Botanical Survey At ESKOM Skaapvlei Substation Included In The West Coast Group of Battery Energy Storage System (BESS) Project, Western Cape Province

Vegetation Assessment

Draft

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Prepared for: SRK Consulting (South Africa) (Pty) Ltd

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Executive Summary

Eskom Holdings SOC Ltd proposes installing Battery Energy Storage Systems (BESSs) at existing distribution substations throughout South Africa to:

- Strengthen the electricity distribution network and address current voltage and capacity constraints;
- Integrate a greater amount of renewable energy into the electricity grid; and
- Reduce the requirement for investment in new conventional generation capacity.

The use of BESS technology has been increasing rapidly worldwide. The growth in the BESS industry is expected to continue as costs of these systems are declining. While costs are still relatively high when compared to conventional grid electricity, the cost of battery energy storage has been decreasing since the 1990s (AIG, undated; Platte River Power Authority, 2017).

Battery storage technologies are widely used because they improve energy security by optimising energy supply and demand, reducing the need to import electricity via interconnectors, and also reducing the need to continuously adjust generation unit output. In addition, BESS's can provide system security by supplying energy during electricity outages, minimizing the disruption and costs associated with power cuts. Another reason for the rising popularity of storage systems is that they can enable the integration of more renewables in the energy mix (AIG, undated).

Battery storage systems can decrease the requirement for investment in new conventional generation capacity, resulting in financial savings and reduced emissions from electricity generation. Using storage systems also means fewer and cheaper electricity transmission and distribution system upgrades are required (AIG, undated).

Due to the cancellation of the Kiwano Concentrating Solar Power (CSP) project, the project funders, the World Bank, agreed that Eskom could use the funds allocated for the Kiwano CSP for an alternative (renewable) project. The World Bank approved the BESS project as a suitable alternative to the Kiwano CSP.

Eskom initially identified a total of 24 substation sites in the Western Cape Province where the BESS could be implemented with a total (proposed) BESS capacity of 148.5 Megawatts (MW). The following criteria were considered in the selection of suitable sites for the BESS:

- Proximity of electricity customers to existing or confirmed future renewable generators. The following renewable energy sources were identified in the West Coast area:
    - Paleisheuwel 75 MW PV facility;
    - Aurora 9 MW PV facility (Vredelus);

  - Sere 100 MW Wind Energy Facility (WEF) (Skaapvlei); and
  - Kerschbosch 65 MW WEF (Hopefield);
- Situations where the distribution network in the West Coast area will see notable benefits from the introduction of BESS:
  - Reduction in electricity supply losses;
  - Peak load reduction on critically loaded network components;
  - Peak load reduction allowing for deferment of capital investment;
  - Reduction in loading / congestion of upstream High Voltage networks;
  - Improvement of local network attributes and quality of supply; and
  - Peak load reduction where the peak load is concurrent with national system peak (i.e. winter evenings);
- Availability of sufficient Medium Voltage connection capacity for the BESS; and
- Availability of sufficient space at the substation for installation of the BESS containers.

Eskom identified five substations in the West Coast, namely:

- Darling;
- Yzerfontein;
- Paleisheuwel;
- Zandberg; and
- Skaapvlei.

Eskom subsequently decided that only **Skaapvlei** and Paleisheuwel will be taken forward into assessment.

In order to provide data to support various environmental applications for a proposed Eskom BESS at Skaapvlei Substation in the West Coast Group of Project, Nemai Consulting (Pty) Ltd was appointed to conduct a botanical assessment specialist study. The aim of this report was to assess the impacts that the proposed development will have on the flora on site. The current ecological status and conservation priority of vegetation on the site were also assessed. Red data plant species and plant species of conservation concern that are known to occur on site were investigated.

The project area falls within the Fynbos biome which extends across the southern corner of South Africa in a 100-200km wide coastal belt in the Western Cape Province. Fynbos is characterised as schlerophyllous shrub-land and this biome is comprised of two major vegetation types, the Fynbos and the Renosterveld (and also Strandveld, although not dominant). The Fynbos Biome forms the main part of the Cape Floristic Region (CFR), which is recognised globally as a biodiversity hotspot, due to the high numbers of endemic plant and invertebrate taxa. The study area is classified as falling within the *Least Threatened* Namaqualand Sand Fynbos vegetation type. The proposed development site falls within

Critical Biodiversity Areas (CBA) 1 (Terrestrial) and Ecological Support Areas (ESA) 2 (Restore) categories.

During the field survey, only one plant species of conservation concern was observed within the study area, namely *Babiana virescens* (listed as Near Threatened).

***Babiana virescens* recorded on site**

It is therefore recommended that prior to construction activities, a suitably qualified Botanist (or a similarly qualified individual, preferably a horticulturist with West Coast Search and Rescue experience) should be appointed to undertake a pre-construction walkdown to identify plant Species of Conservation Concern (SCC) and protected species and oversee the rescue and relocation of these species. There are likely to be additional Red Data Listed plant species such as *Leucoptera nodosa* present at the site which were not observed as some species are naturally rare or are only visible during flowering seasons (June-August).

A picture of *Leucoptera nodosa*

Although *Brunsvigia orientalis* and *Boophone haemanthoides* are listed in the 'Red List' as of 'Least Concern', a 'Search and Rescue' strategy should nevertheless be implemented to save these plants from where they would be impacted by the BESS project as they are provincially protected species (Western Cape Nature Conservation Laws Amendment Act of 2000 Schedule 4 Protected flora). A permit to remove these plant species will need to be obtained from CapeNature. The removal should occur with due care, and these plant species should be relocated into areas with the same aspect, soil conditions and elevation to ensure that the relocations are successful.

All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state where possible. Mitigation measures provided in Table 6 will ensure that any available ecological linkages between sensitive areas are not affected negatively. Mitigation measures included within this report are feasible and will be easy to achieve. During the field survey, it was found that the impacts of the project development on natural habitats can be mitigated to a satisfactory level and as such, the development is deemed acceptable from the flora perspective and should not be prevented from proceeding based on the vegetation considerations. As soon as the proposed development has been constructed, the rehabilitation process needs to take place and should ensure that alien plant emergence and erosion do not occur. The rehabilitation process undertaken post the Sere wind facility project was successful and similar measures should be implemented by Eskom.

Table 1. The summary of all impact significance ratings with mitigation measures are shown below:

Impact	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Impact 1. Loss of plant SCC as a result of the design and placement of infrastructure and the access roads	**Low 5**	Definite	**LOW**	**– ve**	High
With mitigation	**Very-Low 4**	Probable	**VERY LOW**	**+ ve**	High
Impact 2. Potential loss of topsoil from site preparation and construction of the platform and access road	**Very Low** 4	Definite	**VERY LOW**	**– ve**	High
With mitigation	**Very-Low 3**	Possible	**INSIGNIFICANT**	**– ve**	High
Impact 3. Loss of vegetation from vegetation clearance and the construction of the BESS and access road during the construction phase	**Low** 5	Definite	**LOW**	**– ve**	High
With mitigation	**Very-Low 4**	Probable	**VERY LOW**	**– ve**	High
Impact 4. Increased soil erosion due to compaction by vehicles and construction activities, and incorrect storm water management measures	**Very-Low** 4	Possible	**INSIGNIFICANT**	**– ve**	High
With mitigation	**Very-Low 3**	Possible	**INSIGNIFICANT**	**– ve**	High
Impact 5. Proliferation of alien invasive species on account of site disturbance	**Low** 5	Probable	**MEDIUM**	**– ve**	High
With mitigation	**Very-Low 4**	Possible	**INSIGNIFICANT**	**– ve**	High
Impact 6. Loss of vegetation due to fuel and chemical spills from the use of electrical equipment e.g. generator and storage of hazardous substances.	**Low** 5	Possible	**VERY LOW**	**– ve**	High
With mitigation	**Very-Low 4**	Possible	**INSIGNIFICANT**	**– ve**	High
Impact 7. Loss of CBA and ESA habitats from vegetation clearance and construction of the BESS and access roads	**Medium** 6	Definite	**MEDIUM**	**– ve**	High
With mitigation	**Low 5**	Probable	**LOW**	**– ve**	High
Impact 8. Loss and/or degradation of floral habitat	**Low** 5	Probable	**LOW**	**– ve**	High

Impact	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
With mitigation	**Very-Low 4**	Possible	**INSIGNIFICANT**	**– ve**	High
Impact 9. Loss of vegetation from fires due to operating of electrical equipment and smoking of personal	**Medium** 6	Possible	**LOW**	**– ve**	Low
With mitigation	**Very-Low 4**	Possible	**INSIGNIFICANT**	**– ve**	Low

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1 INTRODUCTION

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1.1 Objectives of the Survey

In order to achieve the aim stated above, the following objectives are to be achieved:

- To apply relevant literature to determine the diversity and eco-status of the plants (vegetation) within the proposed development site;
- To carry out a field survey in order to gain an understanding of the diversity and eco-status of taxa which inhabit the study area, as well as the presence of unique habitats that might require further investigation or protection;
- To assess the current habitat and conservation status of plant species within the study area;
- To comment on ecological sensitive species/areas;
- To assess the possible impact of the proposed project on these taxa and/or habitats;
- To list the species on site and to recommend necessary actions in case of occurrence of endangered, vulnerable or rare species or any species of conservation concern; and
- To provide management recommendations to mitigate negative and enhance positive impacts within the proposed development site.

1.2 Declaration of Independence

The specialist investigator declares that I:

- Act as independent specialist for this project.
- Consider myself bound by the rules and ethics of the South African Council for Natural Scientific Professions.
- Do not have any personal or financial interest in the project except for financial compensation for specialist investigations completed in a professional capacity as specified by the Environmental Impact Assessment (EIA) Regulations, 2006.
- Will not be affected by the outcome of the environmental process, of which this report forms part of.
- Do not have any influence over the decisions made by the governing authorities.
- Do not object to or endorse the proposed development but aim to present facts and my best scientific and professional opinion with regards to the impacts of the development.

2 Relevant Legislation and Guidelines

The following legislations and guidelines are relevant to this project:

- Hazardous Substances Act (Act No. 5 of 1973);

- Occupational Health and Safety Act (Act No. 85 of 1993);
- Constitution of the Republic of South Africa (Act No. 108 of 1996);
- National Environmental Management Act (Act No. 107 of 1998);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004);
- Conservation of Agricultural Resources Act (Act No. 43 of 1983);
- National Forestry Act (Act No. 84 of 1998);
- Western Cape Nature Conservation Laws Amendment Act of 2000;
- Guideline for involving biodiversity specialists in EIA processes (2005): Edition 1. CSIR Report No ENV-S-C 2005 053 C;
- Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape (2005);
- Department of Environmental Affairs and Development Planning. WCDMA01 Critical Biodiversity Areas and Ecological Support Areas 2010 [vector geospatial dataset] 2010;
- The Biodiversity Sector Plan for the Saldanha Bay, Bergrivier, Cederberg and Matzikama Municipalities (2010);
- National Biodiversity Assessment (2011);
- Western Cape Biodiversity Framework (2014) Status Update: Critical Biodiversity Areas of the Western Cape (2014); and
- The Western Cape Provincial Spatial Development Framework (2014) (Department of Environmental Affairs & Development Planning).

3 SCOPE OF WORK

The Scope of Work for Nemai Consulting is to provide specialist botanical consulting services for the proposed Eskom BESS substation sites, namely Skaapvlei and Paleisheuwel, located in the Western Cape Province. **This report is only applicable to Skaapvlei BESS site.** The specialist work and report are compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), and the 2014 EIA Regulations, as amended (2017).

SRK Consulting (SRK) has been appointed to undertake the Basic Assessment (BA) Process for the two sites. They will liaise with the botanist to ensure the scope of work is finalised and executed as per the EIA requirements. Adherence to the timelines is of utmost importance to ensure deadline for submissions are achieved. Draft botanical reports will be sent to SRK for review, updated and finalised accordingly and final reports submitted to SRK by the agreed timeframe.

3.1 General Terms of Reference

Botanical assessments must follow guidelines as set out in the following documents:

a. Department of Environmental Affairs and Development Planning (DEA&DP) guidelines for involving biodiversity specialists in the EIA process (Brownlie, 2005);

b. Ecosystem guidelines for Environmental Assessment in the Western Cape (Cadman *et al.,* 2016);

c. CapeNature's Terms of Reference for the consideration of biodiversity in Environmental Assessment and decision-making;

d. The requirements of CapeNature for providing comments on agricultural, environmental, mine planning and water-use related applications; and

e. Appendix 6 of the Environmental Impact Assessment Regulations, 2014 (Government Gazette, 2017 as amended).

3.2 Specific Terms of Reference

a. Describe the existing baseline floral characteristics of the study areas and place this in a regional context. Include a description of biodiversity patterns at a community and ecosystem level (main vegetation type, plant communities in the vicinity and threatened/vulnerable ecosystems), at species level (threatened Red List species, Protected species, Presence of alien species) and in terms of significant landscape features;

b. Describe the sensitivity of the site and its environs; and map these resources;

c. Undertake an independent site walk-through to determine the final location of infrastructure based on ecological, visual and cultural (archaeological and palaeontological) sensitivity of the study area;

d. Identify and assess potential impacts of the project and the alternatives, including impacts associated with the construction and operation phases, using the appointed EAP's (to undertake an EIA) prescribed impact rating methodology;

e. Indicate the acceptability of alternatives and recommend a preferred alternative;

f. Identify and describe potential cumulative impacts of the proposed development in relation to proposed and existing developments in the surrounding area;

g. Recommend mitigation measures to avoid and/or minimise impacts and/or optimise benefits associated with the proposed project; and

h. Recommend and draft a monitoring campaign, if applicable.

4 SITE LOCATION

The site is located within Erf 1862 Farm Olifants River Settlement (C07800070000186200000), Sere Wind Farm area, in Matzikama Local Municipality, West Coast District Municipality, Western Cape Province (**Figures 1, 2** and **3**). The collage of photographs taken within the proposed development site is indicated in **Figure 4** below.

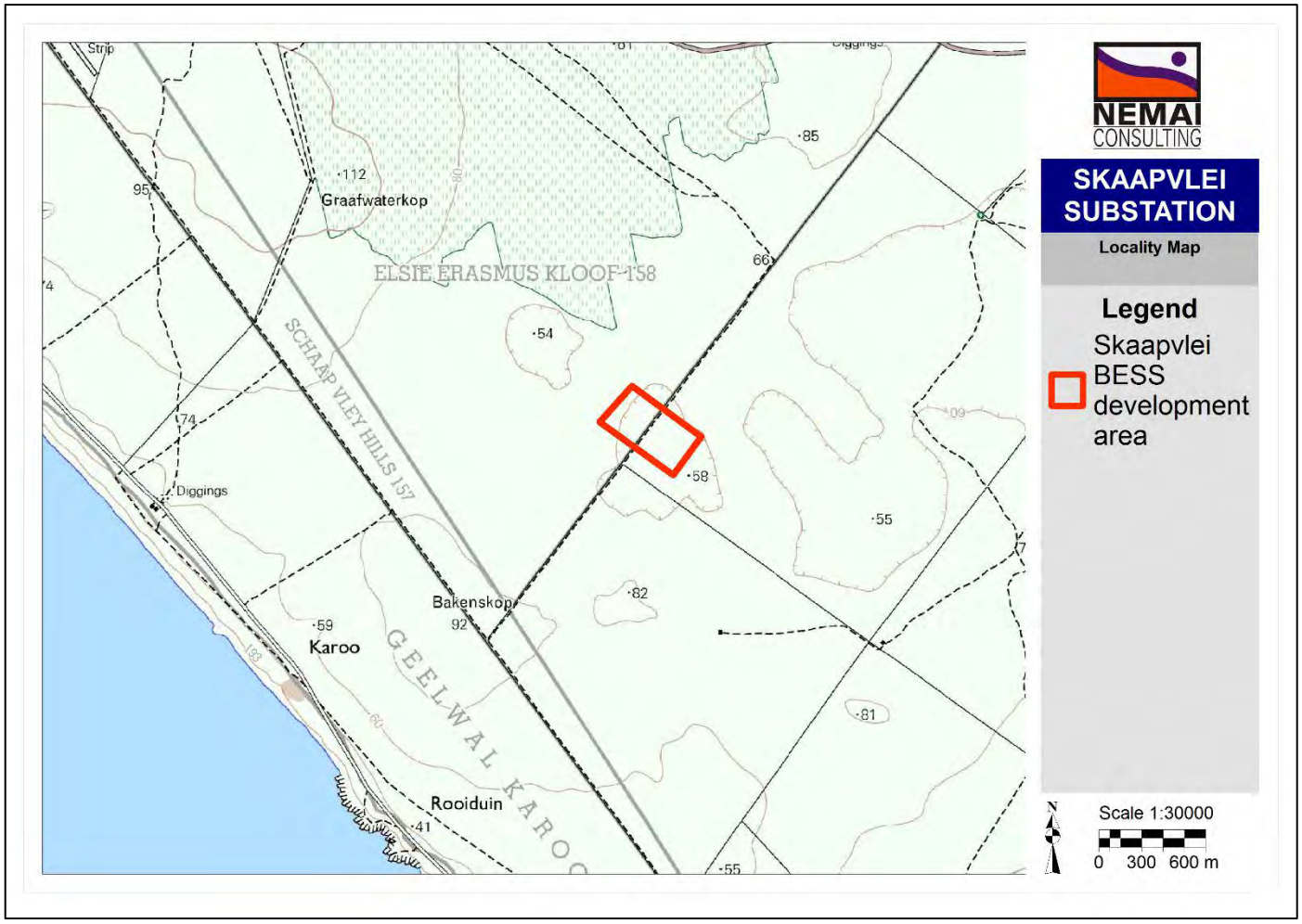

Figure 1. 1 in 50 000 Topographical map of the proposed development area

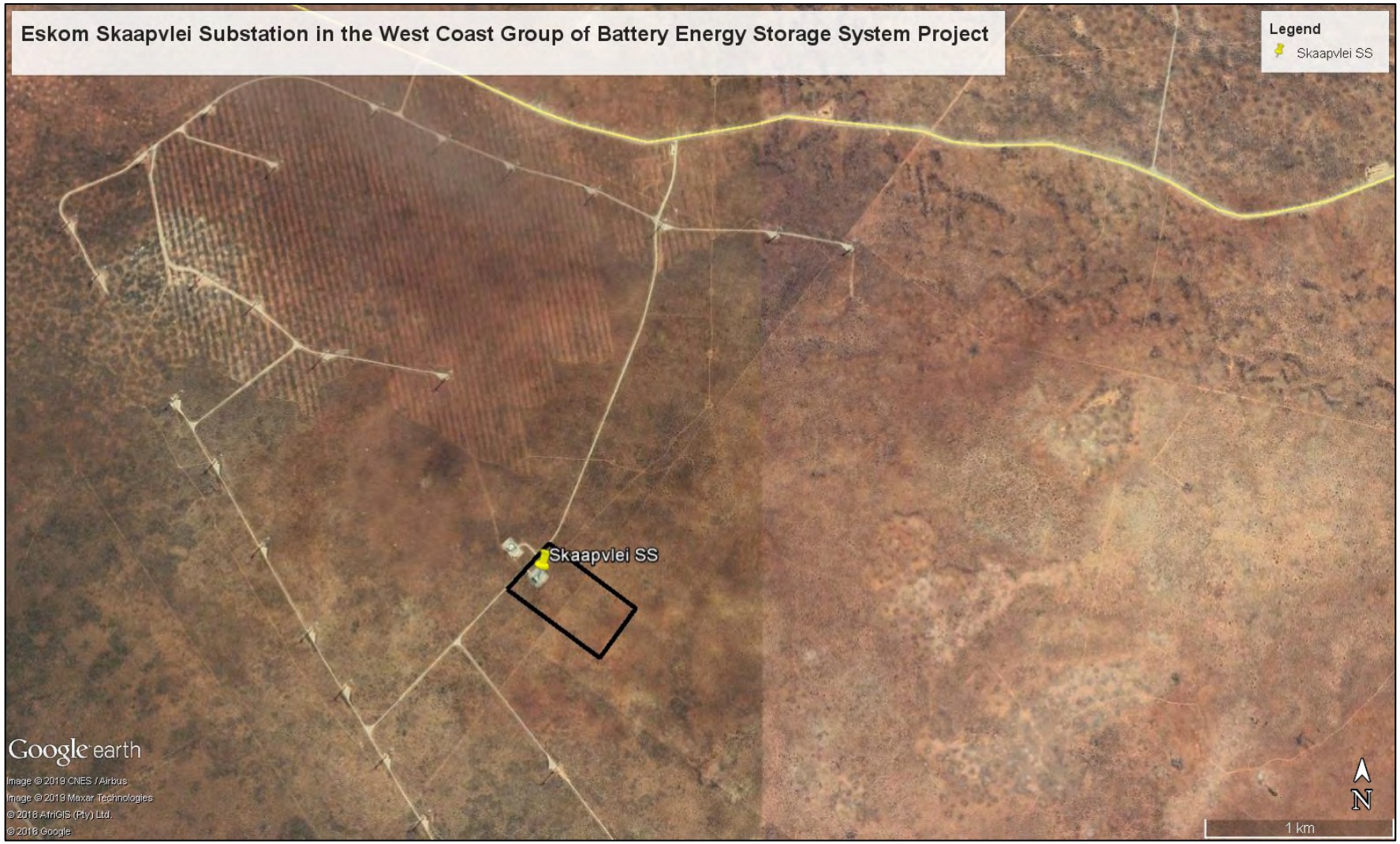

Figure 2. Google Earth map of the proposed development area

Figure 3. Google Earth map of the study area (Green area) (Eskom, 2019)

Figure 4. Collage of photographs taken within the proposed development site

5 REGIONAL VEGETATION

The project area falls within the Fynbos biome (SANBI, 2012) (**Figure 5**) and the Biome extends across the southern corner of South Africa in a 100-200km wide coastal belt in the Western Cape Province. Fynbos is characterised as schlerophyllous shrub-land and this biome is comprised of two major vegetation types, the Fynbos and the Renosterveld (and also Strandveld, although not dominant). The Fynbos Biome forms the main part of the Cape Floristic Region (CFR), which is recognised globally as a biodiversity hotspot, due to the high numbers of endemic plant and invertebrate taxa.

The CFR covers approximately 87 892 km^2 within the Western Cape Province and slightly into the Eastern Cape Province of South Africa. This region is extremely rich in plant species, with approximately 9 600 different species of plants having been documented with at least 70% of these endemic to this region. The diversity of plant taxa arises from the diversity of soil types, topography and climatic conditions across the region.

The chain of large mountain ranges within the region is viewed as essential water catchment areas, and as such has historically received the focus of conservation action in the region. This has unfortunately neglected the low lying Fynbos areas which hold high levels of biodiversity. Much of the vegetation types of the lowlands have been converted into agricultural fields or rangelands, or succumbed to the expansion of infrastructure development. The disruption of the natural fire regimes has impacted negatively on many of the Fynbos plant species as these species utilise specific fire frequencies to set seed and germinate. Infestation by alien invasive plant species, such as certain Australian Acacia and Eucalyptus species, has also converted much of the natural habitat areas into alien "forests", devoid of the natural biodiversity of the region. The Fynbos Biome is predicted to be severely impacted upon by climate change, with estimates of as high as a 50% loss of the Fynbos Biome. The drastic climatic changes predicted could alter the conditions required for the persistence of the biome, such as changes in rainfall patterns and temperature, which in turn lead to changes in the plant communities which are able to persist in the area.

The study area is classified as falling within the Namaqualand Sand Fynbos vegetation type (**Figure 6**).

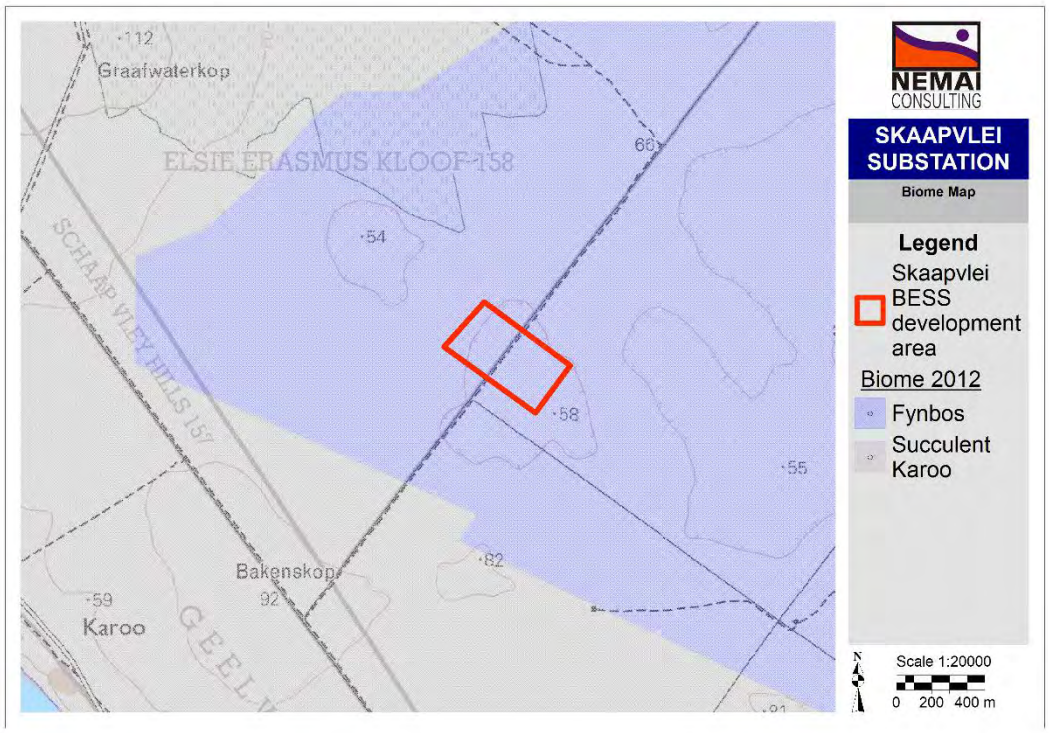

Figure 5. Biome with relation to the development area

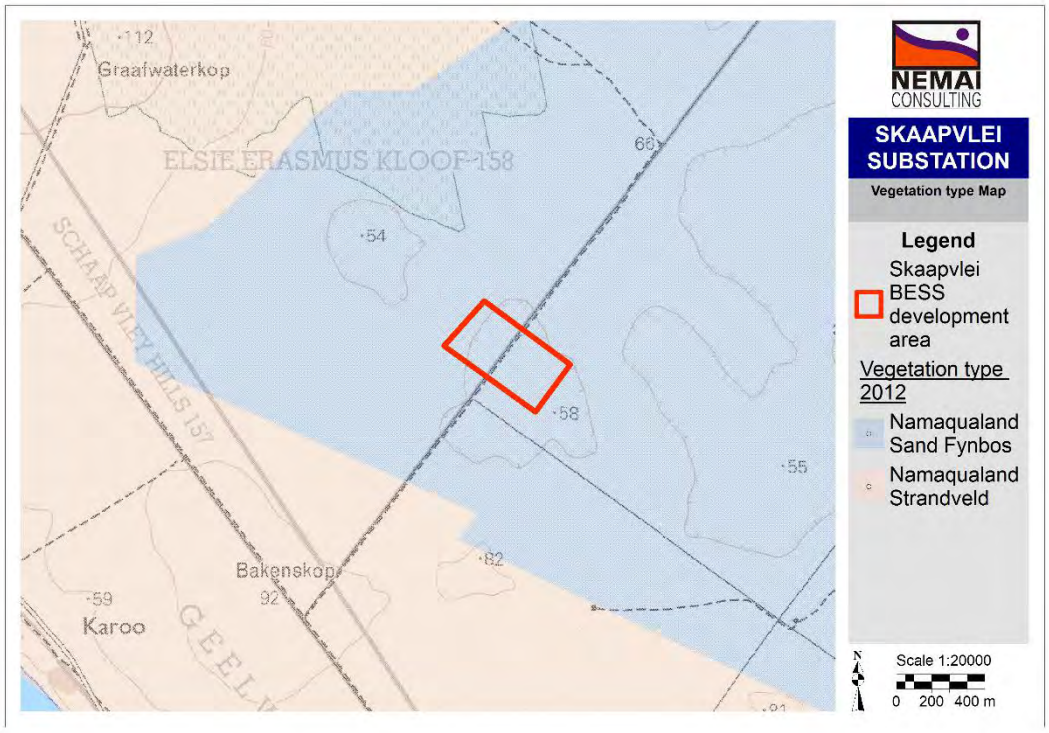

Figure 6. Vegetation type with relation to the development area

The description of the vegetation type follows below:

5.1 Namaqualand Sand Fynbos

The Namaqualand Sand Fynbos is found in the Northern Cape Provinces. It occurs in coastal plains with a well-separated patch between Kommagas and Koingnaas in the north, and a series of patches south of the Spoeg River, to the Olifants River near Koekenaap (Mucina and Rutherford, 2006).

This vegetation type is listed as *Least threatened*, with a conservation target (percent of area) from National Spatial Biodiversity Assessment (NSBA) (2011) of 29%. At present only 1% is statutorily conserved (Namaqua National Park), but proclamation of the proposed new national park at the coast between the mouths of the Groen and Spoeg Rivers may extend the area under protection. About 2% has been transformed for cultivation. The area is subject to extensive sheep grazing on some farms and the aliens, *Acacia cyclops* and *A. saligna* are scattered. Erosion is very low at present, but heavy grazing can lead to re-mobilisation of the stabilised dunes (Mucina and Rutherford, 2006).

6 TERRESTRIAL THREATENED ECOSYSTEMS

The South African National Biodiversity Institute (SANBI), in conjunction with the Department of Environmental Affairs (DEA), released a draft report in 2009 entitled “Threatened Ecosystems in South Africa: Descriptions and Maps”, to provide background information on the above List of Threatened Ecosystems (SANBI, 2009). The purpose of this report was to present a detailed description of each of South Africa’s ecosystems and to determine their status using a credible and practical set of criteria. The following criteria were used in determining the status of threatened ecosystems:

- Irreversible loss of natural habitat;
- Ecosystem degradation and loss of integrity;
- Limited extent and imminent threat;
- Threatened plant species associations;
- Threatened animal species associations; and
- Priority areas for meeting explicit biodiversity targets as defined in a systematic conservation plan.

In terms of section 52(1) (a), of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA), a national list of ecosystems that are threatened and in need of protection was gazetted on 9 December 2011 (Government Notice 1002) (Driver *et al.* 2004). The list classified all threatened or protected ecosystems in South Africa in terms of four categories; Critically Endangered (CR), Endangered (EN), Vulnerable (VU), or Protected. The purpose of categorising these ecosystems is to prioritise conservation areas in order to reduce the rates of ecosystem and species extinction, as well as preventing further degradation and loss of structure, function, and composition of these ecosystems. It is estimated that Threatened Ecosystems make up 9.5% of South Africa, with critically endangered and

endangered ecosystems accounting for 2.7%, and vulnerable ecosystems 6.8% of the land area. It is therefore vital that Threatened Terrestrial Ecosystems inform proactive and reactive conservation and planning tools, such as Biodiversity Sector Plans, municipal Strategic Environmental Assessments (SEAs) and Environmental Management Frameworks (EMFs), EIAs and other environmental applications (Mucina and Rutherford, 2006). The project area does not fall within any of the terrestrial threatened or protected ecosystems (**Figure 7**).

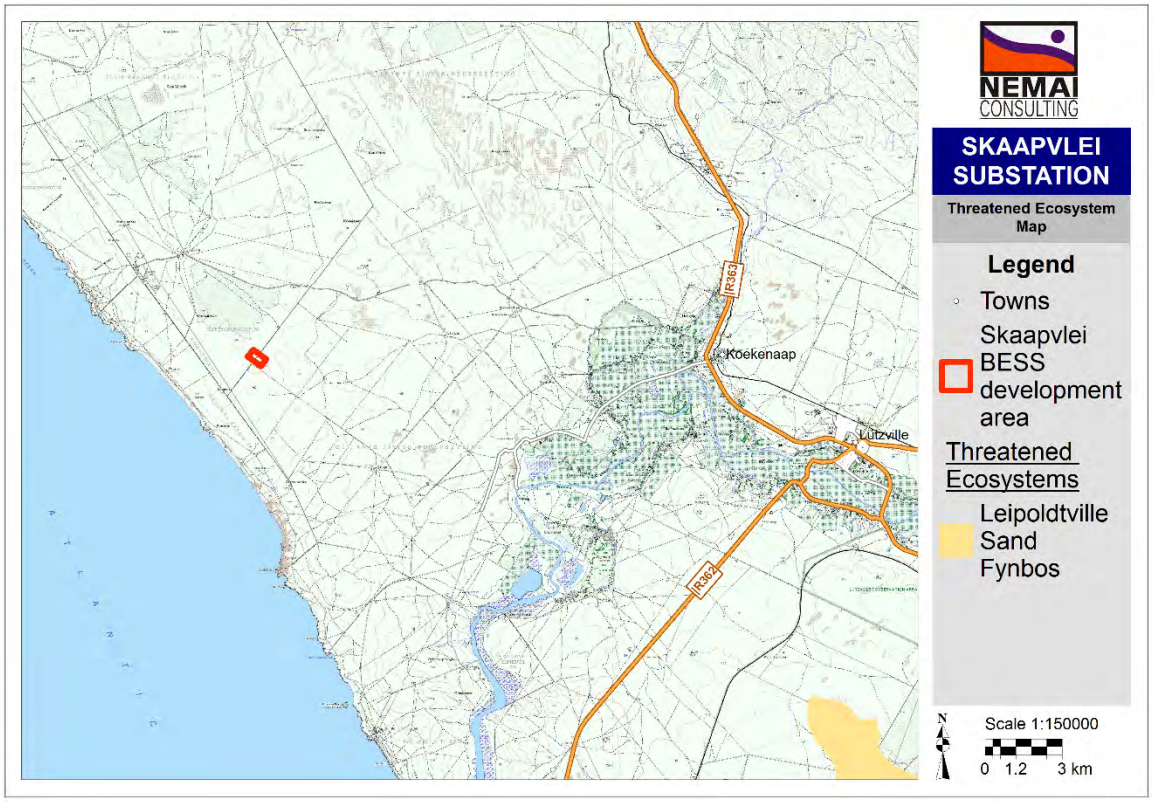

Figure 7. Terrestrial threatened ecosystem with relation to the development area

7 Critical Biodiversity Areas and Ecological Support Areas in the Core Planning Domain of WCDMA and Northern Matzikama LM

The Critical Biodiversity Areas (CBA) map indicates areas of land as well as aquatic features which must to be safeguarded in their natural state if biodiversity is to persist and ecosystems are to continue functioning. Land in this category is referred to as a CBA. CBAs incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species (Skowno, *et al*. 2009).

Ecological Support Areas (ESAs) are supporting zones required to prevent the degradation of CBA and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains CBAs or a terrestrial feature (Skowno *et al*. 2009).

The Western Cape Biodiversity Spatial Plan (WCBSP) is the product of a systematic biodiversity planning assessment that delineates, on a map (via a Geographic Information System (GIS)), CBAs and ESAs which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and freshwater realms. These spatial priorities are used to inform sustainable development in the Western Cape Province. CBA1 are CBAs that are likely to be in a natural condition and CBA2 are ones that are potentially degraded or represent secondary vegetation. Similarly, a distinction is made between ESAs that are likely to be functional (i.e., in a natural, near-natural or moderately degraded condition; ESA 1), and ESAs that are likely severely degraded or have no natural cover remaining and therefore require restoration where feasible (ESA 2) (Skowno, *et al*. 2009).

The proposed development site falls within CBA 1 (Terrestrial) and ESA 2 (Restore) categories (**Figure 8**). According to the Skowno *et al*. (2009), the proposed development area is situated in a natural habitat in terms of its land cover. The CBA on site is still functional with the presence of plant Species of conservation concern and therefore the mitigation measures in this report must be implemented in order to conserve the biodiversity and ecosystems functioning on site.

Figure 8. CBA and ESA with relation to the proposed development area

8 METHODOLOGY

8.1 Flora

The flora assessment consisted of two complementary approaches:

- A desktop analysis, which included a literature review (previous specialist studies), local knowledge, topographical maps, and Google Earth imagery; and
- Site visit was conducted in July 2019.

Satellite imagery of the area (Google Earth) was studied in order to acquire a three-dimensional impression of the topography and land use and also to identify potential "hot-spots" or specialized habitats such as natural habitats on or near the study area.

The Pretoria Computerised Information System (PRECIS) list of Red Data plants recorded in the 3118CA quarter degree grid square was consulted to verify the record of occurrence of the plant species seen in the vicinity of the study area. The site sampled is only a very small portion of the whole grid and so habitats suitable for certain species in the PRECIS list may not be present at the areas sampled. The vegetation map published in SANBI (2012) was consulted to identify vegetation units that are found in the study area. The desktop component of the study of the habitats of the Red-Data-listed plants was conducted before the site visit.

The habitats in the study area were inspected in a random zigzag fashion, paying particular attention to areas that at first sight appeared to be sensitive. All general observations were noted such as grasses, herbs (forbs), shrubs and trees. The habitats suitable for Red Data listed species known to occur in the quarter degree grid square were examined intensively for the presence of such species. Attention was also paid to the occurrence of medicinal, alien and declared weed species. Field guides such as van Wyk *et al.* (1997), Pooley (1998), van Oudshoorn (1999) and Manning (2009) were utilised during the field work.

Exotic and invasive plant species were categorised according to the framework laid out by The Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA). CARA defines weeds as alien plants, with no known useful economic purpose that should be eradicated. Invader plants, also considered by the Act, can also be of alien origin but may serve useful purposes as ornamental plants, as sources of timber, or other benefits such as medicinal uses (Henderson, 2001). These plants need to be managed and prevented from spreading.

Invasive species are controlled by NEM:BA – Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014. The AIS Regulations list four (4) different categories of invasive species that must be managed, controlled or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa.

Invasive plant species are divided into four categories, namely:

- Category 1a: Invasive species which must be combatted and eradicated. Any form of trade or planting is strictly prohibited.

- Category 1b: Invasive species which must be controlled and wherever possible, removed and destroyed. Any form or trade or planting is strictly prohibited.
- Category 2: Invasive species, or species deemed to be potentially invasive, in which a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees.
- Category 3: Invasive species which may remain in prescribed areas or provinces. Further planting, propagation or trade, is however prohibited.

According to van Oudtshoorn (1999), a grass species reacts to grazing in one of two ways: it can either become more or less abundant. Table 2 describes the classification of grasses.

Table 2. Classification of grasses (van Oudtshoorn, 1999)

Class	Description	Examples
Decreasers	Grasses that are abundant in good veld, but that decrease in number when the veld is overgrazed or undergrazed.	*Themeda triandra, Digitaria eriantha*
Increaser 1	Grasses that are abundant in underutilised veld. These grasses are usually unpalatable, robust climax species that grow without any defoliation	*Hyperthelia dissoluta, Trachypogon spicatus*
Increaser 2	Grasses that are abundant in overgrazed veld. These grasses increase due to the disturbing effect of overgrazing and include mostly pioneer and subclimax species	*Aristida adscensionis, Eragrostis rigidor*
Increaser 3	Grasses that are commonly found in overgrazed veld. These are usually unpalatable, dense climax grasses	*Sporobolus africanus, Elionurus muticus*
Invaders	All plants that are not indigenous to an area. These plants are mostly pioneer plants and are difficult to eradicate	*Arundo donax*

9 RESULTS AND DISCUSSION

9.1 Flora

9.1.1 Desktop study results

The study area is located within the following quarter degree square in terms of the 1:50 000 grid of South Africa 3118CA (**Figure 9**). SANBI uses this grid system as a point of reference to determine any Red Data plant species or any species of conservation concern occurring in South Africa. This can be used to determine the list of species which could potentially occur within an area.

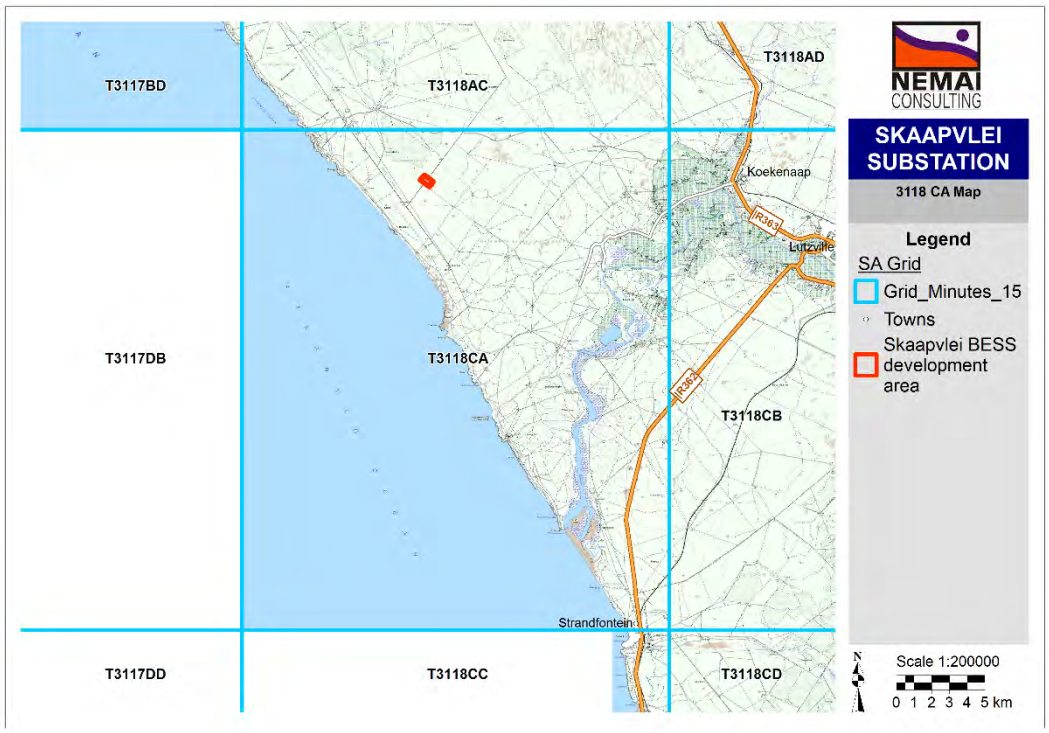

Figure 9. 1:50 000 grid of South Africa 3118CA in relation to the project area

Table *3* indicates the Red Data plant species that are known to occur on or around the project area recorded in 3118CA quarter degree square. The definitions of the conservation status are provided in **Table *4.***

Table 3. Red Data Plant species which could potentially occur within the study area (SANBI data, Raimondo *et al*. 1999)

RDL floral species	Conservation Status
Helichrysum marmarolepis	Near Threatened
Babiana confusa	Near Threatened
Babiana hirsuta	Near Threatened
Ceropegia occidentalis	Near Threatened
Chaenostoma multiramosum	Vulnerable
Babiana teretifolia	Critically Endangered
Ferraria foliosa	Near Threatened
Leucoptera nodosa	Vulnerable
Helichrysum dunense	Vulnerable
Muraltia obovata	Vulnerable
Babiana virescens	Near Threatened
Lapeirousia simulans	Vulnerable
Pelargonium appendiculatum	Endangered
Ruschia langebaanensis	Vulnerable
Tylecodon fragilis	Endangered

Table 4. Definitions of Red Data status (Raimondo *et al.* 1999)

Symbol	Status	Description
CR	Critically Endangered	A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five International Union for Conservation of Nature (IUCN) criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
EN	Endangered	A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
VU	Vulnerable	A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
NT	Near Threatened	A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable, and is therefore likely to become at risk of extinction in the near future.

9.1.2 Plant species recorded in the study area

The plant species recorded during the field visit confirmed the study area's location within the Fynbos Biome of South Africa. According to the Skowno *et al*. (2009), the project area is situated in a natural habitat land cover. All of the plant species recorded during the field visits within the study area are listed in **Table *5*.**

Table 5. Plant species recorded within the study area

Family	Scientific name	Common name	Ecological status (SA Red list categories)	Form
Hyacinthaceae	*Albuca viscosa*		Least Concern	Herb
Rubiaceae	*Anthospermum spathulatum*	Spoon Flowerseed	Least Concern	Shrub
Chenopodiaceae	*Atriplex inflata*	Sponge-fruit saltbush	Alien Category 1b	Herb
Asparagaceae	*Asparagus capensis* var. *capensis*	Wild Asparagus	Least Concern	Shrub
Iridaceae	*Babiana grandiflora*		Least Concern	Herb
Iridaceae	*Babiana virescens*		Near Threatened	Herb
Amaryllidaceae	*Boophone haemanthoides*	Namaqua century plant	Schedule 4 Protected Flora Cape Nature	Herb
Amaryllidaceae	*Brunsvigia orientalis*	Candelabra lily	Schedule 4 Protected Flora Cape Nature	Succulent
Brassicaceae	*Cadaba aphylla*	Black Storm	Least Concern	Herb
Fabaceae	*Calobota sericea*	Silver-pea	Black Storm	Least Concern
Aizoaceae (Mesembryanthemaceae)	*Conicosia pugioniformis*	Clock Plants	Schedule 4 Protected Flora Cape Nature	Succulent
Asteraceae	*Crassothonna cylindrica*	Ossierapuisbos	Least Concern	Herb
Asteraceae	*Didelta carnosa* var. *tomentosa*	Ossierapuisbos	Least Concern	Herb
Asteraceae	*Dicerothamnus rhinocerotis= Elytropappus rhinocerotis*	Rhinoceros bush	Least Concern	Herb
Ebenaceae	*Diospyros lycioides*	Blue bush	Least Concern	Shrub
Aizoaceae (Mesembryanthemaceae)	*Drosanthemum hispidum*	Fyn T'nouroebos	Schedule 4 Protected Flora Cape Nature	Herb
Euphorbiaceae	*Euphorbia burmannii*	Lidjiesmelkbos	Least Concern	Succulent
Euphorbiaceae	*Euphorbia mauritanica*	Yellow milk bush	Least Concern	Succulent
Asteraceae	*Eriocephalus africanus*	Wild Rosemary	Least Concern	Herb
Ruscaceae	*Eriospermum paradoxum*	Haasklossie	Least Concern	Herb

Family	Scientific name	Common name	Ecological status (SA Red list categories)	Form
Aizoaceae (Mesembryanthemaceae)	*Galenia africana*	Kraalbush	Schedule 4 Protected Flora Cape Nature	Herb
Aizoaceae (Mesembryanthemaceae)	*Galenia sarcophylla*	Creeping Vanwyks Brakbush	Schedule 4 Protected Flora Cape Nature	Succulent
Celastraceae	*Gloveria integrifolia*	Splint Spike-thorn	Least Concern	Shrub
Celastraceae	*Gymnosporia buxifolia*	Common spikethorn	Least Concern	Shrub
Aizoaceae (Mesembryanthemaceae)	*Lampranthus* sp		Schedule 4 Protected Flora Cape Nature	Succulent
Aizoaceae (Mesembryanthemaceae)	*Malephora purpureo-crocea*	Copper Vygie	Schedule 4 Protected Flora Cape Nature	Herb
Amaranthaceae	*Manochlamys albicans*	Spanspek soap bush	Least Concern	Herb
Melianthaceae	*Melianthus elongatus*	Kruitjie-roer-my-mie	Least Concern	Shrub
Apocynaceae	*Microloma sagittatum*	Bokhoring	Schedule 4 Protected Flora Cape Nature	Herb
Aizoaceae (Mesembryanthemaceae)	*Mesembryanthemum guerichianum*	Ice Plant	Schedule 4 Protected Flora Cape Nature	Herb
Asteraceae	*Crassothonna (Othonna) cylindrica*		Least Concern	Herb
Celastraceae	*Putterlickia pyracantha*	False Spike-thorn	Least Concern	Shrub
Asteraceae	*Pteronia glabrata*		Least Concern	Succulent
Zygophyllaceae	*Roepera cordifolia*		Least Concern	Herb
Aizoaceae (Mesembryanthemaceae)	*Ruschia stricta*		Least Concern	Shrub
Asphodelaceae	*Trachyandra involucrata*		Least Concern	Herb
Fabaceae	*Vicia* sp		Least Concern	Shrub
Restionaceae	*Willdenowia incurvata*	Sonqua Sunreed	Least Concern	Grass-like restio
Zygophyllaceae	*Zygophyllum morgsana*	Leeubos	Least Concern	Shrub

9.1.3 Alien invasive species recorded in the study area

Alien invader plants are species that are of exotic, non-native or of foreign origin that typically invade undeveloped or disturbed areas. Invaders are a threat to our ecosystem because by nature they grow fast, reproduce quickly and have high dispersal ability (Henderson, 2001). This means that invader plants and seeds spread rapidly and compete for the growing space of our own indigenous plants. If these invader plants out-compete indigenous plants there is a shift in the species composition of the area and the change in our plant communities causes a decline in species richness and biodiversity (Henderson, 2001). Many factors allow alien invasive plants to succeed, particularly the absence of their natural enemies. This makes it difficult to control invasive plants without bringing in natural enemies and eliminating the high competition they have over the indigenous vegetation (Bromilow, 2010). Alien invasive plant species within both the servitude were observed to occur in clumps, scattered distributions or as single individuals on site. Invader and weed species must be controlled to prevent further infestation and it is recommended that all individuals of invader species (Especially Category 1) must be removed and eradicated (Henderson, 2001). Riparian vegetation, human settlements, overgrazed areas, roads and foot paths are all associated with alien invasive plant species. Alien invasive plant species such as *Atriplex lindleyi* ssp*. inflata* (Sponge-fruit saltbush) (**Figure 10**) were recorded in abundance within the study area. *Galenia africana* (kraalbos) is an indigenous plant species, but is also considered as invasive in disturbed and overgrazed areas, as it is unpalatable, and benefits from the lack of competition from more palatable species.

Figure 10. *Atriplex inflata* recorded within the project area

9.1.4 Species of Conservation Concern recorded within the project area

According to the NEM:BA, there is a dire need to conserve biodiversity in each Province and as such, all natural and/or indigenous resources must be utilised sustainably. According to the South African Red Data list categories done by SANBI (**Figure 11**), **threatened species** are species that are facing a high risk of extinction. Any species classified in the International Union for Conservation of Nature (IUCN) categories Critically Endangered, Endangered or Vulnerable is a threatened species whereas **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).

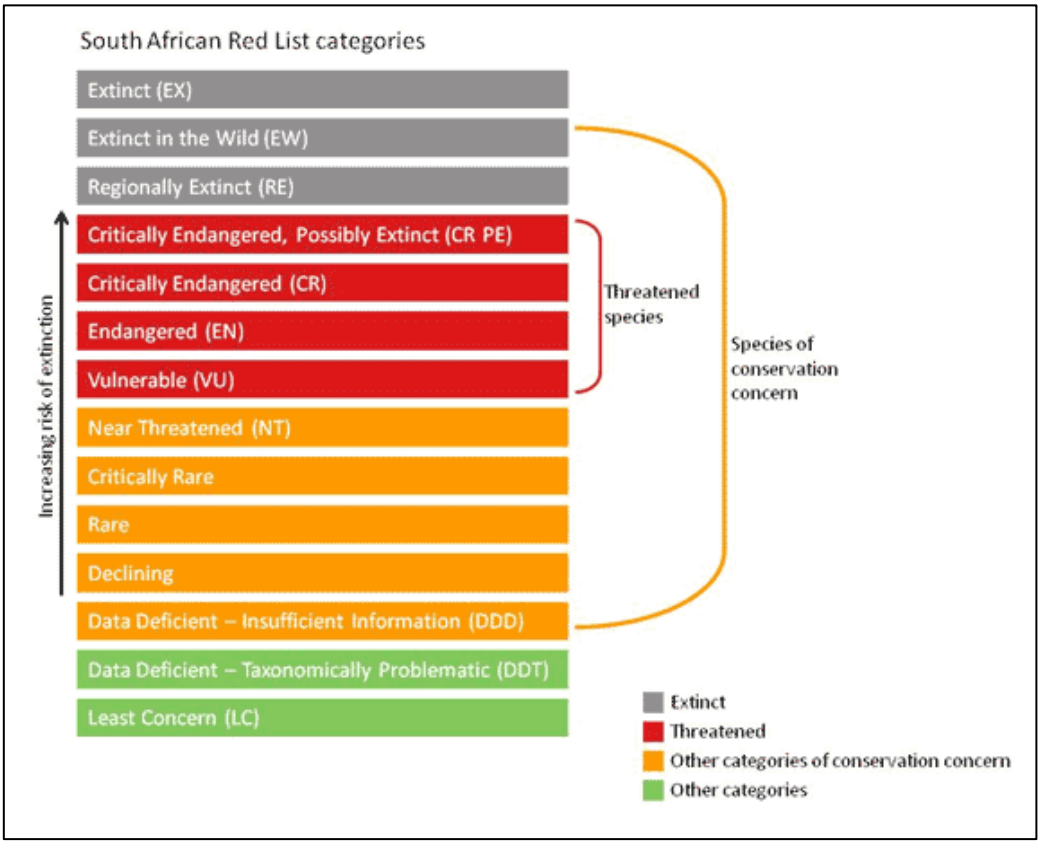

Figure 11. South African Red data list categories (SANBI)

During the field survey, only one plant species of conservation concern was observed within the study area, namely *Babiana virescens*. According to Goldblatt *et al.* (2008), this plant species is listed as Near Threatened. There are likely to be additional listed species present at the site which were not observed as some species are naturally rare or are only visible at specific times of the year. It is therefore recommended that prior to construction activities, a suitably qualified specialist (or a similarly qualified individual, preferably a horticulturist with West Coast Search and Rescue experience) should be appointed to undertake a pre-construction walk-down to identify Species of Conservation Concern (SCC) and protected

species and oversee the rescue and relocation of these species. According to Helme (2007), a threatened plant species such as *Leucoptera nodosa* is found within the Sere Wind Farm. This species is listed as Vulnerable (Helme, & von Staden, 2013).

Babiana virescens (**Figure 12**) occurs in granite hills and valley bottoms. It is found in Fynbos and Succulent Karoo biomes. The distribution of this plant species ranges from Hondeklipbaai to Nuwerus and Lutzville (van der Colff & von Staden, 2015).

Figure 12. *Babiana virescens* recorded on site

Although *Brunsvigia orientalis* (**Figure 13**) and *Boophone haemanthoides* (**Figure 14**) are listed in the 'Red List' as of 'Least Concern' a 'Search and Rescue' strategy should nevertheless be implemented to save these plants from where they would be impacted by BESS project. These plant species are listed in Schedule 4 as Protected Flora in Western Cape Nature Conservation Laws Amendment Act of 2000.

Figure 13. *Brunsvigia orientalis* recorded on site

Figure 14. *Boophone haemanthoides* recorded on site

Apart from the Red Data listed species, there are many provincially protected species present within the study area. These are listed in the Western Cape Nature Conservation Laws Amendment Act of 2000 (Schedule 3 and 4 Endangered and Protected flora, respectively), namely:

- Amaryllidaceae – all species; and
- Mesembryanthemaceae – all species.

A permit in order to remove these plant species will need to be obtained from CapeNature. The removal should occur with due care, preferably by a qualified botanist or similarly qualified individual (a horticulturist with West Coast Search and rescue experience). The plant should be relocated into areas with the same aspect, soil conditions and elevation to ensure that the relocations are successful. The distribution of plant SCC and provincially protected species present within the study area are indicated in **Figure 15** below.

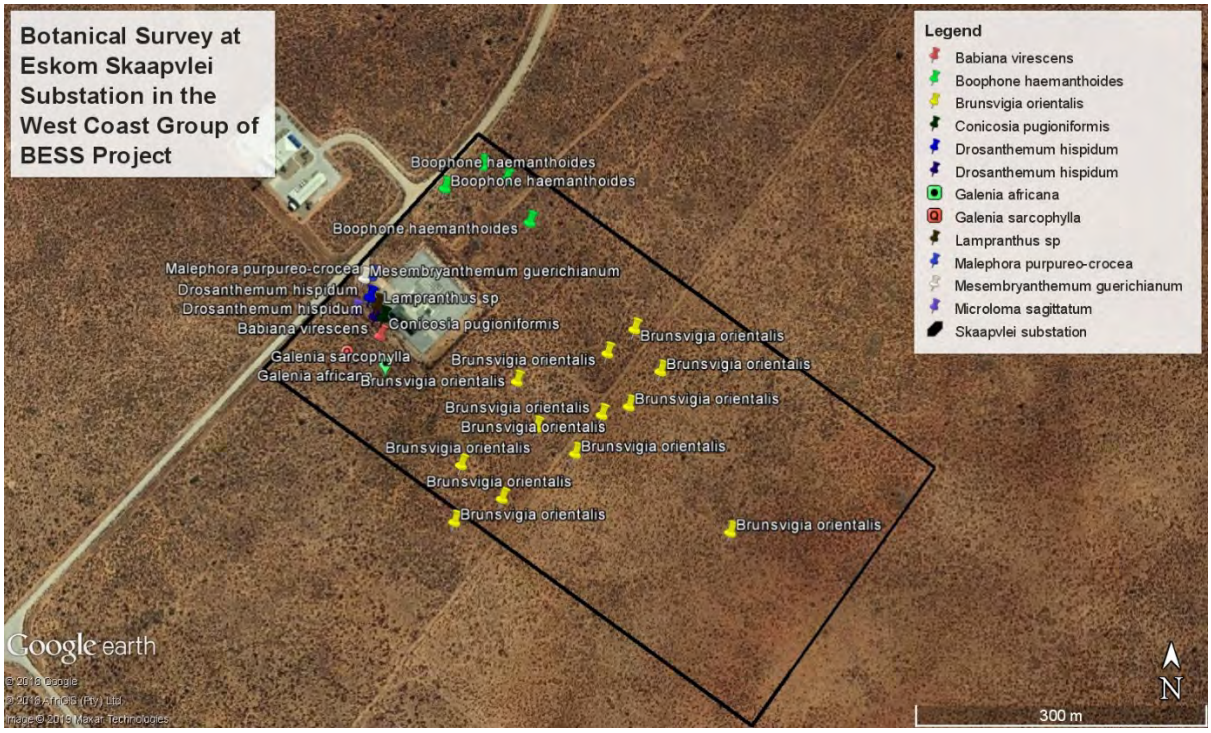

Figure 15. The distribution of plant SCC and provincially protected species present within the study area

9.1.5 Habitat available for species of conservation importance

The list of South African Red data plant species previously recorded in the region (3118CA QDS) in which the proposed development is situated was obtained from SANBI. These species and their probability of occurrence are indicated in **Table *6*** below. The probability of occurrence is based on the suitable habit where the species is likely to occur. On the basis of habitat preferences, the species could be allocated to habitats within the study area where they are most likely to be found.

Table 6. South African Red Listed plant species which are known to occur in the general vicinity of the project area (Raimondo *et al*. 1999) which could potentially be found within the project area.

RDL floral species	Conservation Status	Suitable habitat	Probability of Occurrence
Helichrysum marmarolepis	Near Threatened	Fynbos, Sands in sandveld vegetation.	High
Babiana confusa	Near Threatened	Sandy flats and mountain plateaus.	High
Babiana hirsuta	Near Threatened	Populations are found slightly inland from the coast but predominantly along the coastal plains and dunes of Namaqualand where plants benefit from the deep white sands of the west coast. It occurs in sandy flats and dunes, coastal.	High
Ceropegia occidentalis	Near Threatened	Rocky outcrops in sandveld close to the coast.	Low
Chaenostoma multiramosum	Vulnerable	Sand among rock outcrops.	Low
Babiana teretifolia	Critically Endangered	Deep sand in coastal sandveld.	High
Ferraria foliosa	Near Threatened	Coastal sand dunes close to the seashore.	Low
Leucoptera nodosa	Vulnerable	Coastal dune strandveld.	High
Helichrysum dunense	Vulnerable	Coastal calcareous dunes.	Low
Muraltia obovata	Vulnerable	Sandy flats.	High
Babiana virescens	Near Threatened	Granite hills and valley bottoms.	**FOUND**
Lapeirousia simulans	Vulnerable	Spiny grassland sandveld in red Aeolian sand.	Medium
Pelargonium appendiculatum	Endangered	Strandveld on deep, calcareous, coastal, sandy soils.	Medium
Ruschia langebaanensis	Vulnerable	Granite outcrops near the coast.	Very Low
Tylecodon fragilis	Endangered	Rock outcrops close to the seashore, usually in the shelter of other vegetation.	Low

10 IMPACT ASSESSMENT METHODOLOGY FOR EIAS

The significance of all potential impacts that would result from the proposed Project is determined in order to assist decision-makers. The significance rating of impacts is considered by decision-makers, as shown below.

- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity.
- **HIGH**: the potential impact **will** affect a decision regarding the proposed activity.
- **VERY HIGH**: The proposed activity should only be approved under special circumstances.

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact[1] must be rated according to the methodology set out below:

Step 1 – Determine the **consequence** rating for the impact by determining the score for each of the three criteria (A-C) listed below and then **adding** them. The rationale for assigning a specific rating, and comments on the degree to which the impact may cause irreplaceable loss of resources and be irreversible, must be included in the narrative accompanying the impact rating:

Table 7. Consequence Rating Methodology

Rating	Definition of Rating	Score
A. *Extent* *– the area over which the impact will be experienced*		
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. ***Intensity*** *– the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3

[1] This does not apply to minor impacts which can be logically grouped into a single assessment.

C. *Duration* *– the timeframe over which the impact will be experienced and its reversibility*		
Short-term	Up to 2 years (i.e. reversible impact)	1
Medium-term	2 to 15 years (i.e. reversible impact)	2
Long-term	More than 15 years (state whether impact is irreversible)	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Combined Score (A+B+C)	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Example 1:

Extent	Intensity	Duration	**Consequence**
Regional 2	Medium 2	Long-term 3	**High** 7

Step 2 – Assess the **probability** of the impact occurring according to the following definitions:

Table 8. Probability Rating Methodology

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

Example 2:

Extent	Intensity	Duration	**Consequence**	**Probability**
Regional 2	Medium 2	Long-term 3	**High** 7	Probable

Step 3 – Determine the overall **significance** of the impact as a combination of the **consequence** and **probability** ratings, as set out below:

Table 9. Significance Rating Methodology

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	**INSIGNIFICANT**	**INSIGNIFICANT**	**VERY LOW**	**VERY LOW**
	Low	**VERY LOW**	**VERY LOW**	**LOW**	**LOW**
	Medium	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**
	High	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**
	Very High	**HIGH**	**HIGH**	**VERY HIGH**	**VERY HIGH**

Example 3:

Extent	*Intensity*	*Duration*	***Consequence***	***Probability***	***Significance***
Regional 2	Medium 2	Long-term 3	**High** 7	Probable	**HIGH**

Step 4 – Note the **status** of the impact (i.e. will the effect of the impact be negative or positive?)

Example 4:

Extent	*Intensity*	*Duration*	***Consequence***	***Probability***	***Significance***	***Status***
Regional 2	Medium 2	Long-term 3	**High** 7	Probable	**HIGH**	**– ve**

Step 5 – State your level of **confidence** in the assessment of the impact (high, medium or low).

Depending on the data available, you may feel more confident in the assessment of some impact than others. For example, if you are basing your assessment on extrapolated data, you may reduce the confidence level to low, noting that further ground-truthing is required to improve this.

Example 5:

Extent	*Intensity*	*Duration*	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Regional 2	Medium 2	Long-term 3	**High** 7	Probable	**HIGH**	**– ve**	High

Step 6 – Identify and describe practical **mitigation** and **optimisation** measures that can be implemented effectively to reduce or enhance the significance of the impact. Mitigation and optimisation measures must be described as either:

- **Essential**: best practice measures which must be implemented and are non-negotiable; and.
- **Best Practice**: recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented.

Essential mitigation and optimisation measures must be inserted into the completed impact assessment table. The impact should be re-assessed with mitigation, by following Steps 1-5 again to demonstrate how the extent, intensity, duration and/or probability change after implementation of the proposed mitigation measures.

Example 6: A completed impact assessment table

	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Regional 2	Medium 2	Long-term 3	**High** 7	Probable	**HIGH**	**– ve**	High
Essential mitigation measures: • Xxx1 • Xxx2 • Xxx3								
With mitigation	Local 1	Low 1	Long-term 3	**Low** **5**	Improbable	**VERY LOW**	**– ve**	High

Best practice measures (which are assumed not to affect impact significance ratings) must be presented in the text, in bullet format.

Step 7 – Summarise all impact significance ratings as follows in your executive summary:

Impact	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Impact 1: XXXX	Medium	Improbable	**LOW**	–ve	High
With Mitigation	Low	Improbable	**VERY LOW**		High
Impact 2: XXXX	Very Low	Definite	**VERY LOW**	–ve	Medium
With Mitigation:	*Not applicable*				

10.1 Construction Phase

Activities include:

- Clearance of vegetation that will impact on the vegetation negatively due to loss of plant SCC.
- Removal of topsoil will impact on the rehabilitation of the project area.
- Site establishment and preparation (placement of construction material, construction camp, Laydown areas, etc.).
- Storage of non-hazardous construction material.
- Storage of hazardous/dangerous material e.g. fuel for generators, storage of the liquid electrolyte prior to fuelling the flow batteries.
- Storage of general waste.
- Storage of hazardous waste.

As a result of the proposed activities, the potential impacts include the following:

- Loss of plant SCC from vegetation clearance and the construction of the BESS and access road.

- Potential loss of topsoil from site preparation and construction of the platform and access road. Loss of topsoil on areas that will be compacted and/or covered with hardened surfaces e.g. cement. Topsoil will be removed in these areas and stored until rehabilitation.
- Loss of plant SCC from vegetation clearance and the construction of the BESS and access road.
- Potential loss of topsoil from site preparation and construction of the platform and access road. Loss of topsoil on areas that will be compacted and/or covered with hardened surfaces e.g. cement. Topsoil will be removed in these areas and stored until rehabilitation.
- Loss of vegetation from vegetation clearance and the construction of the BESS and access road during pre/and construction phases.
- Increased soil erosion due to compaction by vehicles and construction activities, and incorrect storm water management measures.
- Proliferation of alien invasive species on account of site disturbance. Introduction and spread of weeds and invasive alien plants in and around the site due to imported soil used during construction of the BESS and access road, transportation and human movements.
- Loss of vegetation from fires due to operating of electrical equipment during construction and smoking of personal.
- Loss of vegetation due to fuel and chemical spills from the use of electrical equipment e.g. generator and storage of hazardous substances.
- Loss of CBA and ESA habitats from vegetation clearance and construction of the BESS and access roads.

The construction phase of the proposed development is anticipated to have direct impacts on floral habitat and potential loss of plant SCC. Even though the vegetation type on site is listed as Least Threatened, plant SCC and provincially protected flora were recorded on site. Site clearing will potentially result in permanent removal of floral habitat which is considered to be of ecological importance to the survival of plant SCC such as *Babiana virescens* and therefore the disturbance of vegetation must be limited only to areas of construction. The provincially protected species were recorded in abundance on site. The potential loss of plant SCC is site specific and the search, rescue and relocation of these species during the construction of Sere Wind project were successful, hence the significance after mitigation is considered very low.

Topsoil will be required during the rehabilitation of the proposed development area and should there be a loss of topsoil and proliferation of alien species, this could ultimately lead to loss and/or degradation of floral habitat.

Soils on site are considered to be equally predisposed to potential contamination, as contamination sources are generally unpredictable and often occur as incidental spills or leak for construction developments. The significance of soil contamination is considered to be very low, largely depending on the nature, volume and/or concentration of the contaminant of concern. Although the majority of the identified soils display moderately low susceptibility to erosion under current (undisturbed) veld conditions, their susceptibility to erosion will be largely increased once the vegetation is cleared for construction activities, and the soils will inevitably be exposed to wind and storm water.

The construction of the access road and clearing of vegetation will lead to the disturbance and degradation of flora habitat, which then creates opportunities for invasion by invasive and alien species. The loss of topsoil, loss of CBA/ESA, soil contamination, proliferation of alien species etc. could ultimately lead to loss and/or degradation of floral habitat. These impacts are mostly localised and if the mitigation measures are adequately addressed, their significance with mitigation measures can be reduced to low and or insignificant.

Table 10. Proposed impacts and the recommended mitigation measures for the proposed Eskom Skaapvlei BESS in the West Coast Group of BESS Project

Impact 1. Loss of plant SCC as a result of the design and placement of infrastructure and the access roads

CONSTRUCTION PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Medium-term 2	**Low** 5	Definite	**LOW**	**– ve**	High
Essential mitigation measures: • Appoint a suitably qualified specialist to undertake a pre-construction walk-down to identify SCC and protected species and oversee the rescue and relocation of these species. A suitable timeframe must be allowed before construction commences to undertake the plant rescue and relocation operation. The relocation/replanting of these plant species should preferably take place in Autumn, once the rains have fallen, in order to fast track establishment of these plant species on site. • Obtain a permit from CapeNature for the removal/destruction of SCC. • The design and construction layout plan should be done in such a manner as to consider the least damage/ removal of SCC and provincially protected plants where possible. • Plants that can be used during rehabilitation should be identified and stored appropriately off-site for use after construction. • Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm and this can be achieved through provision of appropriate awareness to all personnel.								
With mitigation	Local 1	Low 1	Medium-term 2	**Very-Low** **4**	Probable	**VERY LOW**	**+ ve**	High

Impact 2. Potential loss of topsoil from site preparation and construction of the platform and access road

CONSTRUCTION PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Low 1	Medium-term 2	**Very Low** 4	Definite	**VERY LOW**	**– ve**	High
Essential mitigation measures: • During site preparation, topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. It should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. • Records of all environmental incidents must be maintained, and a copy of these records must be made available to authorities on request throughout the project execution.								

• Movement of vehicles on site is to be along the approved and formalised access roads, which shall be adequately mainlined throughout construction.								
With mitigation	Local 1	Low 1	Short-term 1	**Very-Low** **3**	Possible	**INSIGNIFICANT**	**– ve**	High

Impact 3. Loss of vegetation from vegetation clearance and the construction of the BESS and access road during the construction phase

CONSTRUCTION PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Medium-term 2	**Low** 5	Definite	**LOW**	**– ve**	High
Essential mitigation measures: • Indigenous plants naturally growing within the project area, but that would be otherwise destroyed during clearing for development purposes, should be incorporated into landscaped areas. • Vegetation clearing should be kept to a minimum, and this should only occur where it is absolutely necessary. • Plants that can be used during rehabilitation should be identified and stored appropriately off-site for use after construction. • Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm and this can be achieved through provision of appropriate awareness to all personnel. • Prevent contamination of natural vegetation by any pollution. • Proliferation of alien and invasive species is expected within the disturbed areas and they should be eradicated and controlled to prevent further spread. • No structures should be built outside the area demarcated for the development. • No storage of building materials or rubbles are allowed outside the area demarcated for the development. • Avoid translocating stockpiles of topsoil from one place to sensitive areas in order to avoid translocating soil seed banks of alien species. • All stockpiles, construction vehicles, equipment and machinery should be situated within the development site. • Although it is unavoidable that sections of the project infrastructure development will need to traverse areas of potential high sensitivity, the clearing of vegetation must be limited to the development area acquired for the project.								
With mitigation	Local 1	Low 1	Medium-term 2	**Very-Low** **4**	Probable	**VERY LOW**	**– ve**	High

Impact 4. Increased soil erosion due to compaction by vehicles and construction activities, and incorrect storm water management measures

CONSTRUCTION PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Short-term 1	**Very-Low** 4	Possible	**INSIGNIFICANT**	**– ve**	High
Essential mitigation measures: • Topsoil from the construction activities should be stored for post-construction rehabilitation work and should not be disturbed more than is absolutely necessary. • Protect topsoil from contamination by aggregate, cement, concrete, fuels, litter, oils, domestic and wastes. • An ecologically-sound storm water management plan must be implemented during construction and appropriate water diversion systems put in place.								
With mitigation	Local 1	Low 1	Short-term 1	**Very-Low** **3**	Possible	**INSIGNIFICANT**	**– ve**	High

Impact 5. Proliferation of alien invasive species on account of site disturbance

CONSTRUCTION PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Medium-term 2	**Low** 5	Probable	**MEDIUM**	**– ve**	High
Essential mitigation measures: • Control of alien invasive species and noxious weeds for areas disturbed by the construction activities, in accordance with the requirements of the NEM:BA Alien and Invasive Species Regulations. Eradication method to be approved by Eskom OU Project Environmental Manager. • To prevent unnecessary alien plant infestations, an alien plant monitoring and eradication programme needs to be in place, at least until the disturbed areas have recovered and properly stabilised.								
With mitigation	Local 1	Low 1	Medium-term 2	**Very-Low** **4**	Possible	**INSIGNIFICANT**	**– ve**	High

Impact 6. Loss of vegetation due to fuel and chemical spills from the use of electrical equipment e.g. generator and storage of hazardous substances.

CONSTRUCTION PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Medium-term 2	**Low** 5	Possible	**VERY LOW**	**– ve**	High
Essential mitigation measures: • Appropriate measures should be implemented in order to prevent potential soil pollution through fuel, oil leaks and spills and then compliance monitored by an appropriate person. • Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. • An Eskom emergency response contingency plan will be implemented to address clean-up measures should a spill and/or a leak occur. • Measures to avoid leakages and spillages on to bare ground and leakages must be undertaken. • Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Safe disposal certificate must always be returned and filed at the waste disposal site. Drip-trays must be placed under vehicles and equipment when not in use. • Washing and cleaning of equipment should also be done within bunds, in order to trap any cement and prevent excessive soil erosion and these sites must be re-vegetated after construction has been completed. • Eskom's spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans will be implemented during the construction phase. • Surface runoff must be contained and regarded as contaminated and hazardous and must not be allowed into the natural environment. All surface runoff from the waste disposal site must be recaptured through a sump, and either channelled to a treatment facility or contained in drums and disposed off as liquid hazardous waste at a properly permitted hazardous waste site. • Spill kits will be made available on site for clean-up of spills and leaks of contaminants								
With mitigation	Local 1	Low 1	Medium-term 2	**Very-Low** **4**	Possible	**INSIGNIFICANT**	**– ve**	High

Impact 7. Loss of CBA and ESA habitats from vegetation clearance and construction of the BESS and access roads

CONSTRUCTION PHASES								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Long-term 3	**Medium** 6	Definite	**MEDIUM**	**– ve**	High
Essential mitigation measures: • The most significant way to mitigate the loss of sensitive habitat is to limit the construction footprint within the natural habitat areas remaining. Disturbance of vegetation must be limited to the development area acquired for the project. Where possible, sensitive habitats must not be cleared and encouraged to grow. • Disturbance of vegetation must be limited only to areas of construction. • Eskom must employ a botanist/ rehabilitation specialist who will compile a rehabilitation plan and also oversee the entire rehabilitation process. • All stockpiles, construction vehicles, equipment and machinery should be situated inside of the development footprint • Prevent contamination of natural areas by any pollution.								
With mitigation	Local 1	Medium 2	Medium-term 2	**Low** **5**	Probable	**LOW**	**– ve**	High

10.2 Operational Phase

Activities include:

- Vegetation management activities e.g. removal of plants from the BESS site and access roads.
- Changing electrical equipment.
- Refuelling of electrolyte.
- Repairs and maintenance of equipment, buildings, fencing, roads
- Waste generation and temporary storage on site.
- Site inspections by personnel.

As a result of the proposed activities, the potential impacts include the following:

- Loss of vegetation type, important species and ecological processes resulting from vegetation management measures e.g. manual vegetation removal along the road, brush cutting or application of herbicide within the BESS site
- Introduction and spread of weeds and invasive alien plants in and around the site due to disturbance cause during construction of the BESS and access road, transportation and human movements.
- Loss of topsoil due to erosion caused by inadequate/ failing storm water management measures/designs.
- Disturbance to ecological processes due to altered habitat and disturbance to natural movements/processes.
- Soil contamination from hazardous substance spillages outside their primary and secondary containment.
- Loss of vegetation type, important species and ecological processes from soil contamination or spillage onto vegetation from hazardous substance spillages outside their primary and secondary containment.
- Loss of habitat due to operational activities.

According to the information provided by Eskom, “the batteries are designed to have fire detection systems and fire suppression systems when overheating or fires occur. This should prevent a fire from happening in the first place but if the suppression fails or does not work effectively the likelihood of the fire spreading into the surrounding vegetation is improbable. The batteries area will either have a cement platform or stoned. There will also be a road around the site which could act as a firebreak”. This will prevent potential loss of floral habitat from fires due to overheating/explosion of the batteries.

Impact 8. Loss and/or degradation of floral habitat

OPERATIONAL PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local 1	Medium 2	Medium-term 2	**Low** 5	Probable	**LOW**	**– ve**	High
Essential mitigation measures: • All alien seedlings and saplings must be removed as they become evident for the duration of operational phase. • Control of alien invasive species and noxious weeds for areas disturbed by the construction activities, in accordance with the requirements of the NEM:BA Alien and Invasive Species Regulations. Eradication method to be approved by Eskom OU Project Environmental Manager. • Manual / mechanical removal is preferred to chemical control. • Prevent contamination of natural vegetation by any pollution. • Indigenous plants naturally growing within the project area, but that would be otherwise destroyed during clearing for development purposes, should be incorporated into landscaped areas. • Vegetation clearing should be kept to a minimum, and this should only occur where it is absolutely necessary. • All waste generated will be stored in a temporary demarcated storage area, prior to disposal thereof at a licensed registered landfill site. • As much vegetation growth as possible should be promoted post construction activities within the project area in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping. The plant material to be used for rehabilitation should be similar to what is found in the surrounding area. • Entire footprint of area affected by operation and maintenance activities to be reinstated and rehabilitated. • Clear the area of all inert waste and rubble. • Incorporate findings of specialists from walk-down survey (if applicable).								
With mitigation	Local 1	Low 1	Medium-term 2	**Very-Low** **4**	Possible	**INSIGNIFICANT**	**– ve**	High

Impact 9. Loss of vegetation from fires due to operating of electrical equipment and smoking of personal

OPERATIONAL PHASE								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Regional 2	Medium 2	Medium-term 2	**Medium** 6	Possible	**LOW**	**– ve**	Low
Essential mitigation measures: • Firefighting equipment appropriate to the type of hazardous substances and waste on site should be available. • Minimize the storage of flammable liquids on site (e.g. fuel, flammable wastes). These are apart from the dangerous goods stored within the BESS or to fuel the BESS. • Smoking shall not be permitted in those areas where there is a fire hazard, e.g. fuel storage areas and areas susceptible to the rapid spread of fires. Smoking should be discouraged for all areas on site but if required should only be allowed in designated areas with fire extinguishers. • Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires. • Appropriate instruction to employees about the fire risks and the construction of firebreaks around the site perimeter. • The road which will be created around the site could act as a firebreak. • Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulation. • Provide an emergency tipping area for waste loads identified to be on fire or otherwise deemed to be an immediate risk. • No fires for heating purposes shall be allowed on site. • Prepare and annually review a fire risk assessment. • The contractor shall comply with all applicable laws, regulations, permits and approval conditions and requirements relevant to the storage, use and proper disposal of hazardous materials. • Ensure all staff are appropriately trained for fire and explosion hazards. • Emergency numbers for local police, fire department, Eskom and the Local Municipality must be placed in a prominent clearly visible area on site.							
With mitigation	Local 1	Low 1	Medium-term 2	**Very-Low** **4**	Possible	**INSIGNIFICANT**	**– ve**	Low

11 CONCLUSION AND RECOMMENDATIONS

The project area falls within the Fynbos biome and Biome extends across the southern corner of South Africa in a 100-200km wide coastal belt in the Western Cape Province. Fynbos is characterised as schlerophyllous shrub-land and this biome is comprised of two major vegetation types, the Fynbos and the Renosterveld (and also Strandveld, although not dominant). The study area is classified as falling within the *Least Threatened* Namaqualand Sand Fynbos vegetation type. The entire project area falls within the within CBA 1 (Terrestrial) and ESA 2 (Restore) categories.

During the field survey, only one plant species of conservation concern was observed within the study area, namely *Babiana virescens* (listed as Near Threatened). There are likely to be additional listed species present at the site which were not observed as some species are naturally rare or are only visible at specific times of the year. It is therefore recommended that prior to construction activities, a suitably qualified specialist (or a similarly qualified individual (preferably a horticulturist with West Coast Search and Rescue experience) should be appointed to undertake a pre-construction walk-down to identify SCC and protected species and oversee the rescue and relocation of these species. Although *Brunsvigia orientalis* and *Boophone haemanthoides* are listed in the 'Red List' as of 'Least Concern' a 'Search and Rescue' strategy should nevertheless be implemented to save these plants from where they would be impacted by BESS project as they are provincially protected species (Western Cape Nature Conservation Laws Amendment Act of 2000 Schedule 4 Protected flora). A permit to remove these plant species will need to be obtained from CapeNature. The removal should occur with due care, and these plant species should be relocated into areas with the same aspect, soil conditions and elevation to ensure that the relocations are successful.

All areas affected by construction should be rehabilitated upon completion of the construction phase of the development to its pre-construction state where possible. Mitigation measures provided will ensure that any available ecological linkages between sensitive areas are not affected negatively. Mitigation measures included within this report are feasible and will be easy to achieve. Several of the mitigation measures included in this report have been implemented successfully on several different construction sites. During the field survey, it was found that the impacts of the project development on natural habitats can be mitigated to a satisfactory level and as such, the development is deemed acceptable from the flora perspective and should not be prevented from proceeding based on the vegetation considerations. As soon as the proposed development has been constructed, rehabilitation process needs to take place and should ensure that alien plant emergence and erosion do not occur.

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