PV Facility and no further reference to the Phase 1 PV Facility will henceforth be made (refer also to the verification letter (STS 222029, 2022)¹).

¹ **STS 222029, 2022.** Verification of plants listed in the national forest act and species protected in terms of specific provincial legislation within Phase 1 of the proposed 200 megawatts (MW) Sibanye Gold Limited photovoltaic energy facility on portion 1, 2, 4, 5 and 6 of the farm Uitval 280 within the Westonaria local municipality in the Gauteng Province.



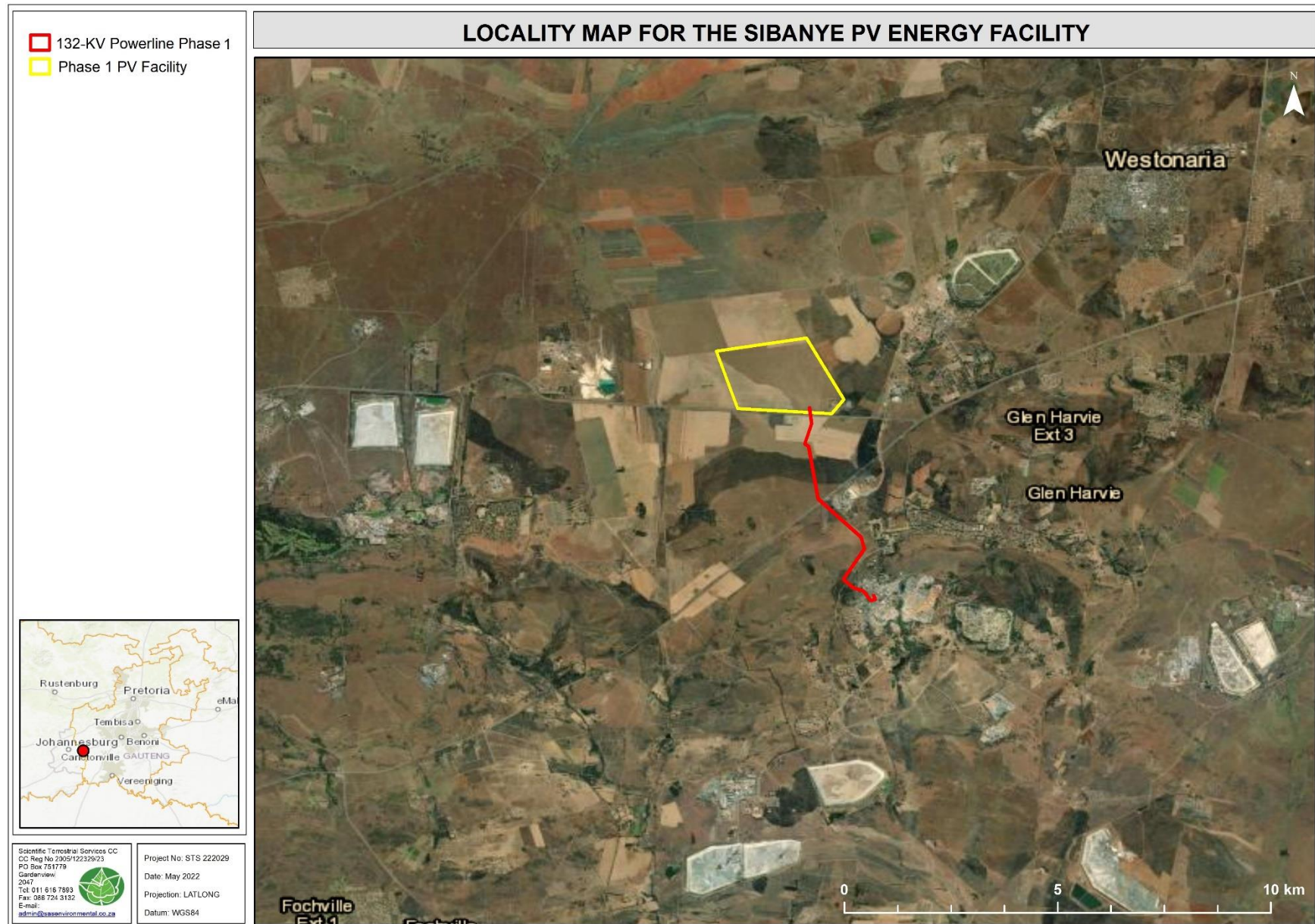


Figure 1: Digital satellite image depicting the Sibanye PV Energy Facility project area (Phase 1) in relation to the surrounding areas.



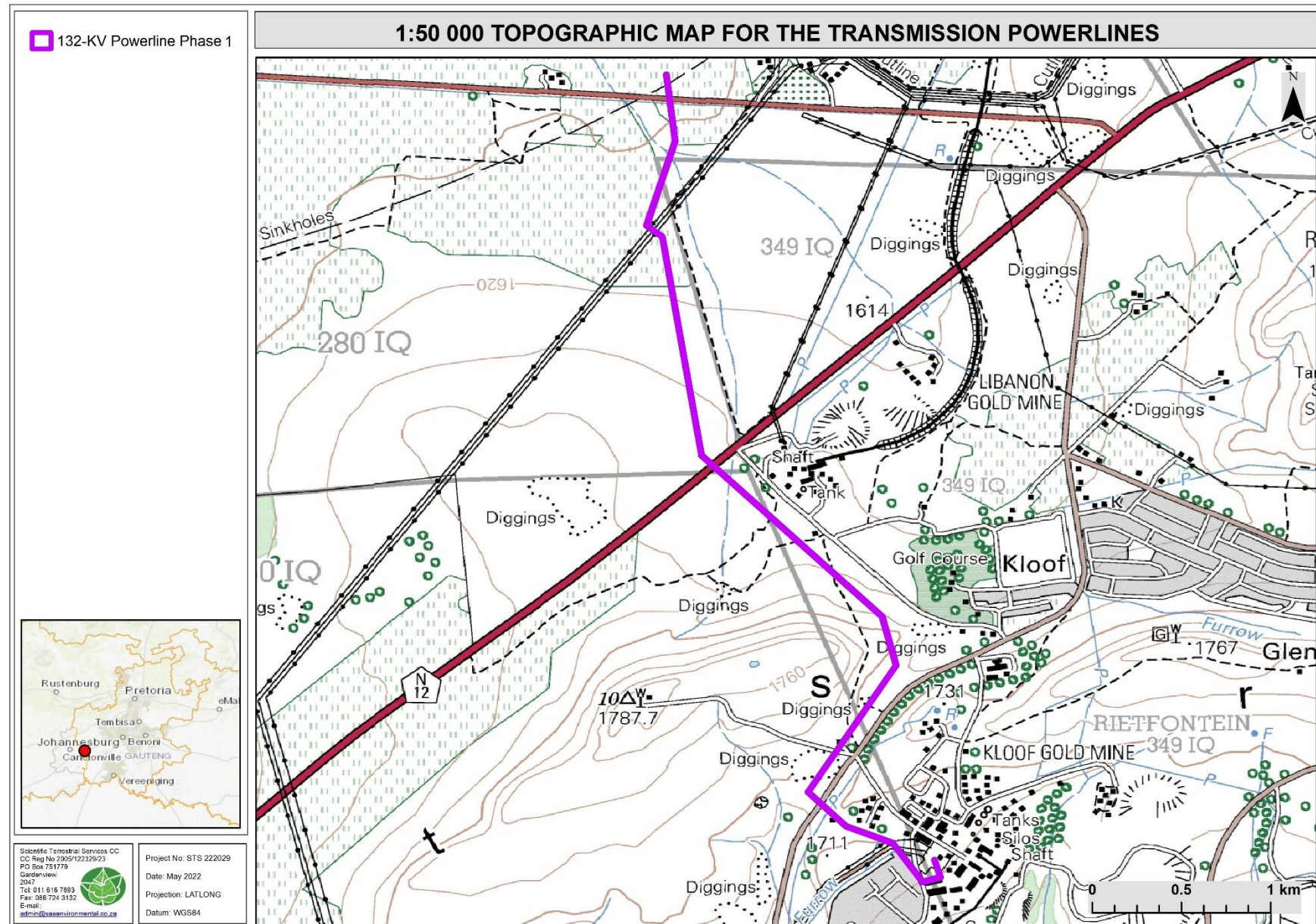


Figure 2: The 132-KV Powerline Phase 1 depicted on a 1:50 000 topographical map in relation to the surrounding area.



1.1 Details of the Environmental Authorisation

“Specific conditions” of the Environmental Authorisation (EA) relevant to this report include:

- Authorisation register number: 14/12/16/3/3/1/1606 (132-KV transmission powerlines)
 - “41. Before the clearing of the site, the appropriate permits must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF)² for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. Copies of the permits must be made available to this Department on request.”.

The authorised extent for the 132-KV transmission powerlines included various options within three Powerline Corridors (200 m authorised for each corridor). Table 1 and Figure 3 presents the boundary relevant to this authorisation.

Table 1: Authorised boundary for the 132-KV transmission powerlines (Authorisation register number: 14/12/16/3/3/1/1606).

LABEL	LONGITUDE	LATITUDE	LABEL	LONGITUDE	LATITUDE
Powerline Corridor 1			Powerline Corridor 2		
A	27° 34' 57.5400" E	26° 21' 51.7210" S	A	27° 30' 49.7700" E	26° 22' 42.6200" S
B	27° 35' 52.6800" E	26° 21' 14.5000" S	B	27° 30' 47.8300" E	26° 22' 51.2800" S
C	27° 36' 51.0000" E	26° 20' 48.5400" S	C	27° 30' 26.9200" E	26° 22' 55.0600" S
D	27° 35' 18.9300" E	26° 21' 52.7900" S	D	27° 30' 19.5400" E	26° 23' 14.1000" S
LABEL	LONGITUDE		LATITUDE		
Powerline Corridor 3					
A	27° 35' 46.6100" E		26° 24' 11.7600" S		
B	27° 35' 44.6700" E		26° 24' 16.8300" S		
C	27° 36' 38.3840" E		26° 24' 36.3200" S		
D	27° 35' 54.1100" E		26° 25' 05.8600" S		
E	27° 37' 24.8200" E		26° 25' 52.2400" S		
F	27° 34' 55.8200" E		26° 21' 54.4600" S		
G	27° 35' 18.4300" E		26° 23' 14.8500" S		
H	27° 35' 44.6700" E		26° 24' 16.8300" S		

² DAFF is now known as the Department of Forestry, Fisheries, and the Environment (DFFE).



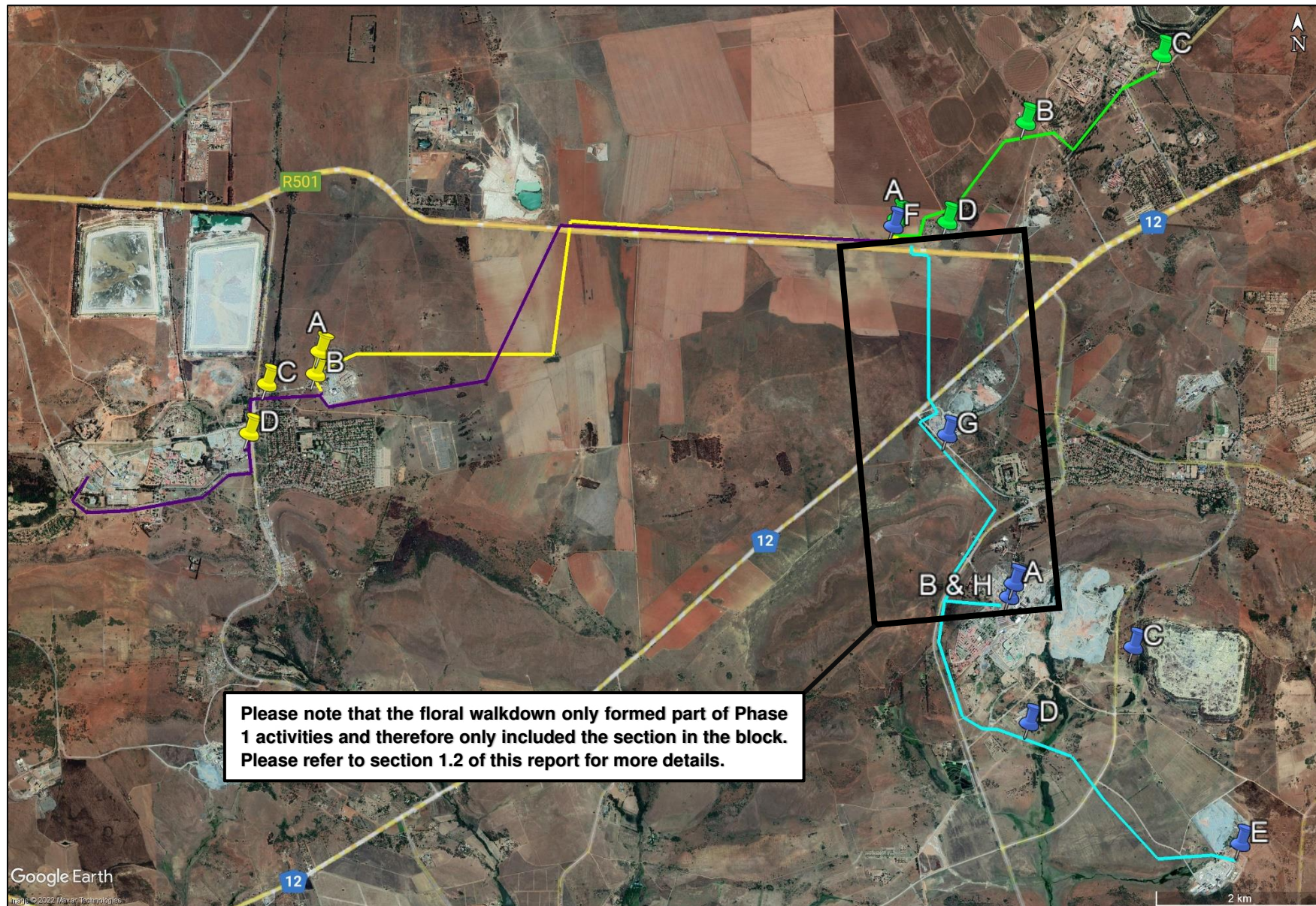


Figure 3: Authorised boundary for the transmission powerlines as per Table 1. Powerline Corridor 1 = green points. Powerline Corridor 2 = yellow points. Powerline Corridor 3 = blue points. The lines represent various options considered for the transmission powerlines.



1.2 Site walkdown details

A site walkdown was restricted to Phase 1 of the Sibanye PV Energy Facility project and was undertaken during May 2022 to take record of all occurring Red Data Listed (RDL)-, provincially- (Orange Listed plants) or nationally protected plant species (henceforth “floral SCC”) (Please refer to Box 1).

**BOX 1:
RED DATA LISTED (RDL)-, PROVINCIAL- (ORANGE LISTED PLANTS) OR NATIONALLY PROTECTED
PLANT SPECIES**

- In terms of Section 56 of the National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA), **threatened species** are Red Data Listed (RDL) species falling into the Critically Endangered (CR), Endangered (EN), Vulnerable (VU), and Protected (P) categories of ecological status.
- The concept of an **Orange List** was introduced as a way of assessing and recording the conservation importance of taxa that are rare and of special concern but are not on a Red List (Victor and Keith, 2004). For Gauteng, this includes species that are endemic to either South Africa or the province, species that have a limited distribution in the country, species that are overharvested for the medicinal plant trade or species that are losing habitat due to urban expansion, to name a few (GDARD, 2014).
- **Nationally protected species fall in various categories:**
 1. Recognised International Union for Conservation of Nature (IUCN) categories not on the Red List: **Species of conservation concern** are species that have a high conservation importance in terms of preserving South Africa's high floristic diversity and include not only threatened species, but also those classified in the categories Extinct in the Wild (EW), Regionally Extinct (RE), Near Threatened (NT), Critically Rare, Rare, Declining and Data Deficient - Insufficient Information (DDD).
 2. Species on the NEMBA Threatened and Protected Species (TOPS) list (with some overlap with threatened species): The Threatened or Protected Species (TOPS) Regulations (R 152 of 2007) under Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), were taken into consideration.
 3. Nationally protected tree species: Tree species as per the National Forest Act, 1998 (Act No. 84 of 1998) (NFA).

Assessed areas for the **132-KV Powerline Phase 1** include a subsection of the Powerline Corridor 3 (Table 2 below and Figure 4).

Table 2: Authorised boundary for the 132-KV transmission powerlines (Authorisation register number: 14/12/16/3/3/1/1606). Data in grey did not form part of the verification.

LABEL	LONGITUDE	LATITUDE
A	27° 35' 46.6100" E	26° 24' 11.7600" S
B	27° 35' 44.6700" E	26° 24' 16.8300" S
C	27° 36' 38.3840" E	26° 24' 36.3200" S
D	27° 35' 54.1100" E	26° 25' 05.8600" S
E	27° 37' 24.8200" E	26° 25' 52.2400" S
F	27° 34' 55.8200" E	26° 21' 54.4600" S
G	27° 35' 18.4300" E	26° 23' 14.8500" S
H	27° 35' 44.6700" E	26° 24' 16.8300" S



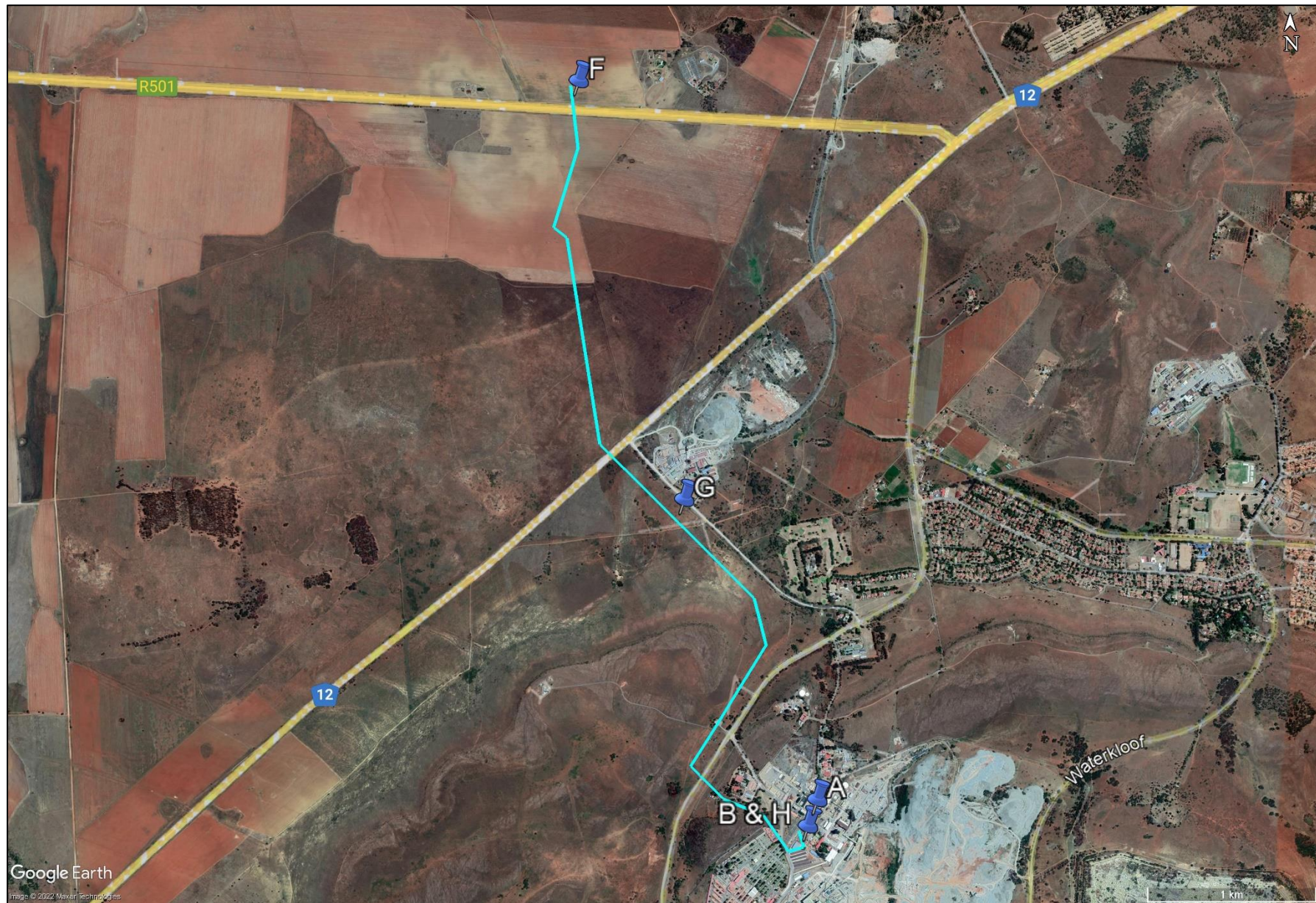


Figure 4: Areas that formed part of the May 2022 site walkdown.



2 PURPOSE AND SCOPE OF WORK

The purpose of the Plant Search, Rescue and Relocation, and Habitat Management Plan (“**Search and Rescue Plan**” hereafter) is to provide management and monitoring guidelines for the relocation process of any **floral SCC** which are present along the 132-KV Powerline Phase 1. The Search and Rescue Plan will form part of the broader Environmental Management Programme (EMPr).

The **key objectives** of the Search and Rescue Plan include to:

- To obtain the number of floral SCC that occur along the 132-KV Powerline Phase 1 by undertaking a detailed walkdown of the footprint provided by the client/proponent, where all floral SCC are marked by means of a hand-held Global Positioning System (GPS);
- Ensure the Search and Rescue Plan meets the requirements of relevant local and regional authorities regarding relocation of floral SCC (especially where species of national importance will be impacted);
- Provide input into the Environmental Management Plan (EMP) regarding the conservation and management of such species;
- Provide recommendations on management and mitigation measures (including opportunities and constraints) with regards to the pre-construction and operation of the proposed activities to lower potential impacts on floral assemblages in the area;
- Provide measures to rehabilitate areas impacted by relocation activities to levels suitable to ensure the ongoing functioning of the ecological resources; and
- Provide measures and expected timeframes to monitor receptor sites (where floral SCC are relocated to) to ensure relocation activities are successful (or to pick up on shortfalls).

The scope for the development and implementation of a Search and Rescue Plan includes:

- The identification of applicable floral SCC (as per Box 1) along the 132-KV Powerline Phase 1. This includes a list of relevant floral SCC, plant size (ranges), recommended planting densities/numbers as well as total areas to be planted (hectares (ha));
- Identification of areas surrounding the 132-KV Powerline Phase 1 where floral SCC can be relocated;
- Development of a monitoring programme to evaluate the success of relocation;
- Development of a record keeping procedure to ensure the location of relocated floral SCC is documented; and



- Compilation of the habitat requirements of all the identified floral SCC that require relocation; and
- Recommendations, action plans, relocation permit requirements (where necessary) and rescue and relocation processes.

3 REFERENCE DOCUMENTATION

This report is to be read in conjunction with the following documentation, which contains the results of the Biodiversity Specialist report and the outcome of the Environmental Authorisation (EA):

- Application for Environmental Authorisation in terms of the National Environmental Management Act, 1998: GNR. 982/983/985 for the proposed 132 kilovolt transmission powerlines to connect the 200-megawatt Sibanye Gold Photovoltaic Energy Facility for Sibanye Gold Limited, Gauteng Province; and
- SAS 215197. 2016. Wetland, faunal, avifaunal and floral ecological assessment as part of the Environmental Impact Assessment for the proposed 200MW solar photovoltaic power plant with associated infrastructure for Sibanye Gold, Carletonville, Gauteng. Prepared for Aurecon (Pty) Ltd. February 2016. Section B: Floral Assessment.

4 LEGISLATIVE REQUIREMENTS

The following legislative requirements are relevant to the development of the Search and Rescue Plan:

- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA);
- The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA); and
- The Gauteng Department of Agriculture and Rural Development (GDARD) Requirements for Biodiversity Assessments Version 3 (GDARD, 2014).

The details of each of the above as they pertain to this study are provided in Appendix A of this report.



5 CURRENT STATUS AND ECOLOGICAL CHARACTER OF THE PROJECT AREA

During the initial SAS 215197 (2016) field assessment, three (3) habitat units were identified for the Sibanye PV Energy Facility sections that are applicable for this Search and Rescue Plan.

1. **Transformed Areas;**
2. **Secondary Grasslands; and**
3. **Ridges.**

Transformed areas (Figure 5) associated with crop fields, mining areas and associated infrastructure. Floral sensitivity is low and not representative of the natural vegetation type. No floral SCC were associated with this unit during the SAS 215197 (2016) field assessment, nor were any recorded during the 2022 floral walkdown.



Figure 5: Representative photos of the Transformed Habitat on site.

Secondary grasslands (Figure 6) where edge effects from agriculture and other activities have led to the transformation of natural grassland habitat to a secondary state of ecological succession. Floral SCC were not mentioned for this habitat unit during the SAS 215197 (2016) field assessment; however, several Orange Listed species were recorded during the 2022 floral walkdown.





Figure 6: Representative photos of the Secondary Grassland Habitat on site.

Ridges (Figure 7) associated with Gauteng Shale Mountain Bushveld - according to 2018 Final Vegetation Map of South Africa, Lesotho, and Swaziland (SANBI, 2018a), as well as the 2018 Terrestrial ecosystem threat status and protection level - remaining extent (SANBI, 2018b; Skowno et al., 2019). This habitat unit is associated with rocky ridges and higher elevation areas within the study area. Primary grassland conditions predominate this habitat unit, and the overall habitat integrity and ecological function is high. Floral SCC were associated with this unit during the SAS 215197 (2016) field assessment and were recorded during the 2022 floral walkdown.



Figure 7: Representative photos of the Ridge Habitat on site outlined in green in the bottom photo.



6 RESCUE AND RELOCATION PLAN

This section of the report serves to provide guidelines for the search and rescue of floral species to ensure that the relocation activities associated with the 132-KV Powerline Phase 1 will be sufficient in ensuring minimal mortality of affected species and vegetation communities.

To develop suitable mitigation and rescue and relocation measures for the 132-KV Powerline Phase 1 project, a field assessment was undertaken during May 2022 and previous ecological studies for the area was analysed³. The field assessment was undertaken within a 20 m buffer around the provided 132-KV transmission powerline footprint where a biodiversity specialist (SACNASP registered botanist) walked evenly spaced transects to search for and mark all relevant SCC with a hand-held GPS.

Two Orange Listed plant species were encountered along the 132-KV transmission powerline:

- Seven (7) *Boophone disticha* individuals (least concern (LC) nationally but Declining on the Orange List). All specimens were recorded within the Secondary Grassland. Refer to Section 6.2.1 and Appendix B for more details; and
- 143 *Hypoxis hemerocallidea* individuals (LC nationally, but Declining on the Orange List). Of the 143 individuals recorded, a total of 64 specimens of *Hypoxis hemerocallidea* were recorded in the Secondary Grassland and a total of 79 within the Ridge Habitat. Refer to Section 6.2.2 and Appendix B for more details.

According to the GDARD principles⁴, the Orange Listed species do not require permits for relocation if the species are relocated within the project area.

A population of 87 of the NT *Adromischus umbraticola* subsp. *umbraticola* was encountered within the Ridge Habitat. Protocols regarding the relocation of NT species require special attention and more stringent planning and mitigation measures. As such, the feasibility for the rescue and relocation of the NT *Adromischus umbraticola* subsp. *umbraticola* were guided by GDARD. After a site visit by officials from GDARD, it was determined that relocation of the NT *Adromischus umbraticola* subsp. *umbraticola* population is **not feasible** and **no such attempts must be made**. Refer to Appendix B for locality records of this species as recorded on site.

³ SAS 215197. 2016. Wetland, faunal, avifaunal and floral ecological assessment as part of the Environmental Impact Assessment for the proposed 200MW solar photovoltaic power plant with associated infrastructure for Sibanye Gold, Carletonville, Gauteng. Prepared for Aurecon (Pty) Ltd. February 2016. Section B: Floral Assessment.

⁴ Gauteng Department of Agriculture and Rural Development (GDARD) Biodiversity Directorate's minimum requirements for vegetation assessments of March 2014.



6.1 Project Details and Commitments

The following project details are relevant in determining potential impacts to the floral SCC on site:

- The clearance of vegetation along the 132-KV Powerline Phase 1 will only take place immediately under and around the pylon bases. No vegetation to be cleared along the remaining stretch of the 132-KV Powerline Phase 1. Regarding vegetation clearance, refer also to the last bullet point in this section for details on access roads for maintenance (where vegetation clearance will not be required);
- Pylon foundations will be restricted in size. Where the pylons occur on rockier environments, the foundations will be as narrow as 1 m. Where the pylons occur in softer soil (lower rock presence) it may require a precast foundation with diameter of approximately 6 m;
- Monopole structures to be used; and
- Preferred site access (as per the EA): “Access would be mostly from existing roads and, where this is not possible, the corridors would be accessed via 4x4 vehicles through the veld and/or agricultural land by means of informal single vehicle farm tracks.”.

As per the South African National Biodiversity Institute (SANBI) principles, avoidance should always be the first mitigation when floral SCC are at risk. However, where this is not feasible, search and rescue should be attempted for species that are eligible for such an undertaking (i.e., the Orange Listed plants). The 132-KV Powerline Phase 1 activities will only require the removal of vegetation (and potentially the relocation of Orange Listed species) underneath the pylons and associated foundations (no vegetation clearance along the transmission lines). As such, it is recommended that placement of the pylons be planned in such a way as to limit the need for search and rescue attempts. Where this is not feasible, section 6.2 of this report should be taken into consideration.



6.2 Species-specific details of the species targeted for rescue and relocation.

Practical considerations:

- Rescued plants may not thrive or even survive;
- Various agencies (incl. IUCN and SANBI) are not supportive of the concept of plant search and rescue;
- If the need arises, rescued plants can be used for rehabilitation of affected areas; and
- Plants donated to the Agricultural Research Council (ARC) or national botanical gardens (as a last resort) can provide contribution to public education.

Ecological Principles and Implications:

- SANBI website "Guidelines for Environmental Impact Assessments" (www.redlist.sanbi.org/eiaguidelines.php) states the following: "Translocations are expensive and rarely successful. Even if they are successful, translocated individuals may harm other species within the receiving environment, the translocated individuals may transmit pathogens and/or parasites, and translocation may result in rapid changes in the species itself.";
- As such, species to be relocated (i.e., translocated) must be as close as possible to the source population and should not harm other floral SCC; and
- Rescue must be limited to only those areas where plants will be impacted by the development.

Important concepts:

- Source population: The existing population of species from which floral SCC will be relocated.
- Receptor site: The area identified for the relocation of the floral SCC.

The below tables present species-specific details and recommendations pertaining to the Rescue and Relocation of protected floral species where avoidance of impacts is not deemed possible. Following each table is a series of maps depicting the localities of the Orange Listed plants along the 132-KV transmission powerline.



6.2.1 *Boophone disticha*

REFERENCE PHOTOS	
	
The first two photos were taken on site. The last three are from online resources (iNaturalist – Photo Licence: CCO ⁵).	
SPECIES DETAILS	
Taxonomy	Scientific Name: <i>Boophone disticha</i> (L.f.) Herb. Higher Classification: Monocotyledons Family: Amaryllidaceae Synonyms: <i>Boophone longepedicellata</i> Pax Common Names: Boesmangifbol (a), Bushman Poison Bulb (e), Candelabra Flower (e), Cape Poison Bulb (e), Century Plant (e), Gifbol (a), Gifui (a), Incoto (z), Incoto (nd), Incwadi (x), Kaffir Onion (e), Khutsane Ea Na Ha (ss), Kopseerblom (a), Kxutsana-ya-naha (ss), Leshoma (ss), Lesoma (ss), Malgif (a), Malkopgif (a), Motlatsisa (ss), Perdespook (a), Poison Bulb (e), Red Posy (e), Seeroogblom (a), Sore-eye Flower (e), Tumblehead (e), Veld Fan (e), Wind Ball (e)
Growth form	Succulent geophyte.
Flowering Time	October-January
Literature Description⁶:	Bulb up to 25 cm in diameter, the apex often emergent from the ground. Leaves up to 60 × 1.5-4 cm, greyish-green or glaucous, developing after the flowers. Scape 5-30 cm, with a spherical inflorescence of 50-100 (or more) flowers. Pedicels 3-8 cm at anthesis, elongating to 40 cm in fruit, angular. Flowers pink to dark purple; tube 0.5-2 cm, narrowly funnel-shaped, always shorter than segments; segments 2-3 × 0.2-0.4 cm, recurved towards apex. Capsule up to 3 cm, irregularly dehiscent. Notes: The flowers appear from a large bulb and are very noticeable after veld fires. The dried stalks and fruits of the inflorescence form "tumble weeds", which, rolled by the wind, disperse the seeds. The leaves only appear after the flowers are finished and form a distinct upright fan.
Condition and size class of species within footprint area	All specimens in site were moderately large, healthy individuals. The bulb varied between 8 cm and 15 cm in diameter above ground (below-ground not measured). The fan of the leaves was dying back at the time of assessment, but it could be established that the fans reached approximately 30 cm – 50 cm in height.

⁵ CCO enables scientists, educators, artists and other creators and owners of copyright- or database-protected content to waive those interests in their works and thereby place them as completely as possible in the public domain, so that others may freely build upon, enhance and reuse the works for any purposes without restriction under copyright or database law.

⁶ Hyde, M.A., Wursten, B.T., Ballings, P. & Coates Palgrave, M. (2022). Flora of Zimbabwe: Species information: *Boophone disticha*. https://www.zimabweflora.co.zw/speciesdata/species.php?species_id=114940, retrieved 13 May 2022



	Number of species recorded: Seven (7) individuals.
Classification	LC nationally, but Declining on the Gauteng Orange List
Permit requirements	No permit application required for species relocated within in project area.
Locality Records	Refer to Appendix B
RESCUE AND RELOCATION DETAILS	
Preferred Option (where avoidance is not possible): Translocation / Relocation	
Best results for rescue and relocation will be transplanting, i.e., digging up the mature individual and planting it at a nearby site. This must be carried out by trained personnel (or under the supervision of a horticulturist) and overseen by a suitably qualified expert to ensure the required conditions are met for successful translocation. There is always potential for plant mortality following translocation attempts and as such it is recommended to also plant harvested propagules⁷ at a ratio of 1:3 to decrease the probability of population declines (i.e., residual impacts from the 132-KV transmission powerline project). The propagules must be planted at randomly spaced intervals around the transplanted specimen at a minimum distance of 1 m, and a maximum distance of 5 m from the transplanted specimen. The planting of propagules does not have to take place during the relocation exercise as propagules may not yet be available. During maintenance activities, note must be taken of when the remaining <i>Boophone disticha</i> individuals set seed so that some seed may be harvested for planting in receptor sites. Step 1: Pegging and GPS capturing - Ensure all individuals that will be impacted, and that required relocation, are pegged with colourful flags. Labels can be placed on the pegs to mark the specimen. Corresponding labels to be placed on the pegs used to indicate receptor sites. - The GPS locality must be recorded for each specimen to be relocated. Refer to the recommended field recording sheet in section 6.3. - Easy options for labelling for short-term use would be masking tape (not as sticky as other tapes and can be removed easily). Permanent markers to be used on the labels. - Receptor sites should be pegged before the specimens are dug up and labelled accordingly. - GPS localities of receptor must be recorded. - Receptor sites must be chosen carefully, making sure the new location will cause minimal damage to the receiving environment. Step 2: Removing the bulb (manual process) - Soil around the bulb must first be soften by means of sufficiently soaking the ground. - Measure how much of the bulb is above-ground and take note of this for relocation (the bulb of the <i>Boophone disticha</i> species must not be fully submerged when replanted). - To ensure no damage comes to the bulb, the excavated area around the specimen must include a minimum distance of approximately 40 cm away from the aboveground material. Use of a garden hand-shovel (or similar) should suffice. The plant may not be pulled out of the soil by the leaves as this may result in damage to the roots. - All ventrally located adventitious rooting systems must be carefully avoided. Damage to the root system must be avoided. The 40 cm mentioned above is a guide only and where it is evident that roots grow deeper (or wider), the excavation must also be deeper (or wider). - Careful handling of the excavated specimen must take place at all times. Damage to the bulb and the root systems must be avoided. Excavated specimens can be bagged (though not essential if immediately being relocated) using in-situ soil material. Bags to be labelled accordingly. - The bulb is poisonous and handling the bulb must take place with gloves. Step 3: Relocation of the bulb (manual process):	

⁷ **Propagules:** a vegetative structure that can become detached from a plant and give rise to a new plant, e.g., a seed, bud, sucker, or spore.



- The receptor site must be within 50 m of the original site; however, **the closer the better** as long as the specimen is relocated to a position where:
 - 1) Relocated species will not be affected by the maintenance activities of the transmission powerlines;
 - 2) No loss of other floral SCC will occur or where the relocation activities may cause extensive damage to the receiving environment;
 - 3) Relocated species will not be outcompeted by surrounding vegetation for resources (spots with less dense vegetation should be chosen);
 - 4) Relocated species are not within a watercourse or the 1:100 year floodline of a watercourse (highly unlikely for the site at hand);
 - 5) Soils are well-drained and similar to the source population (again, receptor sites must be as close to the source population as possible to mimic climatic and soil conditions better); and
 - 6) Relocated species will be within the 200 m authorised servitude of the transmission powerlines where no future development is likely to impact on them.
- Ensure a hole is dug of similar size to the one where the *Boophone disticha* specimen has been removed from (as a guide, the hole must be roughly 30 cm wide and 15 cm deep).
- Incorporate a small amount of sufficiently decomposed compost into the bottom of the excavated hole in order to provide sufficient nutrients, organic carbon, and water retention for the recovery of the individual after the relocation process.
- The bottom of the hole must be flattened (by standing in it) to firm the soil so that the plant does not settle in deeper at later stage.
- When the specimen is placed back into the hole, ensure no damage to the roots occur. Make use of the dug-out soil to fill the hole but ensure that the bulb is not entirely underground. As measured before the plant was dug-up, the same portion of the bulb must be above ground when relocating to receptor sites.
- A layer of mulch must be applied around the base of the plants to help hold in moisture and keep out competing plants.
- After the hole has been filled up, the soil must only be slightly patted down in order to avoid compaction and potential damage to the placed individual.
- Photos of the relocated specimens must be taken for monitoring purposes.

Season of relocation:

- Relocated specimens should be planted in protected areas – although the species is drought-resistant, it is frost-sensitive. If the specimen is relocated during the winter months and the area is prone to frost, ensure that specimens are protected by e.g., a horticultural fleece.
- If specimens are relocated during the winter months, ensure that they are **not watered** after relocation as this may result in the bulb to rot. The first watering of the plants may only take place in September (preferably by means of the first natural rains).



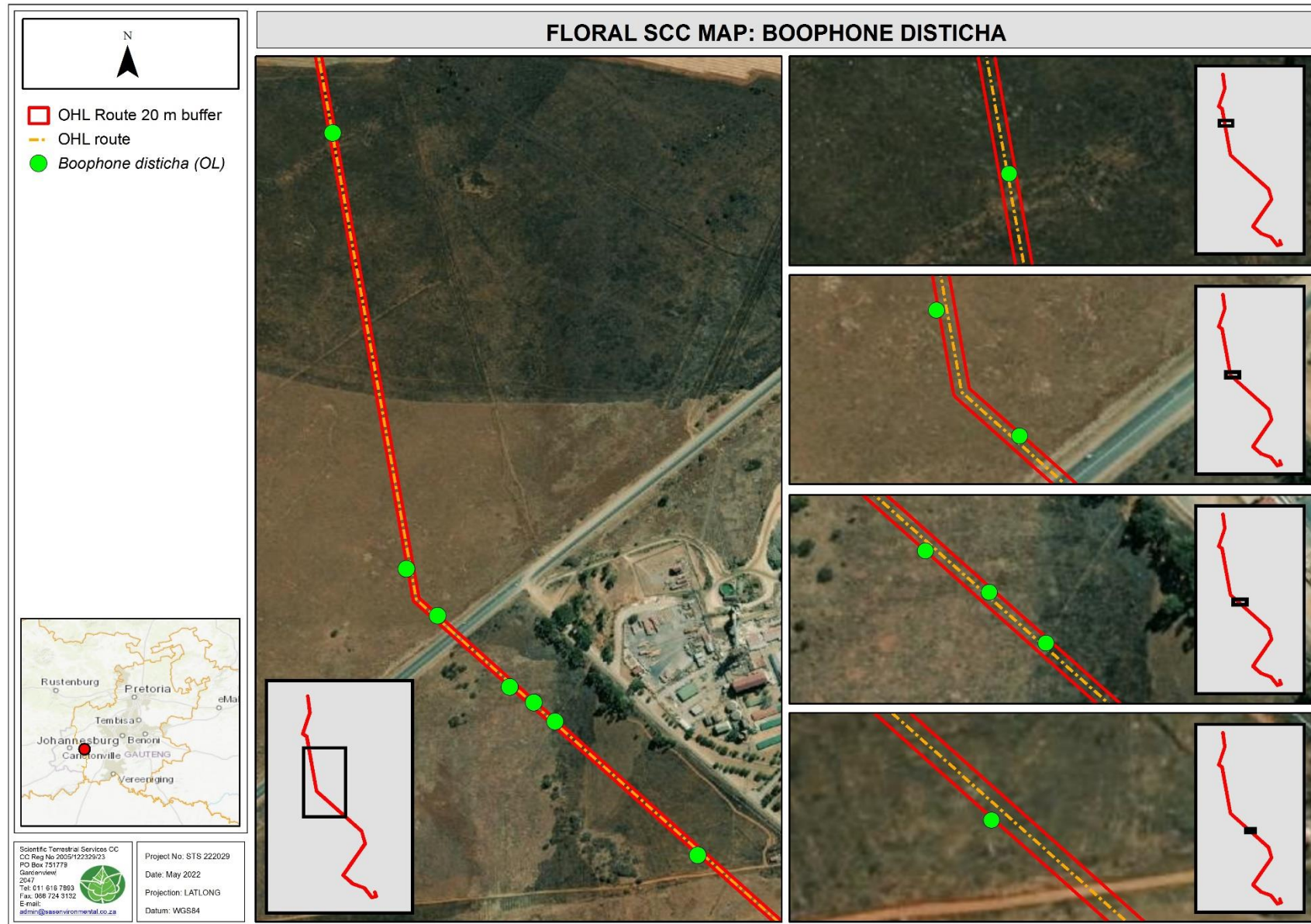


Figure 8: Map depicting the localities of the *Boophone disticha* species along the 132-KV transmission powerline.



6.2.2 *Hypoxis hemerocallidea*

REFERENCE PHOTOS	
	
The first two photos were taken on site. The last three are from online resources (iNaturalist – Photo Licence: CCO ⁸).	
SPECIES DETAILS	
Taxonomy	Scientific Name: <i>Hypoxis hemerocallidea</i> Fisch., C.A.Mey. & Avé-Lall. Higher Classification: Monocotyledons Family: Hypoxidaceae Synonyms: <i>Hypoxis obconica</i> Nel, <i>Hypoxis patula</i> Nel, <i>Hypoxis rooperii</i> T.Moore Common Names: Gifbol (a), Inkomfe (z), Kaffertulp (a), Lotsane (ss), Moli Kharatsa (ss), Star-flower (e), Sterblom (a), Yellow Star (e)
Growth form	Geophyte.
Flowering Time	September-March.
Literature Description⁹:	Robust perennial herb, up to 40 cm tall, growing from a stout vertical rhizome. Leaves 7-16, overlapping at the base, 10-60 cm long, finely many-ribbed, greyish pubescent beneath with mostly 2-armed hairs. Inflorescences 2-14, usually appearing with the leaves, up to 30 cm long. Flowers 2-10 in a raceme-like arrangement 3-10 cm long; bracts linear-lanceolate, 7-30 mm long, densely greyish hairy; tepals up to 2 cm long, yellow, greyish hairy on the outside; outer tepals slightly longer than inner. Capsule 5-8 mm long with black and glossy seeds.
Condition and size class of species within footprint area	All specimens in site were moderately large, healthy individuals. The species were starting to die back for the winter (leaves fall off and the plant will no longer be visible above ground). Number of species recorded: approximately 143 specimens.
Classification	LC nationally, but Declining on the Gauteng Orange List.
Permit requirements	No permit application required for species relocated within in project area.
Locality Records	Refer to Appendix B

⁸ CCO enables scientists, educators, artists and other creators and owners of copyright- or database-protected content to waive those interests in their works and thereby place them as completely as possible in the public domain, so that others may freely build upon, enhance and reuse the works for any purposes without restriction under copyright or database law.

⁹ Hyde, M.A., Wursten, B.T., Ballings, P. & Coates Palgrave, M. (2022). Flora of Zimbabwe: Species information: *Hypoxis hemerocallidea*. https://www.zimbabweflora.co.zw/speciesdata/species.php?species_id=115540, retrieved 13 May 2022



RESCUE AND RELOCATION DETAILS

Preferred Option (where avoidance is not possible): Translocation

Best results for rescue and relocation will be transplanting, i.e., digging up the mature individual and planting it at a nearby site. This must be carried out by trained personnel (or under the supervision of a horticulturist) and overseen by a suitably qualified expert to ensure the required conditions are met for successful translocation.

There is always potential for plant mortality following translocation attempts; however, making use of propagules as a means to substitute relocated individuals is not a feasible option (seed dormancy difficult to break and due to unpredictable seed viability, combinational dormancy, and poor seedling establishment (Mofokeng *et. al.*, 2020)). As such, the relocation activities for *Hypoxis hemerocallidea* must be undertaken with great care.

Step 1: Pegging and GPS capturing

- Ensure all individuals that will be impacted, and that required relocation, are pegged with colourful flags. Labels can be placed on the pegs to mark the specimen. Corresponding labels to be placed on the pegs used to indicate receptor sites.
- The GPS locality must be recorded for each specimen to be relocated. Refer to the recommended field recording sheet in section 6.3.
- Easy options for labelling for short-term use would be masking tape (not as sticky as other tapes and can be removed easily). Permanent markers to be used on the labels.
- Receptor sites should be pegged before the specimens are dug up and labelled accordingly.
- GPS localities of receptor must be recorded.
- Receptor sites must be chosen carefully, making sure the new location will cause minimal damage to the receiving environment.

Step 2: Removing the corm (manual process)

- Soil around the bulb must first be soften by means of sufficiently soaking the ground. This will allow easy extraction and reduce risks of root damage.
- The *Hypoxis hemerocallidea* corms should be extracted carefully and no pulling of the plant by its leaves must be allowed (this will increase risk of damage to the roots). The plant can be pushed up from the rootstock / corm. As much as possible soil should remain around the specimen when relocated so to further buffer against damage to roots and to ensure micro habitat around the roots do not change drastically in receptor sites.
- *Hypoxis hemerocallidea* is a hardy plant but careful handling of the excavated specimen must still take place at all times. Excavated specimens can be bagged (though not essential if immediately being relocated) using in-situ soil material. Bags to be labelled accordingly.

Step 3: Relocation of the corm (manual process):

- The receptor site must be within 50 m of the original site; however, **the closer the better** as long as the specimen is relocated to a position where:
 - 1) Relocated species will not be affected by the maintenance activities of the transmission powerlines;
 - 2) No loss of other floral SCC will occur or where the relocation activities may cause extensive damage to the receiving environment;
 - 3) Relocated species will not be outcompeted by surrounding vegetation for resources (spots with less dense vegetation should be chosen);
 - 4) Relocated species are not within a watercourse or the 1:100 year floodline of a watercourse (highly unlikely for the site at hand);
 - 5) Soils are well-drained and similar to the source population (again, receptor sites must be as close to the source population as possible to mimic climatic and soil conditions better); and
 - 6) Relocated species will be within the 200 m authorised servitude of the transmission powerlines where no future development is likely to impact on them.
- The receptor site must be a minimum of 30 cm x 30 cm (wide and deep).
- Incorporate a small amount of sufficiently decomposed compost into the bottom of the excavated hole in order to provide sufficient nutrients, organic carbon, and water retention for the recovery of the individual after the relocation process. This step is not essential but may be useful.
- The bottom of the hole must be flattened (by standing in it) to firm the soil so that the plant does not settle in deeper at later stage.



- When the specimen is placed back into the hole, ensure no damage to the roots occur. Make use of the dug-out soil to fill the hole. The corm may be fully underground but not too deep.
- A layer of mulch must be applied around the base of the plants to help hold in moisture and keep out competing plants.
- After the hole has been filled up, the soil must only be slightly patted down in order to avoid compaction and potential damage to the placed individual.
- Photos of the relocated specimens must be taken for monitoring purposes.

Season of relocation:

- Relocated specimens should be planted in protected areas.
- Relocation activities must preferably take place before the species go into their dormancy period. In the event that construction occurs when specimens are dormant, it is recommended that excavated topsoil be searched for corms.
- Minimal watering of specimens to take place after relocation to prevent rotting of the corms.



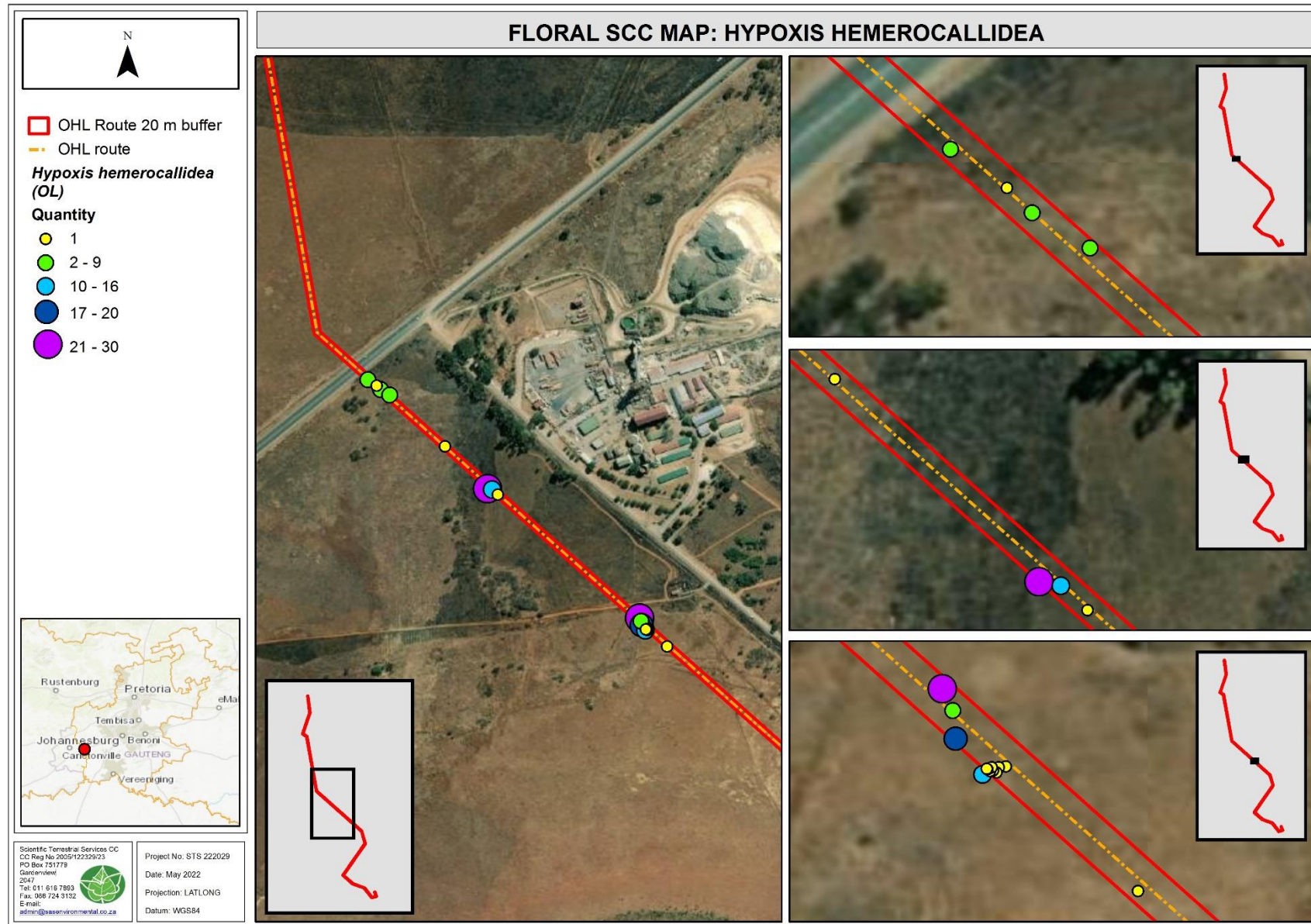


Figure 9: Map depicting the localities of the *Hypoxis hemerocallidea* species along the 132-KV transmission powerline.



6.3 Recommended Field Recording Sheet

FIELD RECORDING SHEET: SIBANYE TRANSMISSION LINE PLANT RESCUE AND RELOCATION					
Date:					
Contractor(s):					
Species / taxon	GPS	Label Name	Bulb size above ground	Bulb size once excavated	Representative Photo
<i>Boophone disticha</i>	1	BD_001	8 cm	10 cm wide; 20 cm long	



6.4 Roles & Responsibilities

Rescue of sensitive plant species during the construction phase of the project will be dependent on several project personnel. These are listed below:

Proponent¹⁰

- The Proponent will be responsible for the appointment of a suitably qualified Environmental Practitioner as an independent Environmental Control Officer (ECO) for the construction phase of the project;
- A management body must be appointed to ensure compliance with the Search and Rescue Plan;
- The Proponent will be responsible for ensuring all contractors receive a copy of this document and understand its contents; and
- Should ownership of the property change, the role and responsibility for compliance with the Search and Rescue Plan must also be transferred.

Environmental Manager (EM)

The EM is the person responsible for the monitoring of the implementation of the Search and Rescue Plan during the implementation of the activities and for reporting on the degree of compliance. The EM should ideally be appointed at the start of the rehabilitation and subsequent rescue and relocation activities and is mandated to do the following:

- Ensure that all contractors/ subcontractors/ employees are fully aware of their environmental responsibilities. This should take the form of an initial environmental awareness-training program in which requirements of this document will be explained;
- Monitor site activities on a regular basis to ensure that there is minimal environmental impact due to construction activities;
- Ensure that a 'hotline' exists for reporting incidents and resolving any problems rapidly;
- The EM has the authority to stop works if, in his/her opinion, there is/may be a serious threat to or impact on the environment caused directly by the construction operations; and
- Conduct a final environmental audit and a review of management and rehabilitation measures.

¹⁰ Any individual, government department, authority, industry, or association proposing an activity (e.g., project, programme or policy).



Contractors

- The contractor/s in this case refers to any contractor/s on site, including the building contractor/s and sub-contractors on any item of infrastructure being erected or demolished;
- Such contractor/s will take full responsibility for each of his/her employees and any penalties imposed; and
- It is the responsibility of the contractor/s to ensure that they adhere to the Rehabilitation Plan.

6.5 Risks considered as part of Rescue and Relocation Activities

Consideration of risks associated with the translocation of indigenous species as per GN 44 of 2015 (NEMBA): Norms and Standards for the translocation of indigenous species in South Africa Gazette No. 38395, are described in BOX 2 below.

BOX 2

NORMS AND STANDARDS FOR THE TRANSLOCATION OF INDIGENOUS SPECIES (GN 44 OF 2015)

“The following risks may be associated with the translocation of indigenous species, including an indigenous species that is also an alien species-

- a) ecological risks, which may include-
 - i. damage to, or destruction of, the habitat into which the indigenous species will be released;
 - ii. competition between an indigenous species to be released in a particular habitat and an indigenous species already occurring in that particular habitat, for living space and/ or resources; or
 - iii. an adverse climatic effect on the translocated indigenous species;
- b) genetic risks, which may result in the loss of the genetic fitness of populations of indigenous species;
- c) pathogenic risks, which may result in the spreading of diseases to livestock or other indigenous species;
- d) social risks, which may result in human-wildlife conflict; and
- e) financial risks, which may arise from remedial action as a result of any damage caused by the translocated species.”

6.6 Recommended Receptor Site(s)

Figure 10 below provides the recommended receptor sites for species that may be impacted by the 132-KV Powerline Phase 1 and was chosen based on the below considerations:

- Area as close as possible to the source population and not in sensitive habitat;
- Area characterised by similar habitat conditions; and
- Area not within sites where future activities are planned.

Important to note is that the recommended area for receptor sites must be within 50 m of the source population; however, where the receptor sites of *Hypoxis hemerocallidea* overlapped with the receptor sites of *Boophone disticha*, a larger area of 100 m from the source population was allowed to ensure no competition between relocated specimens.



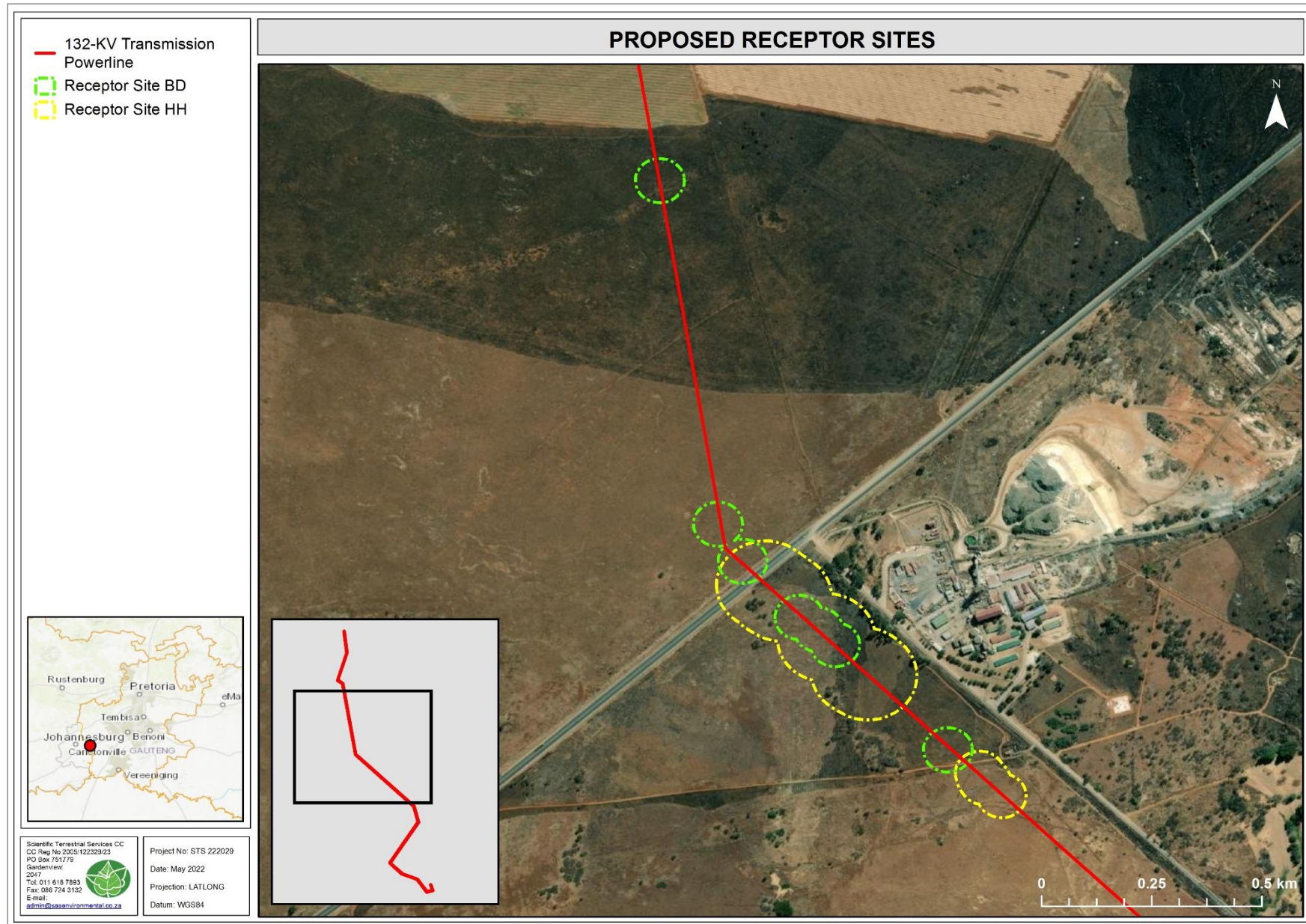


Figure 10: Recommended Receptor sites for *Boophone disticha* and *Hypoxis hemerocallidea*.



7 MONITORING REQUIREMENTS

As well as measuring the well-being and recovery of species, communities and ecosystems, monitoring is needed to document management actions such as rehabilitation practices, and the outcomes of Search and Rescue initiatives. The causes of any problems detected in subsequent monitoring can then be determined, and adaptive management procedures developed and implemented. As such, post-construction monitoring of translocated specimens must be undertaken.

For the sites where rescued and relocated specimens were transplanted to, the monitoring and reporting strategy should be conducted every three months for the first year to ensure that the Search and Rescue Plan is pro-actively managed and to ascertain the efficacy of measures presented in this report. The real value of monitoring, however, lies in the accumulation of information over the longer term and therefore monitoring should continue over a number of years with monitoring and reporting done on an annual basis. General monitoring recommendations include:

- Monitoring methods should be clearly described in the relevant documentation in order to ensure that monitoring is repeatable;
- All data gathered should be measurable (qualitative and quantitative);
- Data should be auditable; and
- Data, when compared to previous sets, should show spatial and temporal trends.

The below table highlights example monitoring approaches along with the required data collection and monitoring frequency.



Table 3: Example approaches for monitoring along with the required data to be collected, monitoring frequency and required equipment.

TASK DESCRIPTION	DATA COLLECTION	EQUIPMENT
Fixed-point Monitoring of all Receptor Sites		
Fixed point monitoring should be applied to all receptor sites. This will ensure that monitoring data is temporally and spatially comparable. Unless otherwise stated, photographs must be taken at a fixed point on a quarterly basis, preferably at the start of each season for the first year. Thereafter, biannual fixed-point monitoring may take place. Monitoring can coincide with maintenance activities,	Refer to below sections	Refer to below sections
Species Descriptions & Information		
Locality Data	<u>Variables to be monitored:</u> *Locality <u>Methods to be used:</u> *GPS data capturing <u>Data storage:</u> *Spreadsheets for easy temporal comparison *Shapefile and/or kmIs for mapping and spatial comparisons	1. GPS
Condition of the specimen	<u>Variables to be monitored:</u> *Alive, dead, wilting, rotting, presence of pests etc <u>Methods to be used:</u> *Scientific (written account of noted condition) *Photographic (visual account of the noted condition) <u>Data storage:</u> *Spreadsheets for easy temporal comparison *Photographs for visual comparison	1. Camera 2. Data sheets.
Site Conditions, Concerns & Recommendations		
Site condition and concerns	<u>Variables to be monitored:</u> *Erosion, soil compaction, alien species, fire, mortality of surrounding vegetation etc. <u>Methods to be used:</u> *Scientific (written account of noted condition) *Photographic (visual account of the noted condition)	1. Camera 2. Data sheets.



TASK DESCRIPTION	DATA COLLECTION	EQUIPMENT
	<u>Data storage:</u> *Spreadsheets for easy temporal comparison *Photographs for visual comparison	
Level of SCC recruitment (In population dynamics and community ecology, recruitment is the process by which individuals are added to a population.)	<u>Variables to be monitored:</u> *None, low, moderate, high etc. <u>Methods to be used:</u> *Scientific (written account of noted condition) *Photographic (visual account of the noted condition) <u>Data storage:</u> *Spreadsheets for easy temporal comparison *Photographs for visual comparison	1. Camera 2. Data sheets.
Recommendations / notes	<u>Variables to be monitored:</u> *E.g., alien control required. Or no additional action currently required, etc. <u>Methods to be used:</u> *Scientific (written account of noted condition) <u>Data storage:</u> *Spreadsheets for easy temporal comparison	1. Data sheets.



8 CONCLUSION

STS was appointed to develop a Search and Rescue Plan for the first phase of the authorised 132-KV transmission powerlines (Authorisation register number: 14/12/16/3/3/1/1606) to connect the 200-MW Sibanye Gold PV energy facility (Authorisation register number: 14/12/16/3/3/2/919) for Sibanye Gold Limited.

During the site walkdown, floral SCC were only encountered along the 132-KV Powerline Phase 1. **No Floral SCC were recorded within the Phase 1 PV Facility.** Two Orange Listed plant species were encountered:

- Seven (7) *Boophone disticha* individuals (least concern (LC) nationally, but Declining on the Orange List); and
- 143 *Hypoxis hemerocallidea* individuals (LC nationally, but Declining on the Orange List).

The population of the NT *Adromischus umbraticola* subsp. *umbraticola* was found unsuitable for relocation attempts (determined by GDARD) and avoidance of all impacts to these species is essential.

In line with the SANBI principles, avoidance of impacts to floral SCC is the primary recommendation. The 132-KV Powerline Phase 1 activities will only require the removal of vegetation (and the relocation of Orange Listed species) underneath the pylon structures and associated foundations, i.e., no vegetation clearance is required along the transmission lines. As such, to ensure minimum requirement for relocation initiatives, it is recommended that placement of the pylons be planned in such a way as to limit impacts to floral SCC. Where this is not feasible, section 6.2 of this report should be taken into consideration.

The report further provides brief monitoring guidelines which should be implemented to track the progress and success of relocation activities, but also to identify areas where the relocation plan might need to be amended.

It is the opinion of the consultant that should the activities as presented in this plan be executed in a cogent and well managed fashion that the relocation of Orange Listed species that may be impacted by the proposed 132-KV Powerline Phase 1 will be successful.



9 REFERENCES

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APPENDIX A: LEGAL REQUIREMENTS

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

Removal of the alien and weed species encountered in the application area must take place in order to comply with existing legislation (amendments to the regulations under the CARA, 1983 and Section 28 of the NEMA, 1998). Removal of species should take place throughout the construction and operation, phases.

THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA)

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the associated Environmental Impact Assessment (EIA) Regulations (GN R326 as amended in 2017 and well as listing notices 1, 2 and 3 (GN R327, R325 and R324 of 2017), state that prior to any development taking place which triggers any activity as listed within the abovementioned regulations, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the Environmental Impact Assessment process depending on the nature of the activity and scale of the impact.

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

The objectives of this act are (within the framework of NEMA) to provide for:

- The management and conservation of biological diversity within the Republic of South Africa and of the components of such diversity;
- The use of indigenous biological resources in a sustainable manner;
- The fair and equitable sharing among stakeholders of the benefits arising from bio prospecting involving indigenous biological resources;
- To give effect to ratify international agreements relating to biodiversity which are binding to the Republic;
- To provide for cooperative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

This act alludes to the fact that management of biodiversity must take place to ensure that the biodiversity of the surrounding areas are not negatively impacted upon, by any activity being undertaken, in order to ensure the fair and equitable sharing among stakeholders of the benefits arising from indigenous biological resources.

Furthermore, a person may not carry out a restricted activity involving either:

- a) A specimen of a listed threatened or protected species;
- b) Specimens of an alien species; or
- c) A specimen of a listed invasive species without a permit.

GDARD REQUIREMENTS FOR BIODIVERSITY ASSESSMENTS VERSION 3

The biodiversity assessment must comply with the minimum requirements as stipulated by GDARD Version 3 of 2014 and must contain the following information:

- A location and description of the application site and proposed activities;
- Photographic record and description of the site characteristics and inventories of the faunal and floral species observed on site, with special mention to Red Listed species;
- Sensitivity map displaying all sensitive areas and associated buffers as listed in the Sensitivity Mapping Rules for Biodiversity Assessments section of GDARD V3 (2014); and
- A list of recommendations and mitigation measures to reduce the potential environmental impacts that the proposed development might have on the terrestrial ecology associated with the site.



APPENDIX B: DETAILS OF THE FLORAL SCC RECORDED ON SITE

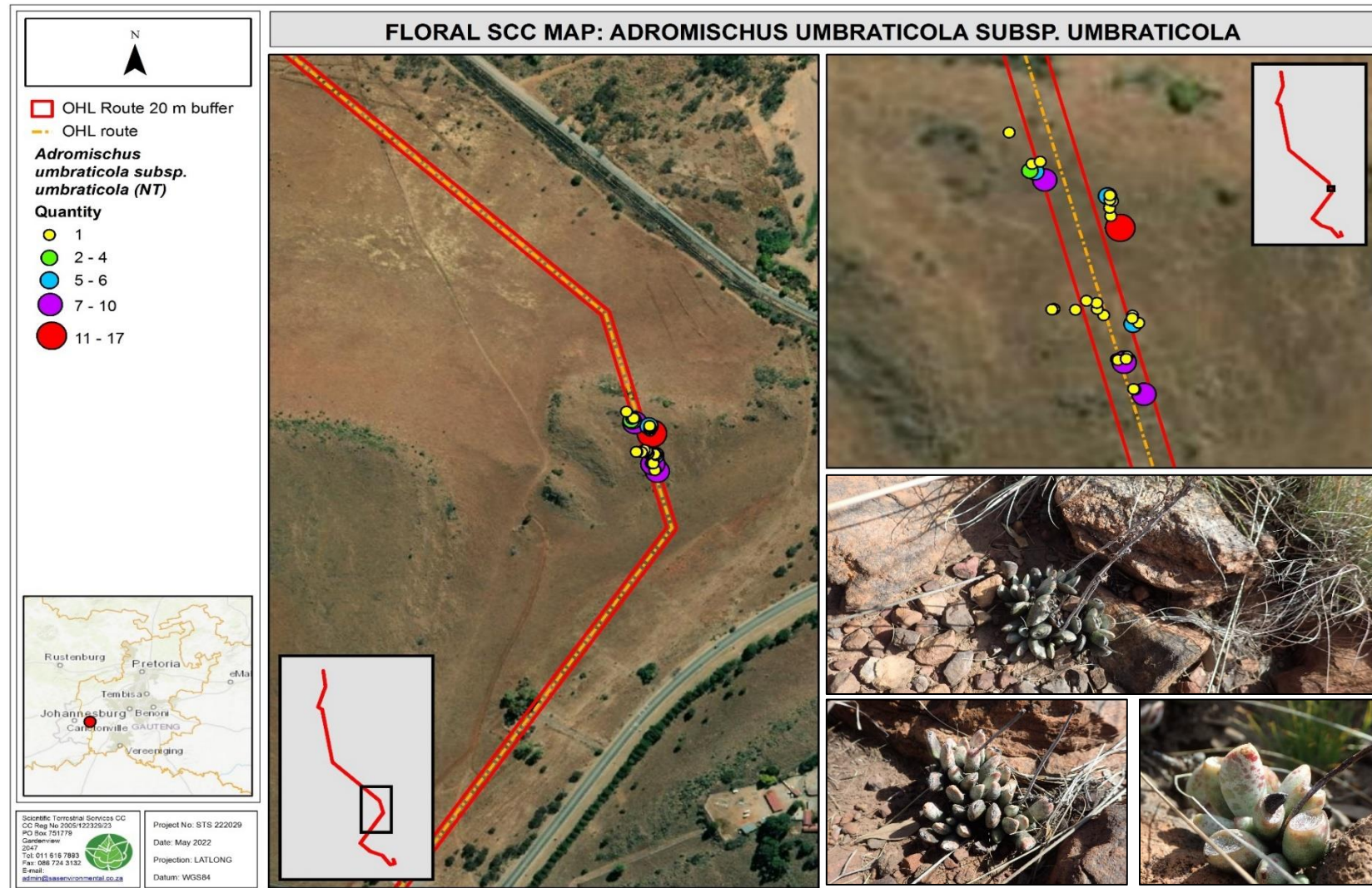


Figure B 1: Depiction of the locality records of *Adromischus umbraticola* subsp. *umbraticola* within the assessed areas. Refer to Table B1 for the coordinates.



Table B 1: Coordinate data for the recorded *Adromischus umbraticola* subsp. *umbraticola* species.

NO.	LONGITUDE	LATITUDE	ELEVATION (m.a.s.l)	NUMBER OF SPECIES AT LOCALITY POINT
1	27° 35' 36.2795" E	26° 23' 37.0501" S	1702.033	10
2	27° 35' 36.2005" E	26° 23' 37.0067" S	1704.158	1
3	27° 35' 36.1896" E	26° 23' 37.0033" S	1704.656	1
4	27° 35' 36.0384" E	26° 23' 36.7224" S	1705.679	1
5	27° 35' 36.0529" E	26° 23' 36.7296" S	1705.678	1
6	27° 35' 36.1320" E	26° 23' 36.6971" S	1706.134	1
7	27° 35' 36.1247" E	26° 23' 36.7188" S	1706.021	1
8	27° 35' 36.1069" E	26° 23' 36.7511" S	1705.721	8
9	27° 35' 36.1824" E	26° 23' 36.3911" S	1706.998	5
10	27° 35' 36.2328" E	26° 23' 36.3805" S	1707.211	1
11	27° 35' 36.1788" E	26° 23' 36.3120" S	1707.328	1
12	27° 35' 36.1751" E	26° 23' 36.3371" S	1706.828	1
13	27° 35' 35.9304" E	26° 23' 36.3084" S	1706.792	1
14	27° 35' 35.8728" E	26° 23' 36.2508" S	1709.003	1
15	27° 35' 35.8692" E	26° 23' 36.1931" S	1709.387	1
16	27° 35' 35.7792" E	26° 23' 36.1717" S	1709.205	1
17	27° 35' 35.6857" E	26° 23' 36.2580" S	1708.727	1
18	27° 35' 35.4983" E	26° 23' 36.2508" S	1708.885	1
19	27° 35' 35.4805" E	26° 23' 36.2544" S	1709.073	1
20	27° 35' 36.0744" E	26° 23' 35.4876" S	1709.636	17
21	27° 35' 35.9917" E	26° 23' 35.3760" S	1710.599	1
22	27° 35' 35.9808" E	26° 23' 35.3003" S	1710.333	1
23	27° 35' 36.0059" E	26° 23' 35.2357" S	1711.061	1
24	27° 35' 35.9844" E	26° 23' 35.2248" S	1711.314	1
25	27° 35' 35.9844" E	26° 23' 35.1817" S	1711.611	1
26	27° 35' 35.9627" E	26° 23' 35.1889" S	1711.48	6
27	27° 35' 35.4193" E	26° 23' 35.0377" S	1711.944	8
28	27° 35' 35.3327" E	26° 23' 34.9584" S	1711.363	5
29	27° 35' 35.2895" E	26° 23' 34.9511" S	1711.634	4
30	27° 35' 35.3076" E	26° 23' 34.8863" S	1711.706	1
31	27° 35' 35.3797" E	26° 23' 34.8648" S	1712.255	1
32	27° 35' 35.1097" E	26° 23' 34.5912" S	1714.971	1



Table B 2: Coordinate data for the recorded *Boophone disticha* species.

NO.	LONGITUDE	LATITUDE	ELEVATION (m.a.s.l)	NUMBER OF SPECIES AT LOCALITY POINT
1	27° 35' 17.8693" E	26° 23' 16.1555" S	1653.777	1
2	27° 35' 09.5929" E	26° 23' 08.4193" S	1643.368	1
3	27° 35' 08.3545" E	26° 23' 07.3140" S	1643.495	1
4	27° 35' 06.9683" E	26° 23' 06.4175" S	1643.031	1
5	27° 35' 02.7852" E	26° 23' 02.2920" S	1643.181	1
6	27° 35' 00.9816" E	26° 22' 59.5633" S	1645.288	1
7	27° 34' 56.7049" E	26° 22' 34.3163" S	1622.34	1

Table B 3: Coordinate data for the recorded *Hypoxis hemerocallidea* species.

NO.	LONGITUDE	LATITUDE	ELEVATION (m.a.s.l)	NUMBER OF SPECIES AT LOCALITY POINT
1	27° 35' 21.8185" E	26° 23' 19.5143" S	1657.653	1
2	27° 35' 20.7419" E	26° 23' 18.4992" S	1654.954	1
3	27° 35' 20.6843" E	26° 23' 18.5064" S	1655.88	1
4	27° 35' 20.6665" E	26° 23' 18.5460" S	1655.955	1
5	27° 35' 20.6375" E	26° 23' 18.5315" S	1656.072	1
6	27° 35' 20.6125" E	26° 23' 18.5351" S	1656.304	1
7	27° 35' 20.6269" E	26° 23' 18.5064" S	1656.582	1
8	27° 35' 20.5907" E	26° 23' 18.5209" S	1656.745	1
9	27° 35' 20.5871" E	26° 23' 18.5173" S	1656.64	1
10	27° 35' 20.5512" E	26° 23' 18.5641" S	1656.265	16
11	27° 35' 20.3315" E	26° 23' 18.2723" S	1656.31	20
12	27° 35' 20.3101" E	26° 23' 18.0421" S	1656.372	9
13	27° 35' 20.2235" E	26° 23' 17.8655" S	1656.202	26
14	27° 35' 11.9975" E	26° 23' 10.7087" S	1645.56	1
15	27° 35' 11.6771" E	26° 23' 10.4136" S	1645.41	15
16	27° 35' 11.4109" E	26° 23' 10.3668" S	1644.755	30
17	27° 35' 08.9339" E	26° 23' 07.9081" S	1644.167	1
18	27° 35' 05.7263" E	26° 23' 04.9344" S	1644.366	5
19	27° 35' 05.2043" E	26° 23' 04.6176" S	1642.768	6
20	27° 35' 04.9740" E	26° 23' 04.3907" S	1643.97	1
21	27° 35' 04.4629" E	26° 23' 04.0415" S	1644.067	4

