

**Botanical Scoping Assessment,  
Erf 3122 Mossel Bay  
(Hartenbos Hills Garden Estate),  
Mossel Bay Municipality  
Western Cape Province**



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**Prepared for Cape EAPrac**

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## **National Legislation and Regulations governing this report**

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

## **Appointment of Specialist**

David J. McDonald of Bergwind Botanical Surveys & Tours CC was appointed by Cape EAPrac to provide specialist botanical consulting services for the proposed development of Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate), Western Cape Province. The consulting services comprise a study of the vegetation to determine botanical 'Red Flags' and to provide a constraints analysis, scoping assessment and finally an impact assessment in terms of the flora and vegetation.

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## **Expertise**

Dr David J. McDonald:

- Qualifications: BSc. Hons. (Botany), MSc (Botany) and PhD (Botany)
- Botanical ecologist with over 40 years' experience in the field of Vegetation Science
- Founded Bergwind Botanical Surveys & Tours CC in 2006
- Has conducted over 400 specialist botanical / ecological studies
- Has published numerous scientific papers and attended numerous conferences both nationally and internationally (details available on request)

## **Independence**

The views expressed in the document are the objective, independent views of Dr McDonald and the study was carried out under the aegis of, Bergwind Botanical Surveys and Tours CC. Neither Dr McDonald nor Bergwind Botanical Surveys and Tours CC have any business, personal, financial or other interest in the proposed development apart from fair remuneration for the work performed.

## **Conditions relating to this report**

The content of this report is based on the author's best scientific and professional knowledge as well as available information. Bergwind Botanical Surveys & Tours CC, its staff and appointed associates, reserve the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation

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## **Curriculum Vitae – Appendix 1.**

## Declaration of independence:

I David Jury McDonald, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

in terms of the general requirement to be independent:

- other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).



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Signature of the specialist:

Bergwind Botanical Surveys & Tours CC

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Name of company:

12 March 2018; 16 April 2021

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Date:

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## 1. Introduction

Erf 3122 Hartenbos Garden Estate is located inland of Hartenbos and north-east of Mossel Bay on the Garden Route of the Western Cape Province (Figure 1). A number of botanical studies have been carried out in the area over the past ten years including one by the author (McDonald, 2006) and Helme (2016). The current study thus takes the previous studies into consideration but takes a recent view to determine (a) botanical constraints on the site and (b) to conduct a scoping assessment.

Bergwind Botanical Surveys & Tours CC was appointed by Cape EAPrac on behalf of the original client (ATKV) to carry out a botanical survey required for a botanical scoping required to assess potential impacts on the flora and vegetation for the application process to develop the property. The property has now changed hands and the new developer is Hartenbos Hills Propco (Pty) Ltd.

This botanical study takes careful note of the requirements and recommendations of CapeNature and the Botanical Society of South Africa for proactive assessment of the biodiversity of proposed development sites and follows published guidelines for evaluating potential impacts on the natural vegetation in an area earmarked for some form of development (Brownlie 2005, Cadman *et al.* 2016). The requirements and recommendations of CapeNature and the Botanical Society of South Africa for assessment of biodiversity of proposed development sites have also been considered as well as the 2020 Species Environmental Assessment Best Practice Guideline for terrestrial biodiversity specialists (Government Gazette, 2020; Enviro Insight, 2020) have been applied.



**Figure 1.** Location of Erf 3122, Mossel Bay (Hartenbos Garden Estate) shown on portion of a 1: 50 000 topographical map.

## **2. Terms of Reference**

### **CONSTRAINTS ANALYSIS:**

- Review the existing botanical reports that were used to inform the previous EIA process;
- Perform a site inspection to familiarise yourself with the site conditions and any changes that may have occurred on-site since the previous EIA process concluded;
- Map vegetation types and ecosystems found on the property and categorise these according to conservation value / sensitivity;
- Pay particular attention to the requirements for fire management;
- Identify and map any rare & endangered or protected species;
- Consider the relevant environmental regulations / policies / plans stipulated by the Department of Environmental Affairs and CapeNature in terms of, amongst others, the National Environmental Management Act (NEMA) and the National Environmental Management Biodiversity Act (NEMBA) to substantiate your Constraints Analysis;
- Produce an accurate Constraints Map in dwg /shapefile / kmz format inclusive of specific features and associated buffers / setback lines that can be used to inform the planning process;
- In a short report detail the various constraints and identify potential opportunities / trade-offs that can be considered;
- Compile a PowerPoint presentation of your Constraints Analysis and present your findings/recommendations to the Project Team.

### **SCOPING ASSESSMENT:**

- Based on the field survey and constraints analysis, conduct a botanical scoping assessment to determine the potential impacts of the proposed layout for the development at Erf 3122, Mossel Bay (Hartenbos Garden Estate).



**Figure 2.** Aerial image of Erf 3122, Mossel Bay (Hartenbos Garden Estate) (red boundary). The image was taken in March 2011 and shows the effect of a fire on the property (light tones).





**Figure 3.** Aerial image of Erf 3122, Mossel Bay (Hartenbos Garden Estate) (red boundary) with sample track (light blue) and waypoints HHE#. The image was taken in March 2017.

### **3. Study Area**

#### **3.1 Locality and environment**

The Hartenbos Hills Garden Estate study area (Erf 3122, Mossel Bay), is located on the Garden Route of the Western Cape, to the northeast of Mossel Bay inland the town of Hartenbos. It lies west of the N2 national road through Hartenbos, immediately west of the existing Hartenbos Heuwels and to the southwest of the R328 road between Hartenbos and Oudtshoorn.

Erf 3122, Mossel Bay, is approximately 310 ha in extent and is presently zoned for agriculture but it has not been used for agriculture for some time. The proposed development would take up approximately 50 ha of the erf, situated mainly on the high-lying plateau.

There are two points of access to the site. One is situated at the gate on the southeast side (S 34° 07' 41.4" E 22° 05' 41.4"; elevation 99 m a.m.s.l.) and the second is from the R328 road on the north side of the property at S 34° 06' 50.1" E 22° 04' 57.9". The southern access point was used for this study.

#### **3.2 Topography**

Erf 3122 Mossel Bay, has a central plateau area that is fairly flat and has an average elevation of 120 m a.m.s.l. To the south, the plateau drops away as uniform slopes with a moderate gradient to the southern boundary near the railway line. On the southeast to northeast side the landscape is dissected by some valleys that are not very deep but do have slopes with distinctly north- and south-facing aspects. The elevation in the valleys is around 60 m a.m.s.l. so the difference in altitude between the deepest valley floor and the central plateau is approximately 60 m. The Hartenbos water reservoir is situated at the highest point on the property at 139.6 m a.m.s.l. The slopes north of the reservoir, with a northerly aspect, are moderately steep, dropping evenly to the northern boundary of the property near the R328. The western slopes drop away from the central plateau also with a moderate gradient and also have a series of valleys that drain to the west into a stream which eventually flows into the Hartenbos River.

The exposure of the central plateau is uniform but the slopes and valleys that drain from the central plateau to the east, north and west result in some complexity to the topography. Together with the variability of the soils the complexity of the topography produces a terrain with a variety of habitats and microclimates to which the vegetation responds. Watercourses and limited 'wetlands' occur mainly on the south-facing slopes.

A series of gravel roads and tracks that are aligned mainly on the central plateau and along the ridges and crests above the valleys link the different parts of the area and provide ready access to them. Some of the tracks have been constructed to provide access for the maintenance of the high voltage power line that traverses the property from south to north close to the eastern boundary. The roads and tracks are in good condition and there is no evidence of erosion resulting from them.

### 3.3 Geology

Erf 3122, Mossel Bay lies on sediments of the Kirkwood Formation, Uitenhage Group. These sediments consisting of variegated mudstone, lithic sandstone and sporadic conglomerates were deposited under fluvial conditions at or near the sea. The Kirkwood Formation lies above the Enon Formation that consists of silty mudstones interspersed with rounded cobbles of quartz and gravels that were deposited by rivers into a marine environment on the coastline during the Cretaceous (Figure 4) (Norman & Whitfield 2006). The geology over the whole of the study area is fairly uniform and erosion through the gravely conglomerates has resulted in the valleys that are seen in the area today.

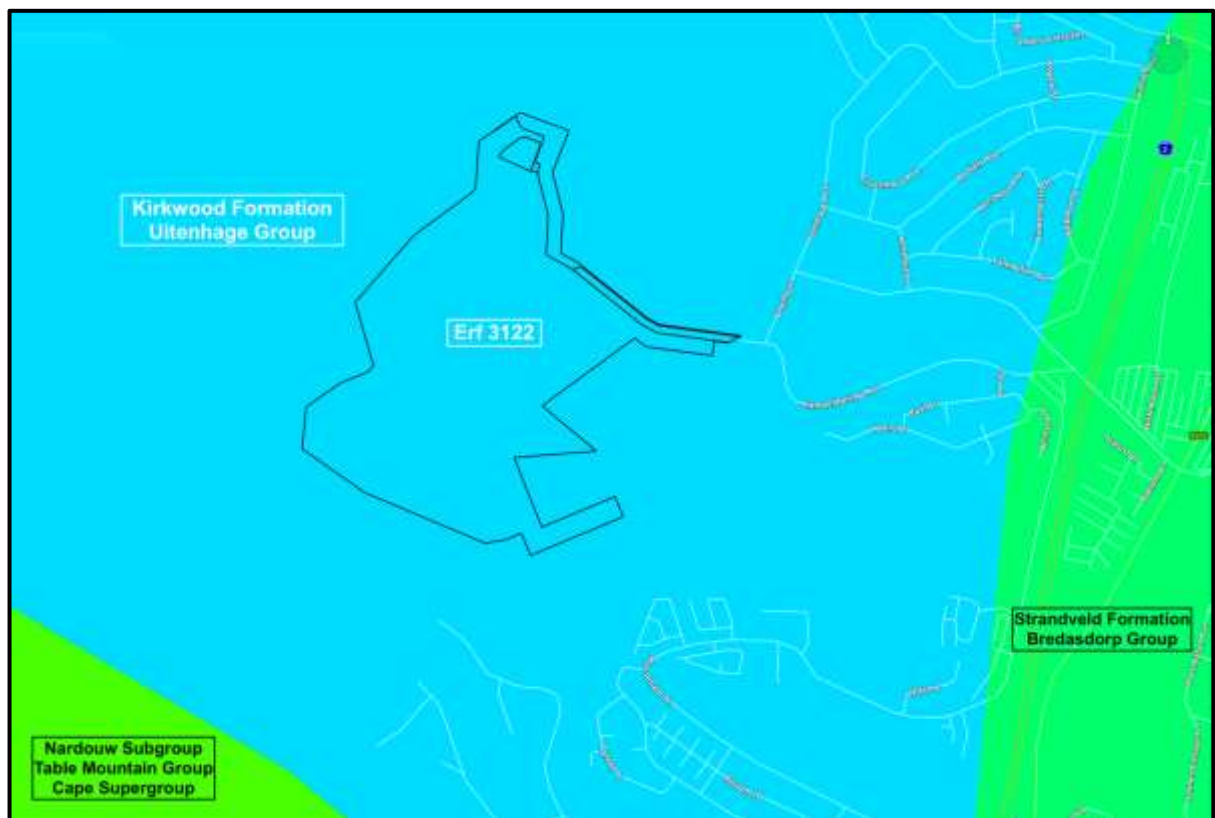


Figure 4.

### 3.4 Climate

Hartenbos Garden Estate has a climate transitional between the Mediterranean-type climate of the far Western Cape Province and the zone of all-year-round rainfall along the Garden Route. The climate is similar to that of nearby Mossel Bay. The average annual rainfall is 425–460 mm *per annum*. The distribution of rainfall shows a tendency towards being bimodal with peaks in April and August. Average temperatures do not range widely with the June, July and August being the coolest months (daily minimum  $\pm 0^\circ\text{C}$ , daily maximum  $\pm 7^\circ\text{C}$ ) and December and January the hottest (daily minimum  $\pm 16^\circ\text{C}$ , daily maximum  $\pm 27^\circ\text{C}$ ) (Figures 5a & 5b).

#### Average temperature and precipitation: Hartenbos

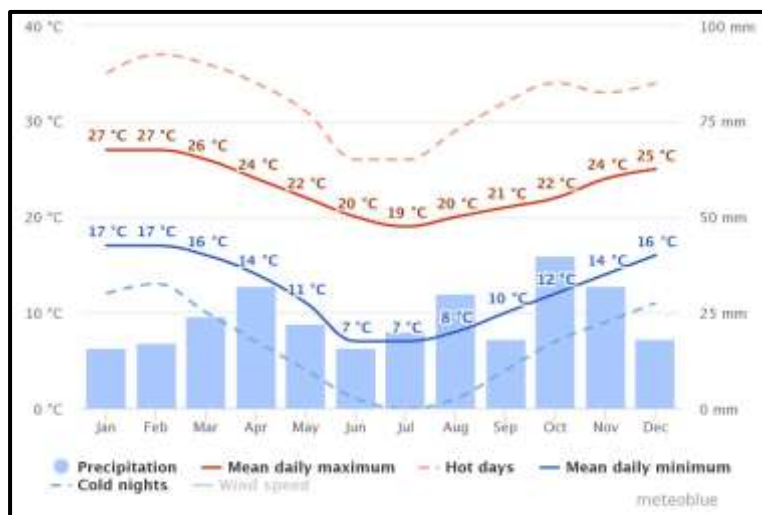


Figure 5a. Average temperature ( $^\circ\text{C}$ ) and average rainfall (mm) for Hartenbos.

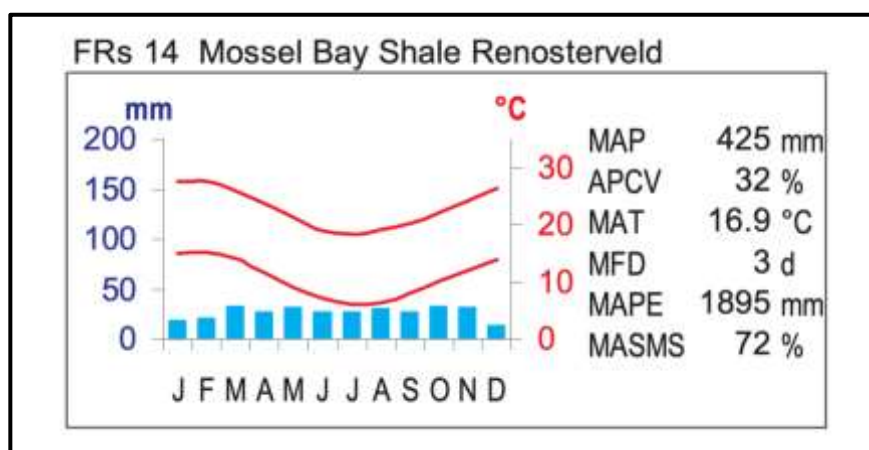


Figure 5b. Climate diagram of Mossel Bay Shale Renosterveld. Blue bars show the median monthly precipitation. The upper and lower red lines show the mean daily maximum and minimum temperature respectively. MAP: Mean Annual Precipitation; APCV: Annual Precipitation Coefficient of Variation; MAT: Mean Annual Temperature; MFD: Mean Frost Days (days when screen temperature was below  $0^\circ\text{C}$ ); MAPE: Mean Annual Potential Evaporation; MASMS: Mean Annual Soil Moisture Stress (% of days when evaporative demand was more than double the soil moisture supply) (Rebello *et al.* 2006 in Mucina & Rutherford, 2006).

## 4. Methods

For the 2006 study (McDonald, 2006), colour aerial photography and Google Earth™ satellite imagery was used to interpret the distribution of plant communities. This method was repeated in 2017 when a sequence of satellite images was available which showed changes in the vegetation of the site over time. One of the important revelations that was not noted in 2006 and that could be determined from the 2011 satellite image (after a fire had burnt the site) was the historical ploughing of the site. This agriculture has had long-lasting effects on the vegetation.

For the purposes of this study, Erf 3122 Mossel Bay (Hartenbos Garden Estate) was re-visited on 24 and 25 August 2017 and records collected at 19 sample waypoints (see Figure 3). The records included lists of plant species, descriptions of the physiognomy of the respective waypoint sites, photographs of the sites as well as any specific plant species that were of importance.

## 5. The Vegetation

According to the national vegetation classification published in 2005 (Mucina, Rutherford & Powrie 2005) the vegetation occurring inland of the coast at Hartenbos is Groot Brak Dune Strandveld. This broad classification was not accurate and was subsequently corrected to Mossel Bay Shale Renosterveld (SANBI, 2018) (Figure 6). From field-observations this classification appears to be inadequate to describe the variation in the vegetation of Hartenbos Hills Garden Estate, despite it being more accurate than the 2005 classification. Low & Rebelo (1996) refer to the vegetation as South Coast Renosterveld, which would be more in keeping with what was found on Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate). These authors point out that the major difference between South Coast Renosterveld and other renosterveld vegetation types is the high proportion of grasses. Cowling *et al.* (1999) refer to this vegetation as Riversdale Coast Renosterveld which was been adopted by C.A.P.E. (Cape Action for People and the Environment) for fine-scale planning. Cowling & Heijnis (2001) referred to Coastal Renosterveld as forming part of the Fynbos/Renosterveld Mosaic. A more detailed local classification could be made based on the type of substrate and the topography of the land units but what is critical is that at a broad scale the vegetation is renosterveld, not strandveld.

In the work of Vlok & de Villiers (2007) for the Gouritz Initiative project, the vegetation from the Breede River to the Groot Brak River was surveyed and the vegetation at Erf 3122 Mossel Bay was included in the unit *PetroSa Fynbos / Renosterveld Mosaic*, and more specifically mainly in Herbertsdale Renoster Thicket (Figure 7a). The investigation at Hartenbos Garden Estate (Erf 3122,

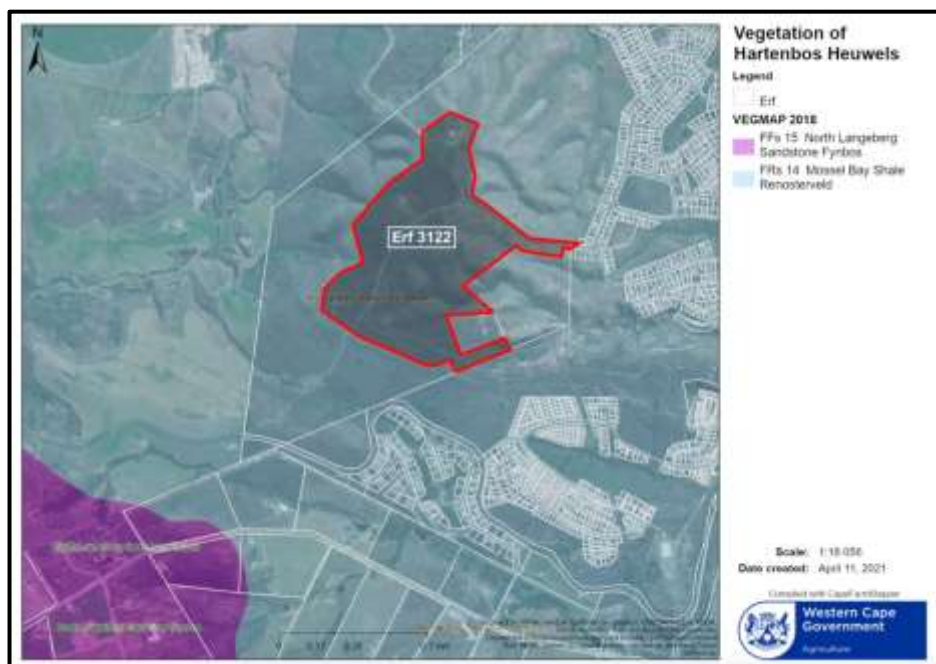
Mossel Bay) indicates that the vegetation found on Erf 3122 fits well with the definition of this mosaic vegetation type. However, Helme (2016) pointed out that Erf 3122 actually lies within the unit Brandwag Fynbos – Renoster Thicket, delimited by Vlok & De Villiers (2007) according to the map extracted from Helme’s (2016) report (Figure 7b).

Although there may be some confusion about the naming of the vegetation unit concerned, in essence all the more recent classifications recognize this unit as predominantly renosterveld in a mosaic with fynbos communities.

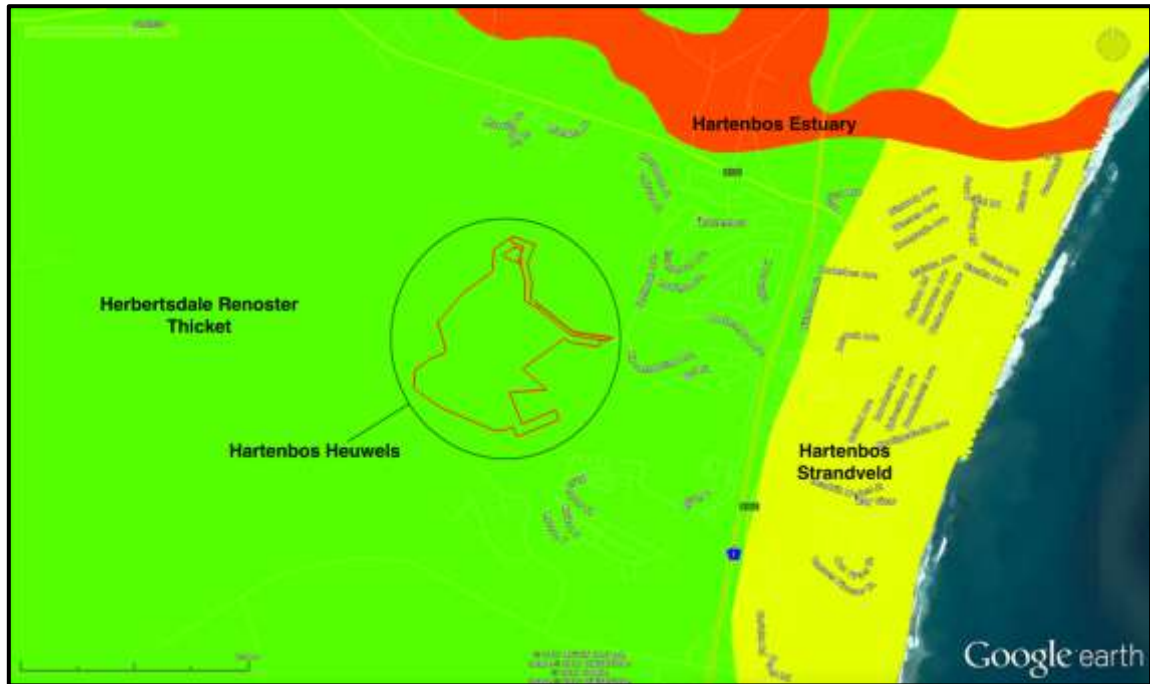
The renosterveld at Erf 3122, Mossel Bay, occurs on the warmer, drier north- and west-facing slopes and the plateau whereas on the cooler and moister, south- and south-east-facing slopes fynbos communities are found. On the mesic north- to north-east-facing slopes there are also remnant stands of very dense and thorny scrub that Acocks (1988) described as part of ‘Coastal Renosterveld’ but related to the Gouritz River Scrub.

For purposes of this study the units recognized follow those of Vlok & de Villiers (2007) but with the distinction that there is grassy fynbos akin to that of North Langeberg Sandstone Fynbos on the south-facing slopes. The latter vegetation is considered to be more sensitive than the renosterveld, which at Erf 3122 Mossel Bay (Hartenbos Hills Garden Estate), is largely secondary.

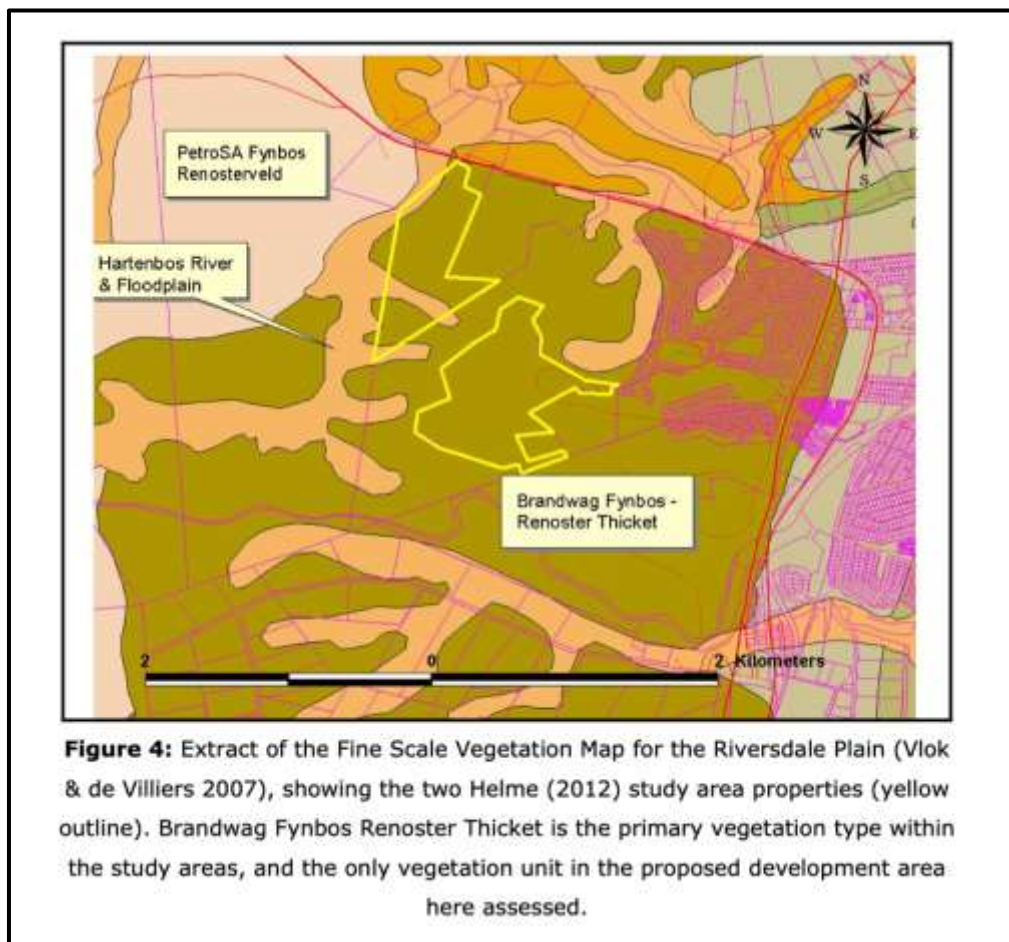
Details of the vegetation found at the waypoints in the re-survey of the site in August 2017 are given in Table 1.



**Figure 6.** Portion of the Vegetation Map of South Africa, Lesotho & Swaziland (SANBI, 2018) overlaid on aerial imagery using Cape Farm Mapper. It shows that according to this classification, Erf 3122 Mossel Bay (red outline) is located in Mossel Bay Shale Renosterveld.



**Figure 7a.** Portion of the fine-scale map for the Gouritz Initiative (Vlok ) showing that Erf 3122, Mossel Bay (red outline) is located in Herbertsdale Renoster Thicket.



**Figure 7b.** The map referred to by Helme (2016) indicating that Erf 3122, Mossel Bay lies in a vegetation unit described by Vlok & De Villiers (2007) as Brandwag Fynbos – Renoster Thicket.

## 5.1 Renosterveld

### 5.1.1 Renosterveld on the central plateau and warm, dry west- and north-facing slopes

Renosterveld is the dominant vegetation type on Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate). It is found on the central plateau and on the warm, dry westerly and northerly slopes. The soils are gravelly and have a clay-rich matrix. This vegetation type has a grey appearance due to the colour of the dominant shrub species, *Elytropappus rhinocerotis*, the renosterbos. Shrubs of this species are from 1–1.5 m tall and generally, but not always, form a mid-dense to dense canopy over other lower shrubs. The cover of renosterbos is from 80 – 90 % with other shrubs forming a much lower proportion of the cover. Low & Rebelo (1996) describe the physiognomy of South Coast Renosterveld as ‘open to mid-dense, cupressoid and small-leaved, low to mid-high shrubland, with emergents generally absent’ and the renosterveld vegetation at Hartenbos fits this description well.

The understorey of the renosterveld can range from being a sparse covering of low shrubs, forbs and grasses to a dense grassy sward with some shrublets and forbs. The pattern in the renosterveld at Erf 3122 is that dominance can change and renosterbos can be completely absent in which case grasses, particularly *Hyparrhenia hirta* (Figure 25), dominate. This results in either a patchy mosaic of small grass-dominated patches within larger renosterbos-dominated stands of vegetation or the opposite where grasses dominate over wide areas with renosterbos either absent completely or occurring in varying density but usually sparsely.

Renosterveld, wherever it occurs, is well-known for its diversity of species and the renosterveld when the author surveyed Erf 3122 Mossel Bay in 2006, it was found that there was a fair species richness in the renosterveld. An exhaustive species list was not compiled for the renosterveld at Erf 3122 but genera and species that were found to occur include, *Asparagus africanus*, *Asparagus* cf. *falcatus*, *Berkheya* sp., *Boophone disticha*, *Brachiaria serrata*, *Bulbine* sp., *Carissa bispinosa*, *Carpobrotus acinaciformis*, *Chrysocoma ciliolata*, *Commelina africana*, *Cynanchum viminalis*, *Dianthus caespitosus*, *Digitaria eriantha*, *E. rhinocerotis*, *Ehrharta* sp., *Eragrostis curvula*, *Eriocephalus africana*, *Euclea undulata*, *Glottiphyllum depressum*, *Gnidia* cf. *polystachya*, *Hermannia flammea*, *Hibiscus* sp., *Indigofera* sp., *Jamesbrittenia argentea*, *Lobelia* sp., *Merxmuellera stricta*, *Ornithogalum dubium*, *Osteospermum moniliferum*, *Polygala myrtifolia*, *Pteronia* spp., *Rhus glauca*, *Ruschia* cf. *hamata*, *Selago* spp., *Tephrosia* sp., *Themeda triandra*, *Ursinia* cf. *nudicaulis* and species in the Acanthaceae (cf. *Blepharis* sp.).



One misinterpretation of McDonald (2006) was that the lack of geophytes found in the 2006 survey was attributed to season. Subsequently it was realized that the lack of geophytes is more likely due to a large area of the central plateau having been cultivated and the geophytic flora lost.

The grassveld encountered at Hartenbos Hills Garden Estate is considered to be a 'sub-community' of the renosterveld. Species composition of the grassveld is very similar to that of the renosterveld proper except that there is a dominance of grasses, especially *Hyparrhenia hirta*. The grassveld has a different signature on aerial photographs and is clearly distinguishable in the field from the true renosterveld. The grassveld tends to occur on well-drained north-facing and some west-facing slopes where it occurs as pure stands over fairly large areas as opposed to the renosterveld which has its best expression on the relatively flat table-land or plateau. As described above the grassveld can also be in a patchy mosaic with renosterveld. This is particularly so when the renosterveld has been disturbed and the renosterbos is removed either mechanically, such as alongside roads or by fire. Grasses aggressively colonize these gaps in the renosterveld. Additional species found in the grassveld that were not noted by McDonald (2006) in the renosterveld include *Albuca* sp., *Aristida junciformis*, *Aspalathus* spp., *Berkheya armata*, *Brunsvigia* sp. (cf. *orientalis*), *Crassula* sp. (2), *Ehrharta scabra*, *Eragrostis capensis*, *Pentaschistis eriostoma*, *Senecio* sp. (succulent leaves).

## 5.2 Scrub thicket

Both Acocks (1988) and Low & Rebelo (1996) recognized the incidence of thicket patches within the renosterveld. Acocks judged that these thickets were probably relics of a once more widespread vegetation type whereas Low & Rebelo suggested that thicket occurs where the relief is greater, rainfall is low and fire cannot spread easily into these protected microhabitats.

The thicket vegetation is dense, thorny and impenetrable and at Erf 3122 Mossel Bay (Hartenbos Hills Garden Estate) the thicket community includes species such as, *Aloe ferox*, *Bulbine* sp., *Carissa bispinosa* (Num num), *Crassula* sp. *Cussonia spicata* (Cabbage tree), *Cynanchum viminale*, *Diospyros lycioides*, *Gymnosporia buxifolia* (Common spike-thorn), *Olea europaea* subsp. *africana* (Wild Olive), *Rhus lucida*, *Schotia afra* (Boerboon), *Sideroxylon inerme* (Milkwood).

## 5.3 Fynbos on the cool, south-facing slopes

In contrast to the renosterveld on the dry slopes, the cooler south-facing slopes, that are probably also moister, support fynbos vegetation. Even though certain elements of fynbos such as some restios (Restionaceae) and *Bobartia robusta* (Iridaceae) occur in the renosterveld, the clue to the presence of true fynbos communities is the presence of Ericaceae, Restionaceae and Proteaceae


growing together. The substrate is similar to that on which the renosterveld is found; the surface of the soil is covered (80%) with round pebbles of varying sizes (10 mm – 200 mm) but is probably gravellier, with a lower clay fraction, than where renosterveld is found. This, however, was not confirmed. The fynbos community has a cover of 80% with two layers and emergent shrubs up to 2 m. *Erica hispidula* is dominant in the upper stratum, <1 m high, with a cover of 60 %. The lower stratum < 50 cm high is graminoid and dominated by grasses and restios. Depending on the location, emergent shrubs such as *Leucadendron salignum*, *Protea lanceolata* and *Erica discolor* var. *speciosa* have variable cover. *L. salignum* and *E. discolor* var. *speciosa* generally have a low cover whereas *P. lanceolata* can form dense stands of a large number of individuals. Another striking aspect of the fynbos vegetation is the occurrence of a large number of plants of *Bobartia robusta* (Iridaceae) which have a relatively low cover but high abundance and are very obvious in the overall appearance of the fynbos in this area.



The bright red geophyte, *Tritoniopsis antholyza*, was in flower at the time of sampling in December 2006. At that time, it was abundant, and from the evidence of porcupine digging it was concluded that the corms are obviously much sought after by these animals. No other geophytes were found while searching through the fynbos and this was most likely because the season was well advanced into summer as opposed to possible historical ploughing as in the renosterveld.



The most important aspect of the fynbos vegetation is the occurrence of *Protea lanceolata* (Lance-leaved Protea). According to Rebelo (1995) this species occurs on the Potberg (De Hoop) and the Riversdale Flats and at the fynbos / thicket ecotone at Mossel Bay on gravels from 0 – 200 m. It was listed in the Red Data list as VULNERABLE (Hilton-Taylor 1996; Raimondo *et al.* 1999) and Rebelo (1995) attributed this to the invasion of its habitat by rooikrans (*Acacia cyclops*). However, in the most recent appraisal (<http://redlist.sanbi.org/species.php?species=799-68>) it is considered to be Least Threatened. At Hartenbos Hills Garden Estate, three distinct stands of *P. lanceolata* were found on south-facing slopes in fynbos vegetation by McDonald (2006). At one of these sites the stand of *P. lanceolata* is being heavily impacted by invasive rooikrans (*A. cyclops*) and this situation needs to be remedied. Only one part of the current study area i.e. near the eastern entrance gate, supports *P. lanceolata*.



**5.4 Vegetation recorded at specific waypoints**

**Table 1. Vegetation found at 19 sample waypoints during the survey of Erf 3122, Mossel Bay, in August 2017.**

Waypoints and Co-ordinates	Descriptive Notes	Illustration
<p><b>HHE1</b></p> <p><b>S 34° 07' 21.2"</b></p> <p><b>E 22° 04' 59.8"</b></p>	<p>Dense grassy slope. Grasses &lt; 30 cm tall with emergent shrubs to 50 cm. Soil gravelly, conglomerate-derived.</p> <p>Species: <i>Acacia cyclops</i>*, <i>Acacia mearnsii</i>*, <i>Aspalathus</i> sp. (low, grey shrub), <i>Asparagus</i> cf. <i>aethiopicus</i>, <i>Asparagus rubicundus</i>, <i>Bobartia robusta</i>, <i>Commelina</i> sp., <i>Crassula muscosa</i>, <i>Crassula</i> sp. (1), <i>Crassula</i> sp. (2), <i>Cynodon dactylon</i>, <i>Diospyros dichrophylla</i>, <i>Drosanthemum hispidum</i>, <i>Elytropappus rhinocerotis</i>, <i>Eragrostis curvula</i>, <i>Erica</i> sp., <i>Eriospermum</i> sp., <i>Euphorbia</i> sp., <i>Ficinia filiformis</i>, <i>Helichrysum</i> cf. <i>cymosum</i>, <i>Hermannia althaeifolia</i>, <i>Hermannia saccifera</i>, <i>Hermannia</i> sp. (red flowers), <i>Hypoxis</i> sp., <i>Indigofera</i> sp. (1), <i>Indigofera</i> sp. (2), <i>Ischyrolepis</i> cf. <i>capensis</i>, <i>Metalasia</i> sp. (2), <i>Metalasia</i> sp. (dominant), <i>Oedera genistifolia</i>, <i>Oxalis</i> sp., <i>Pentaschistis eriostoma</i>, <i>Satyrium</i> sp., <i>Searsia</i> sp. (low shrub), <i>Senecio</i> sp. (succulent), <i>Tenaxia stricta</i>, <i>Themeda triandra</i>.</p> <p><i>Note: This waypoint is outside the study area but is representative of the north-west-facing slopes.</i></p>	

<p><b>HHE2</b></p> <p><b>S 34° 07' 23.92"</b></p> <p><b>E 22° 05' 06.3"</b></p>	<p>On NW-facing slope below the reservoir approximately at the boundary of the study area. The location has been disturbed by dumping of rubble which appears to have caused a thicket to form.</p>	
<p><b>HHE 3</b></p> <p><b>S 34° 07' 23.3"</b></p> <p><b>E 22° 05' 10.6"</b></p>	<p>Dense thicket of <i>Acacia cyclops</i> with thicket species. Abundant <i>Eriosephalus africanus</i>. This waypoint is located just below the reservoir.</p>	

<p><b>HHE4</b></p> <p><b>S 34° 07' 24.68"</b></p> <p><b>E 22° 05' 12.29"</b></p>	<p>On SE side of reservoir. <i>Acacia cyclops</i> found on mid-dense stands. <i>Elytropappus rhinocerotis</i> is dominant with <i>Polygala myrtillifolia</i> common.</p>	
<p><b>HHE5</b></p> <p><b>S 34° 07' 29.6"</b></p> <p><b>E 22° 05' 10.2"</b></p>	<p>On plateau south of the reservoir, along the track, i.e. between the track and the pipeline route which is heavily infested with <i>Acacia cyclops</i>.</p> <p>This area is dominated by <i>Elytropappus rhinocerotis</i> with emergent, scattered shrubs of <i>Osteospermum moniliferum</i>. <i>Pteronia</i> sp. is co-dominant with <i>E. rhinocerotis</i>. Other species recorded include:</p> <p><i>Cymbopogon</i> sp., <i>Ehrharta</i> sp., <i>Eragrostis curvula</i>, <i>Helichrysum pandurifolium</i>, <i>Hermannia althaeifolia</i>, <i>Hermannia saccifera</i>, <i>Metalsia densa</i>, <i>Oxalis</i> sp., <i>Oxalis</i> sp. – very small, <i>Searsia pterota</i> and <i>Tenaxia stricta</i>.</p>	



<p><b>HHE6</b></p> <p><b>S 34° 07' 29.3"</b></p> <p><b>E 22° 05' 12.0"</b></p>	<p>The waypoint is amongst mid-dense to dense <i>Acacia cyclops</i> on the pipeline route from the reservoir. Understorey shrubs include <i>E. rhinocerotis</i>, <i>Hermannia althaeifolia</i>, <i>Hermannia saccifera</i>, <i>Oedera genistifolia</i>, <i>Osteospermum moniliferum</i>, <i>Oxalis</i> sp., <i>Oxalis</i> sp. (2) and <i>Pteronia</i> sp.</p> <p>Grasses are also present but were not identified.</p>	
<p><b>HHE7</b></p> <p><b>S 34° 07' 31.3"</b></p> <p><b>E 22° 05' 07.0"</b></p>	<p>On upland plateau covered with renosterveld. The shrubland is &lt; 1m tall with a few emergent <i>Osteospermum moniliferum</i> shrubs. <i>E. rhinocerotis</i> is dominant, forming a mid-dense to closed stratum with uniform appearance. The soil is reddish clay-loam. Species include: <i>Drosanthemum</i> sp., <i>Hermannia althaeifolia</i>, <i>Hermannia saccifera</i>, <i>Metalasia densa</i>, <i>Oedera genistifolia</i>, <i>Pentaschistis eriostoma</i>, <i>Pteronia</i> sp. (common) and <i>Searsia pterota</i>.</p> <p>This entire area burnt as indicated by skeletons of burnt shrubs.</p>	



<p><b>HHE8</b></p> <p><b>S 34° 07' 30.2"</b></p> <p><b>E 22° 05' 02.8"</b></p>	<p>This waypoint is at the edge of the plateau where the slope breaks (132 m above mean sea level). This is the transition zone from renosterveld to 'grassy fynbos'.</p> <p>It is recommended that no development should occur below this elevation.</p>	 A wide-angle photograph showing a vast, flat landscape of dry, yellowish-brown grasses and scattered shrubs under a blue sky with light clouds. The terrain appears to be a plateau or a gentle slope.
<p><b>HHE9</b></p> <p><b>S 34° 07' 35.0"</b></p> <p><b>E 22° 05' 00.5"</b></p>	<p>An old (closed) land-fill or dump is located at this waypoint. The area is highly disturbed and visible on aerial photographs.</p>	 A photograph of a disturbed area with sparse, low-lying vegetation and patches of bare, reddish-brown soil. In the background, a large, dark, irregular shape suggests a land-fill or dump. The sky is clear and blue.



<p><b>HHE10</b></p> <p><b>S 34° 07' 43.8"</b></p> <p><b>E 22° 04' 55.6"</b></p>	<p>Renosterveld on upland plateau. This area was ploughed historically but has reverted to shrubland dominated by <i>E. rhinocerotis</i> which was burnt in 2009 or 2010. The location has an abundance of <i>Muraltia</i> sp. as well as <i>Asparagus aethiopicus</i>, <i>Erica</i> sp., <i>Hermannia lavandulifolia</i>, <i>Hermannia saccifera</i>, <i>Metalasia densa</i>, <i>Oedera genistifolia</i>, <i>Oxalis</i> sp. and <i>Pteronia</i> sp.</p> <p>The vegetation has a low species diversity and is generally not sensitive.</p>	
<p><b>HHE11</b></p> <p><b>S 34° 07' 45.1"</b></p> <p><b>E 22° 04' 58.5"</b></p>	<p>This waypoint is on the SE side of the 'main track'. This area did not burn in the last fire. The renosterbos is much taller – up to 1.2 m – than on the NW side of the track. A dense grassy sward is found under the renosterbos with some open grassy patches present.</p> <p>The species complement is the same as that at waypoint HHE10 with a few additional species such as <i>Syncarpha</i> sp. and <i>Satyrium</i> sp.</p>	



<p><b>HHE12</b></p> <p><b>S 34° 07' 46.7"</b></p> <p><b>E 22° 05' 02.6"</b></p>	<p>Waypoint HHE12 is located on a convex crest that is visible on aerial photos. The dominant species is an unidentified tussock grass. Other species include, <i>Babiana</i> sp., <i>Bobartia robusta</i>, <i>Brunsvigia orientalis</i>, <i>Bulbine</i> sp., cf. <i>Acrodon bellidiflorus</i>, <i>Diospyros</i> sp. (low shrub), <i>Drosanthemum</i> sp., <i>E. rhinocerotis</i>, <i>Indigofera</i> sp. (dwarf shrub), <i>Eriospermum</i> sp., <i>Ehrharta</i> sp., <i>Eragrostis curvula</i>, <i>Erica</i> sp., <i>Helichrysum</i> cf. <i>cymosum</i>, <i>Hermannia althaeifolia</i>, <i>Ischyrolepis</i> sp. and <i>Muraltia</i> sp.,</p>	
<p><b>HHE13</b></p> <p><b>S 34° 07' 38.0"</b></p> <p><b>E 22° 05' 15.4"</b></p>	<p>South-east side of main track on south-facing slopes. The veld is 'grassy fynbos' in good condition – low grassy shrubland with dense cover. Species recorded here include <i>Aspalathus</i> sp., <i>Asparagus aethiopicus</i>, <i>Babiana</i> sp., <i>Bobartia robusta</i>, <i>Diospyros dichrophylla</i>, <i>E. rhinocerotis</i>, <i>Ehrharta</i> cf. <i>scabra</i>, <i>Erica discolor</i>, <i>Erica hispidula</i>, <i>Hakea sericea</i>*, <i>Hermannia althaeifolia</i>, <i>Hermannia saccifera</i>, <i>Hermannia</i> sp. (red flowers), <i>Indigofera</i> sp. (low shrub), <i>Ischyrolepis</i> sp., <i>Metalasia densa</i> (dominant shrub), <i>Metalasia</i> sp. (2), <i>Oedera genistifolia</i>, <i>Osteospermum moniliferum</i>, <i>Searsia pterota</i>, <i>Tarchonanthus littoralis</i>, <i>Tenaxia stricta</i> and Tussock grass – unidentified.</p>	

<p><b>HHE14</b></p> <p><b>S 34° 07' 37.3"</b></p> <p><b>E 22° 05' 11.9"</b></p>	<p>Waypoint HHE14 is in an area where there is abundant invasive exotic <i>Hakea sericea</i> present. The shrubs are estimated to be 10 to 12 years old. This area also has <i>E. rhinocerotis</i> dominant, however, it is fynbos in general character</p>	
<p><b>HHE15</b></p> <p><b>S 34° 07' 44.5"</b></p> <p><b>E 22° 05' 19.7"</b></p>	<p>Waypoint HHE15 was recorded as a 'checkpoint' to sample grassy fynbos on the ridge. <i>Erica hispidula</i> is dominant on the south-facing slope. Other species recorded include, <i>Babiana</i> sp., <i>Bobartia robusta</i>, <i>E. rhinocerotis</i>, <i>Erica discolor</i>, <i>Hermannia althaeifolia</i>, <i>Hermannia lavandulifolia</i>, <i>Hermannia saccifera</i>, <i>Indigofera</i> sp. (low shrub), <i>Ischyrolepis</i> sp., <i>Leucadendron salignum</i>, <i>Metalasia densa</i>, <i>Metalasia</i> sp. (2), <i>Oedera genistifolia</i>, <i>Osteospermum moniliferum</i>, <i>Satyrium</i> sp., <i>Selago</i> sp., <i>Senecio</i> sp. – succulent leaves, <i>Syncarpha</i> sp. and Tussock grass – unidentified.</p> <p>Thicket elements such as <i>Aloe ferox</i> and <i>Schotia afra</i> were also recorded here.</p>	

<p><b>HHE16</b></p> <p><b>S 34° 07' 59.1"</b></p> <p><b>E 22° 05' 15.7"</b></p>	<p>At the edge of a highly eroded area heavily invaded by <i>Acacia cyclops</i>. An apparent quarry is found at this location and the upper, relatively flat, area above the eroded valley supports shrubland dominated by renosterbos. Species recorded include, <i>Aspalathus</i> sp. – low grey shrub, <i>Babiana</i> sp., <i>Bulbine</i> sp., <i>Crassula</i> sp. – rugose leaves, <i>Drosanthemum</i> sp., <i>E. rhinocerotis</i> – dominant, <i>Eragrostis curvula</i>, <i>Eriospermum</i> sp., <i>Hermannia althaeifolia</i>, <i>Metalasia</i> sp. (2), <i>Osteospermum moniliferum</i>, <i>Pteronia</i> sp. – abundant, <i>Ruschia</i> sp. and <i>Searsia pterota</i>.</p>	
<p><b>HHE17</b></p> <p><b>S 34° 07' 54.1"</b></p> <p><b>E 22° 04' 55.2"</b></p>	<p>Shrubland dominated by <i>E. rhinocerotis</i> with skeletons of <i>Osteospermum moniliferum</i> from the last fire. The vegetation has the same complement of species as recorded elsewhere in the renosterveld at the site.</p>	

<p><b>HHE18</b></p> <p><b>S 34° 07' 48.8"</b></p> <p><b>E 22° 04' 56.9"</b></p>	<p>Renosterveld dominated by <i>E. rhinocerotis</i>. <i>Pteronia</i> sp. is prominent. Skeletons of shrubs burnt in the last fire are commonly found. Species recorded include, <i>Aspalathus</i> sp. – low grey shrub, <i>Berkheya armata</i>, <i>Eragrostis curvula</i>, <i>Hermannia althaeifolia</i>, <i>Hermannia saccifera</i>, <i>Metalasia</i> sp. (2), <i>Muraltia</i> sp., <i>Satyrium</i> sp. <i>Themeda triandra</i> and Tussock grass – unidentified.</p>	
<p><b>HHE19</b></p> <p><b>S 34° 07' 41.8"</b></p> <p><b>E 22° 05' 22.6"</b></p>	<p>Waypoint HHE19 was located in an area of fynbos along the SW side of the entrance road to the site. The soil is pebbly with round cobbles and gravel. The vegetation is mid-high, mid-dense to closed shrubland. Species recorded include <i>Aspalathus</i> sp. – erect shrublet, <i>Bobartia robusta</i>, <i>E. rhinocerotis</i>, <i>Ehrharta scabra</i>, <i>Erica discolor</i> – dominant, <i>Erica hispidula</i> – dominant, <i>Leucadendron salignum</i>, <i>Lobelia</i> cf. <i>coronopifolia</i>, <i>Metalasia densa</i>, <i>Metalasia</i> sp. (2), <i>Muraltia</i> sp., <i>Oedera genistifolia</i>, <i>Osteospermum moniliferum</i>, <i>Phyllica</i> sp., <i>Syncarpha paniculata</i> and <i>Tenaxia stricta</i>.</p>	

### 5.5 Vegetation Map of Erf 3122, Mossel Bay.

In order to simplify the appraisal of the vegetation at Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate), a vegetation map was compiled that recognizes only two vegetation types, renosterveld and grassy fynbos (Figure 8). The renosterveld, as mentioned above, is largely secondary, having 'restored' on areas that were once cultivated. This vegetation considered to have **low sensitivity** whereas the grassy fynbos, which occurs on steeper slopes and has not been historically cultivated, is considered to mostly have **high sensitivity** but the area along the road leading to the reservoir, and the area in the vicinity of the reservoir itself have moderate sensitivity (Figure 9).



Figure 8. Simplified vegetation map for Erf 3122, Mossel Bay.

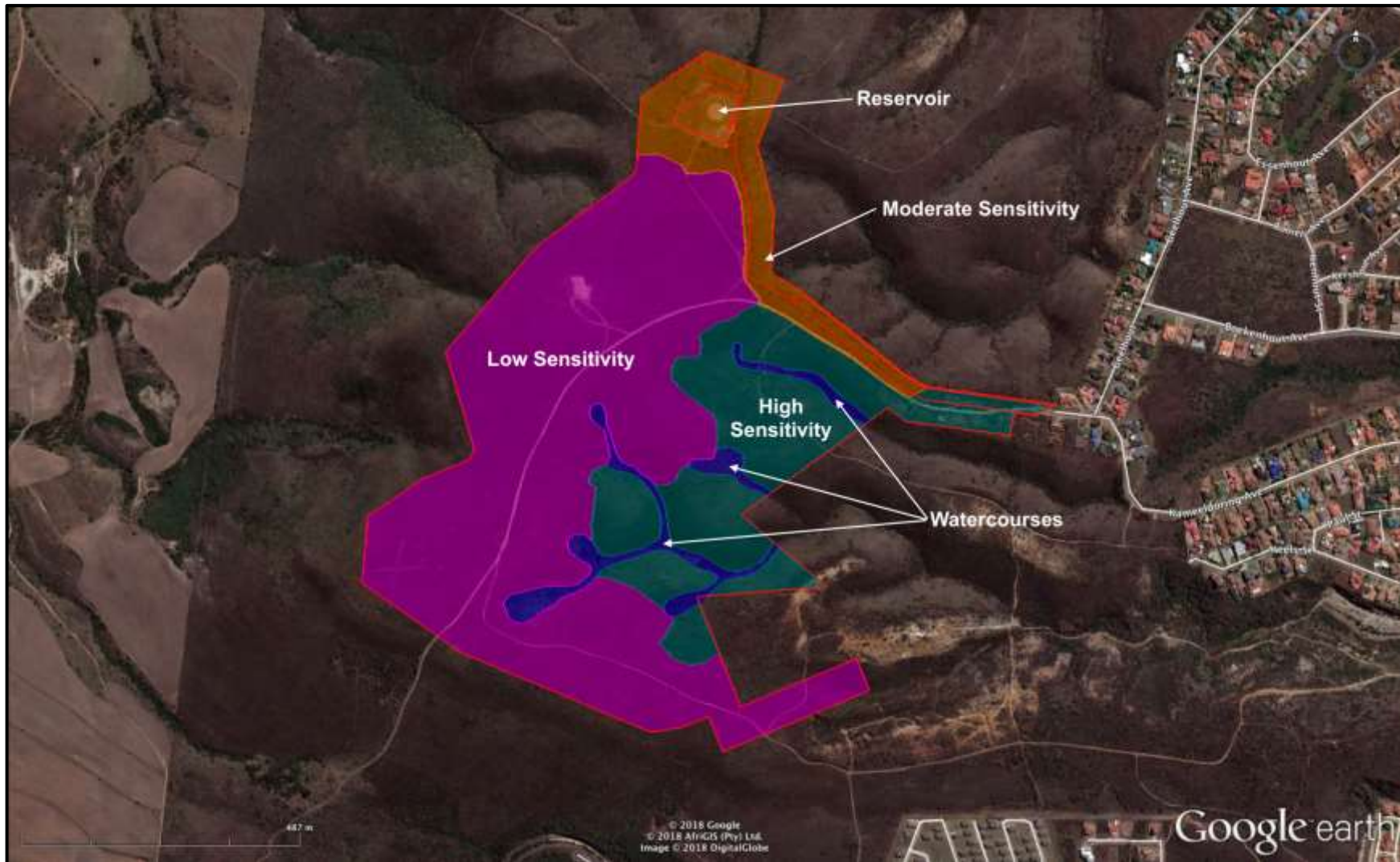


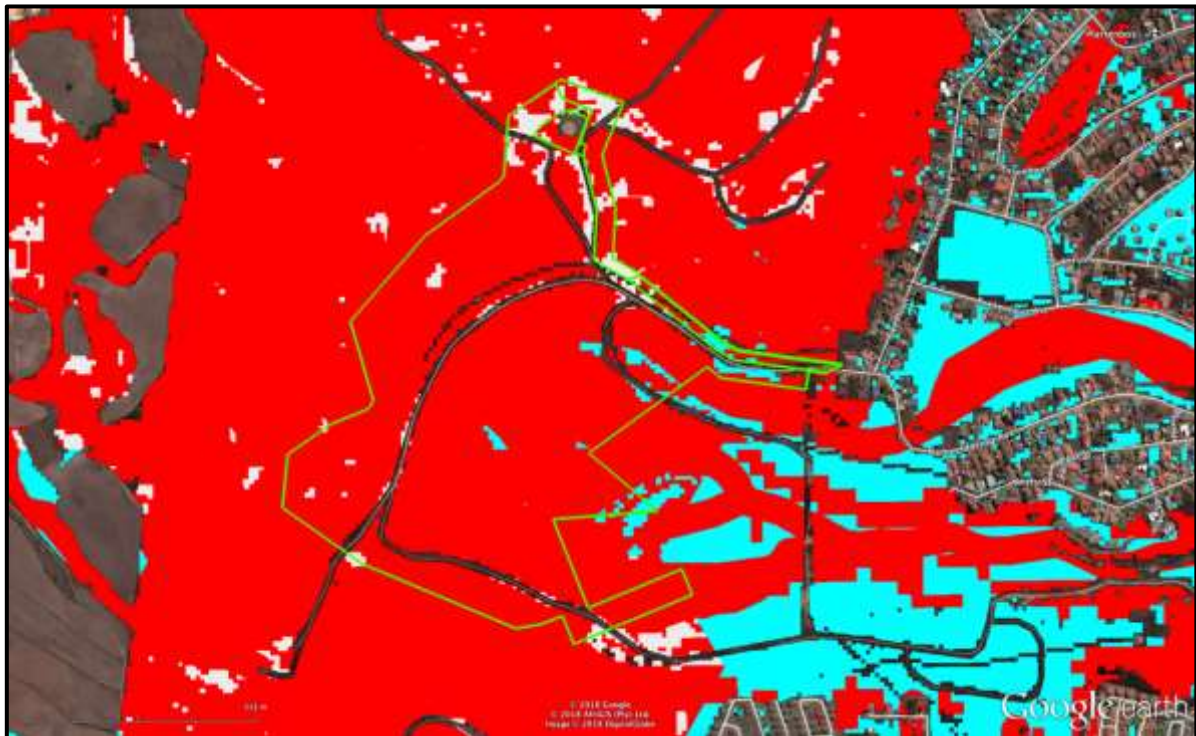
Figure 9. Habitat sensitivity map for Erf 3122, Mossel Bay.

## 6. Conservation Status

### 6.1 The Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Spatial Plan [WCBSP] (CapeNature 2017, Pool-Stanvliet *et al.* 2017) was consulted for determination of conservation status and critical biodiversity areas. The required shapefiles were obtained from the South African National Biodiversity Institute (SANBI) BGIS website and then the critical biodiversity areas (CBA) map for the Hartenbos Hills Garden Estate study area was overlaid on a Google Earth™ image and carefully examined to compare what was observed in the field with the aerial image when overlaid with the CBA map. The presence of CBAs (and ESAs -- Ecological Support Areas) suggests that areas where they have been mapped are ecologically sensitive. However, that is not always the case. Part of the objective of the ground-truthing was to determine the veracity of the units mapped as CBAs and ESAs in the WCBSP as applicable to Hartenbos Hills Garden Estate.

Virtually the entire area of Erf 3122, Mossel Bay is mapped as CBA1 with small areas mapped as CBA2 and even fewer areas mapped as ESA1 (Figure 10). From field observations there is poor correlation between the WCBSP map and the sensitivity of the vegetation. The areas covered by renosterveld are, in my opinion, not botanically sensitive and have low plant species diversity. I thus contend that the renosterveld area should be mapped as ESA1 and not CBA1 or CBA2. This contention is taken into account when determining the constraints on the site (see Figure 13).



**Figure 10.** Critical Biodiversity Areas map for Erf 3122, Mossel Bay (green boundary). Red=CBA1; White = CBA2 and Light blue = ESA1.

### 6.2 The National Web-based Environmental Screening Tool

The National We-based Screening Tool was applied for Erf 3122, Mossel Bay and the result was that the site has a **MEDIUM** sensitivity with respect to the relative plant species theme (Figure 11). There are also not many sensitive species and regarded as sensitive in the species list (the names of those species not named will be obtained from SANBI). However, it is known that *Hermannia lavandulifolia* is an important species since it is the food plant for the rare endemic butterfly *Aloeides trimeni southeyae* (Dr Dave Edge pers. comm.) As for other plants of conservation concern, a number of those listed in Figure 11 were not recorded in the study area and that is attributed to the disturbance history of the site.

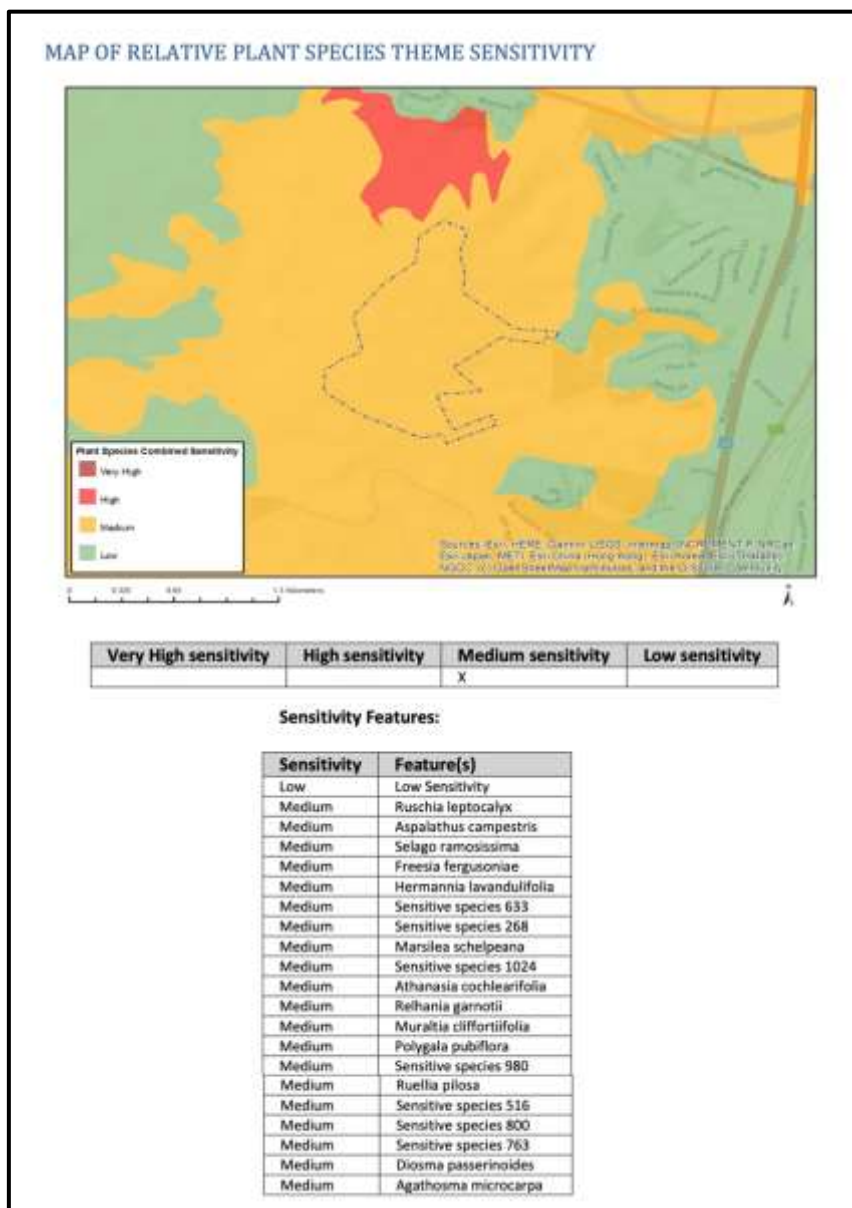


Figure 11. Extract from the report generated for the Relative Plant Species Theme Sensitivity for Erf 3122, Mossel Bay.





### 6.3 Plant Species of Conservation Concern

As for the study by Helme (2016) no species of conservation concern were found on the site in this study. Helme (2016) made observations of endangered species and regional endemics that occur in the near vicinity of the study area. He speculated that these species could occur on the site but that the probability of their occurrence is low. Then following is an extract from Helme (2016):

“No rare or localised plant species were recorded on Erf 3122, but this does not mean that none are present, and there is deemed to be a medium to high likelihood that a few such species are in fact present on site, most likely within the undisturbed parts of the site. The likelihood of there being any such species within the proposed development footprint is low.

Mossel Bay Shale Renosterveld is known to support a number of rare and threatened *Haworthia* species (Bayer 1999; Mucina & Rutherford 2006), and these small, highly cryptic succulent plants could well be present on the undisturbed parts of Erf 3122. *Ruschia leptocalyx* (Plate 6) is a rare succulent Red Listed as Endangered (Raimondo *et al.* 2009), and was recorded along the edges of thicket patches some 1km north of the study area, but is not present on site (see Plate 6). A still unidentified *Lotononis* (Fabaceae) was also recorded just north of the study area, and may prove to be a localised, undescribed species (Dr. S. Boatwright – pers. comm.). *Ruellia pilosa* is a regional endemic (Swellendam to Mossel Bay) and is Red Listed as Vulnerable (Raimondo *et al.* 2009), and may be present in low numbers on the undisturbed parts of the site.”

## 7. Botanical Constraints

Notwithstanding the classification of the entire Erf 3122, Mossel Bay, as CBA1 in the Western Cape Biodiversity Spatial Plan (Pence 2017), the field observations indicate differently. Taking all the relevant indicators into consideration, a constraints map was compiled. The constraints map reflects my view that the renosterveld has **low sensitivity** and the grassy fynbos has **high sensitivity** with consequent low and high constraints as mapped in Figure 13.

The constraints map was used to inform the iterative process of the site layout. It was recommended at a team workshop (31 October 2017) that any proposed development of Erf 3122, Mossel Bay, should only take place in areas identified as ‘Low Constraints’; mostly areas occupied by secondary renosterveld.



Figure 13. Botanical constraints for Erf 3122, Mossel Bay.

## 8. Impact assessment of the proposed development

The process followed to reach an 'acceptable' site development plan (SDP) has taken numerous factors, not only vegetation and habitat, into account. However, there is a strong relationship between the first iteration of the SDP (referred to further as Alternative 1) and the botanical constraints map (compare Figures 13 & 14). The SDP has responded to the landscape and ecology and it is predicted that with further mitigation, the resultant impact on the vegetation is likely to be **low negative** since only the low sensitivity areas would be directly affected. There are likely to be indirect impacts on areas covered by fynbos but little if any direct negative impact.

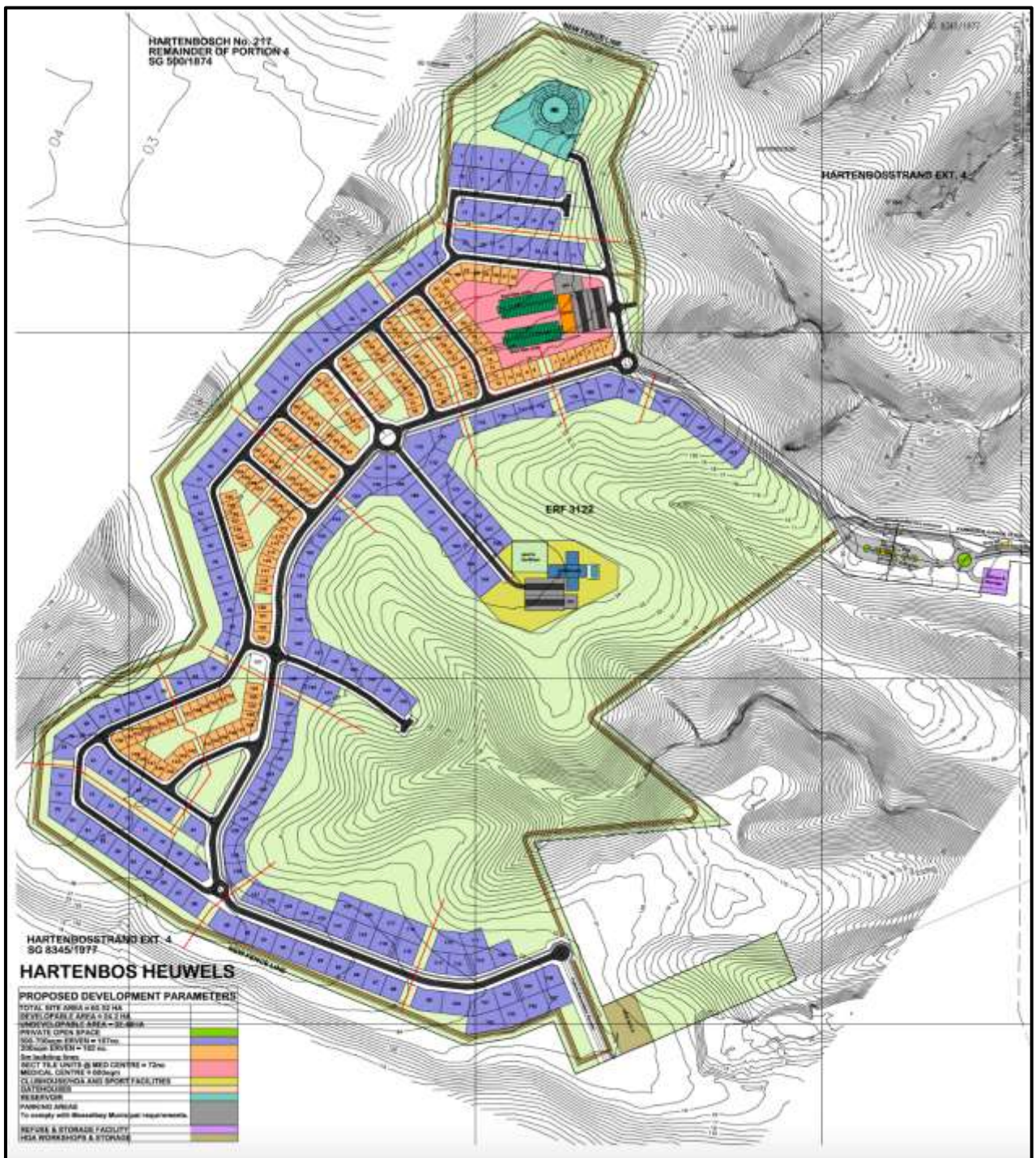


Figure 14. Proposed site development plan (SDP) for Erf 3122 Mossel Bay, (Diagram: Concept 23 (3) 27 February 2018, prepared by AJK Projects).

Subsequent to the development of the site being taken over by Hartenbos Hills Propco (Pty) Ltd, an SDP dated 12 December 2020 has been developed (Figure 15) and that is now the preferred alternative (Alternative 2). This plan provides for a conservation area near the reservoir. This will have only marginal bearing on impacts on the vegetation but the conservation area will benefit the endemic butterfly *Aloeides trimeni southeyae*.



Figure 15. The most recent SDP for Erf 3122, Mossel Bay dated 20 December 2020.

## 9. Conclusions

From a botanical perspective Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate) can be divided into two main vegetation types, low sensitivity renosterveld and high sensitivity grassy fynbos. These vegetation types occupy two distinct areas with the renosterveld being found on the upland plateau. It was historically ploughed and this disturbance has carried through despite the area having apparently restored to 'good' vegetation. Analyses of collected data shows that the renosterveld is relatively poor in plant species with a significant complement of the original species having been lost. The fynbos, on the other hand, is relatively undisturbed and has high sensitivity.

Despite virtually the entire area of Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate) being classified as CBA1 in the WCBS (2017), it has been determined from field studies (ground-truthing) that the area occupied by renosterveld should at best be re-classified as ESA1. The renosterveld areas have low botanical constraints so opportunity exists to propose development of those areas. The proposed SDP reflects the opportunity to develop mainly on the plateau of Erf 3122, Mossel Bay (Hartenbos Hills Garden Estate), while avoiding the fynbos areas on the slopes (mainly south- to east-facing slopes).

A detailed impact assessment will follow the Scoping Phase but it is realistically predicted that the impact of the proposed development would be low negative after mitigation due to the low sensitivity of the habitat that would be displaced by the development.

## 10. References

- Acocks, J.P.H. 1988. Veld Types of South Africa, 3rd edn. *Memoirs of the Botanical Survey of South Africa* No. 57:1-146.
- Brownlie, S. 2005. Guideline for involving biodiversity specialists in EIA processes: Edition 1. *CSIR Report No. ENV-S-C 2005-053 C*. Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning.
- Cadman, M. 2016. (ed.) Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape, Edition 2. Fynbos Forum, Cape Town, 201pp.

- Cowling, R.M., Pressey, R.L., Lombard, A.T., Hejnis, C., Richardson, D.M. & Cole, N. 1999. *Framework for a conservation plan for the Cape Floristic Region, South Africa*. IPC Report 9902, prepared for WWF-SA.
- Cowling, R. & Hejnis, C. 2001. The identification of Broad Habitat Units as biodiversity entities for systematic conservation planning in the Cape Floristic Region. *South African Journal of Botany* 67: 15 – 38.
- Helme, N. 2016. Botanical impact assessment of proposed development on Erf 3122, Hartenbos, Western Cape. Unpublished report for Strategic Environmental Focus, Pretoria.
- Hilton-Taylor, C. 1996. Red Data List of South African Plants. *Strelitzia* 4. National Botanical Institute, Pretoria.
- Low, A.B. & Rebelo, A.G. 1996. (eds) *Vegetation of South Africa, Lesotho and Swaziland – A companion to the Vegetation Map of South Africa, Lesotho and Swaziland*. Department of Environmental Affairs & Tourism, Pretoria.
- McDonald, D.J. 2006. Botanical Survey and Sensitivity Assessment of Erf 3122, Mossel Bay (Hartenbos Heuwels), Western Cape. Unpublished report
- Mucina, L., Rutherford, M.C., & Powrie, L.W. (Eds.). 2005, 2009. *Vegetation map of South Africa, Lesotho, and Swaziland 1:1 000 000 scale sheet maps*. South African National Biodiversity Institute, Pretoria. ISBN 1-919976-22-1.
- Mucina, L. & Rutherford, M.C. 2006. (eds.) *The Vegetation of South Africa. Lesotho & Swaziland*. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- Norman, N. & Whitfield, G. 2006. *Geological Journeys: A traveler's guide to South Africa's rock and landforms*. Struik, Cape Town.
- Pence, G.Q.K. 2017. *The Western Cape Biodiversity Spatial Plan: Technical Report*. Unpublished report. Western Cape Nature Conservation Board (CapeNature), Cape Town.
- Pool-Stanvliet, R., Duffell-Canham, A., Pence, G. & Smart, R. 2017. *The Western Cape Biodiversity Spatial Plan Handbook*. Stellenbosch: CapeNature.

Raimondo, D., Von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. & Manyama, P.A. (eds) 2009. Red List of South African plants 2009. *Strelitzia* 25. South African National Biodiversity Institute, Pretoria.

Rebelo, A.G. 1995. *SASOL Proteas: A field guide to the Proteas of Southern Africa*. Fernwood Press, Cape Town. pp. 224.

South African National Biodiversity Institute (SANBI) 2012, Vegetation Map of South Africa, Lesotho and Swaziland [vector geospatial dataset] 2012. Available from the Biodiversity GIS website <http://bgis.sanbi.org/SpatialDataset/Detail/18>.

Vlok, J.H.J. & de Villiers, M.E. 2007. Vegetation map for the Riversdale domain. Unpublished 1:50 000 maps and report supported by CAPE FSP task team and CapeNature.

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Report submitted: 12 March 2018; updated 16 April 2021



## Appendix 1. Curriculum Vitae

### Dr David Jury McDonald Pr.Sci.Nat.

**Name of Firm:** Bergwind Botanical Surveys & Tours CC. (Independent consultant)

**Work and Home Address:** 14 A Thomson Road, Claremont, 7708

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**Website:** [www.bergwind.co.za](http://www.bergwind.co.za)

**Profession:** Botanist / Vegetation Ecologist / Consultant / Tour Guide

**Date of Birth:** 7 August 1956

#### Employment history:

- 19 years with National Botanical Institute (now SA National Biodiversity Institute) as researcher in vegetation ecology.
- Five years as Deputy Director / Director Botanical & Communication Programmes of the Botanical Society of South Africa
- Fifteen years as private independent Botanical Specialist consultant (Bergwind Botanical Surveys & Tours CC)

**Nationality:** South African (ID No. 560807 5018 080)

**Languages:** English (home language) – speak, read and write  
Afrikaans – speak, read and write

#### Membership in Professional Societies:

- South Africa Association of Botanists
- International Association for Impact Assessment (SA)
- South African Council for Natural Scientific Professions (**Ecological Science, Registration No. 400094/06**)
- Field Guides Association of Southern Africa

#### Key Qualifications :

- Qualified with a M. Sc. (1983) in Botany and a PhD in Botany (Vegetation Ecology) (1995) at the University of Cape Town.
- Research in Cape fynbos ecosystems and more specifically mountain ecosystems.
- From 1995 to 2000 managed the Vegetation Map of South Africa Project (National Botanical Institute)
- Conducted botanical survey work for AfriDev Consultants for the Mohale and Katse Dam projects in Lesotho from 1995 to 2002. A large component of this work was the analysis of data collected by teams of botanists.

- **Director: Botanical & Communication Programmes** of the Botanical Society of South Africa (2000—2005), responsible for communications and publications; involved with conservation advocacy particularly with respect to impacts of development on centres of plant endemism.
- Further tasks involved the day-to-day management of a large non-profit environmental organisation.
- **Independent botanical consultant** (2005 – to present) over 300 projects have been completed related to environmental impact assessments in the Western, Southern and Northern Cape, Karoo and Lesotho. A list of reports (or selected reports for scrutiny) is available on request.

### Higher Education

Degrees obtained

and major subjects passed:

B.Sc. (1977), University of Natal, Pietermaritzburg

Botany III

Entomology II (Third year course)

B.Sc. Hons. (1978) University of Natal, Pietermaritzburg

Botany (Ecology /Physiology)

M.Sc. - (Botany), University of Cape Town, 1983.

Thesis title: 'The vegetation of Swartboschkloof, Jonkershoek, Cape Province'.

PhD (Botany), University of Cape Town, 1995.

Thesis title: 'Phytogeography endemism and diversity of the fynbos of the southern Langeberg'.

Certificate of Tourism: Guiding (Culture: Local)

Level: 4 Code: TGC7 (Registered Tour Guide: WC 2969).

### Employment Record:

January 2006 – present: Independent specialist botanical consultant and tour guide in own company:

**Bergwind Botanical Surveys & Tours CC**

August 2000 - 2005 : Deputy Director, later Director Botanical & Communication Programmes, Botanical Society of South Africa

January 1981 – July 2000 : Research Scientist (Vegetation Ecology) at National Botanical Institute

January 1979—Dec 1980 : National Military Service

Further information is available on website: [www.bergwind.co.za](http://www.bergwind.co.za)