



NICK HELME BOTANICAL SURVEYS

PO Box 22652 Scarborough 7975

Ph: 021 780 1420 cell: 082 82 38350 email: botaneek@iafrica.com

Pri.Sci.Nat # 400045/08

**BOTANICAL BASELINE ASSESSMENT OF
PROPOSED PENINSULA FORMATION
MONITORING (CORE DRILLED) BOREHOLES
AROUND STEENBRAS DAM.**

Submitted to: Aurecon Cape Town

12 November 2018

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence and include an abbreviated Curriculum Vitae.

I, N.A. Helme, do hereby declare that I am financially and otherwise independent of the client and their consultants, and that all opinions expressed in this document are substantially my own, notwithstanding the fact that I have received fair remuneration from the client for preparation of this report.



NA Helme

Abridged CV:

Contact details as per letterhead.

Surname : HELME

First names : NICHOLAS ALEXANDER

Date of birth : 29 January 1969

University of Cape Town, South Africa. BSc (Honours) – Botany (Ecology & Systematics). 1990.

Since 1997 I have been based in Cape Town, and have been working as a specialist botanical consultant, specialising in the diverse flora of the great Cape Floristic Region. Since the end of 2001 I have been working on my own and trade as Nick Helme Botanical Surveys.

A selection of previous work undertaken in the region is indicated below:

- Botanical assessment of Steenbras dam drilling (Aurecon 2018)
- Baseline botanical assessment of Imhoff Farm, Kommetjie (Khula Environmental 2017)
- Botanical assessment of proposed sand mine near Brandvlei Dam (PHS Consulting 2017)
- Botanical assessment of Dragon's Nest, Hout Bay (Khula Environmental 2017)
- Specialist review of botanical IA studies for proposed Kapteinsklip development node, Mitchells Plain (Khula Environmental 2016)

- Botanical assessment of proposed development on farm Palmiet Valley 54, Wellington (Doug Jeffery Environmental Consultants 2015)
- Ecological assessment of proposed Arcelor Mittal power station, Saldanha (ERM 2015)
- Ecological assessment of proposed Globeleq power station, Saldanha (ERM 2015)
- Botanical assessment of proposed iGas pipeline Saldanha – Ankerlig (CES/EOH 2015)
- Scoping and Impact Assessment of Proposed Wind Energy Facility near Swellendam (CSIR 2010)
- Scoping Assessment of Proposed Wind Energy Facility near Bredasdorp (CSIR 2010)
- Scoping and Impact Assessment of proposed Wind Energy Facility near Caledon (Savannah Environmental 2010)
- Scoping and Impact Assessment study of Proposed Wind Energy Facility near Caledon (Arcus Gibb 2009 & 2010)
- Impact Assessment of proposed Blue Crane Signature Golf Estate, Caledon (Doug Jeffery Environmental Consultants; 2010)
- Kogelberg Biosphere Reserve corridor study (CapeNature; 2008)
- Botanical Assessment of Erf 173, Hawston (PHS Consulting; 2008)
- Botanical Assessment of Farm 587/6, Cloud's End, Hemel & Aarde (Peter Dall Consultancy; 2007).
- Botanical Scoping and Impact Assessment of proposed Romansbaai development, Danger Point (Doug Jeffery Environmental Consultants; 2006 & 2007)
- Botanical Assessment of Erf 4574, Betty's Bay (Headland; 2006)
- Botanical Assessment of Erf 4570 and Erf 4576, Betty's Bay (Headland; 2006)
- Botanical Assessment of Erf 589 and Ptn. Erf 595, Greyton (DJ Environmental Consultants; 2006)
- Botanical Assessment of eastern portion of farm Afdakrivier 575, Fisherhaven (Mr J. Carstens; 2006)

TABLE OF CONTENTS

Introduction	1
Terms of Reference	1
Limitations, Assumptions & Methodology	1
Study Area Context	2
Description of the Vegetation	3
Botanical Conservation Value	8
Identified Botanical Impacts	9
Required Mitigation, Conclusions and Recommendations	12
References	14

1. INTRODUCTION

This specialist botanical input was requested to inform management and monitoring of one component of the borehole drilling operations being undertaken in the Steenbras dam area, on land managed by and belonging to the City of Cape Town, plus one site on State land managed by CapeNature (see Figure 1). These five new monitoring wells will be core-drilled (rather than percussion drilled) in positions carefully chosen by the hydrogeologists, and will target the Peninsula formation (generally deep, and water bearing), and their readings should be very useful when interpreting the effects on groundwater of the pumping of the various water production boreholes in the Steenbras wellfield area.

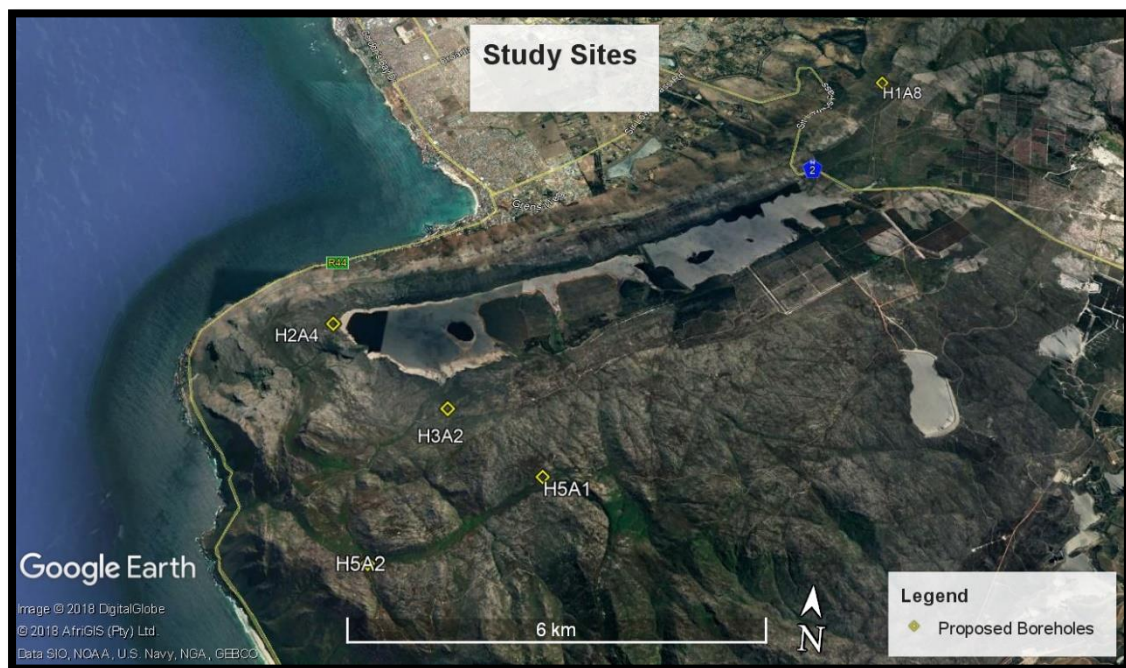


Figure 1: Satellite image of the Steenbras area showing position of the 5 proposed drill sites.

2. TERMS OF REFERENCE

The terms of reference (ToR) for this specialist input were as follows:

- undertake a site visit to assess the vegetation in the study areas
- compile a report that describes the vegetation in the study areas and places it in a regional context
- identify and locate any plant Species of Conservation Concern in or close to the study areas
- provide an overview of the botanical conservation significance (sensitivity) of the study areas
- provide recommendations on whether the sites are botanically suitable for the proposed drilling

- indicate if any special mitigation is required, and if so what needs to be done for each site.

3. LIMITATIONS, ASSUMPTIONS AND METHODOLOGY

The study area was visited on 7 November 2018. The five study areas were as shown in Figure 1.

For purposes of this report the terms site and study area are used interchangeably, and refer to a 10m by 10m centred on the proposed drill site.

All identifiable plant species were noted in the field, and various digital photographs were taken. The GIS based South African National Biodiversity Institute (SANBI) vegetation map for South Africa (Mucina & Rutherford 2006 and 2012 update) was consulted, along with the National List of Threatened Ecosystems (DEA 2011), and other relevant references noted in the text. Conclusions were drawn based on this documentation and professional experience in the area and the region.

4. STUDY AREA CONTEXT

The study area is located within the Southwest Fynbos Subregion of the Fynbos biome and is within the Core Cape Subregion (CCR) of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and it is also by far the smallest floristic region. The Core Cape Subregion occupies only 0.1% of the world's land surface, and supports about 9400 plant species, almost half of all the plant species in southern Africa, and some 20% of the plant species in sub-Saharan Africa. About 68% of all the species in the CCR do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). The montane areas have an especially high number of narrow endemics, and these are thus vulnerable to impacts such as high altitude drilling (especially percussion drilling which causes more disturbance) and associated soil disturbance (road building, pipelines, sump excavation, etc). Most of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the Red Data Book listing process undertaken for South Africa is that 67% of the threatened plant species in the country occur only in the Fynbos biome, and these total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a

major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species. Developments in this area thus need to take this into account.

The Southwest Fynbos bioregion is renowned as the “core of the Fynbos region”, and has exceptionally high levels of diversity, and exceptionally high level of narrow endemics (Raimondo *et al* 2009).

The City of Cape Town Biodiversity Network shows that all 5 study areas are within a formally Protected Area, being a declared Section 23 Nature Reserve. The entire Steenbras area is also part of a declared World Heritage Site (Hottentots Holland and Kogelberg sections). It is thus clear from this mapping that any development in this area needs to be both limited and very sensitive to the environment. In fact, the Protected Areas Act of 2003 (Government Gazette 2003) specifically states, in Section 50 (2) that “an activity allowed in terms of subsection (1)(a) or (b) may not negatively affect the survival of any species in or significantly disrupt the integrity of the ecological systems of the national park, nature reserve or world heritage site.”

5. DESCRIPTION OF THE VEGETATION IN THE STUDY AREAS

The vegetation map of South Africa (Mucina & Rutherford 2006) indicates that the original vegetation type present in all study areas is Kogelberg Sandstone Fynbos. This vegetation type is restricted to nutrient poor, sandstone derived soils in the relatively high rainfall Hottentots Holland and Kogelberg areas. This vegetation type is regarded as Critically Endangered on a national basis, due to the very high number of rare and localised plant species that it supports, not because the habitat is inherently threatened (DEA 2011). Some 83% of the original total extent of this vegetation type remains, and about 59% is formally protected, with a national target of 30% (Rouget *et al* 2004). The unit is this well protected, and still largely intact, with the main impacts having been forestry and dam building.

No alien invasive vegetation occurs at any of the sites, except at H2A4, which is in a disturbed and transformed area.

5.1 H1A8

Borehole H1A8 is provisionally located at the crest of the mountain range, at a point where the sandy access track is about 5-6m wide (see Plate 1). Soils in the area are white, acid sands, with small sandstone rocks. The site is extremely

windy, which probably accounts for the dwarfed stature of much of the vegetation here. Indigenous species diversity is fairly high and is typical of the area, and includes *Leucadendron salignum*, *Pseudopentameris macrantha*, *Edmondia sesamoides*, *Tetraria thermalis*, *Cliffortia atrata*, *Willdenowia glomerata*, *Stoebe plumosa*, *Ursinia paleacea*, *Ficinia radiata*, *F. indica*, *Erica serrata*, *Restio capensis*, *R. pedicellatus*, *R. versatilis*, *Stoebe aethiopica*, *Wachendorfia paniculata*, *Pseudoselago spuria*, *Wahlenbergia* sp., *Elegia* sp., *Hypodiscus willdenowiana*, *Arctotis* sp., *Aspalathus* sp., *Gerbera linnaei*, *Othonna quinquedentata*, *Anaxeton asperum* and *Bobartia gladiata*.

No plant Species of Conservation Concern (SoCC) were recorded.

Botanical Sensitivity: Medium - High



Plate 1: View of H1A8 site, looking east.

5.2 H2A4

This site is within a lawned area that is totally transformed, and supports no indigenous plant species. No plant Species of Conservation Concern (SoCC) were recorded.

Botanical Sensitivity: Very Low

5.3 H3A2

Drilling here is already underway, and is mostly within the existing road surface, although about 15m² of footprint (water tanks and site container) is also above the road (see Plate 2). The habitat here is north facing and very rocky, and the soils are hence well drained rather dry. Species diversity is moderate and includes *Elegia ebracteata*, *E. stipularis*, *E. filacea*, *Restio bifarius*, *Erica serrata*, *Leucadendron gandogerii*, *Searsia angustifolia*, *Cliffortia ruscifolia*, *C. atrata*, *Corymbium africanum*, *Lanaria lanata*, *Phaenocoma prolifera* and *Mastersiella digitata*.

No plant Species of Conservation Concern (SoCC) were recorded.

Botanical Sensitivity: Medium

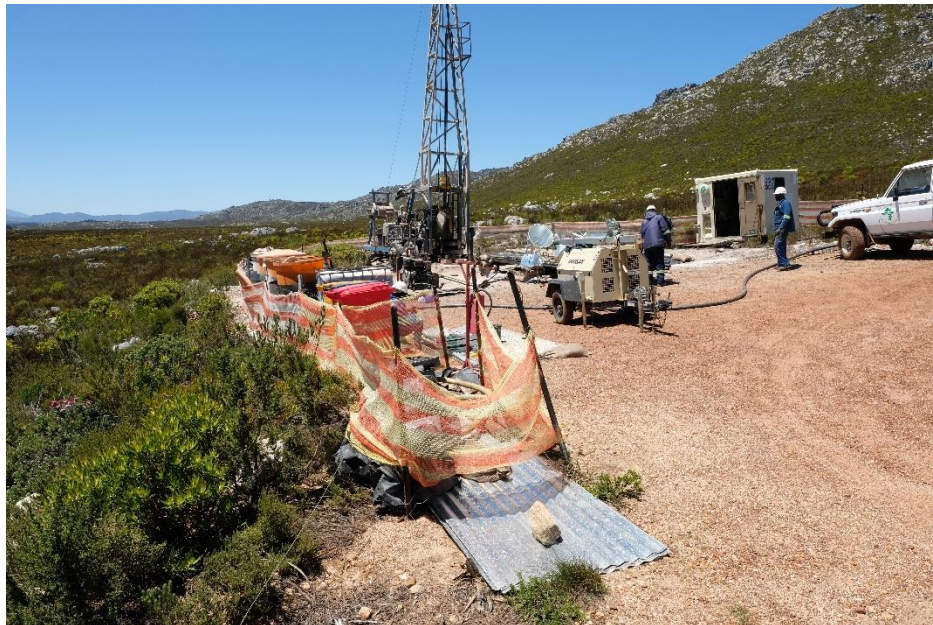


Plate 2: View of drilling operation at H3A2, looking northeast.

5.4 H5A2

This site is 150m higher up than the H3A2, and thus is in a higher rainfall band, with significant slopes uphill of the site, making it a much wetter site altogether. Species diversity is high and includes *Elegia ebracteata*, *E. stipularis*, *E. filacea*, *E. persistens*, *Restio bifarius*, *R. festuciformis*, *R. egregius*, *R. versatilis*, *R. parvispiculus*, *R. capensis*, *Staberoha distachyos*, *Ehrharta* sp., *Erica serrata*, *E. plukenetii*, *E. lutea*, *E. sitiens*, *E. imbricata*, *Helichrysum petiolare*, *Osteospermum ilicifolia*, *Oxalis lanata*, *Leucadendron gandogerii*, *Penaea mucronata*, *Cliffortia atrata*, *Corymbium africanum*, *Mastersiella digitata*, *Hermas villosa*, *Protea*

cynaroides, *Psoralea pinnata*, *Mimetes cucullatus*, *Diospyros glabra*, *Pteridium aquilinum*, *Pentameris* sp., *Centella calliodus*, *Pelargonium cucullatum* and *Berzelia lanuginosa*.

No plant Species of Conservation Concern (SoCC) were recorded.

Botanical Sensitivity: Medium - High



Plate 3: View looking north towards H5A2 from 100m to the south.

5.5 H5A1

This site is 70m higher up than the H5A2, and thus also in a high rainfall band, with some slopes uphill of the site, making it a fairly moist site. The soils appear to be colluvial sands, and deeper than in all other sites. Species diversity is high and includes *Elegia filacea*, *E. fistulosa*, *E. equisetacea*, *Restio festuciformis*, *R. egregius*, *R. versatilis*, *R. parvispiculus*, *Ehrharta* sp., *Tetraria thermalis*, *Tenaxia stricta*, *Erica serrata*, *E. lutea*, *E. sitiens*, *E. imbricata*, *Protea cynaroides*, *P. acaulos*, *Osteospermum ilicifolia*, *Bobartia gladiata*, *Oxalis truncatula*, *Leucadendron gandogerii*, *Penaea mucronata*, *Cliffortia atrata*, *Corymbium africanum*, *Psoralea pinnata*, *Diospyros glabra*, *Pentameris* sp. and *Berzelia lanuginosa*.

No plant Species of Conservation Concern (SoCC) were recorded within the study area, but a localised patch of the tall *Thesium umbelliferum* is present about 30m

southwest of the site, and part of a large population of *Cliffortia recurvata* (Vulnerable) is present about 30m northeast of the site. This tall species is a Kogelberg endemic, while the *Thesium* is evidently widespread, but very poorly known and obviously rare, being known from only three collections.

Botanical Sensitivity: Medium – High, and High in immediately surrounding areas (greater than 10m away from centroid).

6. CONCLUSIONS AND RECOMMENDATIONS

- All the five proposed sites could accommodate the proposed core drilling rigs and monitoring wells without unacceptable levels of botanical impact. No plant Species of Conservation Concern were recorded within any of the study areas, although H5A1 has two such species in close proximity (within 30m of centroid).
- Sites H5A1 and H5A2 are the most sensitive of the five sites, and the road is narrow at both these sites, meaning that extra caution needs to be taken here.
- Site H2A4 presents no botanical constraints and no specific precautions or mitigation are required here.
- All sites other than H2A4 should have all currently practised mitigation in place during drilling, including temporary fencing off of the allowable footprints, harvesting and dry storage of seed and cut material from all vegetated areas that will be impacted, and use of this seed and mulch to rehabilitate the disturbed areas alongside the road once the drilling is completed.

7. REFERENCES

DEA. 2011. Threatened Terrestrial Ecosystems in South Africa. *Government Gazette* Vol. 1002: No. 34809. National Printer, Pretoria.

Government Gazette. 2004. National Environmental Management: Protected Areas Act 2003 (No 57 of 2003). Vol.464 (#26025).

Helme, N., P. Holmes & A. Rebelo. 2016. Mountain Fynbos Ecosystems. In: Cadman, A (ed.). *Ecosystem Guidelines for Environmental Assessment in the Western Cape, Ed.2*. Fynbos Forum, Fish Hoek, South Africa.

Holmes, P., J. Wood and C. Dorse. 2008. Updated (June 2018) and groundtruthed CoCT Biodiversity Network, together with City of Cape Town – Biodiversity Report. Environmental Management Branch, City of Cape Town. Available from: www.iclei.org/lab

Manning, J. and P. Goldblatt. 2012. Plants of the Greater Cape Floristic Region 1: The Core Cape flora. *Strelitzia* 29. South African National Biodiversity Institute, Pretoria.

Mucina, L. and M. Rutherford. *Eds.* 2006 and 2012 update. Vegetation map of South Africa, Lesotho, and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Pence, G. 2017. Western Cape Biodiversity Spatial Plan. CapeNature, Cape Town, South Africa.

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